The Parent and Community Engagement Support attachment is made up of the following documents:

1. Intrinsic Schools Community Engagement Plan
2. Letters of Support
    a. Alderman Ariel Reboyras
    b. Pastor John Zayas, Grace and Peace Community Church
    c. Phil Salemi, Deputy Chief of Schools, Ravenswood Ridge
    d. Shane Smith,Deputy Chief of Schools, O'Hare
    e. Barton Dassinger, Principal Chavez Elementary
    f. Sandra Carlson, Principal Gray Elementary
    g. Barbara Kargas, Principal Goethe Elementary
    h. Victor Simon, Supt. Gower District 62
    i. Dominc Belmonte, Golden Apple
    j. Lizzie Perkins, LookingGlass Theater
    k. Michael Levesque, LEAP Learning
    l. Steve Gordon, Founder, Callahan for Kids Foundation
3. Community Support Petitions
4. Materials used for community outreach

INTRINSIC SCHOOLS

Intrinsic Schools
School 2 Community Engagement Plan

Stakeholder	Task/Activity	Outcome/Next Steps	Week of 2-Sep	9-Sep	16-Sep	23-Sep	30-Sep	7-Oct	14-Oct	21-Oct	28-Oct	4-Nov	11-Nov	18-Nov	25-Nov	2-Dec	9-Dec	16-Dec	23-Dec	30-Dec	6-Jan	13-Jan	20-Jan
Elected Officials	Meet with Alderman Reboyras to discuss the proposed new school and identify specific community engagement strategies	Very supportive. Wiling to speak to other alderman and host community meetings as needed.																					
Elected Officials	Meet with Alderman Mell to introduce Intrinsic and gage interest in her ward	Supportive. Will visit school and help vet potential sites																					
Elected Officials	Meet with Ald. Suarez to provide update on Intrinsic and discuss possible sites	Very supportive. Actively trying to identify sites and scheduled to visit school.																					
Elected Officials	Meet with Alderman Cullerton to introduce Intrinsic and gage interest in his ward																						
Elected Officials	Meet with Alderman Moreno to introduce Intrinsic and gage interest in his ward	Supportive. Will visit school and help vet potential sites																					
Elected Officials	Meet with Alderman O'Conner to introduce Intrinsic and gage interest in her ward																						
Elected Officials	Meet with Alderman Arena to introduce Intrinsic and gage interest in his ward																						
Elected Officials	Host elected officials for tours of school 1 at 17 N.State Street																						
Elected Officials	Host members of Mayors Office on school tour																						
Current Intrinsic Parents	Hold parent meeting to announce application for school 2 and solicit feedback	Strong support for a 2nd school.																					
Current Intrinsic Parents	Email all parents on distribution list link to provide feedback on current school and upcoming schools																						
Current Intrinsic Parents	Hold focus group with parents specifically on location for new school																						
Potential Intrinsic Parents	Participate at the Hidden Gems HS Fair - Seeking support for new school	Collected X signatures for support of a new NW high school.																					
Potential Intrinsic Parents	Hold focus group with potential parents in 30th ward																						
Potential Intrinsic Parents	Hold focus group with potential parents in 31st ward																						
Potential Intrinsic Parents	Participate in the New Schools Expo																						
Potential Intrinsic Parents	Meet with principals of all K-6 schools within NW priority boundary	Ask to host parent meetings at each school																					
Potential Intrinsic Parents	Host meetings with parents of current 3rd and 4th graders at K-6 schools																						
Community Members	Meet with Avondale Neighborhood Association - per Ald. Reboyras																						
Community Members	Meet with Villa Improvement League - per Ald. Reboyras																						
Community Members	Meet with Iglesia Evangelica Food Pantry																						
Community Members	Meet with community leaders as suggested by all Alderman	Seek support and assistance for community meetings to gather input																					
Community Members	CPS Community Meetings																						
Community Members	CPS Public Hearing																						
Faith Based Organizations	Identify influential churches with the NW Priority community																						
Faith Based Organizations	Meet with Pastor John Zamoya - Grace and Peace	Was supportive of first school and has attending parishioners.																					
Faith Based Organizations	Meet with R.A.W. Youth Ministry																						
Faith Based Organizations	Meet with Irving Park Lutheran Church (3938 W. Belle Plaine)																						

Intrinsic Schools
School 2 Community Engagement Plan

			Week of																				
Stakeholder	**Task/Activity**	**Outcome/Next Steps**	**2-Sep**	**9-Sep**	**16-Sep**	**23-Sep**	**30-Sep**	**7-Oct**	**14-Oct**	**21-Oct**	**28-Oct**	**4-Nov**	**11-Nov**	**18-Nov**	**25-Nov**	**2-Dec**	**9-Dec**	**16-Dec**	**23-Dec**	**30-Dec**	**6-Jan**	**13-Jan**	**20-Jan**
Faith Based Organizations	Meet with Pastor Daniel Cruz - Faithworld International																						
Faith Based Organizations	Meet with Our Lady of Grace																						
Faith Based Organizations	Meet with Wilfredo De Jesús - New Life Ministries																						
Faith Based Organizations	Meet with Patrick Reardon - All Saints Orthodox Church																						
Cultural Institutions	Meet with head of Kilborn Park - per Ald. Reboyras																						
Cultural Institutions	Meet with city museums about partnerships (Field, Art Institute, MSI)																						
Businesses	Meet with specific business leaders as identified by Alderman																						
Businesses	Meet with Belmont Central Chamber of Commerce																						
Businesses	Meet with Logan Square Chamber of Commerce																						
Businesses	Meet with North West Chamber of Commerce																						
Businesses	Meet with Portage Park Chamber of Commerce																						
Business	Meet with Fullerton Avenue Chamber of Commerce																						
Business	Meet with the Pulaski Elston Business Association																						
Community Event Participation	Identify community events per suggestions from aldermen or community groups																						
Community Event Participation	Booth at Alderman Suarez Back to School Fair																						
Community Event Participation	Participate in 31st Ward March Against Gun Violence																						

ARIEL E. REBOYRAS
Alderman, 30th Ward
Service Office
3559 N. Milwaukee Ave.
Chicago, IL 60641
(773) 794-3095
(773) 794-8576 (Fax)

City of Chicago
City Council
City Hall, Room 300
121 N. LaSalle Street
Chicago, IL 60602
(312) 744-3304/3305

COMMITTEE MEMBERSHIPS
Aviation
Budget and Government Operations
Committees, Rules and Ethics
Finance
Housing and Real Estate
License and Consumer Protection
Public Safety
Transportation and Public Way

September 23, 2013

Office of New Schools
Chicago Public Schools
125 S. Clark Street, 10th floor
Chicago, IL 60602

Dear Review Committee,

I am pleased to write this letter of support for the Intrinsic Schools application. I have been working closing with the Intrinsic team on their first school and am very impressed with both the school model and the Intrinsic leadership team.

I believe that the northwest side of Chicago is in need of additional great schools. This is evidenced by the high demand for the first Intrinsic school. Despite being approved after the typical recruiting season, Intrinsic received over 650 applications for its initial class of freshman class of 185 students. I was very pleased to see that the majority of students are from the northwest side of the city despite the school's temporary location downtown.

During the past several months, Intrinsic has proven to be very interested in working closely with the community. They have held community meetings with parents and neighbors and have actively sought feedback on how they can become an asset to the ward.

I am also very encouraged with the type of education being offered by Intrinsic. The personalization for each student created by the combination of great teaching and technology is needed to meet the widely varying needs of students in Chicago. I believe that Intrinsic will meet these needs and meet its goal of preparing all students for success in rigorous four-year universities.

Again, I am in strong support of a second Intrinsic school. I encourage the review committee to favorably consider this application.

Sincerely,

Ariel E. Reboyras
Alderman, 30th Ward

GCC/IBT

September 23, 2013

Office of New Schools
Chicago Public Schools
125 S. Clark Street, 10th floor
Chicago, IL 60602

Dear Review Committee,

I am pleased to write this letter in support of Intrinsic Schools. I met Melissa Zaikos and members of her team a little over a year ago when they were exploring sites for their first location. My experience with the team is that they are mission-driven and committed to serving students in the north west side of Chicago. We met several times discussing how to be inclusive of the community and sharing philosophies on school culture, discipline and respect for students.

I hosted a community meeting for them last year where they were able to explain their innovative model to many of my parishioners and community members. The team sought feedback and genuinely listened to questions posed by parents.

I believe that Intrinsic offers a needed new approach to education and I have faith that the team can deliver on its goal of dramatically improving student outcomes for all Intrinsic students.

I encourage the review committee to approve this application for a second Intrinsic school and offer my support to the team to make it happen.

Sincerely,

John Zayas

Pastor John Zayas
Grace and Peace Community Church

CHICAGO PUBLIC SCHOOLS | CPS

Barbara Byrd-Bennett
Chief Executive Officer

Ravenswood-Ridge Elementary Network · 6323 N. Avondale · Suite 228 · Chicago, Illinois 60631
Telephone: 773-534-1100 · Fax: 773-534-1116

Craig E. Benes
Chief of Elementary Schools

Philip M. Salemi
Deputy Chief of Elementary Schools

September 30, 2013

Chicago Public Schools
Office of New Schools
125 S. Clark Street
Chicago, IL 60602

Dear Review Committee,

I am pleased to write this letter of support for the Intrinsic Schools application a second school. I have worked with much of the Intrinsic team when I was principal of Shields Elementary in both AMPS and later the Pershing Network. Melissa Zaikos, Ami Gandhi and Tim Ligue were all critical partners in helping me drastically improve student outcomes at Shields prior to being promoted to Deputy Chief of Schools for the Ravenswood/Ridge Network.

With their support we became very focused on using student data to drive instructional practices and became a Level 1 school. Ms. Zaikos was also a key community ally as our families lobbied for control of a new building that became Shields Middle School.

I believe in the Intrinsic team and their vision for personalized learning for every child. I encourage you to support their application for a second school.

Sincerely,

Philip Salemi

Philip Salemi
Deputy Chief of Schools, Ravenswood Ridge Network

September 26, 2013

Chicago Public Schools
Office of New Schools
125 S. Clark Street
Chicago, IL 60602

Dear Review Committee,

I would like to express my support of the Intrinsic Schools application for a new charter. I worked closely with writers of this proposal as a liaison for AMPS and the Office of Performance Management during the 2010-2011 school year leading intensive site visits to schools that lagged the rest of AMPS for NWEA growth. The team gave feedback to principals and teachers on the current state instruction and use of data and then provided support for improvement. Schools with such support improved dramatically. From 2011-2012, I served as Interim Principal of Haines Elementary in the Pershing Network and experienced support from the team first hand. They are totally committed to meeting the needs of every student and provided very detailed and thoughtful support on how to do so.

I now work as the Deputy Chief of Schools for the O'Hare network on the northwest side of Chicago. I believe that we need new and innovative models for high schools in our area. The team submitting this proposal is uniquely qualified to develop such a model. They have experience in all types of CPS schools, have led district efforts on both technology and strategic use of data, have an unmatched track record for hiring and promoting individuals and are uniquely collaborative. I believe that all of CPS will benefit from working with Intrinsic as they challenge assumptions about what makes a good high school in order to personalize learning for students.

I strongly encourage the review committee to endorse their application.

Sincerely,

Shane Goldstein Smith

Dr. Shane Goldstein Smith

Barton Dassinger, Principal
Cesar E. Chavez LGC / UGC
4747 S. Marshfield Ave / 4831 S. Hermitage Ave
Chicago, Illinois 60609
773.535.4600 / 773.535.4830
Fax 773.535.4603 / 773.535.4848

César E. Chávez Multicultural Academic Center

September 25, 2013

Chicago Public Schools
Office of New Schools
125 S. Clark Street
Chicago, IL 60602

Review Committee:

I would like to express my support for Intrinsic Schools. I have worked with Melissa Zaikos and Tim Ligue and Ami Gandhi as principal of Chavez. We share a common commitment to serving CPS students and a belief that all students should be afforded the opportunity to attend rigorous post-secondary programs.

Last year, Intrinsic held pilot sessions to try their model during track E intercession at Chavez. They honed the design of their model while providing additional instruction for my students over their break. I believe that technology coupled with great teaching will offer a personalized education for each student. The Intrinsic team is very collaborative and their work provides a chance for district schools to both inform and learn from a very different design for high schools. Chavez has been very successful with its use of technology. I consider Melissa and Tim to be thought partners in this work. We share ideas about systems and structures, technology tools, challenges and solutions and various ways to use data to inform instruction.

I encourage you to support this team and their application for a second school.

Sincerely,

Barton Dassinger

Principal, Chavez Elementary

CHICAGO PUBLIC SCHOOLS CPS

William P. Gray Elementary School • 3730 North Laramie • Chicago, Illinois 60641
Telephone 773/534-3520 • Fax 773/534-3613

Sandra Carlson *Principal* | *Catherine Sugrue* *Assistant Principal* | *Victoria Tomko* *Assistant Principal* | *Jodie Schaefer* *LSC Chairperson*

September 26, 2013

Chicago Public Schools
Office of New Schools
125 S. Clark Street
Chicago, IL 60602

Dear Review Committee,

I would like to express my support of the Intrinsic Schools application for a new charter. I have worked with the Intrinsic team for the past 10 years and consider them among my closest professional colleagues. Together, with the team and other AMPS schools, we piloted the NWEA Map assessment, brought in great technology based programs like ST Math and developed as leaders.

Last year my school adopted the Teach to One program for middle school math. Melissa and her team spent several visits with us understanding the benefits and challenges of the program as they refined their initial school design. They are totally committed to creating a high school model that marries great teaching with technology to personalize education for each student.

Several of my 8th grade students have matriculated to Intrinsic this past year. They report feeling very excited about the school design and known by all staff. In fact, some families have been so happy that they recruited others to Intrinsic.

I believe that there will be great demand for a second Intrinsic school by the families in my community. I strongly encourage the review committee to endorse their application.

Sincerely,

Sandra Carlson

Sandra Carlson
Principal, William Gray Elementary

GOETHE ELEMENTARY SCHOOL
2236 Rockwell
Chicago Il. 60639

Barbara Kargas
Principal

Raquel Gonzalez
Assistant Principal

Mirna Martinez
Case Manager/Counselor

September 26, 2013

Chicago Public Schools
Office of New Schools
125 S. Clark Street
Chicago, IL 60602

Dear Review Committee,

Thank you for the opportunity to express my support of Intrinsic Schools. I worked with Melissa and her team as an AMPS school and know that they are very thoughtful about how to improve the high school model and totally committed to each child's success. They do this through a meticulous use of data that pinpoints the instructional need of child and the development of systems and structures to meet those needs.

I am very excited that Intrinsic is looking to expand further into the north west side of Chicago. Our students need more quality high school options and I believe a second Intrinsic school would help to meet this need.

Sincerely,

Barbara Kargas

Barbara Kargas
Principal, Goethe Elementary

"Children at their Best!"

GOWER SCHOOL
DISTRICT 62

ADMINISTRATION

Victor Simon III, Ed.D.
SUPERINTENDENT

Rebecca Laratta, Ed.S.
ASSISTANT SUPERINTENDENT

Gina Rodewald
GOWER WEST PRINCIPAL

Tracy Murphy
GOWER MIDDLE PRINCIPAL

Colleen Brodhead
GOWER MIDDLE
DEAN OF STUDENTS

Darrell Mittelheuser, Ed.D.
SPECIAL EDUCATION
COORDINATOR

DISTRICT OFFICE
7700 Clarendon Hills Road
Willowbrook, IL 60527

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f 630.323.3074

Vesna Nikolic
DIRECTOR OF FINANCE

Hilda Martinez
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THE SUPERINTENEDNT

GOWER WEST
7650 Clarendon Hills Road
Willowbrook, IL 60527

Laureen Oswold
SCHOOL SECRETARY

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GOWER MIDDLE
7941 S. Madison
Burr Ridge, IL 60527

Diane Tucker
SCHOOL SECRETARY

p 630.323.8275
f 630.323.2055

www.gower62.com

September 21, 2013

To Whom it May Concern:

I have dedicated nearly two decades to the field of education and have worked with many fine educators and school leaders in both elementary and high school settings. Tim Ligue is one of those educators. I have known Tim for more than 3 years and can state, without equivocation, that he has not only met the bar set by the Chicago Public Schools to serve as a school leader in our district; but has far surpassed. Tim demonstrates the type of accomplished leadership that could serve any school community serious about continuous improvement. Mr. Ligue has a track record of success spanning across the classroom setting as well as a network of 31 schools serving more than 20,000 students in his role as an Instructional Support Leader for the Pershing Network. I was his direct supervisor at the time and was impressed with his commitment to education and leadership ability.

A specific example of Mr. Ligue's leadership abilities was demonstrated immediately after the Chicago Teachers Union officially announced that they would strike. Despite the breakdown that occurred at the negotiating table and led to this troublesome situation for the school communities we serve, the district forged ahead with their contingency plan, Children First. This plan would call on some of the district's most talented leaders to rally around the children of our city. Each Children First site was led by a school administrator chosen by district leaders and given the specific charge to lead a team of redeployed administrators and available staff to provide a viable option for those most in need. The Children First plan functioned as a shadow of our existing district and it is important to recognize the extraordinary leadership demonstrated by the Children First site leaders throughout this tense and demanding period of our organization.

Mr. Tim Ligue was not a Principal at the time of the strike. However, his leadership skills and abilities were evident and he was selected to serve as a Children First site leader. In the simplest of terms, Tim "stepped up" when our district and our school communities needed him the most. He demonstrated a level of leadership that far surpasses the traditional benchmark for excellence in our field. I recognize the effort displayed by this outstanding administrator and will use the experience as a model to continue shaping the development of other school leaders.

I express my most sincere appreciation and gratitude for the leadership Mr. Ligue has exhibited and submit this letter of recommendation as a testament to his will and ability to stand alongside our children during one of the most difficult times faced by the third largest district in our Nation. There is no question in my mind that Mr. Ligue would be a tremendous asset to any school community serious about placing *children first.*

Yours in Education,

Dr. Victor Simon III

Golden Apple

Golden Apple Foundation
8 South Michigan Ave., Suite 700
Chicago, IL 60603-3463
T 312.407.0006 F 312.407.0344
www.goldenapple.org

September 25, 2013

Chicago Public Schools
Office of New Schools
125 S. Clark Street
Chicago, IL 60602

Dear Review Committee,

This letter serves as a hearty endorsement from me and the organization I lead of the planned and proposed second Intrinsic School.

The Intrinsic model's original proposal was a superior look at schooling as it should be in the future. Its focus on technology, multimedia content and individualized, independent work would, I warranted then and would echo now with this proposal, help to create students who can work in teams, activate their curiosity, and think about problem solving in innovative ways. Their proposal is truly student-centered in a manner that redefines for tomorrow's schooling today how a child progresses through a body of thought and acquisition of skill unfettered by rote, rows, or burdened by a learning construct chained to an industrialized past.

Part of the reason Golden Apple endorses this proposal is seated in our knowledge of and confidence in Ms. Ami Gandhi, who entered teaching through Golden Apple's advanced teacher preparation Scholars of Illinois program when but 17 back in 1997. Over these past sixteen years she has become a brilliant and passionate educator deeply engrained in the belief of teaching as a form of social justice. Her stellar career gives great heft to this proposal. Her colleagues Ms. Zaikos and Mr. Ligue are equally passionate about making the educational experience of deserving children more impactful.

Together and with their colleagues, I have all the confidence thirty-seven successful years in education has provided me to assert that a second Intrinsic School will become another powerful example of how schools should be, a model to the nation and a beacon of hope for students who can through their tutelage become more productive and successful citizens. Golden Apple enjoys a sterling reputation for championing excellence in teaching, and we are proud to endorse this proposal for a second school.

Sincerely,

Dominic Belmonte

Dominic Belmonte
President and CEO

lookingglass

Sept. 25, 2013

Office of New Schools
Chicago Public Schools
125 S. Clark Street, 10
Chicago, IL 60602

To whom it may concern:

Lookingglass Theatre is thrilled to express our support and intent to partner with a new Intrinsic School. Our organization has partnered with various CPS schools since 1992, and we have learned from our experiences that the best partnerships succeed when both partners share a common vision for students and student learning. We are excited about Intrinsic's new blended learning school model — our core values of invention, transformation, and collaboration fit perfectly with Intrinsic's vision of collaborative and student-driven learning.

We are currently providing an intensive six week theater program for Intrinsic students. Through this partnership, we are teaching students the values and lessons of drama techniques, deepening their exposure and commitment to the arts while developing their understanding of collaboration and storytelling in ways that go far beyond the walls of a theatre or a classroom.

Lookingglass is a company devoted to producing new works of theatre, and in our education and community programs, we teach our students how to be authors and creators of their own original stories. Students emerge from our programs not only as expressive, creative individuals, but also as confident members of a team. I believe that a continued partnership with Intrinsic will provide an opportunity to impact Chicago students and teachers for many years into the future. We are very pleased to endorse Intrinsic School's work toward creating a scalable and sustainable model for 21st century learning, and encourage your support of this application!

Sincerely,

Lizzie Perkins

Lizzie Perkins
Director of Education and Community Programs
Lookingglass Theatre Company

2011 TONY AWARD® RECIPIENT

875 North Michigan Avenue
Suite 2200
Chicago Illinois 60611
773.477.9257
773.477.6932

821 North Michigan Avenue
Chicago Illinois 60611
312.337.0665

Leap Learning Systems
For Smarter, More Confident Children

September 26, 2013

Chicago Public Schools
Office of New Schools
125 S. Clark Street
Chicago, IL 60602

Dear Review Committee,

Thank you for the opportunity to express my support of Suzanne Velasquez-Sheehy and the team at Intrinsic Schools. I was first introduced to the Intrinsic Schools team when they visited one of our high school skills building programs called Language for Scholars, this past summer. Principal Velasquez subsequently invited Leap Learning Systems to work with her students to assist them in learning about the importance of building skills in the areas of Academic English and public speaking.

During the time that I have worked with Intrinsic I have learned that the team is committed to success for every child and is using innovative means to personalize education for each student. While their model is heavily supported by technology, they are very focused on twenty first century skills including oral communication, writing and working collaboratively.

I believe that Intrinsic Schools has a good vision and model for personalized learning for every child. I encourage you to support their application for a second school.

Sincerely,

Michael Levesque
Executive Director

Callahan for Kids

September 26, 2013

Office of New Schools
Chicago Public Schools
125 S. Clark St, 10
Chicago, IL 60602

To whom it may concern:

Callahan for Kids Foundation, in partnership with the Chicago Wildfire professional Ultimate Disc team, has recently established an exciting new relationship with Intrinsic School.

Our excitement stems from our belief that the progressive educational approach taken by Intrinsic School maximizes their ability to prepare their students for college and for future success as they grow into adulthood, which is consistent with the core values we hold at Callahan. Through the game of Ultimate (formerly known as Ultimate Frisbee), which is the fastest growing sport in the U.S. over the last 4 years, Callahan exposes children to a fun and safe game that is non-contact, embraces both male and female participation, and espouses a tremendous value set that is consistent with the values taught at Intrinsic School – which is learning how to compete constructively, and doing so while embracing good sportsmanship, fair play, team work, discipline and positivity.

In our experience, we have found Intrinsic School to be focused on providing a fundamentally sound and effective approach to learning that truly prepares their students for the challenges of the real world and positions them for success intellectually, socially and professionally. We are excited to be a partner in such a positive approach to learning and strongly encourage your support of this application and the great things they are doing for their students.

Sincerely,

Steve T. Gordon
Callahan for Kids Foundation
Founder & CEO

INTRINSIC SCHOOLS

COMMUNITY PETITION FORM

As a member of the Intrinsic Schools Community, I am signing this petition to affirm that I have read Intrinsic Schools' mission and agree that there is an urgent need for this school in our community and would like to see Intrinsic Schools open a public charter school in the fall of 2015.

MISSION: The mission of Intrinsic Schools is to prepare all students for 21st century post-secondary success and to cultivate independent, intellectually curious learners. To achieve this we will create a new model, informed by the experience of great teachers, that leverages technology to personalize learning.

NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Lucy Weatherly	4843 W. Barry 60641	7/414-0404	lucy.weatherly@yahoo.com	[illegible]	
Lorena Burgos	2119 N. Whipple St 60647	773-968-0898	Lorena.Burgos28@gmail.Com	Lorena Burgos	
Clehs Park G III	403 N. Plum Grove RD, Palatine 60067	773-208-2117		[illegible]	✓
Cherry Villegas	2954 N. Menard Ave chicago, IL 60634	224-209-7673	cedricvillegas@yahoo.com	[illegible]	
Socorro Guzman	2926 N Monitor chicago IL 60634	(773) 809-0695		[illegible]	
Maria Barreto	4837 N Drake Chicago 60625	773-539-3884		[illegible]	
Alfred Hinojosa	4453 N. Kostner Ave.	224-999-2958		[illegible]	
Geydi Amador	5153 W Grace	773 6270501		Geydi	
[illegible] Jimenez	2619 N Austin 60639	773 606 1670		[illegible]	
Blanca Rodriguez	4806 N Paulina 60640	773-738-0497	Ricanqueen730@yahoo	B Rodriguez	✓

Do you have a current 7th-grade student? If yes, check this box.
(You'll have an option to apply to this school or one closer to home.)

INTRINSIC SCHOOLS

COMMUNITY PETITION FORM

As a member of the Intrinsic Schools Community, I am signing this petition to affirm that I have read Intrinsic Schools' mission and agree that there is an urgent need for this school in our community and would like to see Intrinsic Schools open a public charter school in the fall of 2015.

MISSION: The mission of Intrinsic Schools is to prepare all students for 21st century post-secondary success and to cultivate independent, intellectually curious learners. To achieve this we will create a new model, informed by the experience of great teachers, that leverages technology to personalize learning.

NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Timothy Harper	11801 S. Bishop 60643	708-400-5767	Harper118@Yahoo.com	[illegible]	✓
Debbie Gonzalez	4334 W. Leland Ave. 60643	773.655.7881	dngonzalez@gmail.com	[illegible]	✓
Jose Leon	5549 W. Henderson St. 60641	773 678 1320	JoseLLeon13@gmail	[illegible]	✓
Gloria Merritt	6418 S. Wolcott 60636	773-230-3418	gmerritt 6418 @comcast.net	G. Merritt	✓
Angela Manuel	6552 S Woodlawn 60637	773.955.1365	amanuel30@hotmail	A Manuel	✓
Angelica Diaz	6307 W. Belmont 60634	773.895.0195		[illegible]	✓
LaVonda Scott	139 N. Laramie Ave 60644	773-655-6690	lavonda[illegible]@yahoo.com	[illegible]	✓
Mi[illegible] Woldemarim	5707 N Artesian Ave 60659	(773)814-8766	Mi[illegible]woldemarim	[illegible]	✓
Rosbinda Vilchez	1403 N. Bosworth 60642	(773)600-27-43	Rosbindavilchez063@gmail.com / yahoo.com	Rosbinda Vilchez	✓
Socorro Perez	4029 W Newport 60641	(773)426-5089		Socorro Perez	✓

Do you have a current 7th-grade student? If yes, check this box.
(You'll have an option to apply to this school or one closer to home.)

INTRINSIC SCHOOLS

COMMUNITY PETITION FORM

As a member of the Intrinsic Schools Community, I am signing this petition to affirm that I have read Intrinsic Schools' mission and agree that there is an urgent need for this school in our community and would like to see Intrinsic Schools open a public charter school in the fall of 2015.

MISSION: The mission of Intrinsic Schools is to prepare all students for 21st century post-secondary success and to cultivate independent, intellectually curious learners. To achieve this we will create a new model, informed by the experience of great teachers, that leverages technology to personalize learning.

NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Maria Medrano	4855 N. Drake Chicago IL 60625	773-812-1014	mehxcarl1977@yahoo	[illegible]	
Lucero Reyes	4911 N. Monticello Chicago 60625	872-233-0512	reyeslucero32@yahoo.com	Lucero Reyes	
Elba Arroyo	2617 S. Sawyer Chicago 60623	773 640-4208	elba04@sbcglobal.net	Elba Arroyo	
Juan M. Arroyo	2617 S. Sawyer Chicago IL 60623	773-640-4208	arroyo@gattoplaters.com	Juan Arroyo	
FABIAN ARROYO	2734 N. Mulligan		arroyofab@aol.com	Fabian Arroyo	
Michelle Morales	2417 N springfield st	773-951-2119	moralesmichell[illegible]	Michelle Morales	
Jesenia Perez	3923 N Sawyer	(773)722-4039	JeseniaPerez410@gmail.com	Jesenia Perez	
Rosa Santiago	2937 W. Lyndale	773-516-1642	cochycochy1@yah	Rosa Santiago	

Do you have a current 7th-grade student? If yes, check this box.
(You'll have an option to apply to this school or one closer to home.)

INTRINSIC SCHOOLS

COMMUNITY PETITION FORM

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Luis Caizaguano	2848 N. Mason 60634	(773) 812-3411		Luis Caizaguano	
Cesar Ramos	4908. N. St Louis. 2'S"	312-401-7946	Cxelshaddai@Hotm ail	[illegible]	
Alma O Velasco	2435 N Spaulding	773-489-0312		Alma O Velasco	
Ana Ramos	1728 N. Central Pk Ave. 60647	773-386-5707	ana74ramos @gmail. com	Ana Ramos	
Rachel Gonzalez	5218 W. Galewood Ave 60639	773690-1426	racheligonzaleze	R Gonzalez	
Awilda Delvalle		773 655-1361	Kaylanny78@ yahoo. yahoocom	A. Delvalle	
Harmony Macon	1641 N. Orchard St 60614	312 479-1176	maconharmony@yahoo	H Macon	
Chuck Leatherwood	1822 N Oak Park 60707	773-719-7052	lwood65@comcast.ne	[illegible]	

Do you have a current 7th-grade student? If yes, check this box.
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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Angela Mason-Johnson	9010 S. Oglesby Ave.	773-218-3522	IOTHEM1@yahoo.com	Angela Mason-J	
Jason Balthazar	6302 W. Grace 60634	773-992-8460	jasonb@thinkoffbeat.com	[illegible]	✓
angélica Lopez	3018 N Lavergne	773-668-9575		angélica Lopez	
Vivian Garcia	1054 S. Mayfield 60644	773-3791645		Vivian A Garcia	
Alex Gonzalez	4334 W. LELAND 60630	773-621-6699	gonzalezalexj@gmail.com	[illegible]	✓
Bertha Farag	4912 N DRAKE	773-273-5667		Bertha Farag	
Selsa Dubon	2506 New castle	773 540-0979	ivonne.D@AOL	Selsa Dubon	
Josephine Negrete	2629 S Emerald Ave	773 398 5813	JNegrete@icoedu	Josephine Negrete	

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Olvera Nava	2833 S. Archer 60608	773 627-2913	Ohsarylucia@yahoo.com		
Dionna Rilling	5719 N. St. Louis Ave	773-569-2562	dionna4570@gmail.com	[illegible]	
Erika Urquizo	4516 W Monta 60639	773-992-8028	erika30@hotmail.com	[illegible]	
Julie Fleming	4955 W. Montana 60639	(773)683-8232	jaflem712@yahoo.com	Julie Fleming	
Ada Lopez	3517 N. Kostner 60641	773-699-7679	adalopezamaya@yahoo.com	[illegible]	
Sam Lopez	3517 N. Kostner 60641	773-619-7679	Samamalopez@yahoo	[illegible]	
Ingrid Vera	2836 N. Kildare 60641	773-984-8314	ingrid0482@yahoo.com	[illegible]	
Efrain Cruz	2836 N. Kildare 60641	773-209-5423	—	[illegible]	

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Magdalena Martinez	2118 N. Kedzie Chgo, IL. 60647	(312) 882-6231	N/A.	Magdalena Martinez	
Jessenia Merritt	3946 W. 19th St. #33 Chgo, IL. 60623	(773) 600-3059	Jesseniamerritt@gmail.com	Jessenia Merritt	
Trude Walsdorf	5148 W Newport Chgo IL. 60641	773 202-0441	ewalsdorf@Yahoo.com	Trude Walsdorf	
Joanna Dwojak	5507 W. Cullom, Chicago Il 60641	773-964-7608	joanna.dwojak@yahoo.com	J Dwojak	
Carol Ramos	4908 N. St. Louis '25' Chicago 60625	773-932-7493	shalomchicago@msn.com	C Ramos	
NORMA Lem	5216 W Galewood CHGO 60639	773 750 2446	NORMA-LEM@SBCGlobal.NET	Norma Lem	
Elizabeth Rmz	2827 N Mayrave Chgo 60639	773 837-46-47			

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Carlos	4806 N Paulina Chicago	773-738-0944		Carlos M[illegible]	
Princeton L. Finley	3011 N. WHIPPLE 60618	(773)-299-5389	maseau@gmail.com	Princeton Finley	
Karina Gomez	3444 N TRIPP	(773) 386-4937	Kgomez0505@yahoo	K. Gomez	
Miguel A. Hdz	3317 W Keystone Ave 60641	(773) 698-4758	altra_legna@hotmail.com	Miguel A Hdz	
Darla Benoit	5537 W. DAKIN	773-809-1637	darlabenoit33@yahoo.com	Darla Benoit	
OLTEA ONOFRE	3028 N. CHRISTIANA	(773)816-7311	pjowhiteeagle@gmail	[illegible]	
Toni Taylor	18166 S. Central Park Ave	773.630.1543	t.taylor7407@yahoo	Toni Taylor	

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Olga Guerra	5054 W. Waveland Chicago IL 60641	(773)725-6787	olgalg75@hotmail.c	Olga Guerra	✓
Laura Arellano	6249 W. Waveland Chgo IL 60634	773-490-4582	LLNavarrete@yahoo.com	Laura Arellano	✓
Alberto Flores	2240 N LACROSSE CHICAGO IL 60639	312 810 0164.	FLORES.ALBERTO@SBCGLOBAL.NET	[illegible]	
Jose Alarcon	4818 W HENDERSON CHICAGO 60641	773-592-0908	pepealcon8@yahoo.com	[illegible]	
Adriana Alarcon	4818 W Henderson Chicago 60641	773 4835119	aPchita23@yahoo.com	Adriana Alarcon	✓
Minia Saenz	4444 N. Spaulding chicago 60625	773-279-8174	ESVINCHAVEZ13@yhoo.com	[illegible]	

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Fernando Alemán	4113 N. Normora 60634	(773) 7197843	fernandoaleman29@gmail.com	[signature]	✓
Cecilia Quevedo	4073 W. Roscoe 60641	773) 777 2082		Cecilia Quevedo	✓
Samar Radwan	2131 W 23rd Street 60608	(773) 5039773	Shalawi5@hotmail	[signature]	✓
CARMELLA YORK	5732 S Prairie Ave Unit G-S	(773) 842-1444	cyork1979@Hotmail.com	Carmella York	✓
Caubert York	2031 S Clark St Apt 2106	(312) 842-4575	caubertyork@Hotmail	[signature]	✓

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Arlene Valentin	2118 N. Kedzie Chgo IL. 60647	(312) 882-6231	avalentin94@yahoo.com	Arlene Valentin	
Jerome L. Merritt	3946 W. 19th St. Chgo IL 60623	(773) 822-1484	jerome_merritt@yahoo.com	Jerome L. Merritt	
Zephyr E. Bonds	10228 S. Prospect Chgo IL 60643	773 238-2423	bondschriszeph@sbcglobal.net	[illegible]	
Leticia Fregoso	4900 W. Berenice	(773) 315-0355	jlagfregoso@att.net	Leticia Fregoso	

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Roman Rufino	3141 W Lyndale 60647	(312)340-9111	roman.rufino @hotmail.com	Roman [illegible]	
Catherine Walters	1364 W Estes	(773)671-0698	CatherineMadden33@comcast.net	CWalters	

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Juliana Gonzalez - Nicolen
Destiny - Canvas.

INTRINSIC SCHOOLS

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Brenda Suarez	3425 W Lyndale, Chgo, IL 60647	630-229-5118	bsuarez3425@gmail.com	Brenda S.	✓
Eva Kyriakopoulos	5655 N. Maplewood Ave, Chgo IL 60659	773-506-6210	TKEKMKCK@SBCGLOBAL.NET	Eva Kyriakopoulos	✓
Esteban López	5957 S. Normandy Ave., Chgo IL 60638	773-912-6377	TEBAN0024@COMCAST.NET	Esteban López	✓
Erwin De La O	4920 N. Harding, Chgo IL, 60625	224-730-1664	Kris_042130@yahoo.	[illegible]	✓
William L. Pipkin II	2417 N. Springfield, Chicago, IL, 60647	773 664 9929	—	William L. Pipkin II	✓

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INTRINSIC
SCHOOLS

NORTHWEST SIDE PETITION FORM

As a member of Chicago's Northwest Side, where Intrinsic Schools intends to open a charter school, I am signing this petition to affirm that I have read Intrinsic Schools' mission and agree that there is an urgent need for this school in our community and would like to see Intrinsic Schools open a public charter school in the fall of 2015.

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
Layhao Diep	1345 W. Winnemac 60640	(773) 704-1808	87layhao@gmail.com	[illegible]	✓
Lisa McConnell	4148 S. Berkeley 60653	312 841 9559	[illegible]smzam@yahoo.com	[illegible] McConnell	✓
Fabio Andrade	4110 W. Cornelia 60641	(773) 332-5[illegible]	[illegible]		
Noelle Mcward	2024 W. Leland Ave 60625	(773) 784-6434	Liz Reguera@ hotmail.com	[illegible] Andrade	
Lori Deighan	1522 W. School, Chicago 60657	312-560-2731	noelle.mcward@gmail.com	Noelle Mward	
Patty Landaverry	3406 W. Beach Ave 60651	773-805-0723	patsy726@yahoo.com	Patricia Landaverry	
Abby Ohl	4630 N. Hermitage 60640		bsubepowerpre.com	[illegible]	
Marisol Lazaro	3838 W Division St.	(773) 799-4143	marisolri[illegible]n	[illegible]	
Julie Paracke	4819 W. Addison 60641		julie@birthwithoutfear.com	J Paracke	
Charisma Magno	4853 N. Oak Park Ave.	773-614-9513	charismamagno@msn.com	C Magno	✓

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NAME	STREET ADDRESS (W/ ZIP CODE)	PHONE	EMAIL	SIGNATURE	✓
ED Quiles	3742 N. Whipple 60618	773-720-1640	quilesfriend@sbcglobal	[signature]	
Kenyatta Davis	1618 N Meade 60639	773-499-8161	Kdavis@empire-today.com	[signature]	
Genese Blanchard	712 N Drake Ave 60624	847-770-8340	geneseblanchard@gmail.com	[signature]	
Diana Vasquez	2038 W 19th	312-593-1912	interpret66@yah	[signature]	
Scott Toradash	2852 N. Springfield Ave 60618	312 498-7222	dash611@gmail.com	[signature]	
Jennifer Jeffris	2240 W. Estes 60645	773 274-0046	jjeffris@rcn.com	[signature]	
EDITH TREVINO	5157 S Maplewood	773946 6627	edith52178@gmail.com	[signature]	
Madelon Guinazzo	2424 W. Estes #2A 60645	773-320-7571	madelonleigh@gmail	[signature]	

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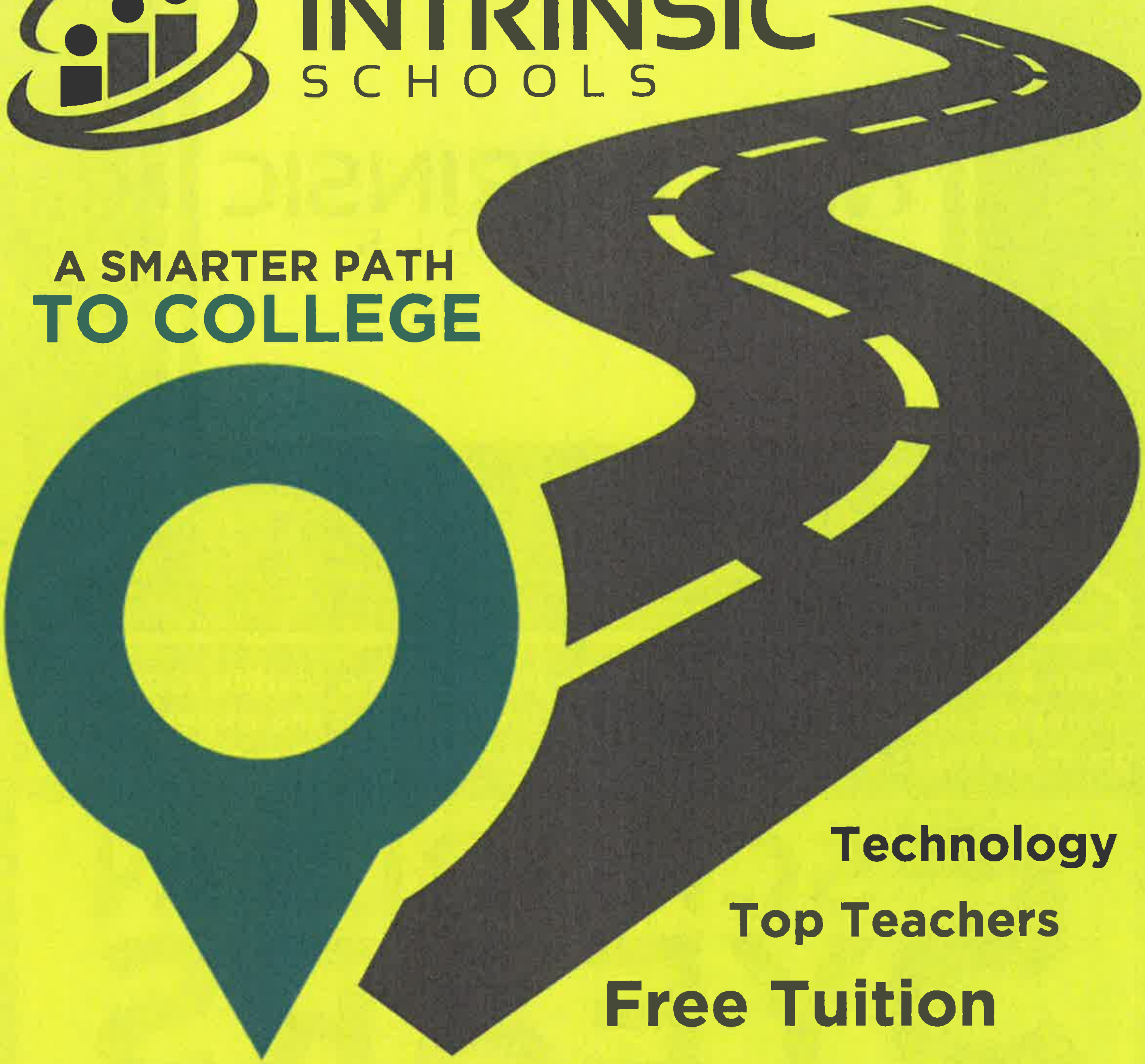
INTRINSIC SCHOOLS

A SMARTER PATH TO COLLEGE



Technology

Top Teachers

Free Tuition

Open to all incoming Chicago 9th-graders—no testing required—Intrinsic combines the power of technology and the experience of great teachers to provide every student a smarter path to college. Intrinsic begins the 2014-2015 year at its new location: 4540 W. Belmont.

MORE: IntrinsicSchools.org ✶ 773-250-7845

OPEN HOUSE!

Saturday, Oct. 19
10 am - 12 pm
17 N. State St.
6th Floor

Open to all incoming Chicago 9th-graders — no testing required — Intrinsic combines the power of technology and the experience of great teachers to provide every student a smarter path to college.

5 SCHOOLS IN YEARS

Our first school opened August 26th, 2013, and we will launch four more new schools over the next five years. This fall our intent is to apply to CPS for Intrinsic's second school, which would open in August 2015 on the Northwest Side of Chicago.

WE NEED YOUR SUPPORT & FEEDBACK

✶ Please email feedback@intrinsicschools.org

APPENDIX B: Intrinsic Schools – Policies for Promotion, Section 2.1

Intrinsic Schools will follow the CPS policy for promotion.

APPENDIX C: Intrinsic Schools – Policies for Graduation, Section 2.1

Intrinsic Schools will follow the CPS policy for graduation.

APPENDIX D: Intrinsic Schools – Policies for Student Discipline, Section 2.2

Intrinsic Schools will follow the CPS student code of conduct.

MELISSA MEGLIOLA ZAIKOS

4517 N. Artesian
Chicago, IL 60625

773-384-9903(cell)
melissazaikos@gmail.com

SUMMARY

Experienced K-12 executive with excellent track record of increasing academic performance. Strong record of developing school principals, implementing rigorous academic programs and driving individual student growth. Former business strategy consultant with results-oriented reputation for engaging stakeholders, building teams and applying rigorous analysis of data to complex, systems-wide challenges.

EDUCATION, FELLOWSHIPS & AWARDS

Broad Fellow
The Broad Fellowship for Education Leaders **2011**
The Broad Residency in Urban Education **2005**

Chicago Council on Foreign Relations, Emerging Leader **2009**

Masters of Business Administration **2000**
Harvard Business School, Boston, MA

Bachelors of Science in Industrial Engineering **1995**
Texas A&M University, College Station, TX
Recipient of Buck Weirus Spirit Award – given by alumni association for campus leadership **1993**

PROFESSIONAL EXPERIENCE

INTRINSIC SCHOOLS **2012 - Present**
CEO Chicago, IL

In early stage development of a new CMO that will rigorously personalize learning via both excellent teaching and adaptive technology to better prepare many more students for success in college and beyond. First school opened 2013 with plans to open five schools. Raised $5M to date.

CHICAGO PUBLIC SCHOOLS **2011-2012**
Chief of Elementary Schools Chicago, IL

Supervised network of 31 public elementary schools (K-8) serving 22,000 students in third largest urban district in the country (435,000 students). Network has 96% students of poverty, 30% English language learners, 15% African American, 69% Hispanic, 12% other and 4% Caucasian.

Organizational Leadership

- Recruited, supervised, and evaluated principals. Hired principals in coordination with local school councils. Assessor for district principal eligibility pool.
- Managed staff of 10 to support and monitor school improvement efforts including instructional leadership team support, teacher professional development and the creation of each school's theory of action.
- Served as lead instructional expert in the rollout of common core standards in English and math across all schools.
- Increased use of data to inform instruction and set individual student goals aligned with a school-wide Response to Intervention (RTI) plan.
- Carefully crafted succession plan over several months before accepting CMO opportunity in order to maintain continuity for schools. Deputy was selected and all network strategies remain in place.

CHICAGO PUBLIC SCHOOLS **2005 – 2011**
Chief Area Officer, Autonomous Zone Chicago, IL

Supervised 97 schools serving 76,000 students. Area supervised included 18 high schools, 77 elementary schools (K-8), and two early childhood special education centers. Schools in the Autonomous Zone were granted additional decision-making authority around budget, instructional materials and programs based on past performance. Area had 71% students of poverty, 11% English language learners, 19% African American, 53% Hispanic, 8% Asian, and 19% Caucasian.

Organizational Leadership

- Served on superintendent's executive leadership team, providing input into system strategic goals, budget, and continuous improvement.
- Managed $7 million departmental budget and staff of 10 people to support principals and build teacher instructional capacity.
- Introduced NWEA growth assessments across all elementary schools to measure impact of each school on individual student growth.
- Designed systemic approach for RTI including data models to identify students and customized support for schools to select and deliver appropriate interventions.
- Created a pipeline program for highest performing principals to develop them as district leaders resulting in seven promotions to district executive roles.

Major Accomplishments

- Increased the percent of students meeting standards from 68% to 87% over six years.
- Increased the percent of students exceeding standards from 16% to 28% over six years.
- Five schools awarded National Blue Ribbon Award, the most of any Chicago area.
- 70% of schools in the area are above the national average for growth in reading and 72% in math (measured by NWEA).
- Led the district with freshman on-track-for-graduation rate of 82%.
- Reduced the achievement gap between white and black students to 8.6% compared to district gap of 26%.
- Increased the number of students enrolled in college from 72.9% to 75.6%, largest area gain in the district.

Suzanne Velasquez-Sheehy

svelasquez@intrinsicschools.org

EDUCATION

January 2010 to Present — **DEPAUL UNIVERSITY**, Chicago, Illinois
Doctoral Candidate in Educational Leadership-Dissertation in Progress
- Illinois Superintendent Certificate (Type 75)

June 1998 — **DEPAUL UNIVERSITY**, Chicago, Illinois
Masters of Arts in Education—Educational Leadership
- Illinois General Administrative Certificate (Type 75)

June 1987 — **UNIVERSITY OF ILLINOIS**, Champaign-Urbana, Illinois
Bachelor of Science Degree—Elementary Education
- Illinois Standard Elementary Certificate for grades K-9 (Type 03), Endorsements: Social Studies and Language Arts (Type 04), Early Childhood Certificate for Birth through Grade 3

PROFESSIONAL EXPERIENCE

January 2013-Present — **Intrinsic Charter Schools,** Chicago, IL
Principal
* Founding member of a new charter school designed to serve students in grades 7-12
* Perform all duties as the building administrator/instructional leader as outlined by CPS Board Policy and ISBE State Standards for School Leaders; including articulating and promoting the school's vision, culture, and instructional programs
* Collaborate and communicate with school community stakeholders

July 2008-January 2013 — **LaSalle II Magnet School,** Chicago, IL
Principal
* Opened a new magnet school and perform all duties as the building administrator as outlined by CPS Board Policy and ISBE State Standards for School Leaders
* Served as the Instructional Leader for over seventy-five faculty and staff members and six-hundred students
* Opened a World Language Academy in 2008 and achieved AYP status in 2010 and 2011 and received the district's highest level rating on a performance policy based on test scores, attendance rate, and value-added metrics (school opened in 2008 with k-2 students so test scores were not available until 2010)
* 2011 Recipient of the AMPS Reading Award for having the highest percentage of student growth as measured on the NWEA Assessments
* 2010 Recipient of AMPS Math and Reading Award for being one of the top schools for having the highest percentages of student growth as measured on the NWEA Assessments

February 2001-June 2008 — **Henry R. Clissold Elementary,** Chicago, IL
Principal
* Performed all duties as the building administrator as outlined by CPS Board Policy and ISBE State Standards for School Leaders
* Served as the Instructional Leader for over sixty faculty and staff members and six-hundred and fifty students

Senior Project Manager **2003 - 2005**

- Developed and managed district high school improvement strategy in 12 high schools. Resulted in rollout of new instructional materials, benchmark and summative assessments and coaching model for math, English and science.
- Secured largest grant ever given by the Bill and Melinda Gates Foundation directly to a public school district ($21.3 million) as of 2006.
- Saved over $5 million and improved the quality of services by developing a strategic sourcing plan for therapeutic day schools.
- Revamped paper Individual Education Plan (IEP) to on-line system.

DELOITTE CONSULTING **1995-1998 and 2001-2003**
Manager, Strategy & Operations Chicago, IL

- Promoted from Senior Consultant in 2002
- Led projects in strategic planning and operational improvement, primarily with large retail and consumer packaged goods, public sector, and non-profit clients.

DIAMONDCLUSTER INTERNATIONAL **2000-2001**
Senior Associate Chicago, IL

- Managed post-merger integration of two global professional services firms. Left after being recruited back to Deloitte Consulting.

PROFESSIONAL & COMMUNITY ACTIVITIES

- Executive Committee and Board Member, Cristo Rey Jesuit High School, 2008- present
- Board Member, Broad Center 2009-2010
- Harvard Public Education Leadership Program 2007
- Harvard Business School Club of Chicago, Statesman Dinner Chairman, 2005- 2007
- Ravinia Festival Associates Board , 2003-2007
- Joffrey Ballet Associates Board, 2001-2003
- Friends of Audubon Elementary School (parent organization)

PRESENTATIONS AND PUBLICATIONS

- Panelist, Deloitte All Analyst Summit, 2011
- Panelist, Broad Residency Orientation, Supervisor Orientation, Recruiting (2004-2011)
- Featured on WBEZ Radio (NPR) - *Chicago Tries Management-Style On Schools*, March 10, 2010
- Featured in *Education Week* - "Best Minds Sought for Central Office, Startups, " March 12, 2009
- Featured in the book, The Secret of TSL: The Revolutionary Discovery that Raises School Performance, William G. Ouchi, Simon & Schuster, 2009
- Featured in Harvard Business School Case Study "Managing the Chicago Public Schools", Dick Elmore, Allen Grossman, Caroline King, October 5, 2006
- Panelist, Kellogg Women Business Association Conference, 2005

* Achieved AYP status for 7 consecutive years while serving as the principal. Test scores rose from 65% to 85.3% in Reading and from 66% to 86.9% in Math from 2001-2008 (including special education and ELL students)

November 1998-February 2001

Seward Communication Arts Academy, Chicago, IL
Assistant Principal
* Assisted the principal with the daily operations of the building
* Observed classroom instruction and collected and analyzed data
* Communicated with parents, students, and community members

June 1998-November 1998

LAUNCH -LEADERSHIP ACADEMY AND URBAN NETWORK FOR CHICAGO
NORTHWESTERN UNIVERSITY, Evanston, IL
* Selected into the first group to participate in the six-week Leadership Academy for aspiring principals

September 1992-June 1998

Seward Communication Arts Academy, Chicago, IL
Lead Teacher/Coordinator
* Prepared State and Federal Program Designs, Amendments, and Budget Transfers
* Processed on-line requisitions, personnel documents, and monitored discretionary funds using the CPS mainframe system
* Coordinated Summer School and Extended-Day programs
* Facilitated Primary Team meetings and supervised 14 primary teachers
* Created and implemented a parent training program

September 1989-June 1992

Seward Communication Arts Academy, Chicago, IL
Teacher
* Third grade self-contained classroom teacher
* Pull-out reading/language arts teacher serving at-risk students

September 1987-June 1989

John Spry School, Chicago, IL
Teacher
* Language arts teacher serving at-risk students

September 1987-June 1989

Wright College, City Colleges of Chicago, IL
Teacher
* Developed and implemented an adult ESL course

OTHER DATA

* 2011 Recipient of the AMPS Reading Award for having the highest percentage of student growth as measured on the NWEA Assessments
* 2010 Recipient of AMPS Math and Reading Award for being one of the top schools for having the highest percentages of student growth as measured on the NWEA Assessments
* Award Recipient for Principal of the Month, May 2002
* Member, Association for Supervision and Curriculum Development
* Member, Phi Delta Kappa
* Member, Illinois Administrators Association
* Member, St. Ignatius Parents Club
* Member of the Board of Trustees, Saint Xavier University (2005-2008)
* Member of the Board of Directors, Beverly Arts Center (2004-2008)

Marcos Alcozer

Director of Technology
for Intrinsic Schools

Education

DePaul University, August 2004 to June 2006
Major: Computer Science

DeVry University, August 2006 to January 2007
Major: Network Systems Administration

Northeastern Illinois University, August 2009 to May 2010
Major: Computer Science

Work Experience

07/2013 to Present
Intrinsic Schools, Chicago IL
Director of Technology

08/04 to 07/07, and 05/08 to 07/2013
Northside College Prep High School, Chicago, IL
Technology Coordinator

Duties:

- Train faculty on various pieces of software and hardware
- Help teachers find tech solutions to their lesson plans
- Maintain a student TechCrew and work with the students for an hour every morning
- Implements and maintains webserver environment such as MySQL databases, IIS, PHP, etc.
- Troubleshoots phone issues and communicates problem to correct department to get issue resolved
- Preps Language Lab and proctors all AP tests that require a computer
- Maintains internship program to mentor college students on working in the technology field
- Maintains language lab by ensuring all computers, headsets, and specialized software is functioning as it should
- Maintains 20 individual desktop recording studios where students can create, edit, and master musical recordings
- Maintains Language Lab of 29 computers where a master console can network with student console to distribute digital media
- Maintains inventory of over 100 software titles that are installed throughout the building
- Software management
    - Creating custom images
    - Scripting of software updates
    - Troubleshooting software issues
    - Monitors software licensing
- Hardware management
    - Inventory
    - Adding/removing/recycling additional assets
    - Troubleshooting LAN equipment such as printers, computers, scanners, faxes, and other peripherals
    - Troubleshoots computers and printers and handles contacting technicians when repairs are

necessary
- User management
  - Assigning of user security rights and setting share permissions
- Server management
  - Installed servers and implemented software for two file servers, backup infrastructure, PrintAudit Print Management Software and print server, DeepFreeze, Symantec Ghost, School Website, Moodle Class Management Software, DyKnow Collaboration and Monitoring Software, Microsoft SQL, MySQL

02/12 to Present
Concordia Place
Youth Mentor/Garden Consultant

Duties:

- Mentor 20 - 35 teens on a how to grow vegetables in two garden sites
- Teach topics such as seed starting, composting, storm water management, and nutrition

09/10 to 12/12
Urban Habitat Chicago
Staff

Duties:

- Site administrator for community gardens in Logan Square and Albany Park
- Web Committee during development and transition to new website
- Youth mentor after school at site in back of Northside College Prep High School

07/2007 to 05/2008
Apple Inc
Mac Genius

Duties:

- Provide customer service to consumers
- Troubleshoot computers, iPods, iPhones
- Diagnose software and hardware issues
- Repair desktop and notebook computers

Ami C. Gandhi
E-mail: agandhi@intrinsicschools.org

EDUCATION & CERTIFICATION

Master of School Leadership and Type 75 Certification, Chicago, IL, *May 2013*
- Concordia University

Illinois Gifted Education Certification, Illinois Association for Gifted Children, *May 2010*

National Board Certification, *November 2008*
- IL Master Teacher Certification: Early Adolescence/Mathematics, *2008 – 2018*

Master of Science in Mathematics Education, Chicago, IL, *July 2007*
- Illinois Institute of Technology

IL Standard Secondary Teaching Type 09 certification, *September 2001*
- Mathematics (grades 6 – 12), Middle School Endorsement

Bachelor of Science in Education and Social Policy, Evanston, IL, *June 2001*
- Northwestern University, Concentration: Mathematics

EXPERIENCE & ACTIVITIES

Curriculum Coordinator, Intrinsic Schools, Chicago, IL • *April 2012 – Present*
- Served as the lead author on the academic vision in the Request for Proposal process
- Participate in key operational decision-making, including the hiring of faculty and staff
- Develop and provide on-going professional development support

Instructional Support Leader, Pershing Network, Chicago, IL • *July 2011 – April 2012*
- Facilitated EXPLORE®, Common Core Mathematics Standards, and Differentiated Math Instruction with NWEA data training for administrators and teachers
- Facilitated a network-wide Algebra Professional Learning Community
- Provided support for developing school-wide Response to Intervention (RtI) Plans

RtI Coordinator/Instructional Manager, Autonomous Schools, Chicago, IL • *Aug. 2010 – July 2011*
- Led Response to Intervention and Professional Learning Communities training for administrators and teachers
- Provided site-based support for RtI at 66 AMP Schools

Teacher, Whitney M. Young Magnet High School, Chicago, IL • *July 2005 – July 2010*
- Math Teacher – 7th grade, gifted and 9th grade Honors Algebra I, 10th grade Geometry
- Math Team Head Coach, Math Team Assistant Coach
- Community of Learners vertical (content-area)/horizontal (grade-level) team member
- Member of school-wide committees & district-wide (Chicago Math & Science) panels
- Mentor for a student observer from Northwestern University (2006 – 2007)
- National Junior Honor Society Faculty Council member (2005 – 2010)
- Certified SMART Technologies Peer Educator – Presented sessions to colleagues effective use of various instructional technologies
- Piloted and utilized mathematics software and devices in the classroom

Teacher, Global Visions Academy (Bowen H.S.), Chicago, IL • *August 2004 – July 2005*
- Math Teacher – 9th grade double-block of Algebra Problem-Solving
- Co-founder of the school's teacher/student mentoring program (G.O.A.L.S.)
- After-school math teacher for the Lighthouse Program, Peer Jury Co-Advisor
- Lead Presenter at the Chicago Small Schools Action Research Forum

Teacher, F. H. Tuttle Middle School, South Burlington, VT• *December 2001 – June 2004*

- Math Teacher - 6th/7th Grades and 7th/8th Grades Accelerated Math (Looping Classes)
- Creator and Director of an after-school math tutoring and homework program
- Yearbook Advisor (2002 - 2004)
- Partners for Equitable Schools Committee Member (2003 - 2004)
- FHTMS Above & Beyond Teacher of the Month (February 2003)
- Selected member of the district-wide Mathematics Vertical Team (2002 - 2003)
- Tutor for homebound and home-schooled students (2002 - 2003)

Research Assistant, Northwestern University, SESP, Evanston, IL • *June 2000 – October 2000*

- Assisted in an on-going research project studying the use of discourse as an effective instructional strategy in teaching mathematics (in 2nd, 3rd & 8th grade classrooms)

Golden Apple Scholar, Golden Apple Foundation, Chicago, IL • *June 1997 – Present*

- Assisted in the Golden Apple Scholar selection process (2006 and 2012)
- Taught at Hyde Park Career Academy, Summer Enrichment Program (1998)
- Taught at Oscar Mayer Elementary School, Summer Bridge Program (1997)
- Participated in summer seminars on effective teaching methodologies and reflective practice (1997 – 2000)

REFERENCES AVAILABLE UPON REQUEST

Ami C. Gandhi
1201 W. Adams St., Apt 701, Chicago, IL 60607 • Cell: (802) 999 – 5188 • E-mail: agandhi@intrinsicschools.org

Aracelys Rios

1501 Brentwood Lane
Wheaton, IL 60189

Phone: 630-690-3163
Cell: 630-207-6976
riosaracelys@aol.com

Professional Summary

Science/Chemistry teacher with 18+ years experience introducing complex concepts to students. Bilingual, fluent in Spanish (reading, writing, speaking, translating). Experienced in leading research projects for students in chemistry, environmental science and education including an collaborative project with a gifted high school in Beijing, China.

Experience

Illinois Mathematics and Science Academy — August 2003 to Current
Science/Chemistry Faculty
Aurora , IL
Teaching integrated science, sophomore chemistry, advanced chemistry and environmental chemistry to talented and gifted students. Advisor to students participating in the research and inquiry program. Teaching independent studies in nuclear and physical chemistry.

Canton Middle School — July 2001 to June 2003
Bilingual and ESL Mathematics and Science Teacher
Streamwood , IL
Teaching algebra and physical sciences to bilingual and ESL students in district U46

St. Augustine College — August 1996 to June 2001
Adjunct Faculty
Aurora, IL
Teaching bilingual chemistry to adult students returning to college.

Elmhurst College — August 1995 to May 2001
Adjunct Faculty
Elmhurst, IL

College of DuPage — August 1994 to June 1995
Instructor
Glen Ellyn , IL
Teaching general Inorganic Chemistry

Berlitz — August 1992 to June 1994
Spanish Instructor, Interpreter and Translator
Oakbrook, IL

Elmhurst College — August 1992 to May 1994
Adjunct Professor
Elmhurst, IL
Teaching Inorganic, Organic and Biochemistry to nursing students

Education

National-Louis University — 2006

Secondary Education - Physical Sciences
Masters of Arts in Teaching
Lisle, IL

Michigan State University 1992
Physical Chemistry
Ph.D.
East Lansing, MI

University of Puerto Rico 1986
Chemistry
Bachelor of Science
Rio Piedras, Puerto Rico
Chemistry major with a minor in Mathematics.

Professional Affiliations

American Chemical Society
Illinois Science Teacher Association
National Consortium of Specialized Secondary Schools of Mathematics, Science and Technology

Brian Kates

Email: bkates@intrinsicschools.org
Phone: 773.250.7845 ext. 1015

Industry Experience

Intrinsic Schools **Chicago, IL** **2013 – Present**

Director of Finance and Operations **2012 – Present**

- Work with CEO to develop strategic plan for a five school, 4,500 student charter management organization.
- Build systems and infrastructure for operational and financial activities of startup charter school.
- Lead facility acquisition, development, and financing activities.
- Manage day to day financial activities, including accounting, accounts payable, payroll, and cash management.
- Ensure financial sustainability through long-term strategic planning and financial modeling.

Achievement School District **Nashville, TN** **2012 – 2013**

Director of Budget and Finance **2012 – 2013**

- Led finance team and built financial infrastructure for state-wide startup school district.
- Built and managed budgets for three directly run schools and central office as well as providing financial oversight to three charter schools, with a total district budget of $31 million.
- Led project team for selecting and implementing a new Enterprise Resource Planning solution.
- Ensured financial compliance across the district, including the U.S. DOE Race to the Top grant.

Charter School Growth Fund **Broomfield, CO** **2006 – 2012**

Senior Investment Associate **2009 – Present**

- Managed relationships across up to $24.0 million in portfolio investments, including providing ongoing strategic support and ensuring performance against investment targets.
- Led due diligence and provided support developing strategic business plans and financial models on seven investment opportunities: $6.3 million in investments, approximately $9.0 million pending.
- Assisted in the development and implementation of CSGF's $7.5 million facility financing fund: $4.3 million in investments, approximately $2.0 million pending.
- Assisted in the development of organization's first regional fund in Tennessee: $14.0 million in government and private funding secured, first investment made June 2011.
- Worked with new CEO and existing staff to develop organization's five-year strategic business plan for a $155 million core fund: launched in fall 2010, $100 million raised as of June 2011, five investments executed.

Associate, Analytics Team Manager **2008 – 2009**

- Managed analytics team that produced all quantitative analysis for due diligence on 11 potential investments and portfolio management for 17 active investments.
- Developed and managed process for constructing and populating organization's first portfolio scorecard: analyzed performance against annual academic, financial, and growth milestones.
- Led and supported due diligence and strategic planning efforts: $29.5 million in investments.
- Worked closely with Director of Quality Assessment to develop internal database for storing academic, financial, and operational data across the entire portfolio.

Analyst **2006 – 2008**

- Worked as organization's first analyst during initial launch of an $87.0 million fund.
- Developed tools for assessing financial health, sustainability, and academic quality of charter operators.
- Supported due diligence and business planning efforts: $31.7 million in investments.
- Led efforts for collecting annual data submissions from 16 investments and reporting results to funders.

Brian Kates

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Phone: 773.250.7845 ext. 1015

Wells Fargo Business Credit, Inc. **Denver, CO** **2004 – 2005**

Business Analyst

- Trained for three months across all operational areas as organizations first intern, transitioning from intern into business analyst role.
- Analyzed financial statements and ensured proper financial reporting.
- Performed weekly and monthly assessments against loan covenants.
- Constructed new projection model to analyze pro forma financials.

Other Experience **2001 – 2005**

- Controller and baker at startup bakery
- Executive Assistant at startup grocery store
- Intern to CFO at grocery store chain

Education

University of Denver **Denver, CO** **August 2005**

- M.S. Finance

University of Denver **Denver, CO** **June 2004**

- B.S. Business Administration and Finance with a minor in Leadership
- Honors Program and Pioneer Leadership Program
- Graduated Magna Cum lade with Honors

Skills

Finance

- Extensive experience building financial models for charter management organizations.
- Worked with over 40 charter operators to develop financial models for long-term growth.
- Analyzed financial health of over 40 charter operators nation-wide at various stages of maturity.

Analysis

- Extensive experience analyzing academic, financial, and operational performance of charter management organizations and single school operators.
- Experience developing databases and maintaining stored data for the purposes of data analysis.
- Extremely proficient in use of Excel as an analytics tool.

Strategic Planning

- Experience working with organization's in turnaround situations.
- Provided strategic and technical support to over 40 charter operators that were expanding or considering expansion, including: Board development, financial planning, fundraising, human resources, maintaining academic quality, market analysis, organizational structure, systems development, and risk mitigation.

Interests

Brian Kates

Email: bkates@intrinsicschools.org
Phone: 773.250.7845 ext. 1015

- Distance Running: Road races to trail runs, 5K to Half Marathon
- Hiking: Colorado to New Zealand
- Volleyball: Sand and Grass
- Guitar: Rhythm only
- Singing: From rock bands to karaoke
- World Travel: Third-world to first-world

Maria Condus

Experience **CHALK, LLC (Manager)**, Chicago, 2007 to Present

CHALK is a privately held consulting firm specializing in special education related professional development and program design to implement and sustain inclusive best practices, progress towards adequate yearly progress, enhance teaching effectiveness, and create and/or refine data collection tools used for monitoring and analyzing schools' ability to address least restrictive environment (LRE) and Individuals with Disabilities Education Act (IDEA) for students with disabilities.

Since inception, CHALK has worked primarily with the Chicago Public Schools focusing on developing system wide improvements in adherence to the spirit and requirements of IDEA and resolving matters related to complete settlement of the Corey H. Settlement Agreement. In addition, CHALK has provided numerous trainings on effective use of teaching staff, scheduling students with disabilities, making the LRE decision, and implementing co-teaching approaches in the classroom.

CHICAGO PUBLIC SCHOOLS (CPS), Chicago, 2005 to 2007
Executive Director – Instruction, Office of Specialized Services (OSS)

The third largest public school district in the U.S. with a student body exceeding 450,000 of which 88% are minority and 83% qualify for free and reduced lunch. CPS has an annual budget in excess of $5 billion and oversees 700 public, charter, contract, and private therapeutic schools. OSS is the largest department within CPS. It provides physical and emotional health programs and services for all CPS students, alternative schools for students with severe behavior disorders and homeless services. OSS has overall responsibility for 57,000 students receiving special education services and manages over 11,000 employees with a budget exceeding $750 million annually.

As Executive Director of Instruction, responsibilities include: development, management and evaluation of programs for students with high and low-incidence disabilities, implementation of instructional best practice strategies, management of a $200 million budget, strategic and tactical planning, evaluation of program effectiveness and efficiency, management of the Corey H. Settlement Agreement and 40-Schools ISBE project, development and maintenance of collaborative relationships with other CPS departments and relevant government entities, planning and coordinating professional development. Report directly to Chief Officer of OSS, member of senior management team supervising directors, managers, office, and program staff

- Designed effective strategies to promote enhanced special education programs in Charter schools
- Developed and implemented transparent system-wide staffing formulas to address programmatic equity
- Developed and implemented model special education classrooms for students with low incidence disabilities
- Developed and implemented classroom assessment tools to measure low-incidence program effectiveness
- Designed program components and established specific techniques and data tools to successfully eliminate targeted district-wide findings in the 40-Schools ISBE project
- Developed strategies and data tools to ensure instructional best practices in existing and new programs
- Developed specialty school scorecard

CHICAGO PUBLIC SCHOOLS, Chicago, 2000 - 2005
Director Specialized Schools and Services, Office of Specialized Services

As Director of Specialized Schools and Services, responsibilities included: supervision and monitoring of educational programs for 2,300 students with disabilities placed in 110 private, nonpublic separate day and residential facilities located throughout the city, state, and country; oversight of special education services at 60 charter school sites serving approximately 2,000 students; management of $65 million budget.

- Successfully designed and implemented the Cluster Provider Program with eight private schools to control increasing costs, improve instruction, promote least restrictive environment (LRE) and reduce inappropriate segregated placements

- Developed plan to align nonpublic schools with CPS instructional initiatives
- Decreased private school enrollment by 30%; decreased number separate day referrals by 43% in five years; decreased residential enrollment by 42% in three years and increased number of students returning to public schools (LRE) by 125% in three years

CHICAGO PUBLIC SCHOOLS, Chicago, 1988 - 2000
Evaluation Coordinator, Office of Specialized Services

- Managed timely and accurate evaluations of students in nonpublic separate day and residential facilities
- Achieved and maintained compliance rate between 95-98% for timely evaluations

CHICAGO PUBLIC SCHOOLS, Chicago, 1985 - 1988
Instructional Intervention Teacher for Students with Social/Emotional Disorders, Special Education

CHICAGO PUBLIC SCHOOLS, Chicago, 1984 - 1985
Approved Sabbatical Leave for Completion of Doctoral Studies

CHICAGO PUBLIC SCHOOLS, Chicago, 1980 - 1984
Teacher of Students with Learning Disabilities, Otis Elementary School

CHICAGO PUBLIC SCHOOLS, Chicago, 1975 - 1980
Learning Disabilities Diagnostician & Itinerant Teacher of Students with Learning Disabilities, Pupil Support Service Center

CHICAGO PUBLIC SCHOOLS, Chicago, 1972 - 1975
Primary Teacher, Farren Elementary School

Education

Ph.D. , 1985, Special Education Administration, Southern Illinois University, Carbondale, IL
Graduated with Honors

Dissertation: A Comparison of the Keyword Mnemonic Strategy with Three Alternative Leaning Methods in Teaching Word Meanings to Children with Learning Disabilities.

M.A. , 1978, Special Education-Learning Disabilities and B.A. , 1972, Elementary Education, Northeastern Illinois University, Chicago, IL

Certificates

Type 75 – General Administration
Type 10 – Learning Behavior Specialist I
Type 03 – Standard Elementary
Type 04 – Standard Early Childhood

Publication

Journal of Learning Disabilities, 1985, 19 (10), 609-613
Effects of the keyword mnemonic strategy on vocabulary acquisition and maintenance by learning disabled children

References Available upon Request

TIMOTHY J. LIGUE

4441 South Lowe, Chicago, IL 60609
(312) 213-5949/ tim.ligue@gmail.com

EXPERIENCE

Intrinsic Charter Schools — Chicago, IL
Resident Principal / PE & Health Teacher — July 2013 – Present

Intrinsic Charter Schools, opened its first school in the Summer of 2013 with a focus on personalized student learning and preparing kids for college. Intrinsic will leverage technology, 1 to 1 Chromebooks, and rely on a proven experienced staff to ensure student success.

- Serve as primary support for principal on day to day operational and instructional activities which include:
  - School culture and climate
  - Teacher observations and assist with planning professional development activities
  - Oversee safety and security policy
  - School wide events
- Collaborated with founding team members to launch the inaugural school, activities included: served on hiring committee, student recruitment, community involvement
- Teach Freshmen Physical Education and Health classes.

CHICAGO PUBLIC SCHOOLS (Broad Resident) — Chicago, IL
Manager – Pershing Network — June 2011 – July 2013

Pershing Network consisted of 31 schools (K-8) serving 22,000 students in the third largest urban district in the country (435,000 students). Network had 96% poverty, 30% English language learners, 15% African American, 69% Hispanic, 12% other and 4% Caucasian.

- Maintained multi-million dollar budget for network and collaborated with network Chief to determine staffing needs and spending amounts for discretionary projects
- Collaborated with administrative teams at three transformative schools within Pershing Network to establish change management/improvement strategies:
  - Adjusted master schedule to maximize time for instruction and increase small-group interventions
  - Introduced technology-based interventions (Compass Learning)
  - Created routines to improve culture and climate;
  - Assisted in initiating the removal of low performing teachers
  - Worked with administrative teams to help schools group students by ability level, irreverent of grade level
- Served as network liaison with Peace & Education Coalition, which serves the Back of the Yards Neighborhood, and includes six Pershing Network schools.

CHICAGO PUBLIC SCHOOLS (Broad Resident) — Chicago, IL
Manager – Autonomous Schools Office — August 2010 – May 2011

Part of an eight person team that led 97 autonomous schools serving 76,000 students. Schools in the Autonomous Zone were granted additional decision-making authority around budget, instructional materials and programs based on past performance. Area had 71% poverty, 11% English language learners, 19% African American, 53% Hispanic, 8% Asian, and 19% Caucasian.

- Led the administration of formative assessment (NWEA) in Autonomous Schools and developed systems for data driven instruction among school instructional leadership teams
-
- Designed and coordinated week long professional development for 1100 principals and teachers with a focus on differentiated instruction, RtI, and technology in the classroom. Project tasks included
  - Managed $300K budget
  - Coordinated with keynote speaker to craft message to fit area goals (Dr. Robert Marzano)
  - Vetted local teachers to present at the Summit

- Coordinated and participated in school diagnostic visits for 21 low performing schools (measured by percent of students meeting previous academic year's growth targets).
  - Organized diagnostic teams, which included network staff, retired and current principals to participate in the two day visits
  - Results included 19 of 21 schools meeting growth targets in the following year

THE CLEMENT GROUP Chicago, IL
Manager - Strategic Consulting September 2009 – December 2009

- Conducted market analysis, drafted presentation materials and proposed strategic recommendations for clients
- Collaborated with team members to develop instruments to conduct national surveys, synthesized research and analyzed data in the transportation and manufacturing sectors

MCMASTER-CARR IDUSTRIAL SUPPLY COMPANY Elmhurst, IL
Parcel Shipping Manager (Management Training Rotation) October 2006 - April 2009

- Trained and managed 30 employees and coached three supervisors to ensure a robust, self-sufficient shipping operation that averaged more than 14,000 packages per day
- Analyzed operational performance metrics and implemented new and innovative operating procedures: reduced damaged shipment frequency and applied checks and balances across the operation to ensure successful fulfillment of shipping requests
- Participated in annual capital budgeting, project planning, and payroll adjustments; presented proposals to executives

Bin Filling Supervisor (Management Training Rotation)

- Supervised full-time team of 10 order fillers and exceeded operational goals established by senior management
- Tailored coaching and individual improvement plans for each employee to provide superior customer service, reduce errors, and continue personal professional development

BRUNSWICK CORPORATION Lake Forest, IL
Strategic Planning Intern - Bowling & Billiards Division June 2005 - August 2005

- Analyzed the business development needs for growing alternative bowling concepts and presented recommendations to the division president. Analysis included site visits, demographic studies, and compilation of relevant financial data
- Designed and built a model to improve the time interval between the placement of orders and the receipt of cash for bowling products and proposed specific action plans to senior management

MORGAN STANLEY New York, NY
Preferred Stock Trader April 2003 - June 2004

- Managed multi-million dollar trading account comprised of over 85 preferred securities based in the financial, telecom, and industrial sectors
- Collaborated with colleagues from the investment banking division and strategic products group to successfully launch new preferred stock issues, resulting in the highest new issuances of preferred stock in a 12 month period
- Led preferred stock update portion of the weekly sales meeting with members of senior staff. Preferred stock sales revenue rose over 10 percent during this time

Associate, Fixed Income Sales August 2001 - April 2003

- Advised retail sales force in the marketing and trading of fixed income securities
- Led cross-functional team in redesigning and implementing a new hire training program for the retail fixed income trading desk, which greatly improved and expanded the training process
- Prepared and participated in client meetings, built client relationships by creating client solicitation materials and transaction proposals ranging from 1 million to 50 million dollars

EDUCATION

THE UNIVERSITY OF CHICAGO, BOOTH SCHOOL OF BUSINESS Chicago, IL
Master of Business Administration September 2004 - June 2006

- *Concentrations*: Strategic Management and Economics
- *Member*: Corporate Management & Strategy Group

PRINCETON UNIVERSITY Princeton, NJ
Bachelor of Arts in Politics September 1997 - June 2001

- Four year member of the Princeton University Varsity Football Team; 2 year letter winner
- *Senior Thesis*: Strengths and Weaknesses in the Oval Office - A Look at Harry Truman

COMMUNITY INVOLVMENT

- Canaryville Improvement Association – President of community group that works with the Alderman, State Representative and local business leaders for the betterment of the community
- St. Gabriel School Board – Serve on elementary school board serving 200 students on Southside of Chicago

SUSMITA PRATIHAST

Experienced professional with strong record of developing instructional leadership to improve student growth through intentional use of formative assessments and performance frameworks. Former background in education advocacy leading to successful engagements with international organizations, non-profits and public sector.

Education

Master of Public Policy — **Irving B. Harris School of Public Policy Studies, University of Chicago, 2009**
Specialization: Education Policy, Program Evaluation

B.A. (Hons) Economics — **Hindu College, University of Delhi, 2002**

Professional Experience

Atlantic Research Partners, Chicago, IL — ***Director (Oct 2010-Present)***
- Provided strategic advisory support on data and performance management to the Chief of Elementary Schools (South-west CPS Network).
- Led professional development initiatives for principals, ILTs and teacher teams to develop data and leadership capacity for effective use of formative assessment in instructional decision making.
- Designed a comprehensive framework for effective (operational and instructional) implementation and use of formative assessments.
- Created a structured protocol for selection of appropriate performance metrics to monitor student growth and school programs in CPS.
- Developed data models and benchmarks to identify students' needs for systematic approach to RTI and differentiated support to schools.
- Provided a comprehensive data protocol and advisory support on performance management for elementary CICS charter schools.
- Conceptualized and developed a student growth attribution model using multi-year EPAS data for turnaround CPS high schools.
- Piloted a college-readiness aligned model between EXPLORE and NWEA for a high performing data-savvy principal group in CPS.

Chicago Public Schools, Chicago, IL — ***Data Strategist (2009 - 2010)***
Department: Autonomous Management & Performance Schools; #Schools: 95; Enrolment: 76,000; Poverty: 71%; ELL: 11%
- Implemented NWEA assessment and provided analytical support to 77 elementary schools for improving student growth.
- Conceptualized and designed a systematic performance management system for tiered support and incentives to schools.
- Identified implications of Network's performance data and made strategic recommendations to Chief of Schools and principals.
- Created appropriate data systems and customized data tools for periodic and effective progress monitoring in schools.
- Provided coaching on data literacy to school leadership and teacher teams to develop and execute aggressive school improvement plans.

Indicus Analytics Private Limited, India — ***Analyst (2006 – 2007)***
- *UNICEF*: Researched and compiled report on factors impacting education attainment in India to support initiative on universal education.
- *World Bank*: Assessed public expenditure efficiency on education in 35 states and created state-level ranking through robust economic modeling and Data Envelopment Analysis.

Centre for Civil Society, India — ***Research Associate & Manager (2003 – 2006)***
- Published a research report on financial and administrative analysis of 30 Delhi State departments through extensive primary and secondary data analysis; developed research framework to be adopted for similar publications in 3 cities and 2 states of India.
- Managed the Research Internship Program (guided 25 interns) on assessment of socio-economic regulatory issues and poverty premiums.

Research & Consulting Projects

Centre for Comparative Human Development, University of Chicago — ***(Oct 07- May 08)***
- Performed exploratory analysis on factors impacting education preparedness among kindergarten children in Chicago neighborhoods through econometric analysis of two panel data sets.

World Bank, Washington DC — ***(Dec 08 – Feb 09)***
- Assisted the technical evaluation team of "School Choice Randomized Evaluation Study" in rural (200 villages) Andhra Pradesh, India.
- Evaluated and consolidated a research report on the impact of school vouchers on education outcomes through advanced econometric and quantitative analysis of pilot data; evaluation and improvement of survey instruments.

PriceWaterhouseCoopers, India — ***(Jul 08 – Sep 08)***
- Developed statistical models to examine public spending efficiency (technical) in water and irrigation sector in Madhya Pradesh, India.
- Performed sensitivity analysis for resource allocation and provided budgetary recommendations for State's financial planning process.

Publications & Presentations

- Presenting at the NWEA National Conference 2012 on "Collaborative Processes with Formative Assessments in Chicago Public Schools"
- Presented at the NWEA National Conference 2010 on "Autonomy & Formative Assessments in Chicago Public Schools"
- Copy Editor, Editorial Board for Chicago Policy Review, University of Chicago, 2008-09
- Health Care Expenditure (co-authored) - Business Standard 2007
- Educating the Uneducated: The Endeavour Continues!- Bihar Citizen Handbook 2007
- Health Care in India: Revisiting Priorities - Indian Economy Review 2007
- Food Security in Jharkhand: Miles to Go! - Jharkhand Citizen Handbook 2006

Proficient in STATA, MS Office; Working Knowledge of SPSS, ArcGIS — References can be provided on request

APPENDIX F: Intrinsic Schools – Demographic Data, Section 2.2

Demographic data is found in section 2.2 of the narrative.

APPENDIX G: Intrinsic Schools – Job Descriptions for Instructional Leadership Team, Section 2.2

Job descriptions are included the comprehensive job descriptions for all positions in staffing plan.

INTRINSIC SCHOOLS CURRICULUM CORE SCOPE AND SEQUENCE Common Core State Standards – Next Generation Science Standards – College Readiness Standards				
GRADE	**MATH**	**SCIENCE^**	**ELA**	**SOCIAL SCIENCE**
7th	Math 7/Pre-Algebra, Algebra	Environmental Science (Nature of Science)	ELA 7: Identity, Community, Environment, and Beliefs	European Renaissance and Early U. S. History
8th	Algebra, Geometry	Engineering/Programming Course (Physical or Digital)	ELA 8: Reinventing the World (Then and Now)	Modern U. S. History
9th	Geometry, Algebra/Trig	Chemistry (Research Process and Literacy of Scientific Writing)	Rhetoric and Composition I: The Power of Definition (Genre Focus)	AP Human Geography, World Studies
10th	Algebra/Trig, Pre-Calculus, AP Computer Science# *(Programming Course prerequisite)*	Physics (Algebra 1 Prerequisite)	Rhetoric and Composition II: The Power of Choice (American Literature Focus)	US History, AP US History, AP Human Geography
11th	Pre-Calculus, AP Statistics, AP Calculus *(Pre-Calculus prerequisite)*, AP Computer Science#	Biology	Great Books: Power of Imagination (World Literature Focus) AP Language#	Modern World History AP World History#, AP US History,
12th	AP Statistics, AP Calculus, AP Computer Science#, College Mathematics Course**	AP Chemistry, AP Physics, AP Biology, Earth/Space Science	Topics in Literature Seminar Series: Choosing to Participate (The Power of One), AP Literature#	Facing History and Ourselves Capstone: Choosing to Participate, AP European History, AP Psychology#
#Online Option ****Dual Enrollment in College begins senior year** * In mathematics, accelerated students will have the option to begin the year in the most appropriate course in the sequence either via a live seat or an online course.				

APPENDIX H: Intrinsic Schools – Scope and Sequence, Section 2.4

INTRINSIC SCHOOLS CURRICULUM NON-CORE SCOPE AND SEQUENCE	
GRADE	**COURSE**
7th	PE, Art History & Physical Art
8th	PE, World Language, Multi-media Arts (Business & Entrepreneurship)
9th	PE (Health), World Language, Music History & Digital Music
10th	PE (Drivers Education)/ World Language/ Multi-media Arts (Marketing & Virtual Enterprise)
11th	Elective Core Course, College Portfolio Development: College Applications, Internships
12th	Elective Core Course, Independent Study and Capstone, College: College Applications, Financial Aid, Internships

INTRINSIC SCHOOLS CURRICULUM MAP COMPONENTS
Our educational philosophy is driven by the belief that students learn best when they receive a mix of at-grade-level and at-instructional level instruction. Students will receive personalized instruction based on formative assessment data via high quality digital content. Students will receive at grade level instruction from their teacher.
Common Core Algebra I Unit Design Intrinsic Schools courses are designed around the Common Core State Standards. This document provides the units covered in High School Algebra I and corresponding standards addressed within each unit.
Intrinsic Schools Algebra 1 Course Syllabus This document provides a detailed overview of the course expectations, objectives, and pacing guide of the current Algebra 1 Course.
Performance Tasks This document provides performance tasks which assess students' mastery toward the Common Core State Standards and align with the course syllabus.
Intrinsic Schools Math Curriculum Matrix This document illustrates the progression of mathematical skills from middle school to high school. Each column represents a NWEA RIT-Band, which indicates students' instructional level. The corresponding skills are shown in the highlighted boxes. Each skill is also aligned with the appropriate Common Core grade level standard.

COMMON CORE STATE STANDARDS FOR

Mathematics

Appendix A:

Designing High School Mathematics Courses Based on the Common Core State Standards

Traditional Pathway: High School Algebra I

The fundamental purpose of this course is to formalize and extend the mathematics that students learned in the middle grades. Because it is built on the middle grades standards, this is a more ambitious version of Algebra I than has generally been offered. The critical areas, called units, deepen and extend understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend, and students engage in methods for analyzing, solving, and using quadratic functions. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.

Critical Area 1: By the end of eighth grade, students have learned to solve linear equations in one variable and have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. Now, students analyze and explain the process of solving an equation. Students develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities, and using them to solve problems. They master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations.

Critical Area 2: In earlier grades, students define, evaluate, and compare functions, and use them to model relationships between quantities. In this unit, students will learn function notation and develop the concepts of domain and range. They explore many examples of functions, including sequences; they interpret functions given graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations. Students build on and informally extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. Students explore systems of equations and inequalities, and they find and interpret their solutions. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.

Critical Area 3: This unit builds upon prior students' prior experiences with data, providing students with more formal means of assessing how a model fits data. Students use regression techniques to describe approximately linear relationships between quantities. They use graphical representations and knowledge of the context to make judgments about the appropriateness of linear models. With linear models, they look at residuals to analyze the goodness of fit.

Critical Area 4: In this unit, students build on their knowledge from unit 2, where they extended the laws of exponents to rational exponents. Students apply this new understanding of number and strengthen their ability to see structure in and create quadratic and exponential expressions. They create and solve equations, inequalities, and systems of equations involving quadratic expressions.

Critical Area 5: In this unit, students consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions. They select from among these functions to model phenomena. Students learn to anticipate the graph of a quadratic function by interpreting various forms of quadratic expressions. In particular, they identify the real solutions of a quadratic equation as the zeros of a related quadratic function. Students expand their experience with functions to include more specialized functions—absolute value, step, and those that are piecewise-defined.

Units	Includes Standard Clusters*	Mathematical Practice Standards
Unit 1 Relationships Between Quantities and Reasoning with Equations	• Reason quantitatively and use units to solve problems. • Interpret the structure of expressions. • Create equations that describe numbers or relationships. • Understand solving equations as a process of reasoning and explain the reasoning. • Solve equations and inequalities in one variable.	**Make sense of problems and persevere in solving them.** **Reason abstractly and quantitatively.** **Construct viable arguments and critique the reasoning of others.** **Model with mathematics.** **Use appropriate tools strategically.** **Attend to precision.** **Look for and make use of structure.** **Look for and express regularity in repeated reasoning.**
Unit 2 Linear and Exponential Relationships	• Extend the properties of exponents to rational exponents. • Solve systems of equations. • Represent and solve equations and inequalities graphically. • Understand the concept of a function and use function notation. • Interpret functions that arise in applications in terms of a context. • Analyze functions using different representations. • Build a function that models a relationship between two quantities. • Build new functions from existing functions. • Construct and compare linear, quadratic, and exponential models and solve problems. • Interpret expressions for functions in terms of the situation they model.	
Unit 3 Descriptive Statistics	• Summarize, represent, and interpret data on a single count or measurement variable. • Summarize, represent, and interpret data on two categorical and quantitative variables. • Interpret linear models.	
Unit 4 Expressions and Equations	• Interpret the structure of expressions. • Write expressions in equivalent forms to solve problems. • Perform arithmetic operations on polynomials. • Create equations that describe numbers or relationships. • Solve equations and inequalities in one variable. • Solve systems of equations.	
Unit 5 Quadratic Functions and Modeling	• Use properties of rational and irrational numbers. • Interpret functions that arise in applications in terms of a context. • Analyze functions using different representations. • Build a function that models a relationship between two quantities. • Build new functions from existing functions. • Construct and compare linear, quadratic, and exponential models and solve problems.	

*In some cases clusters appear in more than one unit within a course or in more than one course. Instructional notes will indicate how these standards grow over time. In some cases only certain standards within a cluster are included in a unit.

Unit 1: Relationships Between Quantities and Reasoning with Equations

By the end of eighth grade students have learned to solve linear equations in one variable and have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables. This unit builds on these earlier experiences by asking students to analyze and explain the process of solving an equation. Students develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities, and using them to solve problems. They master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations. All of this work is grounded on understanding quantities and on relationships between them.

Unit 1: Relationships between Quantities and Reasoning with Equations	
Clusters with Instructional Notes	**Common Core State Standards**
SKILLS TO MAINTAIN *Reinforce understanding of the properties of integer exponents. The initial experience with exponential expressions, equations, and functions involves integer exponents and builds on this understanding.**	
• Reason quantitatively and use units to solve problems. *Working with quantities and the relationships between them provides grounding for work with expressions, equations, and functions.*	N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
• Interpret the structure of expressions. *Limit to linear expressions and to exponential expressions with integer exponents.*	A.SSE.1 Interpret expressions that represent a quantity in terms of its context.★ a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.*
• Create equations that describe numbers or relationships. *Limit A.CED.1 and A.CED.2 to linear and exponential equations, and, in the case of exponential equations, limit to situations requiring evaluation of exponential functions at integer inputs. Limit A.CED.3 to linear equations and inequalities. Limit A.CED.4 to formulas which are linear in the variable of interest.*	A.CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.* A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*

*Instructional suggestions will be found in italics in this column throughout the document.

Unit 1: Relationships between Quantities and Reasoning with Equations

Clusters with Instructional Notes	Common Core State Standards
• Understand solving equations as a process of reasoning and explain the reasoning. *Students should focus on and master A.REI.1 for linear equations and be able to extend and apply their reasoning to other types of equations in future courses. Students will solve exponential equations with logarithms in Algebra II.*	A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
• Solve equations and inequalities in one variable. *Extend earlier work with solving linear equations to solving linear inequalities in one variable and to solving literal equations that are linear in the variable being solved for. Include simple exponential equations that rely only on application of the laws of exponents, such as* $5^x=125$ *or* $2^x=\frac{1}{16}$.	A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Unit 2: Linear and Exponential Relationships

In earlier grades, students define, evaluate, and compare functions, and use them to model relationships between quantities. In this unit, students will learn function notation and develop the concepts of domain and range. They move beyond viewing functions as processes that take inputs and yield outputs and start viewing functions as objects in their own right. They explore many examples of functions, including sequences; they interpret functions given graphically, numerically, symbolically, and verbally, translate between representations, and understand the limitations of various representations. They work with functions given by graphs and tables, keeping in mind that, depending upon the context, these representations are likely to be approximate and incomplete. Their work includes functions that can be described or approximated by formulas as well as those that cannot. When functions describe relationships between quantities arising from a context, students reason with the units in which those quantities are measured. Students explore systems of equations and inequalities, and they find and interpret their solutions. Students build on and informally extend their understanding of integer exponents to consider exponential functions. They compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change. They interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.

Unit 2: Linear and Exponential Relationships	
Clusters with Instructional Notes	**Common Core State Standards**
• Extend the properties of exponents to rational exponents. *In implementing the standards in curriculum, these standards should occur before discussing exponential functions with continuous domains.*	N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.* N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.
• Solve systems of equations. *Build on student experiences graphing and solving systems of linear equations from middle school to focus on justification of the methods used. Include cases where the two equations describe the same line (yielding infinitely many solutions) and cases where two equations describe parallel lines (yielding no solution); connect to GPE.5 when it is taught in Geometry, which requires students to prove the slope criteria for parallel lines.*	A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
• Represent and solve equations and inequalities graphically. *For A.REI.10, focus on linear and exponential equations and be able to adapt and apply that learning to other types of equations in future courses. For A.REI.11, focus on cases where f(x) and g(x) are linear or exponential.*	A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★ A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Unit 2: Linear and Exponential Relationships

Clusters with Instructional Notes	Common Core State Standards
• Understand the concept of a function and use function notation. *Students should experience a variety of types of situations modeled by functions. Detailed analysis of any particular class of functions at this stage is not advised. Students should apply these concepts throughout their future mathematics courses.* *Draw examples from linear and exponential functions. In F.IF.3, draw connection to F.BF.2, which requires students to write arithmetic and geometric sequences. Emphasize arithmetic and geometric sequences as examples of linear and exponential functions.*	F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.*
• Interpret functions that arise in applications in terms of a context. *For F.IF.4 and 5, focus on linear and exponential functions. For F.IF.6, focus on linear functions and exponential functions whose domain is a subset of the integers. Unit 5 in this course and the Algebra II course address other types of functions.*	F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*★ F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*★ F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★
• Analyze functions using different representations. *For F.IF.7a, 7e, and 9 focus on linear and exponentials functions. Include comparisons of two functions presented algebraically. For example, compare the growth of two linear functions, or two exponential functions such as $y=3^n$ and $y=100^2$*	F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ a. Graph linear and quadratic functions and show intercepts, maxima, and minima. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

Unit 2: Linear and Exponential Relationships	
Clusters with Instructional Notes	**Common Core State Standards**
• Build a function that models a relationship between two quantities. *Limit to F.BF.1a, 1b, and 2 to linear and exponential functions. In F.BF.2, connect arithmetic sequences to linear functions and geometric sequences to exponential functions.*	F.BF.1 Write a function that describes a relationship between two quantities.★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.* F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★
• Build new functions from existing functions. *Focus on vertical translations of graphs of linear and exponential functions. Relate the vertical translation of a linear function to its y-intercept.* *While applying other transformations to a linear graph is appropriate at this level, it may be difficult for students to identify or distinguish between the effects of the other transformations included in this standard.*	F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
• Construct and compare linear, quadratic, and exponential models and solve problems. *For F.LE.3, limit to comparisons between linear and exponential models. In constructing linear functions in F.LE.2, draw on and consolidate previous work in Grade 8 on finding equations for lines and linear functions (8.EE.6, 8.F.4).*	F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
• Interpret expressions for functions in terms of the situation they model. *Limit exponential functions to those of the form $f(x) = b^x + k$.*	F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.

Unit 3: Descriptive Statistics

Experience with descriptive statistics began as early as Grade 6. Students were expected to display numerical data and summarize it using measures of center and variability. By the end of middle school they were creating scatter-plots and recognizing linear trends in data. This unit builds upon that prior experience, providing students with more formal means of assessing how a model fits data. Students use regression techniques to describe approximately linear relationships between quantities. They use graphical representations and knowledge of the context to make judgments about the appropriateness of linear models. With linear models, they look at residuals to analyze the goodness of fit.

Unit 3: Descriptive Statistics	
Clusters with Instructional Notes	**Common Core State Standards**
• Summarize, represent, and interpret data on a single count or measurement variable. *In grades 6 – 8, students describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points.*	S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots). S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
• Summarize, represent, and interpret data on two categorical and quantitative variables. *Students take a more sophisticated look at using a linear function to model the relationship between two numerical variables. In addition to fitting a line to data, students assess how well the model fits by analyzing residuals.* *S.ID.6b should be focused on linear models, but may be used to preview quadratic functions in Unit 5 of this course.*	S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.* b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.
• Interpret linear models. *Build on students' work with linear relationships in eighth grade and introduce the correlation coefficient. The focus here is on the computation and interpretation of the correlation coefficient as a measure of how well the data fit the relationship. The important distinction between a statistical relationship and a cause-and-effect relationship arises in S.ID.9.*	S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit. S.ID.9 Distinguish between correlation and causation.

Unit 4: Expressions and Equations

In this unit, students build on their knowledge from unit 2, where they extended the laws of exponents to rational exponents. Students apply this new understanding of number and strengthen their ability to see structure in and create quadratic and exponential expressions. They create and solve equations, inequalities, and systems of equations involving quadratic expressions.

Unit 4: Expressions and Equations	
Clusters with Instructional Notes	**Common Core State Standards**
• Interpret the structure of expressions. *Focus on quadratic and exponential expressions. For A.SSE.1b, exponents are extended from the integer exponents found in Unit 1 to rational exponents focusing on those that represent square or cube roots.*	A.SSE.1 Interpret expressions that represent a quantity in terms of its context.★ a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.* A.SSE.2 Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*
• Write expressions in equivalent forms to solve problems. *It is important to balance conceptual understanding and procedural fluency in work with equivalent expressions. For example, development of skill in factoring and completing the square goes hand-in-hand with understanding what different forms of a quadratic expression reveal.*	A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★ a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*
• Perform arithmetic operations on polynomials. *Focus on polynomial expressions that simplify to forms that are linear or quadratic in a positive integer power of x.*	A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
• Create equations that describe numbers or relationships. *Extend work on linear and exponential equations in Unit 1 to quadratic equations. Extend A.CED.4 to formulas involving squared variables.*	A.CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.* A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*
• Solve equations and inequalities in one variable. *Students should learn of the existence of the complex number system, but will not solve quadratics with complex solutions until Algebra II.*	A.REI.4 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

Unit 4: Expressions and Equations	
Clusters with Instructional Notes	**Common Core State Standards**
• Solve systems of equations. *Include systems consisting of one linear and one quadratic equation. Include systems that lead to work with fractions. For example, finding the intersections between $x^2+y^2=1$ and $y = (x+1)/2$ leads to the point (3/5, 4/5) on the unit circle, corresponding to the Pythagorean triple $3^2+4^2=5^2$.*	A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. *For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.*

Unit 5: Quadratic Functions and Modeling

In preparation for work with quadratic relationships students explore distinctions between rational and irrational numbers. They consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions. They select from among these functions to model phenomena. Students learn to anticipate the graph of a quadratic function by interpreting various forms of quadratic expressions. In particular, they identify the real solutions of a quadratic equation as the zeros of a related quadratic function. Students learn that when quadratic equations do not have real solutions the number system must be extended so that solutions exist, analogous to the way in which extending the whole numbers to the negative numbers allows x+1 = 0 to have a solution. Formal work with complex numbers comes in Algebra II. Students expand their experience with functions to include more specialized functions—absolute value, step, and those that are piecewise-defined.

Unit 5: Quadratic Functions and Modeling	
Clusters with Instructional Notes	**Common Core State Standards**
• Use properties of rational and irrational numbers. *Connect N.RN.3 to physical situations, e.g., finding the perimeter of a square of area 2.*	N.RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
• Interpret functions that arise in applications in terms of a context. *Focus on quadratic functions; compare with linear and exponential functions studied in Unit 2.*	F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*★ F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*★ F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★
• Analyze functions using different representations. *For F.IF.7b, compare and contrast absolute value, step and piecewise-defined functions with linear, quadratic, and exponential functions. Highlight issues of domain, range, and usefulness when examining piecewise-defined functions. Note that this unit, and in particular in F.IF.8b, extends the work begun in Unit 2 on exponential functions with integer exponents. For F.IF.9, focus on expanding the types of functions considered to include, linear, exponential, and quadratic.* *Extend work with quadratics to include the relationship between coefficients and roots, and that once roots are known, a quadratic equation can be factored.*	F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as* $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, *and classify them as representing exponential growth or decay.* F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

Unit 5: Quadratic Functions and Modeling	
Clusters with Instructional Notes	**Common Core State Standards**
• Build a function that models a relationship between two quantities. *Focus on situations that exhibit a quadratic relationship.*	F.BF.1 Write a function that describes a relationship between two quantities.★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*
• Build new functions from existing functions. *For F.BF.3, focus on quadratic functions, and consider including absolute value functions. For F.BF.4a, focus on linear functions but consider simple situations where the domain of the function must be restricted in order for the inverse to exist, such as $f(x) = x^2, x>0$.*	F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.* F.BF.4 Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. *For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.*
• Construct and compare linear, quadratic, and exponential models and solve problems. *Compare linear and exponential growth to quadratic growth.*	F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

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COURSE DESCRIPTION

Algebra 1 focuses on the development of skills that will relate concepts to the real world. We will learn about number relationships and use them in functions, linear equations and inequalities, systems of equations, polynomials, and quadratic equations. We will be using multiple methods to solve, graph, and analyze each type of equation and see how they are used in our world.

ESSENTIAL QUESTIONS

We are delighted to serve a diverse group of students in Chicago. We believe your experiences and knowledge will help all of us explore the themes of identity, community, and environment as we build our new school. In order to provide meaning and context to everything you learn this year, we will ask you to think about and answer the following essential questions:

- How are we all connected?
- How are we similar and different from one another?
- How do we come together to form a community?
- How do we use new ideas to change the world?

ALGEBRA ESSENTIAL QUESTIONS

- How does solving equations pertain to the real world?
- How can I use graphs to represent relationships in my community?
- How can I use statistical data to analyze situations in my community?
- How do patterns, relations, and functions connect our world and the environment?

COURSE FORMAT

This class will incorporate multiple methods of learning. We will work both individually and in small groups. We will use online resources and have class discussions.

CREDIT and PREREQUISITES

One-half credit per semester. No prerequisites.

COURSE EXPECTATIONS

Attendance

- Please refer to the Student Handbook for general information.
- Please check Canvas to stay up to date or see any Announcements. Minor absences will not affect any Performance Assessment due dates.
- Please call in all absences to the Attendance Office

Class Behavior

At Intrinsic, our learning community is defined by four core values:

1. **Empathy**: the capacity to recognize emotions that are being experienced by another

2. **Perseverance**: the steady persistence in reaching goals even in the face of difficulties or obstacles
3. **Independence**: the willingness to set goals, take initiative, and solve problems on your own and with others.
4. **Curiosity**: the desire to know, ask questions, and learn new things.

We expect all members of our school community to demonstrate our core values of empathy, perseverance, independence, and curiosity both within and outside of school. **Be Intrinsic, Be EPIC!**

Process Goals

- I will be tracking your participation both online and in the classroom discussions. You need to be able to meet the deadlines given for all necessary items such as performance assessments. I believe you should be constantly working towards mastery and challenging yourself.

COURSE MATERIALS

You are **required** to have the following:

- Library Card
- Pencils
- Pens
- Notebook or Binder
- Scientific and Graphing Calculator App

The following materials are **optional**:

- Loose Leaf Paper
- Graph Paper

Please have all materials by Tuesday 9/3 and bring them to class daily. I will have many materials on the pod for you to use, but you may want to ensure that you have what you need to complete the work. If you have questions about the materials, please see me as soon as possible.

CATEGORY DESCRIPTIONS and GRADE DETERMINATION

Each course at Intrinsic Schools is composed of learning objectives. These objectives are aligned to the content and skills from the Common Core State Standards. You will be supported until you reach mastery of all critical learning objectives. You will work on a variety of assignments to demonstrate mastery. The three main categories are:

Content Assessments (20%) are smaller, more frequent assessments that measure procedural and conceptual fluency. Content assessments will be taken individually and provide real-time data on what content and skills you are understanding and/or where you might need more support.

Performance Tasks (70%) are more complex, long-term assignments on which you will be asked to apply your knowledge (skills assessed on the content assessments). Performance tasks will be completed individually and/or in groups. Performance Tasks will be scored through content-specific rubrics. All writing and presentation assignments will be scored on a common rubric across content areas.

Projects (10%) are semester-long multi-disciplinary projects. These projects should reflect your best work. Thus, you will be expected to work on these projects throughout the semester and will receive feedback on various components before you submit your final product. The first semester project will be completed as a group. The end-of-year capstone project will be completed individually. Projects will be scored through content-specific rubrics. All writing and presentation assignments will be scored a common rubric across content areas.

COURSE SUCCESS

In order to be successful in this course, you should:

- Always be ready to learn
- Do your best every day
- Use all resources available for you
- Persevere through all activities and problem solving
- Stay on task to ensure you will complete Performance Tasks on time.
- Ask for help whenever necessary

LEARNING OBJECTIVES and COURSE OUTLINE

SEMESTER 1 8/26/2013 - 1/24/2014

Objectives	Approx. Time (weeks)
1. **Problem Solving**-Apply various problem solving strategies such as: making a table, working backward, determining patterns, and making models.	2 weeks (ongoing)
2. **Real Numbers and Expressions**-Define variables and create expressions for given situations. Solve expressions given a variable. Use properties to create equivalent expressions. Understand the difference between rational and irrational numbers.	4 weeks
3. **Equations and Functions**-Solve equations with one variable using inverse operations. Determine the relationship between the input and output values. Express the domain and range of a given situation. Understand the difference between linear, quadratic, and exponential functions.	4 weeks
4. **Linear Equations**-Write, solve, and graph linear equations using slope-intercept form, point-slope form, and standard form. Apply knowledge of linear equations to given situations.	4 weeks

5. **Linear Inequalities-**Write, solve, and graph basic and compound inequalities for given situations.	4 weeks
6. **Statistical Data-** Use a scatter plot to create a line of best fit to analyze data.	2 weeks

SEMESTER 2 1/27/2014 - 6/10/2014

Objectives	Approx Time (weeks)
1. **Systems of Equations and Inequalities-**Create systems of equations and inequalities for a given situation. Solve systems using substitution, elimination, and graphing.	4 weeks
2. **Exponents and Radicals-**Apply exponent properties to simplify expressions. Apply knowledge of exponents to growth and decay situations. Use exponents to calculate scientific notation. Understand how radicals relate to exponents and use square roots to solve problems.	4 weeks
3. **Polynomials-**Use properties to add, subtract and multiply polynomials. Use polynomials to represent situations. Factor polynomials completely to find the solutions.	4 weeks
4. **Quadratic Equations-**Write, graph, and solve quadratic equations using vertex form, factoring, completing the square, and the quadratic formula.	4 weeks
5. **Research and Presentation-**Complete research for a given topic and prepare a presentation of your findings.	3 weeks

Intrinsic Schools Algebra I Performance Task

Lead-In Materials Overview: Integrated Algebra

The performance assessment test you will be administering to your Algebra 1 classes is aligned to the Common Core State Standards in Mathematics. These tasks were specifically developed to assess key Common Core standards in High School Algebra. This assessment is comprised of five tasks. Each of the tasks addresses several standards. These tasks are designed to assess a learning progression of knowledge and understanding of essential concepts and skills in a math course. The tasks probe deeper to measure students' conceptual understanding and how they can apply, generalize and/or justify their findings. The purpose of these tasks is to allow students to fully show what they know and are able to do using key concepts in a math course.

Overall Assessment Structure	
Session 1: Introduction	Familiarize students with a medium scaffolded performance task. This will provide a learning experience where students can understand the format and expectations of the assessment instrument.
Session 2: Day 1 of Task administration	Administer the **first three** tasks to the student.
Session 3: Day 2 of Task Administration	Administer the **last two** tasks to the student.

Teacher Lead-in Materials **Session 1**

(25 min.) **Activity 1**: Administer Sample Task

1) Pass out student lead-in booklet which contains a sample task
2) Explain to the students that the purpose of assessment is to see what they know, or what they need to learn. Emphasize that they should attempt to do the entire task and that if they feel they can not, they should work on as much of it as possible. Ensure that students understand that their answers can help them know what they need to focus on learning this year.
3) Allow students to work with the task individually.
    a. Students should show and explain all their work and thinking. The more students show their work and explain their thinking, the better they will score on the tasks.
    b. Encourage students to never erase, rather to draw a line through the erroneous part of their answers.

   c. Encourage students to create diagrams, pictorial representations, tables, graphs, number sentences and equations.
   d. Students should do their best to reflect and recall their thinking, and then share that as part of the written response.
4) Allow all students to finish the task.

(20 min.) **Activity 2**: View the rubric and samples of student work.

1) Show students the rubric for the task.
2) Use the samples of student work to show students the range of solution methods and strategies.
3) When reviewing the task, share interesting solutions.
   a. Help students understand the expectations of performance.
      i. Often, there are different approaches or different solution paths that are worthy of credit.
      ii. Help students realize that different methods are often awarded the same points even though the approaches vary and maybe less mathematically sophisticated than others.
   b. Students should understand that giving an honest attempt and showing all of their thinking is beneficial.
   c. If possible (time permitting) help students understand how even answering questions wrong can help them understand what they know and what they need to learn.
4) If you have time: Review the Questions for Reflection on Picking Apples.

Picking Apples

This problem gives you the chance to:
- work out costs from given rules

Anna goes to pick apples.
She sees two orchards next to each other; David's orchard and Pam's orchard.
The signs below are at the entrance to the orchards.

DAVID'S APPLE ORCHARD Pick your own apples!	PAM'S ORCHARD DELICIOUS APPLES
First 10 pounds $2 per pound	$10 entry fee
	First 10 pounds $1.50 per pound
Each additional pound $1 per pound	Each additional pound $0.75

Anna wants to pick 40 pounds of apples.

1. a. How much does this cost at David's orchard? ____________

Show your calculations.

b. How much does it cost at Pam's orchard? ____________

Show your calculations.

Chris has $30 to spend.

2. a. How many pounds of apples will he get if he goes to David's orchard? ________________
Explain how you figured it out.

___

___

___

b. If Chris goes to Pam's orchard, how many pounds of apples will he get? ________________
Explain how you figured it out.

___

___

___

3. How many pounds of apples must Chris pick before Pam's orchard is cheaper than David's?
Show your work. ________________

Picking Apples		Rubric
The core elements of performance required by this task are: • work out costs from given rules Based on these, credit for specific aspects of performance should be assigned as follows	points	section points
1. a. Gives correct answer: **\$50**	1	
Shows correct work such as: 10 x \$2 + 30 x \$1	1	
b. Gives correct answer: **\$47.50**	1	
Shows correct work such as: \$10 + 10 x \$1.50 + 30 x \$0.75	1	4
2. a. Gives correct answer: **20 pounds**	1	
Gives a correct explanation such as: The first 10 pounds of apples cost \$20. The remaining \$10 buys 10 pounds. Altogether 10 + 10 = 20 pounds.	1	
b. Gives correct answer: **$16^2/_3$ pounds** (accept 16)	1	
Gives a correct explanation such as: The entry fee is \$10. The first 10 pounds of apples cost \$15. The remaining \$5 buys 6.6 (accept 6) pounds. Altogether 10 + 6.6 = 16.6 pounds (accept 16)	1	4
3. Gives correct answer: **more than 30 pounds** (Accept 31)	1	
Shows work such as: David's: 10 x \$2 + 20 x \$1 = \$40 Pam's: \$10 + 10 x \$1.50 + 20 x \$0.75 = \$40 or Draws a correct graph	1 or 1	2
Total Points		**10**

Looking at Student Work on Picking Apples

Student A shows a clear understanding of the proportional relations described in "per pound" by showing the multiplication for the different amounts of apples. The student uses labels clearly to define what each computation represents. To solve for part 3 the student makes an organized list to show where David's cost is less than Pam's, at what point the costs are the same, and the where Pam's becomes less expensive.

Student A

Anna goes to pick apples.
She sees two orchards next to each other; David's orchard and Pam's orchard.
The signs below are at the entrance to the orchards.

DAVID'S APPLE ORCHARD Pick your own apples!	PAM'S ORCHARD DELICIOUS APPLES
	$10 entry fee
First 10 pounds $2 per pound	First 10 pounds $1.50 per pound
Each additional pound $1 per pound	Each additional pound $0.75

Anna wants to pick 40 pounds of apples.

4

1. a. How much does this cost at David's orchard? $50 ✓

Show your calculations.

10 × 2 = $\boxed{\$20}$ for first 10 lbs.

40 − 10 = 30 lbs. left

30 lbs × $1 per lb. = $\boxed{\$30}$

$30 + $20 = $50 ✓

b. How much does it cost at Pam's orchard? $47.50 ✓

Show your calculations.

$1.50 × 10 = $15 for first 10 lbs.

30 lbs. left × .75 per each additional lb = $22.50 ✓

$15 + $22.50 = $37.50

+ $10.00 entrance fee

$47.50

Student A, part 2

2. a. **How many pounds of apples will he get if he goes to David's orchard?** 20 pounds ✓ 1
Explain how you figured it out.

The first 10 pounds is \$20, because 10lbs × \$2 = \$20. Chris then only has \$10 left to spend, and each additional pound after buying the first 10lbs. is \$1. So he can buy 10lbs of apples. ✓ ✓

b. If Chris goes to Pam's orchard, how many pounds of apples will he get? 16 pounds ✓ 1
Explain how you figured it out.

\$10 of Chris' money is spent on the entrance fee. So, he only has \$20 to spend on apple at Pam's orchard. The first 10lbs. at Pam's costs him \$15. He has \$5 left to spend, but apples are 75 ¢ now that he has bought his first 10lbs. If he buys 6 more pounds he will spend \$4.50. (6 × .75 = 4.50) And he will spend a total of \$29.50 ✓ 1 ✓

3. How many pounds of apples must Chris pick before Pam's orchard is cheaper than David's?

Show your work. 31 pounds ✓ 1

Davids

lbs	\$
19	29
20	30
21	31
25	35
30	40
31	41

Pams

lbs	\$
19	31.75
20	32.75
21	33.50
25	36.25
30	40
31	40.75

19 31.75

10
15
+15
40

10.00
+15.00
15.75

10
15
7.50

✓ 1

Student C approaches the problem from a different perspective by identifying the cause for Pam's initial higher costs, i.e. the entrance fee. The student then shows how many pounds must be purchased to compensate for that initial cost.

Student C

3. How many pounds of apples must Chris pick before Pam's orchard is cheaper than David's?

Show your work. 31

Pam must make up the $10 difference (the entrance fee),
First 10 lbs gives $5; after that you save 25¢ per lb,
5 multiplied by 4 (25¢ is 1/4 of dollar) is 20, 20+10 is 30,
You must buy 31 lbs. before Pam's is cheaper.

Student D tries to use the organized list to find where Pam's cost is less than David's. The student knows that the change occurs between 30 lb. and 35 lb. The student's logic breaks down by forgetting that he is looking for the "smallest" amount where Pam's is cheaper rather than any amount where Pam's is cheaper. When looking at the table of values for 30 lb. and 35 lb., the student should have jumped to 31lb.

Student D

3. How many pounds of apples must Chris pick before Pam's orchard is cheaper than David's?

Show your work. 34lbs

Pounds	25lbs	30lbs	35lbs	34lbs
David's	$35	$40	$45	$44
Pam's	$36.25	$40	$43.75	$43

$20 + $15 = 35

$10 + (1.5×10) + 15×.75
10 + 15 + 11.25
= 36.25

$10+15+8.75

$10+15+18 =

$20 + 20 = $40 (10 lb)

10 + 15 + 15 = 40

20 + 25 = 45

$20 + 24 = 44

10

Page 3 Picking Apples Test 8

Picking Apples

Points	Understandings	Misunderstandings
0	92% of the students with this score attempted the task.	Some students had difficulty interpreting the language of proportionality, "per pound". 8% of all students had answers of $32 for apples at David's, because they didn't multiply the first 10 lbs. by $2. 8% of the students thought the cost of 40 lbs. was $40, just taking $1 for every pound and ignoring the difference in price for the first 10 lbs.
2	Students could interpret the meaning of "per pound" and calculate the cost of 40 lbs. of apples at David's orchard.	Students had difficulty interpreting the 3 constraints for Pam's orchard. 11% of the students ignored the entry fee. 4% only added $1.50 for the first 10 lbs. getting answer of $34. 5% did not use monetary notation giving an answer of $47.5.
4	Students could calculate the cost of buying 40 lbs. of apples at David's and find the number of pounds that could be purchased for $30, showing appropriate calculations for each.	11% of the students, who missed part 2a, ignored the change in cost for the first 10 lb. They thought $30 would get 30 lbs. 6% thought that if 40 lbs. = $40 and the first 10 lb. = $2, then $30 would buy 38 lbs. Other common answers for 2a were 15, 150, and 40 pounds.
6	Students could find the cost of 40 lbs. at both orchards. They could work backwards from a cost of $30 to the amount of apples purchased at David's, but not at Pam's.	Some students had difficulty working backwards from a cost of $30 to the number of pounds at Pam's. Some calculated it as if all apples cost $ .75, giving them an answer of 40 lb. Some students did not realize you can by fractional amounts of pounds, so they picked answers that would use most of the money like 13 or 15 pounds.
8	Students could find the cost of 40 lbs. or the number of pounds that could be purchased for $30 at both orchards, showing appropriate calculations.	Many students who were successful at all other parts of the task did not attempt the final part of the task. They did not know how to attack the problem. 65% of all students did not attempt this part of the task.
10	Students could find the cost of 40 lbs. or the number of pounds that could be purchased for $30 at both orchards, showing appropriate calculations. Students could also find the point where Pam's orchards were cheaper than David's.	Students might try guess and check to find some value where Pam's orchard was cheaper, but not narrow it down to the lowest amount giving answers as high as 100 or 187 lbs.

Questions for Reflection on Picking Apples

- What kinds of language do your students use to make sense of rates or proportional situations? Do you think they understand terms like per pound, per hour, per box? Do you think they see these terms as sets of equal size groups?
- What types of activities do students do to help them make sense of the meaning behind rates or proportions? Do they associate multiplication/ division with these ideas? In what ways?
- How are labels used in the classroom when solving problems? Do you provide explicit instruction to help students deal with dimensional analysis or how operations effect or change labels?
- Looking at student work in part 1 and 2, were students thinking in terms of function or doing several individual calculations?

Look at student work for part 1a. How many of your students put:

\$50	\$40	\$32	\$8	\$30	\$20	Other

Can you follow the reasoning chain that led to each particular error pattern? What does this show you about student misunderstandings?

Look at student work for 1b. How many of your students put:

\$47.50	\$47.5 or \$47.05	\$55	\$34	\$37.50	Other

What additional misconceptions contributed to the problems in this part of the task?

- What types of problems do students work requiring them to "work backwards" or do inverse operations? Do students work with this idea with computational procedures or just with problem-solving tasks?
- Are students comfortable with order of operations and how that works when undoing a procedure?

- How comfortable are students with symbolic notation like parentheses, division symbols?
- When looking at student work in part 2, check student thinking to see if they combined inappropriate terms like $ and pounds. Did they lose track of the meaning behind their computations?

Look at student work on 2a. How many students put:

20	15	30	150	38	40	Other

Look at student work on 2b. How many students put:

16 2/3 or 16	10	30	19	20	25	No response	Other

What misconceptions led to these error patterns? What made this part more difficult for students?

Now look at work in the final section. Many students did not know how to approach this part of the task. They did not have the sense of finding the point where the number of pounds and the cost were the same for both orchards.

- How many of your students did not attempt this part of the task?
- How many of your students guessed a large value (34 to 187) that made Pam's cheaper?
- How many lost track of some of the constraints (like entrance fee) when making their calculations for this section?
- Were successful students able to set up an equation to solve the problem or did they use guess and check to solve the problem?

Do you have any problems in your text dealing with the idea of break-even point? Have you students worked with problems graphing two equations to find where they intersect? What strategies would you have expected or wanted your students to be able to use?

Implications for Instruction:

Students at this grade level should be comfortable with identifying and using constraints to solve problems. Students should be starting to do operations with labels to keep track of how the calculations change the labels. Students should also start to use equations to express the multiple constraints, rather than using a string of calculations.

A big idea for middle grades is the ability to use proportional reasoning or understand multiplicative relationships. Students should be comfortable with the language of proportions or rates, like per pound, per hour, per person. Students need explicit instruction of help them connect cost per pound or miles per hour as representing equal groups that can be multiplied or divided. Students also need help seeing how these operations change the units.

Students at this grade level should be preparing for the transition to algebra. They need many opportunities to work problems involving inverse operations. They need to be confronted with situations with multiple steps, where order of operations makes a difference. So when students share solutions, it is important for them to be asked why they have different answers. The teacher might pose questions, such as, "If two students both subtracted and both divided, how is it possible for them to get two different solutions? How can we determine which one is correct?" Having students grapple with these issues helps them see the logic behind the rules or algorithms in a way that direct instruction alone doesn't.

Another big idea to help then prepare for algebraic thinking is the idea of equality. In order for students to think about the idea of when Pam's orchard is cheaper, it is helpful to ask the question, " At what point are the two orchard's the same?" As more than half the students had no idea how to even start this part of the task, giving them this as a discussion point when returning the papers would be a good classroom activity.

Name:____________________

Problem Solving Performance Assessment

Directions: Complete each problem the best you can and show all work. You must also state the strategy you used for each problem.

1. a) This is a magic square that uses each of the digits from 1 to 9, inclusive, because the sum of the numbers in each row, column, and diagonal is the same number, 15.

4	9	2
3	5	7
8	1	6

b) Using the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 to create another magic square.

2. Jacinski's Hardware has a number of bikes and tricycles for sale. There are 27 seats and 60 wheels all together. Determine how many bikes there are and how many tricycles there are.

3. Mr. Procopio has nine coins with a total value of 62 cents. What coins does he have?

4. List the four-digit numbers that can be written using each of 1, 3, 5, and 7 once and only once.

5. A rectangle has a perimeter of 28 cm.
a) What are the possible dimensions of the rectangle?
b) Which of those dimensions yield a rectangle with the largest area?

6. One of the most interesting and useful patterns in all of mathematics is the numerical array called Pascal's Triangle. It is named after the French mathematician Blaise Pascal (1623 – 1662) who showed that these numbers play an important role in the theory of probability. Fill in the next three rows of numbers by recognizing the pattern(s) that you notice.

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

1 5 10 10 5 1

1 6 15 20 15 6 1

7. Compute the sum of the elements in each row of Pascal's triangle (shown above). Do this for the first 6 rows. Look for a pattern. See if you can predict the sum of the elements for the seventh row, then check by adding. Do the same for rows 8 and 9. State the general rule for the sum of the elements in words.

8. West School has teams only in volleyball, swimming, soccer, and basketball. Erica, Justin, Molly, and Dave each play a different sport. Justin's sport does not use a ball. Molly is older than the volleyball player. Neither Molly nor Dave plays soccer. Who plays what sport?

9. Sarah went to a store, spent half of her money, and then spent $10 more. She went ot a second store, spent half of her remaining money, and then spent $10 more. Then she had no money left. How much money did she have in the beginning when she went to the first store?

10. Look for a pattern and fill in the next three blanks with the most likely choices for each sequence. You must also state the pattern you used.

a) 2, 5, 8, 11, _____, _____, _____

b) 3, 6, 12, 24, 48, _____, _____, _____

c) 1, 3, 4, 7, 11, 18, _____, _____, _____

How Old Are They?		Rubric
	points	section points
1. Gives a correct expression: **w + 3**	1	1
2. Gives a correct expression: **2(w + 3)**	2	2
3 Gives correct answers: Will is **8** years old Ben is **11** and Jan is **22** years old Shows correct work such as: w + w + 3 + 2(w + 3) (allow follow through) 4w + 9 = 41 4w = 32	1 1 2	4
4. Gives a correct answer: in **6** years time Gives a correct explanation such as: Will is 14 years younger than Jan so when Will is 14 Jan will be 28. 14 – 8 = 6. Accept guess and check with correct calculations. Solves correct equation.	2 1	3
Total Points		**10**

How Old Are They?

Will is w years old.

Ben is 3 years older.

1. Write an expression, in terms of w, for Ben's age.

....

Jan is twice as old as Ben.

2. Write an expression, in terms of w, for Jan's age.

....

If you add together the ages of Will, Ben and Jan the total comes to 41 years.

3. Form an equation and solve it to work out how old Will, Ben and Jan are.

Will is ....years old

Ben is ....years old

Jan is ....years old

Show your work.

4. In how many years time will Jan be twice as old as Will?

in.................years time

Explain how you figured it out.

....

....

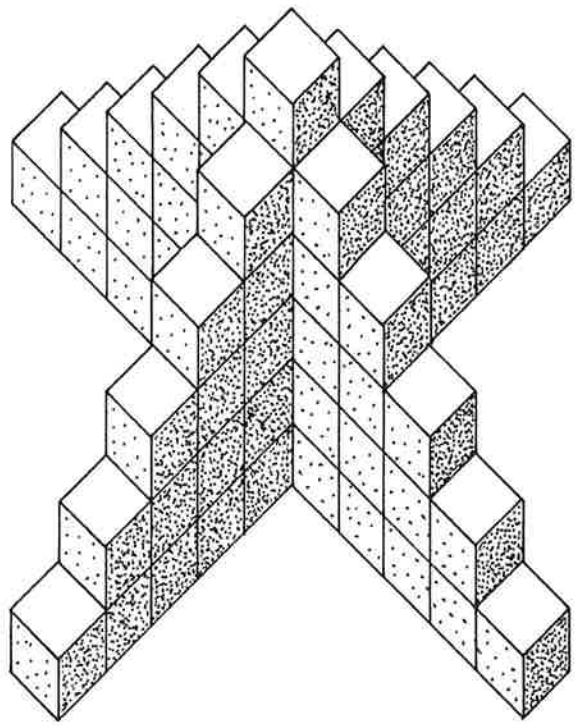
....

....

....

Skeleton Tower		Rubric
	Points	Section points
1. Gives correct answer: **66** *Partial credit:* Adds together the numbers 1, 5, 9, 13, 17 and 21 with no more than one error.	2 (1)	2
2. Gives correct answer: **276** Gives a correct explanation such as: Each layer has 4 more cubes than the layer above. Adds together 12 layers. Alternatively: May add the number of cubes in one wing of the tower, and then multiply by 4. The number of cubes on the 12 layers are 1,5,9,13,17,21,15,29,33,37,41,45	1 2 or 2 1	4
3. Gives correct answer: $\mathbf{2n^2 - n}$ *Partial credit*: Finds the number of cubes for at least the first 4 towers to try to find the pattern. 1, 6, 15, 28, 45, 66 ..... Provides a correct explanation showing how the formula can be found.	2 (1) 2	4
Total Points		**10**

Skeleton Tower



1. How many cubes are needed to build this tower? ______________
   Show your calculations

2. How many cubes are needed to build a tower like this, but 12 cubes high?
   Explain how you figure out your answer. ______________

____

____

____

____

Skeleton Tower (continued)

3. How would you calculate the number of cubes needed for a tower n cubes high?

Meal Out		Rubric
	points	section points
1. Gives correct answer: **15x +12(10 – x) = 141** Selects 15x + 12y =141	3 (1)	 3
2. Gives correct answers: 7 and **3** Correctly solves the equation : x =7 **Tests** that the solution x = 7 satisfies the correct equation 15 x 7 + 12 x 3 = 141 *Partial credit* Uses guess and check *Alternatively* Selects an incorrect equation and correctly solves it.	2 x 2 2 1 (1) or (1)	 7
Total Points		**10**

Meal Out

Ten friends go out for a meal.

Some friends have three-course meals and the rest have two-course meals.

The bill for all 10 meals is $141 dollars.

The number of people who have three-course meals is x.

1. One of these equations can be solved to find the correct value of x.

$$15x + 12x = 141$$
$$15x + 12(x - 10) = 141$$
$$15x + 12(10 - x) = 141$$
$$(15 + 12)x = 141$$
$$15x + 12y = 141$$

Which is the correct equation? ____________________

Dinner Menu
Three-course meal $15
Two-course meal $12
See our delicious choices overleaf!

2. Solve the equation and find the number of people who had three-course meals and the number of people who had two-course meals.
Show how you figured it out and show that you have tested your answers to see they are correct.

Number who had three-course meals ____________

Number who had two-course meals ____________

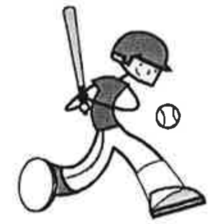
Baseball Jerseys Rubric		
	points	section points
1. Gives correct answers: **c = 21.5n**	2	2
2. Gives correct answers: **c = 18n + 70**	2	2
3. Gives correct answer: **$35** Shows correct work such as: 21.5 x 30 = 645 18 x 30 + 70 = 610	1 1 1	3
4. Gives correct answer: **21** or **more than 20** Partial credit: 20 Gives a correct explanation such as: The costs will be equal when 21.5n = 18n + 70, 3.5n = 70, n = 20. So it will be cheaper for more than 20 jerseys.	2 (1) 1	3
Total Points		**10**

Baseball Jerseys

Bill is going to order new jerseys for his baseball team.

The jerseys will have the team logo printed on the front.

Bill asks 2 local companies to give him a price.



1. 'Print It' will charge \$21.50 each for the jerseys.

   Using *n* for the number of jerseys ordered and *c* for the total cost in dollars, write an equation to show the total cost of jerseys from 'Print It'.

   ____

2. 'Top Print' has a one off setting up cost of \$70 and then charges \$18 for each jersey.

   Using *n* to stand for the number of jerseys ordered and *c* for the total cost in dollars, write an equation to show the total cost of jerseys from 'Top Print'.

   ____

3. Use the two equations from questions 1 and 2 to figure out how many jerseys Bill would need to order for the price from 'Top Print' to be less than from 'Print It'.
   Explain how you figured it out. ______________________

   ____

   ____

   ____

   ____

4. Bill decides to order 30 jerseys from 'Top Print'.
   How much more would the jerseys have cost if he had bought them from 'Print It'?
   Show all your calculations. ______________________

Illustrative Mathematics

8.F Battery Charging

Alignment 1: 8.F.A.2
Not yet tagged

Sam wants to take his MP3 player and his video game player on a car trip. An hour before they plan to leave, he realized that he forgot to charge the batteries last night. At that point, he plugged in both devices so they can charge as long as possible before they leave.

Sam knows that his MP3 player has 40% of its battery life left and that the battery charges by an additional 12 percentage points every 15 minutes.

His video game player is new, so Sam doesn't know how fast it is charging but he recorded the battery charge for the first 30 minutes after he plugged it in.

time charging (minutes)	0	10	20	30
video game player battery charge (%)	20	32	44	56

a. If Sam's family leaves as planned, what percent of the battery will be charged for each of the two devices when they leave?

b. How much time would Sam need to charge the battery 100% on both devices?

Commentary

This task has students engaging in a simple modeling exercise, taking verbal and numerical descriptions of battery life as a function of time and writing down linear models for these quantities. To draw conclusions about the quantities, students have to find a common way of describing them. There are three solution techniques presented below:

1. Finding equations for both functions.
2. Using tables of values.
3. Using graphs.

There are also ample opportunities to talk about the role of modeling here, touching on mathematical practice standard MP4. How reasonable is it that the output units are reported as percents? Does the model hold for all time? In particular, note that the model predicts that the percent charged grows linearly for all time, even beyond 100%!

If the task is done in small groups, different groups would likely use different representations in their solutions. Having groups present their answers could lead to a rich discussion on connecting different representations of functions.

Solution: Finding and using equations

a. The battery charge of both devices can be modeled with linear functions. The wording describing the MP3 player suggests a linear function since it uses a constant rate of change. The table of values for the video game player shows a constant rate of change for the first 30 minutes. It is a reasonable assumption that the battery will continue to charge at the same rate. However, it is an assumption on our part. (Another possibility would be that as the battery charge approaches 100%, the rate of change decreases, but that would be much harder to model.)

   The MP3 player charges at a rate of 12 percentage points every 15 minutes, which is equal to 0.8 percentage points per minute. If we let y be battery charge of the device (in percentage points) we have:

   $$y = 0.8t + 40,$$

   where t is measured in minutes.

   We know that the video game player is initially 20% charged and from the table we see that the charge increases by an additional 12 percentage points every 10 minutes, or 1.2 percentage points per minute. So for this function we get:

   $$y = 1.2t + 20.$$

   Sam's family is planning to leave the house 60 minutes after Sam started charging his devices. We are looking for the charge when $t = 60$

   MP3 player: $y = 0.8 \cdot 60 + 40 = 88\%$ charged

   video game player: $y = 1.2 \cdot 60 + 20 = 92\%$ charged

b. To answer this question, we need to find the values of t for which each function has output value 100.

   MP3 player: Solving $100 = 0.8t + 40$ for t we have, $t = 75$ minutes.

   video game player: Solving $100 = 1.2t + 20$ for t we have $t = 67$ minutes.

   So if Sam's family could wait just 15 more minutes, Sam could have both devices fully charged for the car trip.

Solution: Using tables

a. Since the video game player's battery charge is given in a table, we can extend the table and see what value it will give after 60 minutes. Note that the rate of change of the data in the table is constant: For every 10 minutes the charge increases by 12 percentage points. Assuming that this pattern continues, we have:

time charging (minutes)	0	10	20	30	40	50	60
video game player battery charge (%)	20	32	44	56	68	80	92

We can make a similar table for the MP3 player:

time charging (minutes)	0	15	30	45	60
MP3 player battery charge (%)	40	52	64	76	88

So after 60 minutes, the MP3 player's battery would be 88% charged and the video game player will be 92% charged.

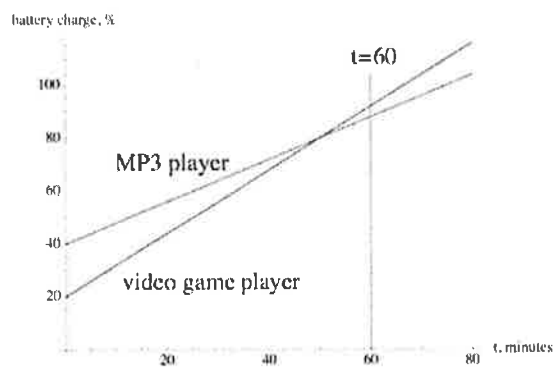
b. We can see from the table above that the MP3 player would be fully charged in another 15 minutes, we just have to add one more column to the table to find that answer.

The video game player will need less than 10 minutes to fully charge, since we are only missing 8 percentage points after 60 minutes. To be exact, using the rate of increase, we will need 2/3 of 10 minutes, which is just under 7 minutes.

Solution: Using graphs

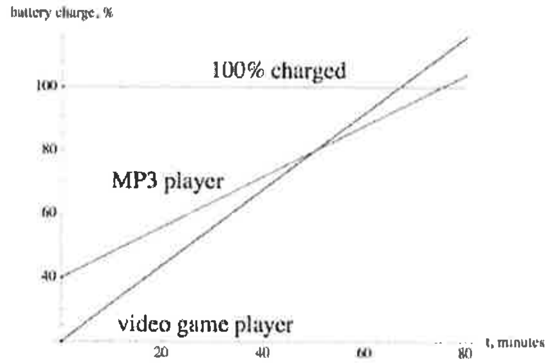
a. With the given information, it is quite straight-forward to graph the functions for both devices. For the MP3 player we have a starting value (i.e. vertical intercept) of 40% and a rate of change (i.e. slope) of 12/15 = 0.8 percentage points per minute.

For the video game player we have a starting value of 20% and the rate of change for the data in the table is constant at 12/10 = 1.2 percentage points per minute. Below are the two graphs.



We can estimate from the graph that after 60 minutes the MP3 player has a battery charge of just under 90% and the video game player has a battery charge of just over 90%. Zooming in on a graphing calculator or other graphing device would give us better estimates.

b. To find out how long it will take until both batteries are fully charged, we need to find values of t for which the output value is 100% for both functions.



From the graph we see that the MP3 player will take the longest to charge and it will take about 75 minutes total. So if Sam's family can wait an extra 15 minutes before they leave, Sam would have both devices fully charged.

Illustrative Mathematics

8.F US Garbage, Version 1

Alignment 1: 8.F.A.1

The following table shows the amount of garbage that was produced in the US each year between 2002 and 2010 (as reported by the EPA).

t (years)	2002	2003	2004	2005	2006	2007	2008	2009	2010
G (million tons)	239	242	249	254	251	255	251	244	250

Let's define a function which assigns to an input t (a year between 2002 and 2010) the total amount of garbage, G, produced in that year (in million tons). To find these values, you can look them up in the table.

a. How much garbage was produced in 2004?

b. In which year did the US produce 251 million tons of garbage?

c. Does the table describe a linear function?

d. Draw a graph that shows this data.

Commentary:
Standard 8.F.1 states that students should "understand that a function is a rule that assigns to each input exactly one output." Often students think that a function has to be defined by an *algebraic* rule and that working with functions consists of plugging numbers into a formula. In this task, the rule of the function is more conceptual: We assign to a year (an input) the total amount of garbage produced in that year (the corresponding output). Even if we didn't know the exact amount for a year, it is clear that there will not be two different amounts of garbage produced in the same year. Thus, this makes sense as a "rule" even though there is no algorithmic way to determine the output for a given input except looking it up in the table.

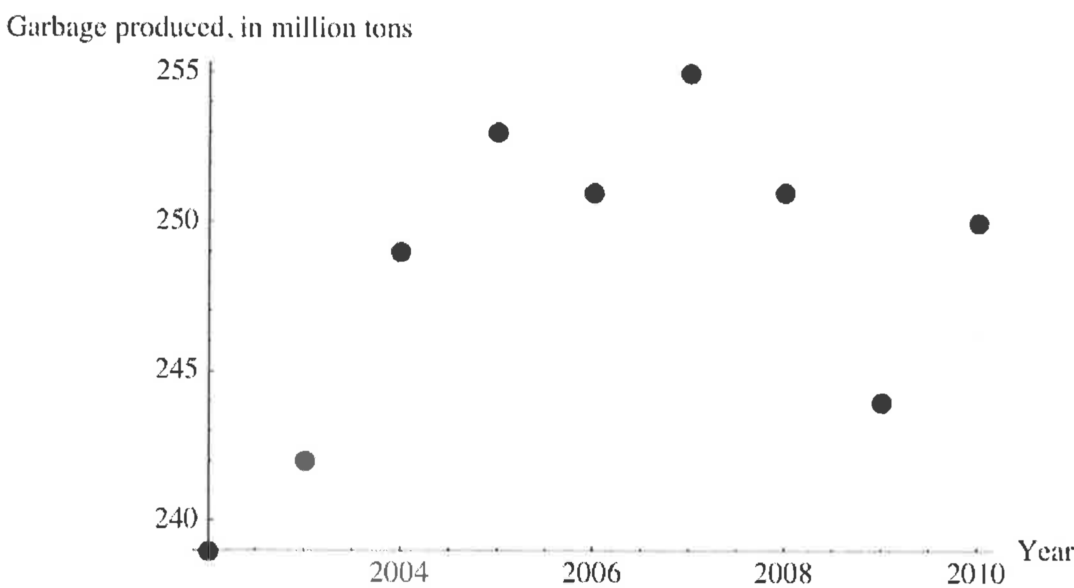
Many situations can be described with a function even though there is no algebraic rule that defines it. Since functions are so powerful, we would like to analyze these situations with the tools that we have available when working with functions (e.g. associating inputs and outputs and graphing in 8th grade and function notation and rates of change in later years). This task presents an opportunity to explore a more general and non-algebraic view of functions.

Note that the details of this problem were chosen carefully. For one thing, the domain is naturally discrete (that is, it is hard to make sense of $G(2003.5)$) so there is no reason to think about values other than those that appear in the table. Later, students will be working with tables that only show some input-output pairs for a given function; sometimes they will be asked to find an algebraic expression that could extend the function to a larger domain. Here all input-output pairs for this function are contained in the table and there is no need determine whether the function naturally extends to a larger domain. Also, the "rule" of the function was stated very explicitly to help students expand their notion of a rule to be more compatible with the more general idea of a function that they will encounter in later grades.

This task is appropriate as an example for instruction or for assessment.

Solution: 1

a. Finding $t = 2004$ in our table, we see that 249 million tons of garbage was produced in 2004.
b. Finding $G = 251$ in our table, we see that the US produced 251 million tons of garbage in two years that are listed in the table, 2006 and 2008.
c. For this function to be linear equal changes in input values have to correspond to equal changes in output values. Since our input values, t, are given for every year, we would want our output values, G, to be increasing by the same amount for each year. We can see that from 2002 to 2003, G changed from 239 to 242 million tons, so it increased by 3 million tons. However, from 2003 to 2004, G changed from 242 to 249 million tons, meaning it increased by 7 million tons. From 2005 to 2006 the amount of garbage even decreased by 3 million tons. Therefore, our function is not linear.
d. By plotting the points given in the table, we arrive at the following graph, which also shows that the function is not linear because the points do not all lie on a line.



CONCEPT DEVELOPMENT

Mathematics Assessment Project
CLASSROOM CHALLENGES
A Formative Assessment Lesson

Functions and Everyday Situations

Mathematics Assessment Resource Service
University of Nottingham & UC Berkeley
Beta Version

For more details, visit: http://map.mathshell.org

Functions and Everyday Situations

MATHEMATICAL GOALS

This lesson unit is intended to help you assess how well students are able to:

- Articulate verbally the relationships between variables arising in everyday contexts.
- Translate between everyday situations and sketch graphs of relationships between variables.
- Interpret algebraic functions in terms of the contexts in which they arise.
- Reflect on the domains of everyday functions and in particular whether they should be discrete or continuous.

COMMON CORE STATE STANDARDS

This lesson relates to the following *Standards for Mathematical Content* in the *Common Core State Standards for Mathematics*:

F-IF Interpret functions that arise in applications in terms of a context.
F-IF Analyze functions using different representations.
F-LE Construct and compare linear, quadratic, and exponential models and solve problems.

This lesson also relates to the following *Standards for Mathematical Practice* in the *Common Core State Standards for Mathematics*:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically. (Graphing calculator.)

INTRODUCTION

The lesson unit is structured in the following way:

- Before the lesson, students work individually on an assessment task that is designed to reveal their current understanding and difficulties. You then review their solutions and create questions for students to consider that may help them improve their work.
- During the lesson, small groups work on a collaborative task, matching situations, sketch graphs, and algebraic functions. They also refine the graphs and interpret the formulas to answer questions.
- In a whole-class discussion, students discuss what has been learned and the strategies used.
- In a follow-up lesson, students return to their original task to consider their responses and the questions posed, and use what they have learned to complete a similar task; *Another Four Situations*.

MATERIALS REQUIRED

- Each student will need a copy of the assessment tasks *Four Situations* and *Another Four Situations*.
- Each small group of students will need a mini-whiteboard, a pen, and an eraser, the cut-up card sets: *Everyday Situations 1, 2, and 3; Graphs 1, and 2;* and *Algebraic Functions,* and a graphing calculator to check answers.

There is a projector resource to support whole-class discussions. You may also want to copy the card sets onto transparencies to be used on an overhead projector.

TIME NEEDED

20 minutes before the lesson, a 75-minute lesson, and 20 minutes in a follow-up lesson (or for homework). These timings are approximate. Exact timings will depend on the needs of the class.

BEFORE THE LESSON

Assessment task: *Four Situations* (20 minutes)

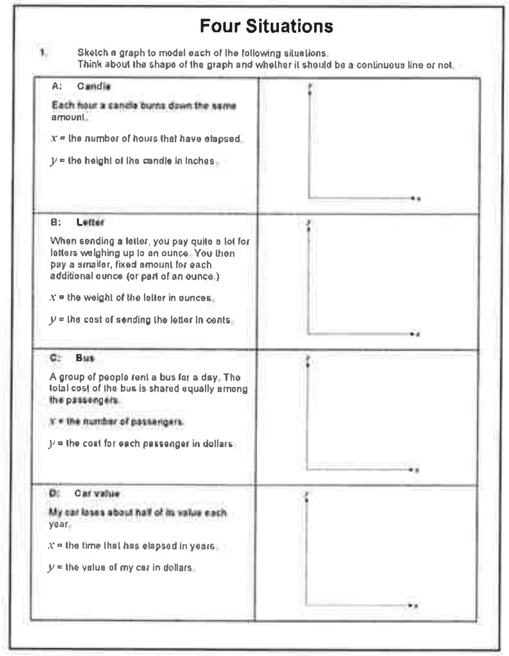
Have the students complete this task, in class or for homework, a few days before the formative assessment lesson. This will give you an opportunity to assess the work, and to find out the kinds of difficulties students have with it. You should then be able to target your help more effectively in the follow-up lesson.

Give each student a copy of the task *Four Situations.*

> *Read through the questions and try to answer them as carefully as you can.*
>
> *You are* ***not*** *to use a graphing calculator to do this task.*

It is important that, as far as possible, students are allowed to answer the questions without your assistance.

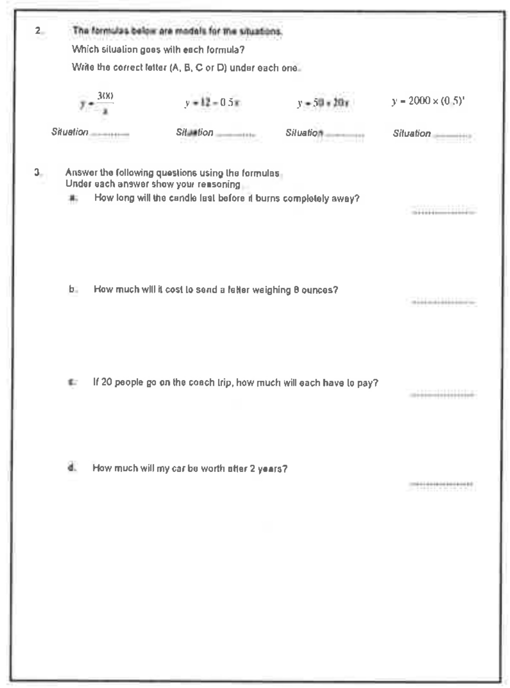
Students should not worry too much if they cannot understand or do everything because, in the next lesson they will engage in a similar task that should help them. Explain to students that by the end of the next lesson, they should expect to answer questions such as these confidently. This is their goal.



Four Situations

1. Sketch a graph to model each of the following situations.
Think about the shape of the graph and whether it should be a continuous line or not.

A: Candle Each hour a candle burns down the same amount. x = the number of hours that have elapsed. y = the height of the candle in inches.	
B: Letter When sending a letter, you pay quite a lot for letters weighing up to an ounce. You then pay a smaller, fixed amount for each additional ounce (or part of an ounce.) x = the weight of the letter in ounces. y = the cost of sending the letter in cents.	
C: Bus A group of people rent a bus for a day. The total cost of the bus is shared equally among the passengers. x = the number of passengers. y = the cost for each passenger in dollars.	
D: Car value My car loses about half of its value each year. x = the time that has elapsed in years. y = the value of my car in dollars.	



2. The formulas below are models for the situations.
Which situation goes with each formula?
Write the correct letter (A, B, C or D) under each one.

$y = \frac{300}{x}$ Situation ....

$y = 12 - 0.5x$ Situation ....

$y = 50 + 20x$ Situation ....

$y = 2000 \times (0.5)^x$ Situation ....

3. Answer the following questions using the formulas.
Under each answer show your reasoning.
a. How long will the candle last before it burns completely away? ....
b. How much will it cost to send a letter weighing 8 ounces? ....
c. If 20 people go on the coach trip, how much will each have to pay? ....
d. How much will my car be worth after 2 years? ....

Assessing students' responses

Collect students' responses to the task and note what their work reveals about their current levels of understanding, and their different approaches.

We suggest that you do not score students' work. The research shows that this will be counterproductive, as it will encourage students to compare their scores, and will distract their attention from what they can do to improve their mathematics.

Instead, help students to make further progress by summarizing their difficulties as a series of questions. Some suggestions for these are given in the *Common issues* table on the next page. These have been drawn from difficulties observed in trials of this unit.

We suggest you make a list of your own questions, based on your students' work. We recommend you either:

- Write one or two questions on each student's work, or
- Give each student a printed version of your list of questions, and highlight the appropriate questions for individual students.

If you do not have time to do this, you could select a few questions that will be of help to the majority of students, and write these on the board when you return the work to the students.

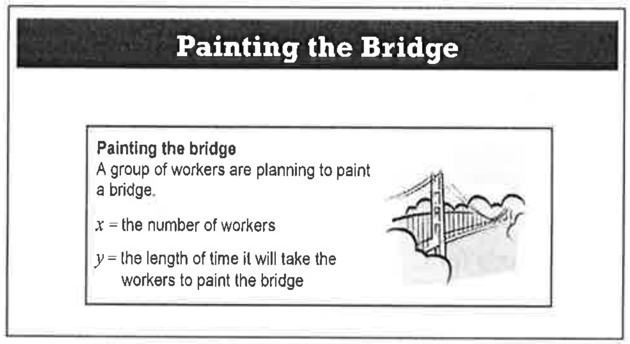
Common issues:	**Suggested questions and prompts:**
Students have a limited repertoire of graphs (Q1) For example: The student draws increasing graphs for A, C, D. Or: The student draws straight line graphs for C, D.	• As x increases does y increase or decrease? Why? • As x goes up in equal steps, does y go up in equal steps? Why?
Student draws continuous lines for all the graphs (Q1)	• Is x a discrete or continuous variable? Why? • Is y a discrete or continuous variable? Why?
Students' graphs cut the axes at inappropriate places (Q1) For example: The graph meets or crosses *y*-axis for C. Or: The graph meets or crosses *x*-axis for C, D.	• What happens when no passengers go on the coach trip? • How many passengers would you need for y =0? (cost for each passenger is nothing!).
Student draws a graph that consists of two straight lines of differing slopes	• What does the slope represent? Why does the steepness of your slope change?
Student matches the formulas incorrectly (Q2)	• Check your matching by trying a few values for x. • As x increases, does y increase or decrease? How can you tell? • As x increases in equal steps, does y change in equal steps?
Students are unable to interpret and use the formulas correctly (Q3)	• What does each statement tell you about the value of x? • What does each statement tell you about the value of y?

SUGGESTED LESSON OUTLINE

Whole-class introduction (15 minutes)

Give each student a mini-whiteboard, a pen, and an eraser. Maximize participation in the whole-class discussion by asking all students to show you a solution on their mini-whiteboards.

Use Slide P-1 to write or project the following situation:



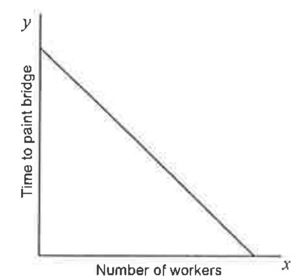
Ask the students to sketch a graph that describes this situation:

Look at this situation carefully. Can you sketch a graph to show how y will depend on x?

Show me your answer on your mini-whiteboard and be prepared to give an explanation for what you have drawn.

Students may well come up with a range of answers. If this is the case, draw a few on the board and discuss which are appropriate models for the situation. Help students to develop their ideas until they are able to fully understand the most appropriate graph.

Some students, for example may draw a linear graph:



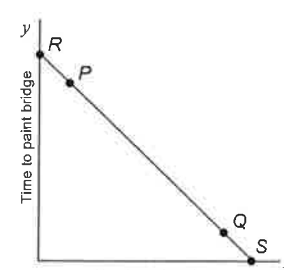
If this is the case, spend some time discussing the meaning of a linear graph. It is likely that students who have viewed the problem as a linear situation understand that the more workers that are involved, the less time it will take to paint the bridge. Explore the specific features of the graph and encourage students who have drawn non-linear graphs to participate in the discussion as well. It may be helpful to label some points on the graph:

What does point P tell you? [If only a few paint the bridge, it will take a long time.]

What about point Q? [A lot of workers will take a shorter time.]

What about the points R and S, where the line crosses the axes?

How can we change this graph so that it is a better model of the situation?



This kind of questioning should help students to see that the graph should not cross the axes. However, some students may simply suggest erasing the ends of the graph as a way of making it a better model of the situation. Help students to understand why a curved graph is a more appropriate model. It might be appropriate to consider what happens to the amount of time taken to paint the bridge as the number of workers varies:

Suppose we know the time it takes for a specific numbers of workers to paint the bridge.

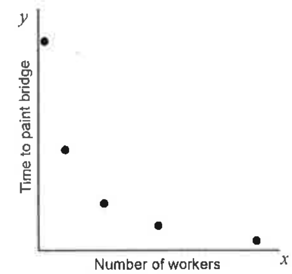
What would happen if we doubled the number of workers that paint the bridge? [You would halve the time it takes.]

What would this look like on the graph?

If we halved the number of workers, what would this look like?

Will these points be in a straight line?

What shape will these points make?



If some students in the class have successfully drawn a curved graph, encourage them to explain their reasoning to the rest of the class. Emphasize that strictly speaking the graph should not be continuous, as it does not make sense to have fractions of people painting a bridge. The domain of the graph should be discrete.

Once students are happy with the shape of the graph, ask them to think about an appropriate function that describes it.

Can you suggest a possible algebraic function that will fit this graph? [$y = \frac{A}{x}$ *]*

If students are struggling to come up with a possible function, consider a specific situation. Drawing up a table of values may also help students to see the relationship between x and y.

If it takes 20 people 5 years to paint a bridge, how long would it take 10 people? [10 years.]

How long would it take 50 people? [2 years.]

What would the function be in this case? [$xy = 100$ *or* $y = 100/x$ *]*

Explain to students that during this lesson they are going to be considering a number of similar situations and thinking about the graphs and algebraic functions that can be used to model them.

Collaborative activity: Matching situations to graphs (20 minutes)

Organize the class into groups of two or three students.

Give each group the cut-up card sets: *Everyday Situations 1, 2* and *3*, and *Graphs 1* and *2*. **Do not give out graphing calculators!**

Explain how students are to work collaboratively. Slide P-2 of the projector resource summarizes these instructions:

Take turns to match a situation card to one of the sketch graphs.

If you place a card, explain why that situation matches that graph.

Everyone in your group should agree on, and be able to explain, your choice.

If you think the graph could be improved in any way, then say how it should be changed. For example you may think that it should be discrete rather than continuous.

There are two blank graphs for you to complete!

Arrange pairs side by side (not on top of one another) so I can see them as I walk around.

You may want to check that everyone understands each situation before students begin on the task. Tell students to ignore the questions on the situation cards for the moment.

The purpose of this structured group work is to make students engage with each others' reasoning, and take responsibility for the understanding of the group. Encourage students not to rush, but spend time justifying fully the pairing of the cards.

Whilst students work on the collaborative activity you have two tasks, to notice students' approaches and difficulties and to support student reasoning:

Note different student approaches to the task

Notice how students make a start on the task, where they get stuck, and how they interpret the situations. Do they sort the cards in any way before they try to match them? If so, what is their strategy? How do students go about completing the blank cards? Notice whether students are addressing the difficulties they experienced in the assessment task. You may want to use the questions in the *Common issues* table to help to address any misconceptions.

If students are struggling to get started on the task suggest that they focus on Situations A, B, C and D and see if they can find graphs to match these four situations first.

If you find that students are having difficulty imagining a situation, then talk it through with them. Ask them to describe orally what happens to y as x changes.

Support student reasoning

Try not to make suggestions that move students towards a particular approach to the task. Instead, ask questions that help students clarify their thinking. It is important that students are encouraged to engage with their partner's explanations and take responsibility for each other's understanding.

Peter, you matched this graph with this situation. Gail, can you explain why Peter matched these two cards?

Prompt students to think and reason more deeply.

What happens to the temperature of the boiling kettle if you leave it standing?

Is the water in the kettle cooling at a constant rate?

When the kettle is very hot, does it cool down more quickly or more slowly than when it is nearly at room temperature? Why?

Which graph best shows this relationship?

Try out some values for this situation.

Encourage students to label their axes with the descriptions. Organizing their values into a table may help students to see a relationship between x and y.

Collaborative activity: Matching situations and graphs to formulas (20 minutes)

When students have had a chance to match up the situations and graphs, give each group the cut-up cards: *Algebraic Functions*, a large sheet of paper, and glue stick for making a poster.

Now match these cards to the pairs you already have on the table.

You should be able to do this without using a graphing calculator.

After you have matched the function, try to answer the question on the right hand side of the situations card.

Students should be able to match the linear functions more easily, but may find the others much more challenging. Encourage them to use 'strategic substitutions' (**not** graphing calculators) to make their decisions:

Can you group these functions in a way that will help you match them?

Which of these functions are linear? Non-linear?

Which are increasing/ decreasing?

Where does this function cross the x-axis / y-axis?

Where does this function reach its maximum/ minimum value?

Show me a function that never crosses the x-axis. How do you know?

Show me a function that intersects the origin. How do you know?

Show me a function that has two x-intercepts. How do you know?

Support the students as in the first collaborative activity.

When students have matched an algebraic function card to the other two, allow them to check their answers using graphing calculators, then encourage them to try to answer the question on the situations card by looking at the **form** of the algebraic function. For example:

OK, you think that the function that shows how the height of the golf ball changes is:
$y = 30x - 5x^2$
How can we answer the question: "When does the ball hit the ground?" [Let y = 0.]

At this point, the cards may be stuck down and the questions answered on the poster.

Whole-class discussion (20 minutes)

Organize a discussion about what has been learned and the different strategies students have used to match the cards. You may, first, want to select cards that most groups matched correctly to encourage good explanations, before selecting one or two cards that groups found difficult to match. It is likely that some groups will not have matched all the cards. The aim of this discussion is to encourage contributions from everyone in the class, rather than merely checking for correct matches.

Give me a situation/graph/algebraic function that was easy to match. Why was this?

Once one group has justified their choice for a particular match, ask students from other groups to contribute ideas of alternative matches/approaches. The intention is that you focus on getting students to understand and share their **reasoning** and explore the different approaches used within the class.

Did anyone find this situation/graph/algebraic function difficult to match or use a different strategy to the one explained?

When discussing a match, encourage students to listen carefully to each other's explanations and comment on which explanation was easier to follow.

Did anyone manage to match a graph with the Folding Paper situation? Which graph did you choose?

Why did you decide this graph best matched this situation?

Can anyone explain this match in a different way?

Did anyone choose a different graph for the Folding Paper situation?

Which explanation is easiest to understand?

Explore the situation in as much depth as possible, rather than just discussing the answer to the question on the card. Consider features of the graph as well as exploring in detail the ways in which the algebraic function relates to the situation.

In what ways could we improve graph G3 as a model for the Folding Paper situation? [The graph should be a series of discrete points as the number of folds can only be whole numbers. It should also stop at x = 8 as you cannot physically fold paper more than 8 times.]

Which algebraic function best matches graph G3? [A12: $y = \frac{2^x}{1000}$*.]*

What does the 1000 stand for in this function? [The thickness of the paper in inches.]

How thick would the paper be if you could fold it ten times? [about 1 inch.]

How thick would the paper be if you could fold it 50 times? [17 million miles!]

There will not be time to discuss all of the cards in this way and it is not necessary to do so. A discussion of a few cards that maximizes student involvement, and encourages a thoughtful discussion and reflection of students' work, is recommended.

Follow-up lesson: *Another Four Situations* (20 minutes)

Return the original assessment task *Four Situations* to the students, together with a copy of the task *Another Four Situations.*

If you have not added questions to individual pieces of work, then write your list of questions on the board. Students should select from this list only those questions they think are appropriate to their own work.

Look at your original responses and think about what you have learned this lesson.

Carefully read through the questions I have written.

Spend a few minutes thinking about how you could improve your work.

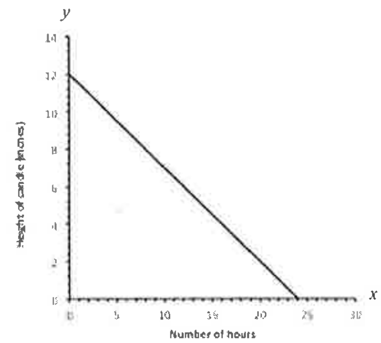
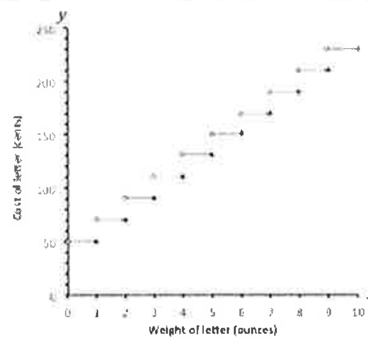
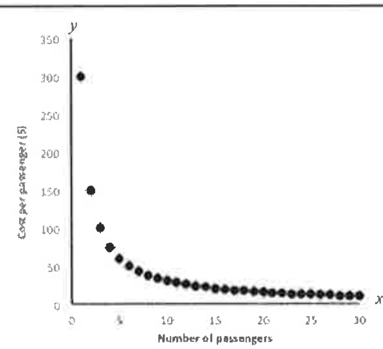
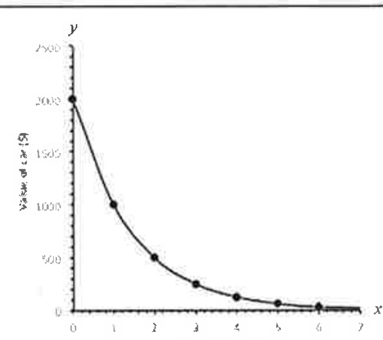
You may want to make notes on your mini-whiteboard.

Using what you have learned, try to answer the questions on the new task Another Four Situations.

Some teachers give this for homework.

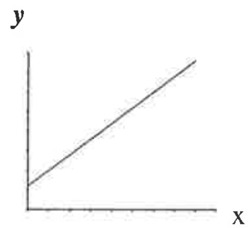
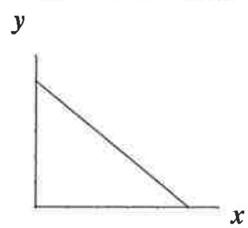
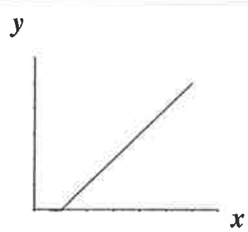
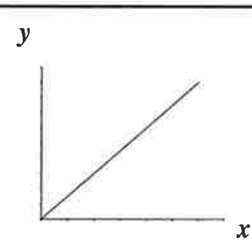
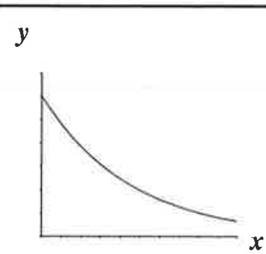
SOLUTIONS

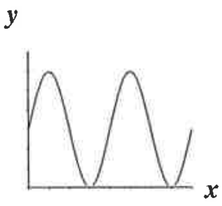
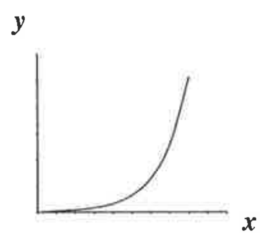
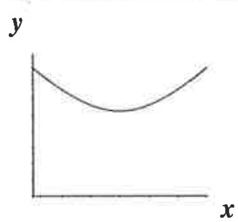
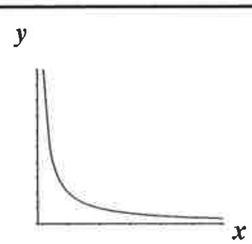
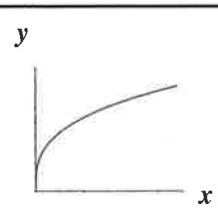
Assessment Task: Four Situations.

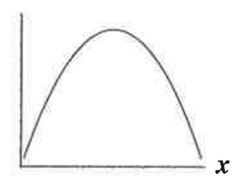
A: Candle 1. The candle sketch graph should be linear and decreasing as shown. Both time and height are continuous variables. 2. It corresponds to the function $y = 12 - 0.5x$ 3. It will burn out completely after 24 hours.	
B: Letter 1. The graph should be linear and increasing and passing through a point (0,A) where A>0. 2. Some students may realize that the x-axis is continuous and the y-axis will be discrete. Also the costs will jump as shown here. 3. The cost of a letter weighing x ounces is given by the function: $y = 30 + 20x$ 4. A letter weighing 8 ounces will cost 190 cents.	
C: Bus 1. The graph should be non-linear (a hyperbola), decreasing. It should not meet either axis. Some students may realize that the x-axis is discrete and the graph will consist of points. 2. The function modeling this is: $y = \frac{300}{x}$ 3. If 20 people go on the trip, it will cost each person 15 dollars.	
D: Car value 1. The graph should be smooth, continuous, decreasing exponential. 2. The function modeling this is: $y = 2000 \times (0.5)^x$ 3. After 2 years the car will be worth $500.	

Collaborative activity: Making Posters

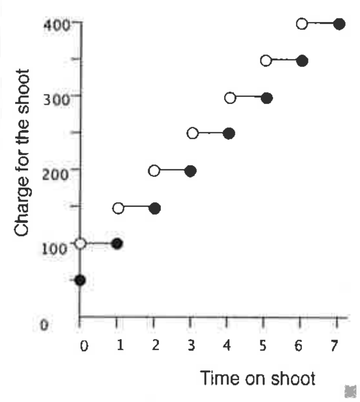
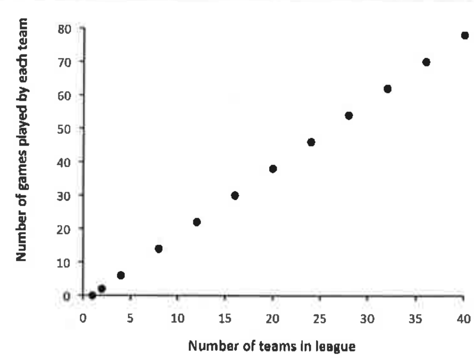
Students may change the shape of some of the curves or show the graph as discrete rather than continuous.

Situation	Graph	Formula
A. Plumber A plumber charges a fixed fee for coming to your house, then charges a fixed amount per hour on top of this. x = the time the job takes in hours. y = the total cost of the plumber's time in dollars.	**G2**  Step function is better	**A3** $y = 40x + 60$ Plumber charges $180 for a 3-hour job.
B. Cycling A cyclist travels along a direct route from town A to town B. x = the distance of the cyclist from town A in miles. y = the distance of the cyclist from town B in miles.	**G10** 	**A4** $y = -x + 100$ Towns are 100 miles apart.
C. Movie subscription You get two movies free, but then you get charged at a fixed rate per movie. x = the number of movies seen. y = the total money spent in dollars.	**G4**  Graph to be drawn on by student. Discrete points would be better.	**A1** $y = 5x - 10$ The fixed rate per movie is $5.
D. Internet café An internet café charges a fixed amount per minute to use the internet. x = the number of minutes spent on the internet. y = the cost of using the internet in dollars.	**G7** 	**A2** $y = \frac{3x}{4}$ $8 will buy 6 minutes.
E. Cooling kettle A kettle of boiling water cools in a warm kitchen. x = the time that has elapsed in minutes. y = the temperature of the kettle in degrees Celsius.	**G9** 	**A11** $y = 20 + 80 \times (0.27)^x$ As the water cools it approaches the room temperature of 20°C.

F. Ferris wheel A ferris wheel turns round and round. x = the time that has elapsed in seconds. y = the height of a seat from the ground in meters.	**G11** 	**A10** $y = 30 + 30\sin(18x)$ The starting point is $x = 0$ and $y = 30$. After one complete turn $y = 30$.The Ferris wheel is at this height at x = 10 (half a turn) and x = 20 (complete turn). It takes 20 seconds for the Ferris wheel to turn once.
G. Folding paper A piece of paper is folded in half. It is then folded in half again, and again.... x = the number of folds. y = the thickness of the paper in inches.	**G3**  The student may change the shape of the curve. Paper can be folded up to 8 times. Discrete points would be better.	**A12** $y = \frac{2^x}{1000}$ Folding it ten times results in thickness of about an inch. This is impossible! $x \leq 8$ in practice (try it!).
H. Speed of golf shot A golfer hits a ball. x = the time that has elapsed in seconds. y = the speed of the ball in meters per second.	**G8** 	**A7** $y = 10\sqrt{(x-3)^2 + 7}$ Speed is a minimum after 3 seconds.
I. Test drive A car drives along a test track. x = the average speed of the car in meters per second. y = the time it takes to travel the length of the track in seconds.	**G1** 	**A5** $y = \frac{200}{x}$ Distance = speed $\times$ time $= y \times x$. The track is 200 meters long.
J. Balloon A man blows up a balloon. x = volume of air he has blown in cubic inches. y = diameter of the balloon in inches.	**G6**  If puffs are allowed the graph will show steps. At some point the balloon will pop.	**A6** $y = \frac{5}{4}\sqrt[3]{x}$ $x = 1{,}000$. Diameter of balloon is about 1 foot (12.5 inches).

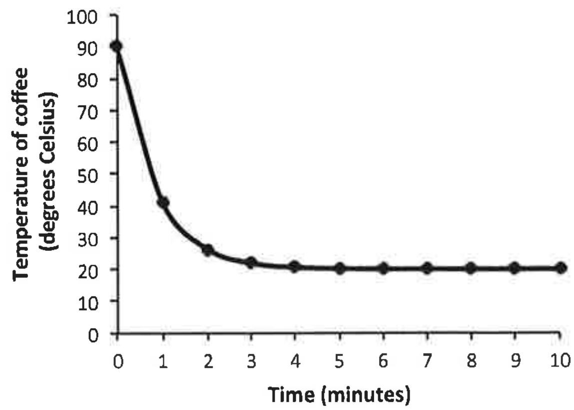
K. Height of golf shot. A golfer hits a ball. x = the time that has elapsed in seconds. y = the height of the ball in meters.	**G5** y 	**A9** $y = 30x - 5x^2$ The ball hits the ground when: $5x(6 - x) = 0$; $x = 0$ or $x = 6$. Ball hits ground after 6 seconds.
L. Film projector A film is shown on a screen using a small projector. x = the distance from the projector to the screen in feet. y = the area of the picture in square feet.	**G12** y 	**A8** $y = \frac{1}{4}x^2$ When projector is 10 feet away, area of picture is 25 square feet.

Assessment Task: ***Another Four Situations***

A: Photographer 1. The graph should be linear and increasing and passing through a point (0,A) where A>0. Some students may realize that the x-axis is continuous and the y-axis will be discrete. The charges will jump as shown here. 2. It corresponds to the function $y = 50(1 + x)$ 3. The photographer will charge $400 for a 7 hour 'shoot'.	
B: Football 1. The graph should be linear and increasing and passing through a point (1,0). Some students may realize that both the x-axis and the y-axis are discrete. 2. The function modeling this is: $y = 2x - 2$ 3. When there are 20 teams in the league, each team will play 38 games.	

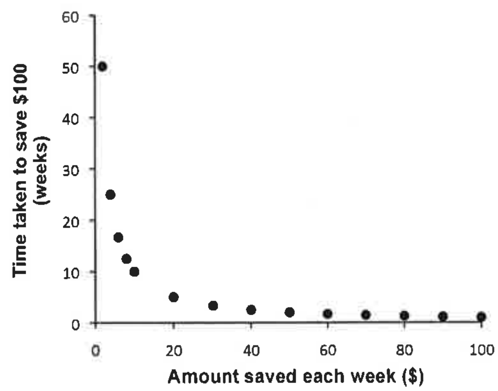
C: Cup of coffee

1. The graph should be smooth, continuous, decreasing exponential.
2. The function modeling this is:
   $y = 20 + 70 \times (0.3)^x$
3. After 3 minutes, the temperature of the coffee will be 21.89°C.



D: Saving up

1. The graph should be non-linear (a hyperbola), decreasing. It should not meet either axis. Some students may realize that the y-axis is discrete and the graph will consist of points.
2. The function modeling this is: $y = \dfrac{100}{x}$
3. It will take Tanya 20 weeks to save for the coat.



Four Situations

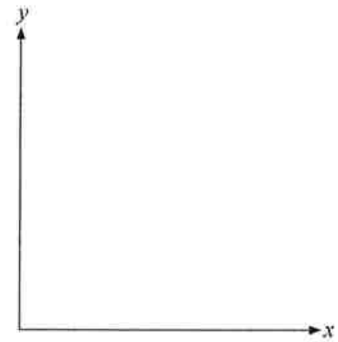
1. Sketch a graph to model each of the following situations.
Think about the shape of the graph and whether it should be a continuous line or not.

A: Candle

Each hour a candle burns down the same amount.

x = the number of hours that have elapsed.

y = the height of the candle in inches.

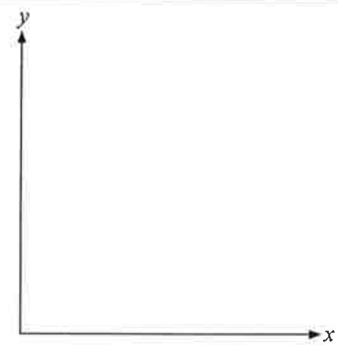


B: Letter

When sending a letter, you pay quite a lot for letters weighing up to an ounce. You then pay a smaller, fixed amount for each additional ounce (or part of an ounce.)

x = the weight of the letter in ounces.

y = the cost of sending the letter in cents.

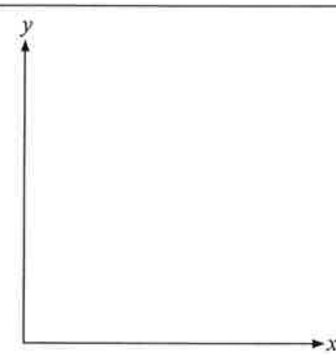


C: Bus

A group of people rent a bus for a day. The total cost of the bus is shared equally among the passengers.

x = the number of passengers.

y = the cost for each passenger in dollars.

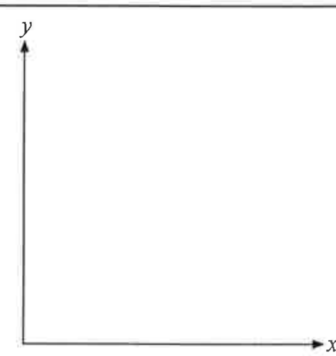


D: Car value

My car loses about half of its value each year.

x = the time that has elapsed in years.

y = the value of my car in dollars.



2. The formulas below are models for the situations.

   Which situation goes with each formula?

   Write the correct letter (A, B, C or D) under each one.

$y = \dfrac{300}{x}$	$y = 12 - 0.5x$	$y = 30 + 20x$	$y = 2000 \times (0.5)^x$
Situation …………	*Situation* …………	*Situation* …………	*Situation* …………

3. Answer the following questions using the formulas.
   Under each answer show your reasoning.

   a. How long will the candle last before it burns completely away?

   …………………

   b. How much will it cost to send a letter weighing 8 ounces?

   …………………

   c. If 20 people go on the coach trip, how much will each have to pay?

   …………………

   d. How much will my car be worth after 2 years?

   …………………

Everyday Situations 1

A. Plumber

A plumber charges a fixed fee for coming to your house, then charges a fixed amount per hour on top of this.

x = the time the job takes in hours.

y = the total cost of the plumber's time in dollars.

How much does the plumber charge for a 3-hour job?

B. Cycling

A cyclist travels along a direct route from town A to town B.

x = the distance of the cyclist from town A in miles.

y = the distance of the cyclist from town B in miles.

How far apart are the towns?

C. Movie subscription

You get two movies free, but then you get charged at a fixed rate per movie.

x = the number of movies seen.

y = the total money spent in dollars.

What is the fixed rate per movie?

D. Internet café

An internet café charges a fixed amount per minute to use the internet.

x = the number of minutes spent on the internet.

y = the cost of using the internet in dollars.

How many minutes will $8 buy?

Everyday Situations 2

E. Cooling kettle

A kettle of boiling water cools in a warm kitchen.

x = the time that has elapsed in minutes.

y = the temperature of the kettle in degrees Celsius.

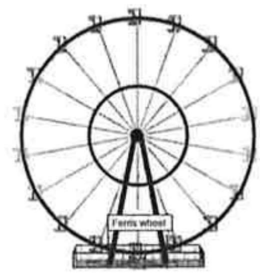
What is the temperature of the room?

F. Ferris wheel

A Ferris wheel turns round and round.

x = the time that has elapsed in seconds.

y = the height of a seat from the ground in meters.



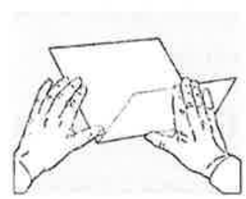
How long does it take the Ferris wheel to turn once?

G. Folding paper

A piece of paper is folded in half. It is then folded in half again, and again…

x = the number of folds.

y = the thickness of the paper in inches.



How thick would the paper be if you could fold it 10 times?

H. Speed of golf shot

A golfer hits a ball.

x = the time that has elapsed in seconds.

y = the speed of the ball in meters per second.

When is the ball travelling most slowly?

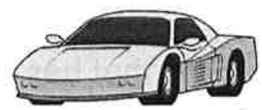
Everyday Situations 3

I. Test drive

A car drives along a test track.

x = the average speed of the car in meters per second.

y = the time it takes to travel the length of the track in seconds.



How long is the track?

J. Balloon

A man blows up a balloon.

x = the volume of air he has blown in cubic inches.

y = the diameter of the balloon in inches.

What is the diameter of the balloon when the man has blown in 1000 cubic inches?

K. Height of golf shot.

A golfer hits a ball.

x = the time that has elapsed in seconds.

y = the height of the ball in meters.

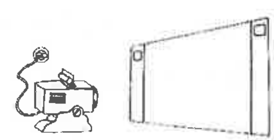
When does the ball hit the ground?

L. Film projector

A film is shown on a screen using a small projector.

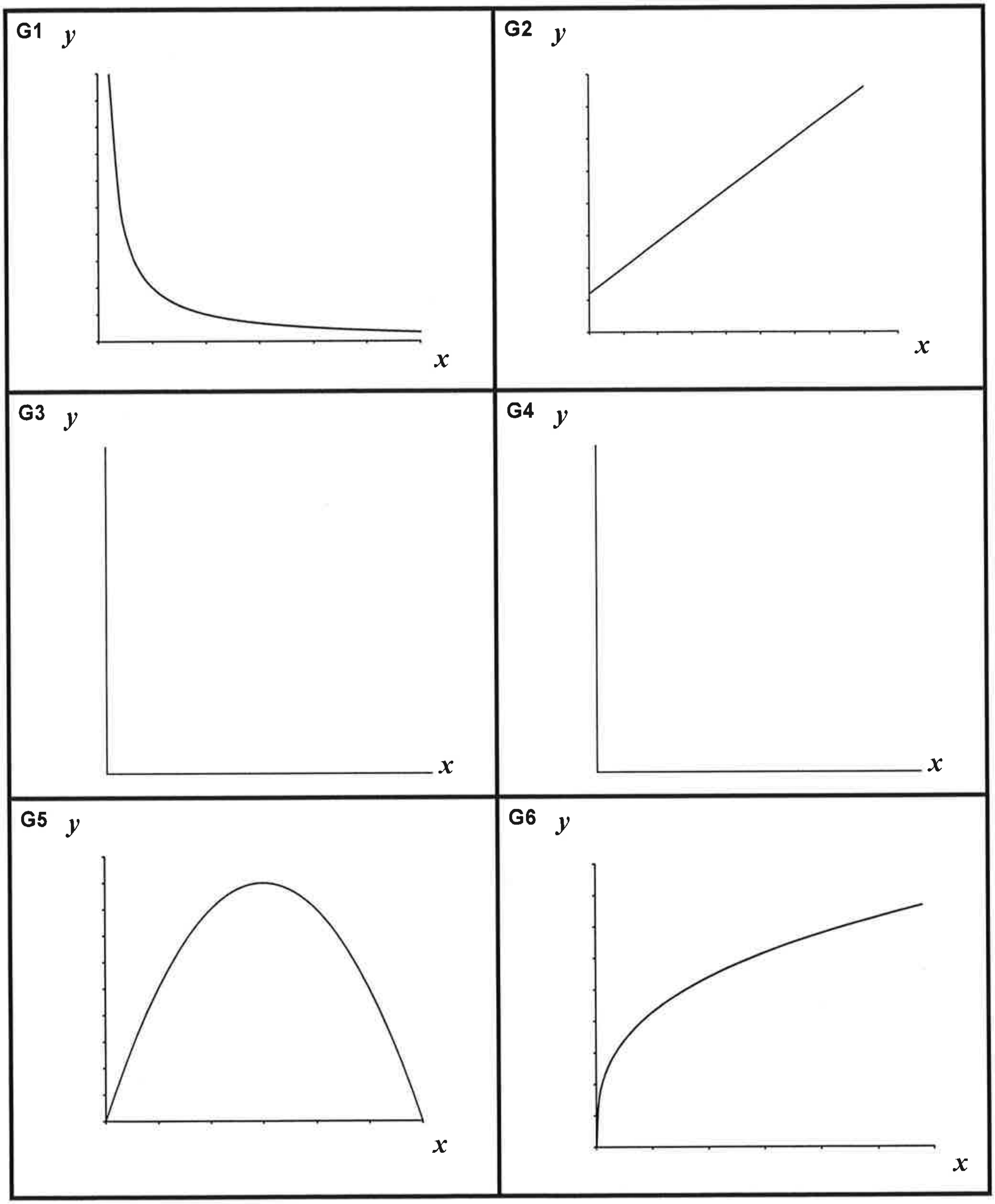
x = the distance from the projector to the screen in feet.

y = the area of the picture in square feet.

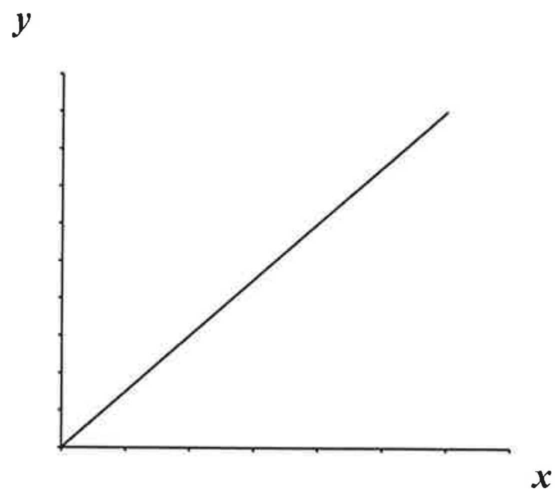


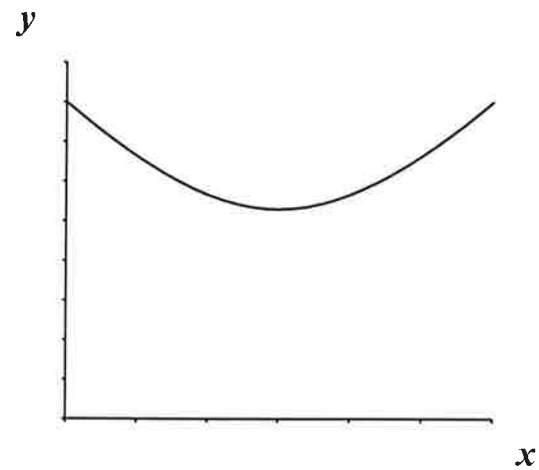
How large is the picture when the screen is 10 feet away?

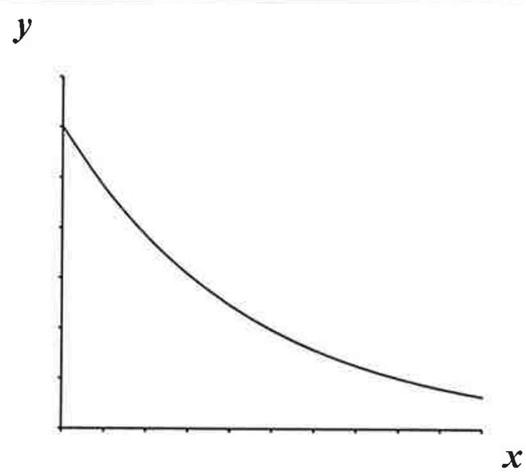
Graphs 1

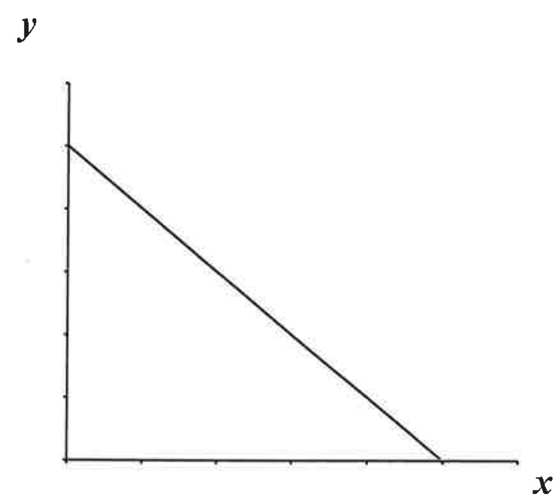


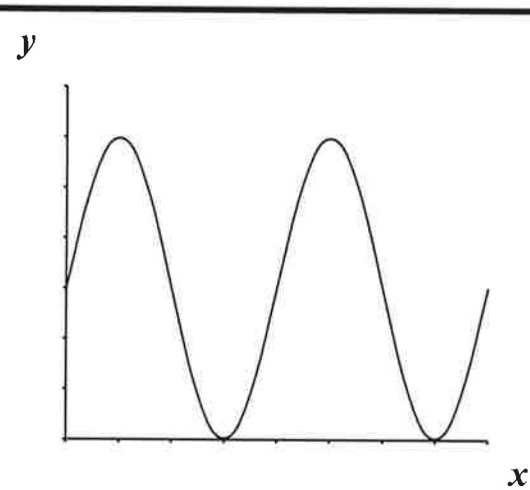
Graphs 2

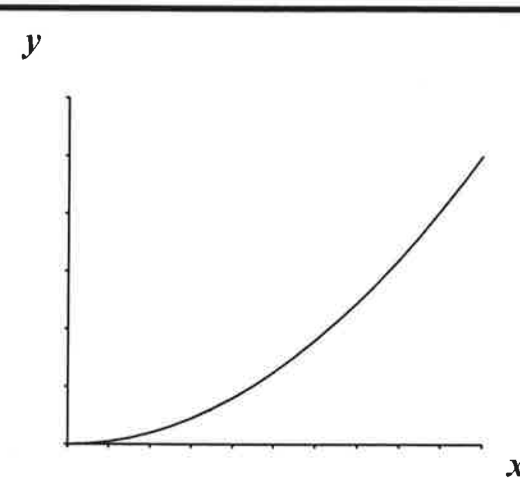
G7


G8


G9


G10


G11


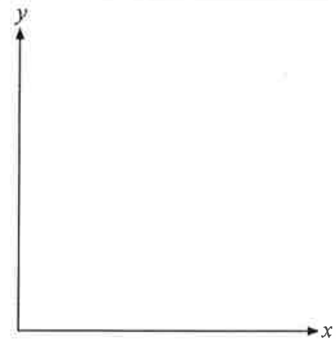
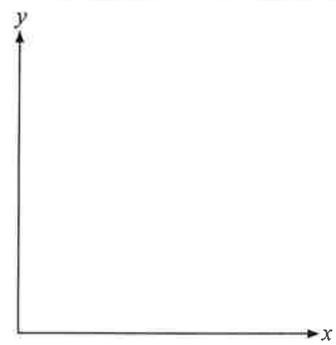
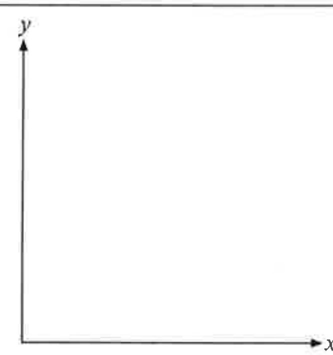
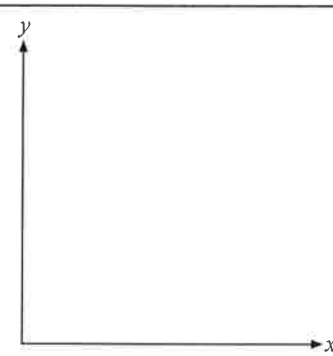
G12


Algebraic Functions

A1 $y = 5x - 10$	A2 $y = \dfrac{3x}{4}$
A3 $y = 40x + 60$	A4 $y = -x + 100$
A5 $y = \dfrac{200}{x}$	A6 $y = \dfrac{5}{4}\sqrt[3]{x}$
A7 $y = 10\sqrt{(x-3)^2 + 7}$	A8 $y = \dfrac{1}{4}x^2$
A9 $y = 30x - 5x^2$	A10 $y = 30 + 30\sin(18x)$
A11 $y = 20 + 80 \times (0.27)^x$	A12 $y = \dfrac{2^x}{1000}$

Another Four Situations

1. Sketch a graph to model each of the following situations.
Think about the shape of the graph and whether it should be a continuous line or not.

A: Photographer For each 'shoot' a photographer charges a fixed fee for expenses, then a fixed amount for each hour (or part of an hour.) x = the time a 'shoot' takes in hours. y = the total amount the photographer charges.	
B: Football In a football league, each team plays all other teams twice. x = the number of teams. y = the number of games played by one team.	
C: Cup of coffee A cup of coffee cools in a warm diner. x = the time that has elapsed in minutes. y = the temperature of the coffee in degrees Celsius.	
D: Saving up Tanya saves a fixed amount each week until she has enough money in the bank to buy a coat. x = the amount saved each week. y = the time that it takes Tanya to save enough for the coat.	

2. The formulas below are models for the situations.

Which situation goes with each formula?

Write the correct letter (A, B, C or D) under each one.

$y = 20 + 70 \times (0.3)^x$	$y = \dfrac{100}{x}$	$y = 2x - 2$	$y = 50(1 + x)$
Situation	*Situation*	*Situation*	*Situation* ....

3. Answer the following questions using the formulas.
Under each answer show your reasoning.

a. How much will the photographer charge for a 7-hour 'shoot'? ....

b. If there are 20 teams in the league, how many games will each team play? ....

c. What will be the temperature of the coffee after 3 minutes? ....

d. If Tanya saves $5 a week, how long will it take her to save for the coat? ....

Painting the Bridge

Painting the bridge

A group of workers are planning to paint a bridge.

x = the number of workers

y = the length of time it will take the workers to paint the bridge

Matching the Cards

1. Take turns to match a situation card to one of the sketch graphs.

2. If you place a card, explain why that situation matches the graph.

3. If you think the graph could be improved in any way, then say how it should be changed. (For example, you may think that it should be discrete points rather than a continuous line.)

4. Arrange cards side by side (not on top of one another) so I can see them as I walk round.

Everyone in your group should agree on
and be able to explain your choice.

Mathematics Assessment Project
CLASSROOM CHALLENGES

This lesson was designed and developed by the
Shell Center Team
at the
University of Nottingham
Malcolm Swan, Nichola Clarke, Clare Dawson, Sheila Evans
with
Hugh Burkhardt, Rita Crust, Andy Noyes, and Daniel Pead

It was refined on the basis of reports from teams of observers led by
David Foster, Mary Bouck, and Diane Schaefer
based on their observation of trials in US classrooms
along with comments from teachers and other users.

This project was conceived and directed for
MARS: Mathematics Assessment Resource Service
by
Alan Schoenfeld, Hugh Burkhardt, Daniel Pead, and Malcolm Swan
and based at the University of California, Berkeley

We are grateful to the many teachers, in the UK and the US, who trialed earlier versions of these materials in their classrooms, to their students, and to Judith Mills, Carol Hill, and Alvaro Villanueva who contributed to the design.

This development would not have been possible without the support of
Bill & Melinda Gates Foundation
We are particularly grateful to
Carina Wong, Melissa Chabran, and Jamie McKee

Illustrative Mathematics

A-REI, A-CED Cash Box

Alignment 1: A-REI.C.6, A-CED.A
Not yet tagged

Nola was selling tickets at the high school dance. At the end of the evening, she picked up the cash box and noticed a dollar lying on the floor next to it. She said,

> *I wonder whether the dollar belongs inside the cash box or not.*

The price of tickets for the dance was 1 ticket for $5 (for individuals) or 2 tickets for $8 (for couples). She looked inside the cash box and found $200 and ticket stubs for the 47 students in attendance. Does the dollar belong inside the cash box or not?

Commentary

The given solutions for this task involve the creation and solving of a system of two equations and two unknowns, with the caveat that the context of the problem implies that we are interested only in non-negative integer solutions. Indeed, in the first solution, we must also restrict our attention to the case that one of the variables is further *even*. This aspect of the task is illustrative of mathematical practice standard MP4 (Model with mathematics), and crucial as the system has an integer solution for both situations, that is, whether or not we include the dollar on the floor in the cash box or not. However, because the number of tickets sold to couples has to be even, we can determine if the dollar belongs in the cash box or not.

Alternate variants of the problem and its presentation are easy to come by (e.g., students could have a physical simulation -- a cash box with play money and ticket stubs available -- to further increase the cognitive demand on their modelling skills). Likewise, there are a variety of solution options: In addition to the two provided (and similar minor variants), there are some rather clever solution techniques which do not involve the creation or solution of a system of linear equalities. For example, students might reason that if all 47 tickets sold were individual tickets, there would be \$235 in the cash box. The presence of only \$200 in the cash box would imply that precisely 35 tickets were sold to couples, which is impossible as couples tickets are sold in pairs. Repeating the argument with \$201 in the cash box leads quickly to the correct solution. Solutions of this form should be encouraged and illustrate many of the mathematical practice standards (e.g., MP2 (reason abstractly and quantitatively)). Since it is possible to solve the problem without referencing systems of linear equations, the task is not recommended for directly assessing the aligned content standards.

Task adapted form a submission from Luke Biesecker, Math Teacher, Ferndale High School, Humboldt County, California.

Solution: System of linear equations

Let s be the number of tickets sold to individuals and c be the number of tickets sold to couples. We know that 47 tickets were sold so far, so we have $s + c = 47$.Since each individual's ticket is $\$5$, the total amount of money made by selling tickets to individuals is $5s$. Similarly, since each ticket sold to couples is $\$4$, the total amount of money made by selling tickets to couples is $4c$. The cash box contains $\$200$ total, so we have $5s + 4c = 200$.Thus, we can represent the situation with a system of equations:

$$s + c = 47$$
$$5s + 4c = 200$$

Does this system of two equations in two unknowns have a positive integer solution? Furthermore, c has to be even, since tickets sold to couples were only sold in sets of 2.
Solving the first equation for s we have

$$s = 47 - c.$$

Substituting for s in the second equation we obtain

$$5(47 - c) + 4c = 200.$$

Distributing and collecting like terms we have

$$235 - c = 200.$$

Therefore, $c = 35$and $s = 12$ This means that without the found extra dollar in the cash box, 35 tickets were sold to couples and 12 tickets were sold to individuals. This is not possible, since couples tickets were only sold in sets of 2.

First indications are that the $\$1$ on the floor belongs in the cash box. To check this, we change the system of equations so that it reflects the extra $\$1$ in the cash box:

$$s + c = 47$$
$$5s + 4c = 201$$

The solution to the changed system of equations is $s = 13$and $c = 34$,so 13 tickets were sold to individuals and 34 tickets were sold to couples. This combination of tickets is indeed possible.
Note that it is not really necessary to solve the second system of equations in the standard way. We could just have argued that exchanging one couples' ticket for an individual's ticket would increase the money in the cash box from 200 to 201 and it would result in an even number of couples tickets sold.

Solution: System of linear equations, slight variant

We briefly outline a second way of modelling the problem: If we let s be the number of singles attending the dance, and c be the number of couples attending the dance (rather than the number of people attending as part of a couple), then the system of linear equations becomes instead

$$s + 2c = 47$$
$$5s + 8c = 200$$

which one checks as in the other solution does not have a solution in non-negative integers. On the other hand, the analogous system

$$s + 2c = 47$$
$$5s + 8c = 201$$

with solution $s = 13$and $c = 17$. So, as in the other solution, we conclude that the extra dollar belongs in the cash box, with 13 singles and 17 couples attending the dance.

NOT SO FAST

lesson guide

In most places, fines for speeding are based on how fast you're driving over the speed limit. In this lesson we'll write and solve equations to learn more about how speeding tickets are calculated.

How are fines different in regular vs. school/work zones, and is driving 80 in a 60 really the same as driving 40 in a 20? If not, are speeding tickets calculated fairly, and how would you calculate them if *you* were a police officer?

Students Will...

- Use the speeding ticket fine schedule (e.g. $61 fine + $6/mile over limit) to calculate sample speeding tickets
- Explain process in words, and write an equation for two types of tickets: regular & school/work zone
- Given a speeding ticket amount & type, solve equation to determine how fast a person was driving over the limit
- Correctly match speed limit, speedometer and fine
- Understand that fine is the same for driving *40 in a 25* as *20 in a 5*, even though they're proportionally very different
- Discuss whether speeding tickets are calculated fairly, and propose alternate methods for calculating them

Common Core Standards	Materials	Approximate Time
Grade 7 EE.4a Grade 8 EE.5, EE.7b, EE.8a, EE.8c, F.1, F.2, F.3, F.4	• Student Handout • Presentation • LCD projector & speakers	65-85 minutes

Preview

5 min.

This lesson is all about driving, and in particular, *bad* driving. Terrible, horrible, awful driving!

To preview the lesson, students are asked how many traffic violations they can come up with. They'll likely have an easy time with ones like running a red light, missing a stop sign, etc., but there are some really random ones, too. (For instance, did you know it's illegal to drive with headphones? I said, *DID YOU KNOW IT'S ILLEGAL TO DRIVE WITH HEADPHONES?*)

Consider having students work in groups & giving a prize to the group that comes up with the most. In the lesson we use the Virginia Pre-payable Offenses Information Sheet.

Follow-Up Questions

- Do you know anyone who's gotten a ticket recently? If so, what was it for and how much did it cost?
- It's illegal to "fail to pay full time and attention." What do you think that means? (This one's for you, text-messagers!)
- Do you think a "disabled parking violation" ($211) should cost more than running a red light ($161)?

Act One

15-20 min.

Students learn that there are two types of speeding tickets in Virginia and that they're calculated differently:

- Speeding (regular) : $6/mile over limit plus $61
- Speeding in a school/work zone: $7/mile over limit plus $61

Next, they watch six videos of someone speeding, including one of someone driving below the speed limit. They're shown the view of the road, the speedometer and the speed limit and must calculate the fine*. For instance:

40 in 35 mph work zone

$61 + $7(5)
Fine = $96

80 in a 60 mph zone

$61 + $6(20)
Fine = $181

In Act Two we'll have students write equations, but for now they'll simply explain in words how they calculated the fine. The goal is for them to think of the fine as having two parts: the $61 part, and the mph part.

**Note: you can expect students to ask whether they videos are real, i.e. whether the person is actually speeding. If so, please explain that the speedometer and windshield videos were filmed separately and were combined to make it "seem" like the driver was speeding. In terms of the 80 mph speedometer, there are 70 mph zones, so in this case we may have exceeded it a little...but c'mon: flow of traffic!*

Follow-Up Questions

- On the highway, it's common for everyone to drive faster than the speed limit. If the flow of traffic in a 60 mph zone is 70 mph, would you slow down and "do" the speed limit?
- What do you think is more dangerous: driving 10 miles over the speed limit, or 10 miles under?
- Do you think police officers would write you a ticket for doing 5 mph over? 10? 20?

Act Two

15-20 min.

Now we'll write equations. Students begin Act Two by looking at four sample equations for the regular speeding ticket and determining whether they'll yield the correct fine or not:

John	Tamara	Grace	Chen
S = speed L = speed limit	S = speed L = speed limit	S = speed L = speed limit	V = speed over limit
$T_R = 61 + 6(L - S)$ ✗	**$T_R = 61 + 6S - L$ ✗**	**$T_R = 6(S - L) + 61$ ✓**	**$T_R = 61V + 6$ ✗**
$T_R = 61 + 6(S - L)$ ✓	***$T_R = 61 + 6S - 6L$ ✓***		***$T_R = 61 + 6V$ ✓***

Some students may be able to eyeball them and determine that John, Tamara & Chen are wrong, and that Grace is right. Even still, it would still be a good idea for them to check their work, and they can simply use one of the speeding ticket examples from Act One to do so.

Once students understand that there are various ways to write equations – indeed, that there are different variables, too – they write their own. The goal is to write as many correct equations as possible, and as many incorrect ones, too. The reason for writing incorrect equations is simple: if students know why something is wrong, they'll be less likely to repeat the mistake later!

Regular Speeding Ticket (T_R)	
Correct (✓)	**Incorrect (✗)**
$61 + 6(S - L)$ $6(S - L) + 61$ $6S - 6L + 61$ $61 + 6S - 6L$ $-6L + 6S + 61$ etc. $6V + 61$ $61 + 6V$	Good grief, there are too many to count.

Speeding Ticket in a School/Work Zone (T_Z)	
Correct (✓)	**Incorrect (✗)**
$61 + 7(S - L)$ $7(S - L) + 61$ $7S - 7L + 61$ $71 + 7S - 6L$ $-7L + 7S + 61$ etc. $7V + 61$ $61 + 7V$	Yikes.

To end the section, students are told that a friend received a $145 ticket for speeding in a school zone and must write down everything they know about how fast he was driving. What they're really doing, of course, is solving the equation $61 + 7V = 145$. The goal is for them to explain their thinking, and their thought process might go something like:

		61 + 7V	**=**	**145**
Step 1:	Of the $145, $61 is for the fee. When I get rid of this...	– 61		– 61
Step 2:	I know that the "speeding part" was $84.	**7V**	**=**	**84**
Step 3:	If he had to pay $7 for every mile an hour, then $84 would mean...	÷ 7		÷ 7
Step 4:	He was driving 12 mph over the limit.	**V**	**=**	**12**

On the other hand, if the friend received a ticket for $200, this would correspond to a "speeding part" of $139. This would mean the friend was traveling 23.17 mph (regular zone) or 19.86 mph (work/school zone) over the limit, which isn't possible. Radar guns aren't this accurate, so we know that this ticket can't exist! The only tickets that are possible are those where the speeding part is divisible by 6, 7 or both.

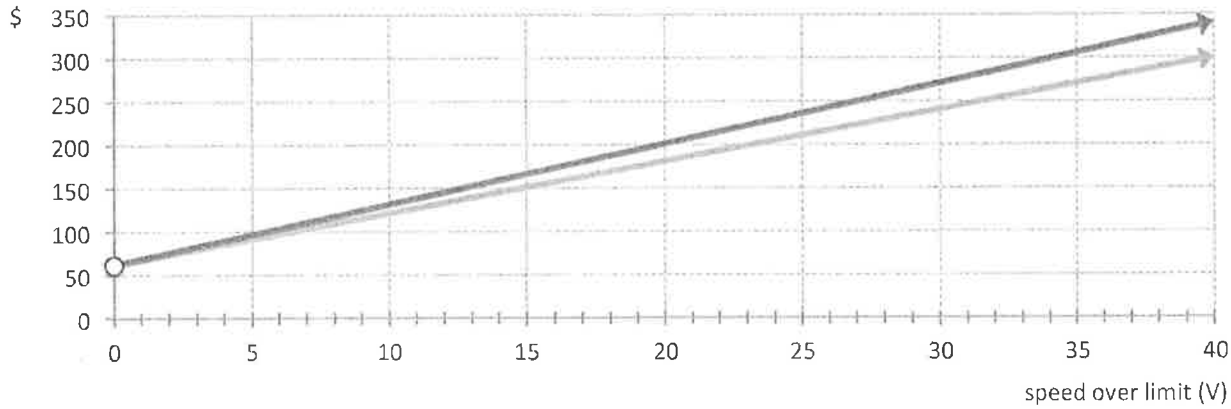
Follow-Up Questions

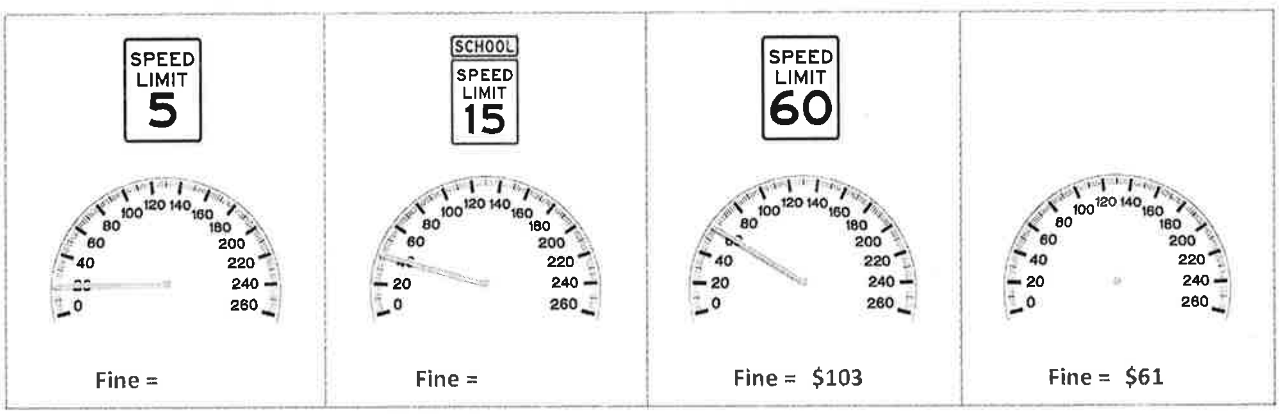
- Which set of variables do you prefer – S & L, or V – and why?
- If you're given a speeding ticket fine, how can you quickly determine whether it's legitimate/possible or not?

Act Three

15-20 min.

In Act Three students are shown the graphs for the regular & school/work zone speeding tickets, and use it – as well as the algebraic thinking from Act Two – to fill in missing information from a speed limit, speedometer & fine. For instance:





This should be relatively straightforward for students, and they may enjoy working in small groups. For some they'll be able to use the graph. For others the graph won't be precise enough; they can use it to get an approximation of the answer, but will have to use an algebraic/logical route to get the exact answer.

However, there are two scenarios that aren't possible to determine with any certainty, namely the third & fourth examples above. If the speeding fine is $103, the "speeding part" is $42. This means the driver was either going 7 mph over the speed limit (in a regular zone) or 6 mph over (in a school/work zone). This would correspond to either a 53 mph regular speed limit, or a 54 mph school/work zone speed limit. Of course, neither of these are actual speed limits, anyway, so students should notice something is funky and move on.

On the other hand, a $61 fine is straight-up impossible. This would mean the person is going 0 mph over the speed limit...in which case they wouldn't have gotten pulled over. (Maybe they have a busted tail light, but from the Preview activity we know that this would cost $91: *Equipment Violation.*)

Follow-Up Questions

- Which line is steeper (i.e. which has the steeper slope) and what does this mean?
- What does it mean that the graphs "start" at $61, i.e. the y-intercept is $61? Is the fine for 0 mph over the limit $61??
- Some speed ticket amounts are possible for *both* regular & school zones. Can you figure out what they are? (Ans: any tickets where the "speeding part" is divisible by both 6 & 7, e.g. 42, 84, etc. Therefore 42 + 61 = $103 works for both, as does $145, $206, etc.)

Act Four

10-15 min.

In Act Four we're going to put a different spin on things. By this point students should be very comfortable calculating speeding tickets...but are speeding fines calculated *fairly?* That's what we'll discuss now.

To begin, students compare two different speeding scenarios, e.g. 40 in a 25 vs. 20 in a 5. These will obviously incur the same fine, but is the "amount" of speeding really the same when compared to the speed limit? In the first case (25 mph zone), the additional speed (15 mph) is only 3/5^{ths} the limit, but in the second case it's *three times* the limit. Put another way, 15mph isn't much when compared to 40 mph, but it's a lot compared to 5 mph!

For each pair, students will decide which speeding scenario they think *should* result in a higher fine and why. Mathematically, you might encourage them to describe the speed differences in as many ways as possible, e.g.

		Comparing *additional* speed (15 mph) to limit			**Comparing *actual* speed to limit**
40 mph in a 25 mph zone	15 mph over	3/5^{ths} over the limit	For every 5 mph you're allowed, you're going an additional 3	60% over the limit	Driving speed is 1.6x = 160% of speed limit
20 mph in a 5 mph zone	15 mph over	3x over the limit	For every 1 mph you're allowed, you're going an additional 3	300% over the limit	Driving speed is 4x = 400% of speed limit

To end the main lesson, students imagine they're the police chief for their town or city and determine how they would (re)write the rules for calculating speeding tickets. Answers may vary, and it might be valuable for students to work together in groups to come up with a plan. Some groups may decide that speeding fines should be based on the percent that someone goes over, e.g. $2 for every percent. Others might stick with the current plan, but add additional fines for speeding in heavily populated areas or in bad weather.

However they do it, students should be able to justify their thinking. After all, they're going to have some angry motorists to answer to, and they'll want to be prepared!

Follow-Up Questions

- What do you think would happen if speeding fines were proportional to the speeding amount? (Answers may vary, but it might certainly be strange if the ticket for doing 10 in a 5 were the same as 120 in a 60!!)
- How are speeding tickets calculated in your city/town?
- Do you think police officers have any discretion in how or even whether they write ticket? (Ans: they do. I spoke to some police officers about this, and they said they rarely write tickets on highways – it's too dangerous to get into a high-speed chase – and tend to be more vigilant when the weather is bad or when there are a lot of pedestrians.)

Just One More

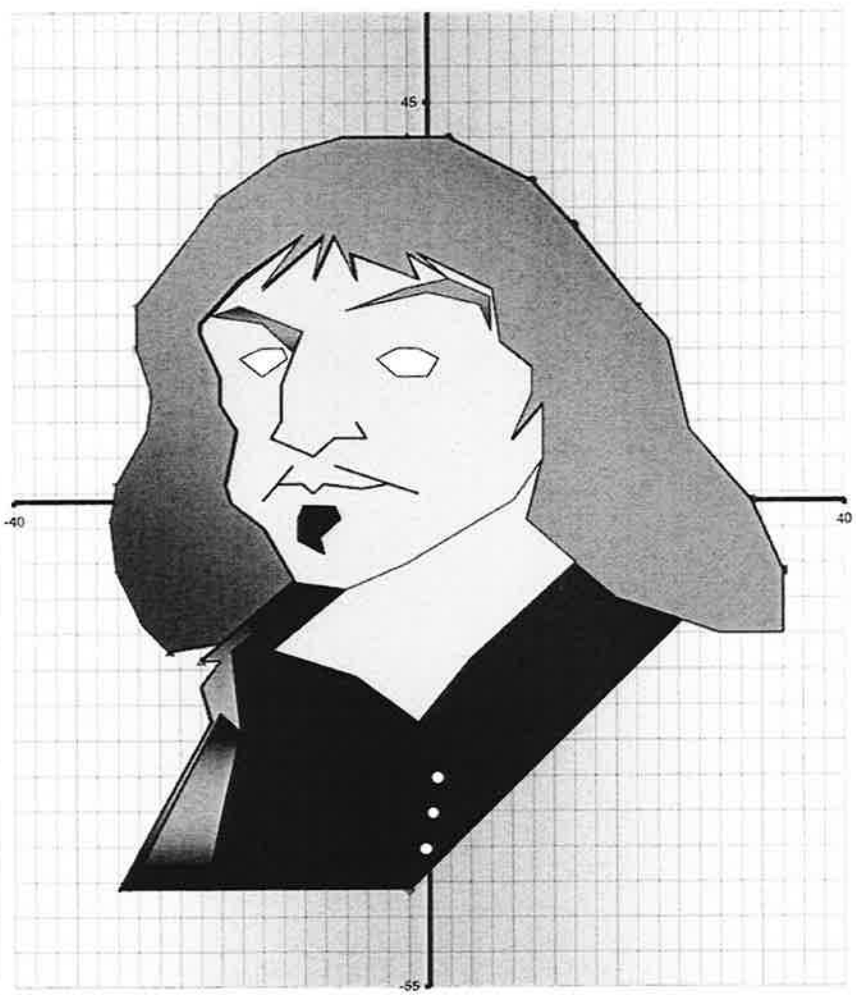
5 min.

Is this fair? Similar to Act Four, should going 20 mph over the speed limit, or going 80 mph, *always* be considered reckless? What if the speed limit is 70 mph??

Reckless Driving (Felony or Misdemeanor)

- Reckless driving - speeding in excess of 80 mph (11 years)
- Reckless driving - speeding 20 mph or more above the posted speed limit (11 years)

RENE DESCARTES
(1596-1650)



Rene Descartes by Matthew Lung, HTH, 9th grade.

Graph-It Design

Alfred Solis, Math/Physics, High Tech High

For the Graph-It Design project, each student used Excel software to create their own "mathterpiece" of an image pertaining to a historical figure. Students identified 124 sets of data points from an image of their choice, and derived 25 different linear equations to reproduce the image. They then presented and displayed their work gallery-style during an exhibition night.

Teacher Reflection

As a teacher, I enjoy leveraging the power of Excel in different ways. In this case, it helped me to integrate art and mathematics. Also, Excel software acts like a video game because it assesses students' work in real-time. When they entered data points and equations, they could see whether or not it aligned with the original image. This instant feedback made them check their work every step of the way. This taught perseverance, because even though the graphs involved a lot of work, the students wanted them to look great for the exhibition.

—Al Solis

Student Reflection

Pictures can easily be drawn or taken, but this project proved to be not as simple. We used Excel to draw our picture, but rather than drawing in lines, we calculated the equations for each straight line on an x-y axis and entered the equations into Excel. The first thing that I did once I had my picture was to plot the points on an x-y graph. Then I connected the dots and started to solve for the equations of my lines. Even though we were only required to solve for 25 lines, I solved for my entire portrait of Rene Descartes. In the end, I was really proud of the fact that I did not draw any lines and I was amazed at how well my picture looked compared to the real portrait. I was in awe as the lines popped up onto the screen as I entered in the equations. It really helped me visualize line equations. From this single project we learned about a vast range of concepts, from slope, y-intercept, equations of lines, parallel lines, perpendicular lines, and to how to graph lines in Excel.

—Matthew Lung, 9th grade

To learn more about this project and others visit the HTH Digital Commons and Alfred Solis' digital portfolio at http://www.hightechhigh.org/ and http://staff.hightechhigh.org/~asolis/

Illustrative Mathematics

F-LE, A-REI Population and Food Supply

Alignment 1: F-LE.A.2, F-LE.A.3, A-REI.D.11

The population of a country is initially 2 million people and is increasing at 4% per year. The country's annual food supply is initially adequate for 4 million people and is increasing at a constant rate adequate for an additional 0.5 million people per year.

a. Based on these assumptions, in approximately what year will this country first experience shortages of food?

b. If the country doubled its initial food supply and maintained a constant rate of increase in the supply adequate for an additional 0.5 million people per year, would shortages still occur? In approximately which year?

c. If the country doubled the rate at which its food supply increases, in addition to doubling its initial food supply, would shortages still occur?

Commentary:
In this task students construct and compare linear and exponential functions and find where the two functions intersect (F-LE.2, F-LE.3, A-REI.11).

One purpose of this task is to demonstrate that exponential functions grow faster than linear functions even if the linear function has a higher initial value and even if we increase the slope of the line. This task could be used as an introduction to this idea. The steps in this task require students to find linear and exponential functions from verbal descriptions. If they previously learned how to do this, the task can be completed independently. So they can practice previously learned skills and explore the idea of the dominance of exponential over linear functions at the same time.

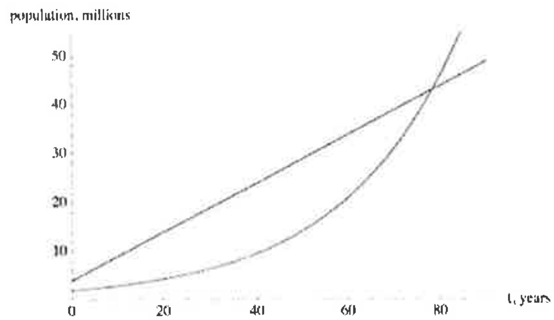
Solution: Finding intersection points

a. We can first express the country's population, $p(t)$, in millions of people, as a function of the time t, measured in years from the initial time. Since we know the initial population $p(0) = 2$ and the annual growth rate is 4%, then $p(t)$ is an exponential function:

$$p(t) = 2(1.04)^t.$$

We are also given that the food supply grows at a constant rate. So we can express the country's food supply at time t, which we call $f(t)$, as a linear function of t. Again, we know the initial value $f(0) = 4$ and the constant rate of change is 0.5 million people per year, so we have:

$$f(t) = 4 + .5t.$$



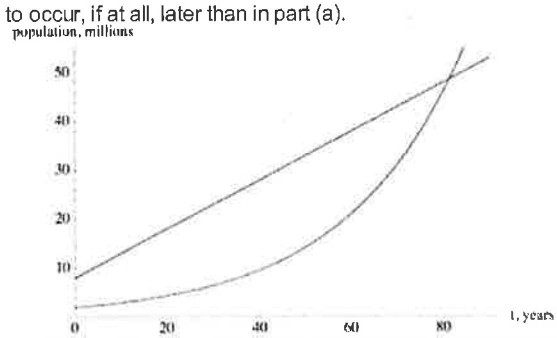
We are looking for the value of t which makes $p(t)$ greater than $f(t)$ for the first time.

We see from the graph that the two functions intersect at around $t = 78$. So after 78 years the food supply is just barely enough for the country's population. After this point, however, we see that $p(t) > f(t)$, so this country will first experience shortages of food after approximately 78 years.

b. If the country doubled its initial food supply, our new function for the food supply would be

$$h(t) = 8 + .5t$$

We would expect food shortages to occur, if at all, later than in part (a).

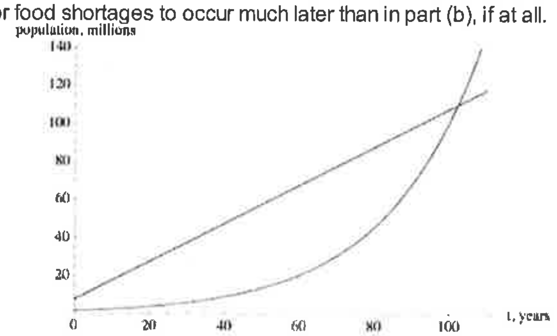


Again looking at the graph, we see that the two functions intersect, and so food shortages would still occur. We find $p(t) = h(t)$ at roughly $t = 81$. So, the country will first experience food shortages after 81 years. So doubling the initial food supply delays the eventual food shortage by only 3 years.

c. If the country doubled the rate at which its food supply increases, in addition to doubling its initial food supply, we have the new food supply function:

$$j(t) = 8 + t$$

We would expect, in this case, for food shortages to occur much later than in part (b), if at all.



Looking at the graph we see that this time the food shortage occurs at $t = 103$, about 25 years later than in part (a).

Examining the behavior of the exponential function more closely we observe, that the slope of the exponential function keeps increasing whereas the slope of any linear function is constant. Even if a linear function has a very large slope, an exponential function will eventually grow even faster and overtake the linear function.

Illustrative Mathematics

8.EE Summer Swimming

Alignment 1: 8.EE.C.8.c
Not yet tagged

The local swim center is making a special offer. They usually charge $7 per day to swim at the pool. This month swimmers can pay an enrollment fee of $30 and then the daily pass will only be $4 per day.

a. Suppose you do not take the special offer. Write an equation that represents the amount of money you would spend based on how many days you go to the pool if the passes were bought at full price.

b. Write a second equation that represents the amount of money you would spend if you decided to take the special offer.

c. Graph your two equations from part (a) and (b).

d. After how many days of visiting the pool will the special offer be a better deal? How can you tell algebraically? How can you see this graphically?

e. You only have $60 to spend for the summer on visiting this pool. Which offer would you take? Explain.

Commentary

The purpose of this task is for students to represent relationships between quantities in a context with equations and interpret the resulting system of equations in the context. This task has a wide array of uses: it could be an introductory task to systems of equations or used in assessment. The task initially has the students write out different equations for two different scenarios. Then the students can consider the two equations together, which naturally leads into a discussion on the point of intersection of two graphs and into systems of equations. Students are asked to reason abstractly and make sense of the representations of the relationships between two quantities in the context (MP2).

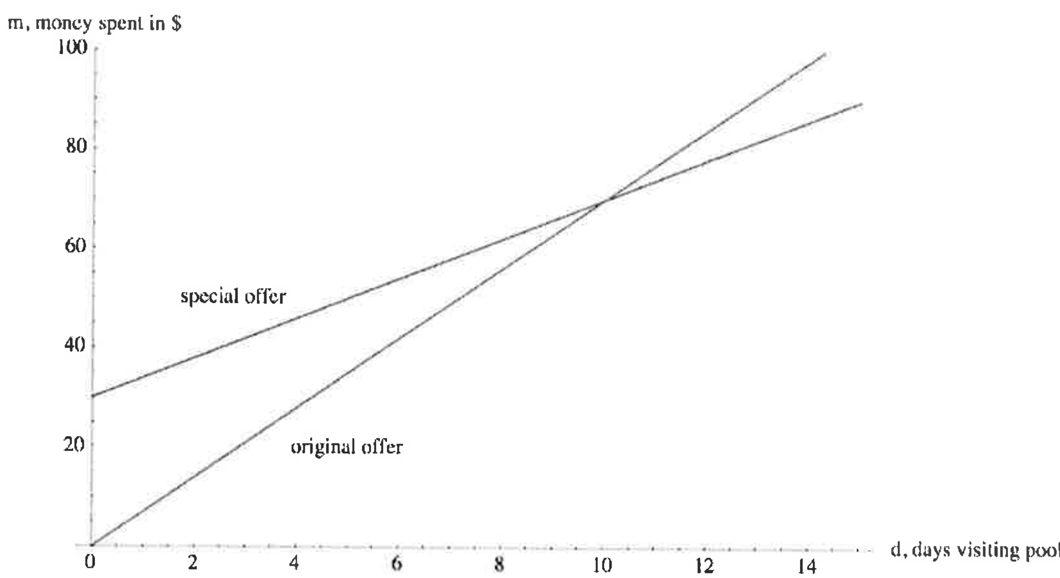
This task also asks the student to not only consider what m (the amount of money they spend) would be for different values of d (the number of days they swim) but what would d be for a certain value of m. Although it is not mentioned in the solution until part (e), this task also provides a good opportunity to discuss the fact that only integer values of d make sense in this context, although we make a continuous line in our graphs. We do this to see the general trend and compare the two relationships more easily, and because we are asked to graph our equations, not a table of discrete values.

Solution: 1

a. Let m represent the amount of money you spend, and let d represent the number of days you go to the pool. At full price, you would spend \$7 per day, so $m = 7d$ represents the amount of money you would spend without the special offer.

b. Again, let m represent the amount of money you spend, and let d represent the number of days you go to the pool. With the special offer, you would spend \$30 once, and then \$4 per day, so $m = 4d + 30$ represents the amount of money you would spend with the special offer.

c. We can graph these equations on the same set of axes:



d. When considering when the special offer will become a better deal, we want to find out after how many days we will be spending less money than with the full price passes. For example, after 3 days, the full price offer will cost us \$21 dollars and the special offer will cost us \$39, so the special will cost more. We see that this is because of the initial fee of \$30.

Algebraically, we can determine exactly when the special offer costs the same amount as the standard price by setting our two expressions for m equal to each other and solving for d.

$$4d + 30 = 7d$$

$$30 = 3d$$

$$d = 10.$$

So, when $d = 10$, or on the 10th day, the special offer and the original will have cost us the same amount of money:

$$m = 7(10) = 70$$

and

$$m = 4(10) + 30 = 70.$$

Because on the 11th day, and every day thereafter, the special offer will cost less ($4 a day versus $7 a day), we can conclude that after the 10th day is when the special offer becomes a better deal.

Graphically, we can see that the graph of the special offer drops below the graph of the original offer after $d = 10$ and as lower translates into less money spent, we can see our conclusion in the graph, as well.

e. We have a total of $60 to spend, and so $m = 60$ We can substitute this into the equation for each offer.

Special offer:

$$60 = 4d + 30 \implies 30 = 4d \implies \frac{30}{4} = 7.5 = d$$

Since d represents days, and we can only go for full days, .5 of a day does not make sense, and so we find that with $60, we can go to the pool for 7 days if we take the special offer.

Original offer:

$$60 = 7d \implies \frac{60}{7} = 8\frac{4}{7} = d$$

Again, we cannot visit the swim center for $\frac{4}{7}$ of a day, and so with $60 we are able to go for a full 8 days if we take the full price offer.

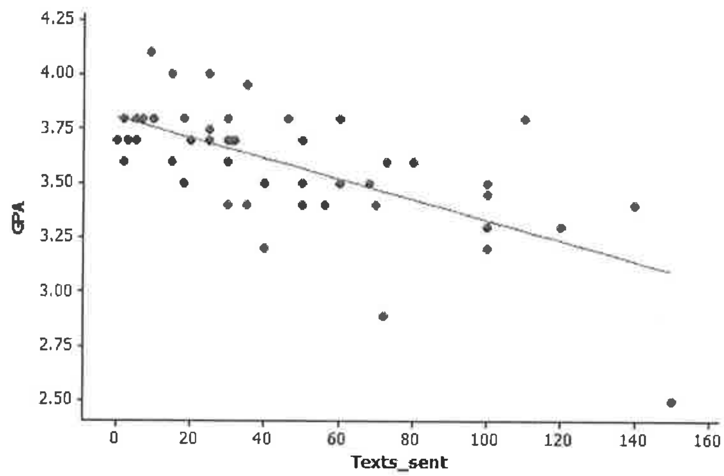
Therefore, we should take the original offer if we only have $60 to spend, because we can go for an additional day over the special offer.

Illustrative Mathematics

S-ID.7 Texting and Grades II

Alignment 1: S-ID.C.7
Not yet tagged

Medhavi suspects that there is a relationship between the number of text messages high school students send and their academic achievement. To explore this, she asks a random sample of 52 students at her school how many text messages they sent yesterday and what their grade point average (GPA) was during the most recent marking period. Her data are summarized in the scatter plot below. The least squares regression line is also shown.



The equation of the least squares regression line is $\widehat{GPA} = 3.8 - 0.005(\text{Texts sent})$ Interpret the quantities -0.005 and 3.8 in the context of these data.

Commentary

The purpose of this task is to assess ability to interpret the slope and intercept of the least squares regression line in context. There are two common errors that students make when interpreting the slope. Students may not make it clear that the slope is the *predicted* change (not necessarily an actual change) in GPA associated with an increase of 1 in number of text messages sent. They also often do not clearly communicate that the slope describes *change*

You might want to point out that in a linear regression setting, it is not always reasonable to interpret the intercept as the predicted y value when x = 0, as this often involves extrapolation far beyond the range of the x values in the data set. In this example, however, it is appropriate because there are observations with x = 0 in the data set.

You can also point out that the interpretation of the slope and intercept represents a generalization from the sample of 52 students to the population of all students at the school. This is appropriate becasue the sample was a random sample of students from the school.

Although this task is short and looks simple, some of the points brought out in this task are subtle. It might be a good strategy to engage in a whole class discussion of the correct interpretations.

Solution: Solution

Interpretation of the slope: For students at this school, the predicted GPA decreases by 0.005 for each additional text messaage sent OR GPA desreases by 0.005, on average, for each additional text message sent.

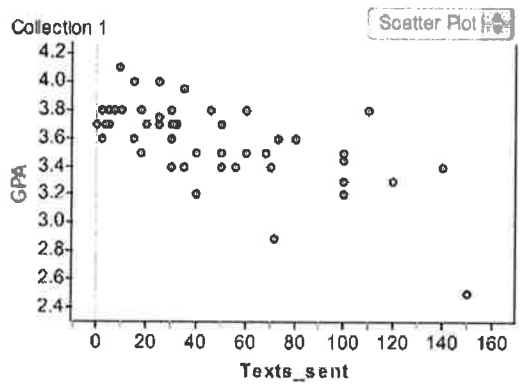
Interpretation of intercept: The model predicts that students at this school who send no text messages have, on average, a GPA of 3.8.

Illustrative Mathematics

8-SP.1 Texting and Grades I

Alignment 1: 8.SP.A.1

Medhavi suspects that there is a relationship between the number of text messages high school students send and their academic achievement. To explore this, she asks each student in a random sample of 52 students from her school how many text messages he or she sent yesterday and what his or her grade point average (GPA) was during the most recent marking period. The data are summarized in the scatter plot of number of text messages sent versus GPA shown below.



Describe the relationship between number of text messages sent and GPA. Discuss both the overall pattern and any deviations from the pattern.

Commentary:
The student should address the form of the relationship (linear, curved, etc.), direction (positive or negative), and strength of the relationship between the two variables, and also point out any unusual observations.

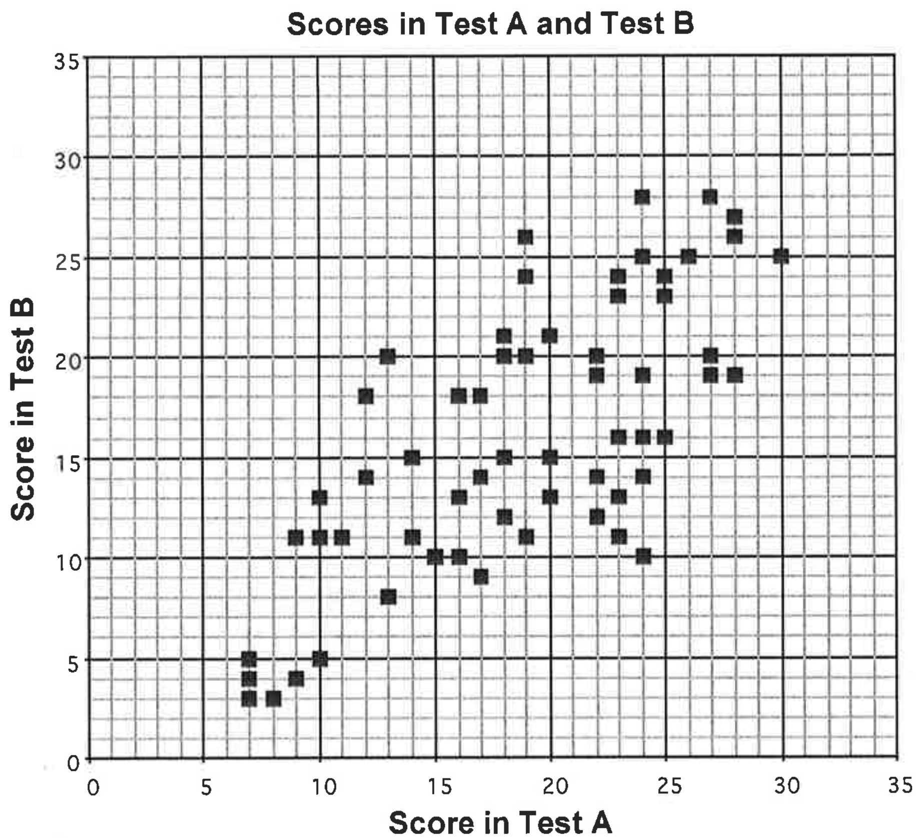
Solution: Possible Solution

The scatter plot shows a moderate negative linear relationship between the number of texts a student sends and his or her GPA. There is one outlier that has a particularly low GPA and high number of texts sent, though it is in keeping with the overall pattern. It appears that students who send more text messages tend to have lower GPAs.

	Scatter Diagram	points	section points
1	Point correctly plotted	1	1
2	Line of best fit drawn, passing through mean point and with gradient between 0.6 an 1	2	
	Line of best fit can be used to estimate a students' score in one test if you know the score in the other	1	3
3	√	1	
	No. Lowest score on Test A is 7 and on Test B is 3	2	
	√	1	
	No. Student with highest score on Test A got 25 on Test B but the highest score was 28	1	
	No. The biggest difference is 16	1	6
	Total Points		**10**

Scatter Diagram

A group of 66 students took two tests; Test A and Test B.
In the scatter diagram, each square represents one student and shows the scores that student got in the two tests.



1. The mean score for Test A was 19 and the mean score for Test B was 16.

   Plot a point to show this on the scatter diagram.

2. Draw a line of best fit on the scatter diagram.

   How can a line of best fit be used?

   ____

   ____

3. Here are five statements about the scores shown on the scatter diagram.
   If a statement is true check (√) it.
   If it is not true, write a correct statement.

Statement	Check (√) or write correct statement
The scatter diagram shows positive correlation between the scores on Test A and the scores on Test B.	
The lowest score on Test A is lower than the lowest score for Test B.	
The range of scores on Test B is 25.	
The student with the highest score on Test A also has the highest score on Test B.	
The biggest difference between a student's scores on the two tests is 5.	

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP

UNIT OVERVIEW

This packet contains a curriculum-embedded CCLS aligned task and instructional supports. The task is embedded in a 4-5 week unit on Reasoning with Equations and Inequalities.

TASK DETAILS

Task Name: The Cycle Shop

Grade: High School Algebra (Algebra 1)

Subject: Mathematics

Depth of Knowledge: 3

Task Description: The tasks in the unit access the full range of *Depth of Knowledge* including Recalling and Recognizing, Using Procedures, Explaining and Concluding and Making Connections, Extensions and Justifying.

Standards Assessed:

A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify the solution method.

A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Standards for Mathematical Practice:

MP.1 Make sense of problems and persevere in solving them.

MP.3 Construct viable arguments and critique the reasoning of others.

MP.4 Model with mathematics.

MP.7 Look for and make use of structure.

Department of Education
Dennis M. Walcott Chancellor

TABLE OF CONTENTS

The task and instructional supports in the following pages are designed to help educators understand and implement tasks that are embedded in Common Core-aligned curricula. While the focus for the 2011-2012 Instructional Expectations is on engaging students in Common Core-aligned culminating tasks, it is imperative that the tasks are embedded in units of study that are also aligned to the new standards. Rather than asking teachers to introduce a task into the semester without context, this work is intended to encourage analysis of student and teacher work to understand what alignment looks like. We have learned through the 2010-2011 Common Core pilots that beginning with rigorous assessments drives significant shifts in curriculum and pedagogy. Universal Design for Learning (UDL) support is included to ensure multiple entry points for all learners, including students with disabilities and English language learners.

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP PERFORMANCE TASK

Department of Education
Dennis M. Walcott Chancellor

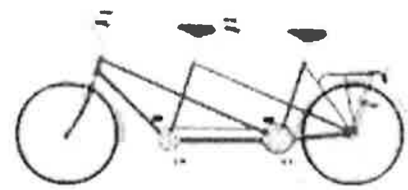
Performance Task

The Cycle Shop

You work for a small business that sells bicycles, tricycles, and tandem bikes. Bicycles have one seat, two pedals and two wheels. Tricycles have one seat, two pedals, and three wheels. Tandem bikes have two seats, four pedals and two wheels.

Bicycle

Tricycle



Tandem Bike

1. On Monday you counted 48 tricycle wheels.

   How many tricycles were in the shop? ________________.

   Write an algebraic equation that shows the relationship between the number of wheels (**w**) and the number of tricycles (**t**).

2. On Wednesday there were **no** tandem bikes in the shop. There were only bicycles and tricycles. There are a total of 24 seats and 61 wheels in the shop. How many bicycles and how many triangles are in the shop?

   ____

   Show how you figured it out using algebra.

Performance Task

The Cycle Shop

3. A month later, there are a different number of bicycles, tricycles tandem bikes in the shop. There are a total of 144 front steering handlebars, 378 pedals, and 320 wheels.

How many bicycles, tricycles and tandem bikes are in the shop?

____

Explain your solution.

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP RUBRIC

The rubric section contains a scoring guide and performance level descriptions for the Cycle Shop task.

Scoring Guide: The scoring guide is designed specifically to each small performance task. The points highlight each specific piece of student thinking and explanation required of the task and help teachers see common misconceptions (which errors or incorrect explanations) keep happening across several papers. The scoring guide can then be used to refer back to the performance level descriptions.

Performance Level Descriptions: Performance level descriptions help teachers think about the overall qualities of work for each task by providing information about the expected level of performance for students. Performance level descriptions provide score ranges for each level, which are assessed using the scoring guide.

High School Algebra: The Cycle Shop
Scoring Guide

Cycle Shop	Rubric	
The core elements of performance required by this task are: • modelling a situation using systems of equations • determining unknowns using multiple constraints • solving equations Based on these, credit for specific aspects of performance should be assigned as follows	points	section points
1. Gives correct answers **16** tricycles	1	
Writes an equation such as: t = w/3	1	2
2. Gives correct answer: **11** bicycles and **13** tricycles	2x1	
Show correct work such as: t: number of tricycles and b: number of bicycles 24 = t + b and 61 = 3t + 2b so 61 = 3(24 – b) + 2b and b = 11 and t = 13	1	3
3. Gives correct answer: **67** bicycles, **32** tricycle, **45** tandem bikes	1	
Gives an explanation such as: t: number of tricycles b: number of bicycles n: number tandem bikes 144 = t + b + n 378 = 2t + 2b + 4n 320 = 3t + 2b + 2n	1	
(320 = 3t + 2b + 2n) - (288 =2t + 2b + 2n) results in t = 32	1	
Substituting for t and using equations 1 & 2 (112 = b + n) – (314 = 2b + 4n) results in n = 45	1	
Substituting for t and n in first equation: 144 = 32 + b + 45 results in b = 67		3
Total Points		**8**

High School Algebra: The Cycle Shop
Rubric

Performance Level Descriptions and Cut Scores
Performance is reported at four levels: 1 through 4, with 4 as the highest.

Level 1: Demonstrates Minimal Success (0 -2 points)
The student's response shows few of the elements of performance that the tasks demand as defined by the CCLS. The work shows a minimal attempt on the problem and struggles to make a coherent attack on the problem. Communication is limited and shows minimal reasoning. The student responses rarely uses definitions in their explanations. The students struggle to recognize patterns or the structure of the problem situation.

Level 2: Performance Below Standard (3 – 4 points)
The student's response shows some of the elements of performance that the tasks demand and some signs of a coherent attack on the core of some of the problems as defined by the CCSS. However, the shortcomings are substantial and the evidence suggests that the student would not be able to produce high-quality solutions without significant further instruction. The student might ignore or fail to address some of the constraints of the problem. The student may occasionally make sense of quantities in relationships in the problem, but their use of quantity is limited or not fully developed. The student response may not state assumptions, definitions, and previously established results. While the student makes an attack on the problem it is incomplete. The student may recognize some patterns or structures, but has trouble generalizing or using them to solve the problem.

Level 3: Performance at Standard (5 – 6 points)
For most of the task, the student's response shows the main elements of performance that the tasks demand as defined by the CCSS and is organized as a coherent attack on the core of the problem. There are errors or omissions, some of which may be important, but of a kind that the student could well fix, with more time for checking and revision and some limited help. The student explains the problem and identifies constraints. Students make sense of quantities and their relationships in the problem situations. They often use abstractions to represent a problem symbolically or with other mathematical representations. The student response may use assumptions, definitions, and previously established results in constructing arguments. They may make conjectures and build a logical progression of statements to explore the truth of their conjectures. The student might discern patterns or structures and make connections between representations.

Level 4: Achieves Standards at a High Level (7 – 8 points)
The student's response meets the demands of nearly all of the tasks as defined by the CCSS, with few errors. With some more time for checking and revision, excellent solutions would seem likely. The student response shows understanding and use of stated assumptions, definitions and previously established results in construction arguments. The student is able to make conjectures and build a logical progression of statements to explore the truth of their conjecture. The student response routinely interprets their mathematical results in the context of the situation and reflects on whether the results make sense. The communication is precise, using definitions clearly. Students look closely to discern a pattern or structure. The body of work looks at the overall situation of the problem and process, while attending to the details

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP ANNOTATED STUDENT WORK

This section contains annotated student work at a range of score points. The student work shows examples of student understandings and misunderstandings of the task. This section contains annotated student work at a range of score points and implications for instruction for each performance level (excluding the expert level). The student work and annotations are intended to support teachers, showing examples of student understandings and misunderstandings of the task. The annotated student work and implications for instruction can be used to understand how to move students to the next performance level.

High School Algebra: The Cycle Shop
Annotated Student Work

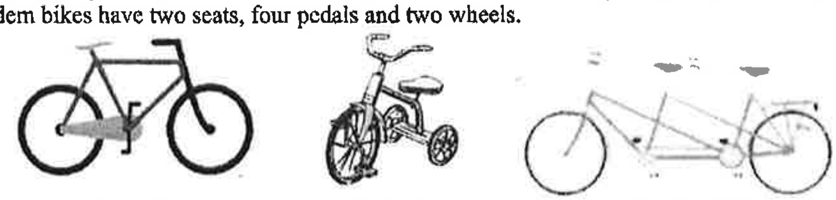
Level 4: Achieves Standards at a High Level (Score Range 7 – 8)

The student's response nearly meets the demands of the entire task, with few errors. With more time for checking and revisions, excellent solutions would seem likely. The student response shows understanding and use of stated assumptions, definitions and previously established results in constructing arguments. The student is able to make conjectures and build a logical progression of statements to explore the truth of their conjecture. The student response routinely interprets their mathematical results in the context of the situation and reflects on whether the results make sense. The communication is precise, using definitions clearly. The students look closely to discern a pattern or structure. The body of work looks at the overall situation of the problem and process, while attending to the details.

STUDENT A – Level 4

Student A achieved standards at a high level (4) with a score of 8. The student demonstrates understanding of all parts of the task and provides written work that illustrates and justifies solutions.

You work for a small business that sells bicycles, tricycles, and tandem bikes. Bicycles have one seat, two pedals and two wheels. Tricycles have one seat, two pedals, and three wheels. Tandem bikes have two seats, four pedals and two wheels.



Bicycle **Tricycle** **Tandem Bike**

1. On Monday you counted 48 tricycle wheels.

   How many tricycles were in the shop? 16

   Write an algebraic equation that shows the relationship between the number of wheels (**w**) and the number of tricycles (**t**).

   W = 3t

The student was able to find the answer to the number of tricycles and was able to create an equation to represent the situation. A-REI.3 & MP4

In part two, the student models the situation using two equations. The student labels the variables, show a solution path for solving the system and then checks the solutions. A-REI.1, A-REI.6 MP1, MP3 & MP4

2. On Wednesday there were **no** tandem bikes in the shop. There were only bicycles and tricycles. There are a total of 24 seats and 61 wheels in the shop. How many bicycles and how many triangles are in the shop?

   11 bikes and 13 tricycles

   Show how you figured it out.

T : Tricycles
B : Bicycles
2B + 3T = 61
B + T = 24
check : 11 + 13 = 24
22 + 39 = 61

2B + 3T = 61
2B + 2T = 48

T = 13
B = 11

High School Algebra: The Cycle Shop
Annotated Student Work

STUDENT A – Level 4 continued

3. A month later, there are a different number of bicycles, tricycles tandem bikes in the shop. There are a total of 144 front steering handlebars, 378 pedals, and 320 wheels.

How many bicycles, tricycles and tandem bikes are in the shop?

67 Bicycles, 32 tricycles, 45 tandem bicycles

Explain your solution.

B = Bicycles

T = Tricycles

N = Tandem Bikes

EQ1: $B + T + N = 144$

EQ2: $2B + 2T + 4N = 378$

EQ3: $2B + 3T + 2N = 320$

Compare EQ1 + EQ3

$2B + 3T + 2N = 320$

$- \; 2B + 2T + 2N = 288$

$T = 32$

Compare EQ1 + EQ2

$2B + 64 + 4N = 378$

$2B + 64 + 2N = 288$

$2N = 90$

$N = 45$

so $B + 32 + 45 = 144$

$B = 67$

The student presents a clear solution to part 3. The variables and values are labeled. The student modeled the situation using a system of three equations. The work showed how the equations were used to find solutions. The values were then checked to verify the solution. The student demonstrated skills in the following standards: A-REI.1, A-REI.6, MP1, MP3, MP4 & MP7.

High School Algebra: The Cycle Shop
Annotated Student Work

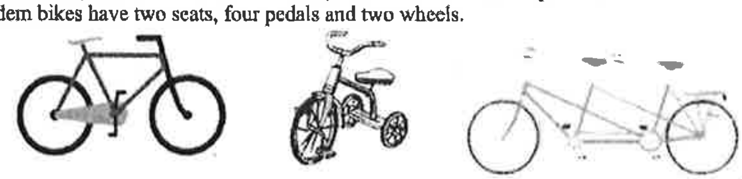
Level 3: Performance at Standard (Score Range 5 - 6)

For most of the task, the student's response shows the main elements of performance that the tasks demand and is organized as a coherent attack on the core of the problem. There are errors or omissions, some of which may be important, but of a kind that the student could well fix, with more time for checking, revision and some limited help. The student explains the problem and identifies constraints. The student makes sense of quantities and their relationships in the problem situations. S/he often use abstractions to represent a problem symbolically or with other mathematical representations. The students response may use assumptions, definitions, and previously established results in constructing arguments. They may make conjectures and build a logical progression of statements to explore the truth of their conjectures. The student might discern patterns or structures and make connections between representations.

STUDENT B – Level 3

Student B met standard (Level 3) with a score of 5. This student showed understanding of using both constraints to find two unknowns, but the same strategy was more difficult for three constraints and three unknowns.

You work for a small business that sells bicycles, tricycles, and tandem bikes. Bicycles have one seat, two pedals and two wheels. Tricycles have one seat, two pedals, and three wheels. Tandem bikes have two seats, four pedals and two wheels.



Bicycle **Tricycle** **Tandem Bike**

The student was able to find the answer to the number of tricycles and was able to create an equation to represent the situation. A-REI.3 & MP4

1. On Monday you counted 48 tricycle wheels.

   How many tricycles were in the shop? 16 Tricycle

   Write an algebraic equation that shows the relationship between the number of wheels (w) and the number of tricycles (t).

   $3 \times t = w$

2. On Wednesday there were **no** tandem bikes in the shop. There were only bicycles and tricycles. There are a total of 24 seats and 61 wheels in the shop. How many bicycles and how many triangles are in the shop?

   11 bikes 16 trikes

   Show how you figured it out.

Bike	trike	total seats	total wheels
1	1	2	5
2	2	4	10
5	5	10	25
12	12	24	24 + 36 = 60
13	11	24	26 + 33 = 59
11	13	24	22 + 39 = 61

In part two, the student arrived at the correct answers by using a table and reasoning with guess and check strategy. A-REI.6 MP4, MP7 and MP1.

High School Algebra: The Cycle Shop
Annotated Student Work

STUDENT B – Level 3 continued

This student tried to use a similar strategy that was used in part two. It appears the table and data with three variables became more challenging to negotiate. The students did not attempt to use equations to represent situations. The standard A-REI.6 was not met.

3. A month later, there are a different number of bicycles, tricycles tandem bikes in the shop. There are a total of 144 front steering handlebars, 378 pedals, and 320 wheels.

How many bicycles, tricycles and tandem bikes are in the shop?

48, 39, 55

Explain your solution.

Bike	Trike	TB	HB	Pedals	Wheels
1	1	1	3	2+2+4 = 8	2+3+2 = 7
10	10	10	30	20+20+[illegible]=[illegible]0	20+30+20 = 70
40	40	40	120	80+80+160= 320	80+120+80 = 280
50	50	50	150	100+100+200=400	100+150+100 = 350
48	40	60	148	96+80+240 =	96+120+120 =

High School Algebra: The Cycle Shop
Annotated Student Work

Level 3 Implications for Instruction

Students who met standard on the task can still improve their performance. Students must learn to provide complete and clear work. This should involve labeling variables and values to record and keep track of their own thinking. It is equally important that students also check their solutions against all constraints to ensure the solutions are sound.

Representing a system either through a set of equations, a table, a graph and/or diagram is an important and necessary first step. Reasoning a solution using the representation is the second step. If students use a table they must be systematic and complete in determining a solution. If students use equations they must use an equal number of constraints as unknowns in order to ensure a correct solution to the system. They can employ a process like substitution or elimination to isolate variables. They must understand why and how these processes work in order to reconstruct and persevere when faced with a complex set of equations. Students who use a graph to determine solutions for a system must check the coordinates of the intersections to ensure the estimate meets the given conditions. Students should have experiences with all these strategies and understand how the different methods of solving systems relate and connect to one another.

High School Algebra: The Cycle Shop
Annotated Student Work

Level 2: Performance below Standard (Score Range 3 - 4)

The student's response shows some of the elements of performance that the tasks demand and some signs of a coherent attack on the core of some of the problems. However, the shortcomings are substantial, and the evidence suggests that the student would not be able to produce high-quality solutions without significant further instruction. The student might ignore or fail to address some of the constraints. The student may occasionally make sense of quantities in relationships to the problem, but their use of quantity is limited or not fully developed. The student response may not state assumptions, definitions, and previously established results. While the student makes an attack on the problem it is incomplete. The student may recognize some patterns or structures, but has trouble generalizing or using them to solve the problem.

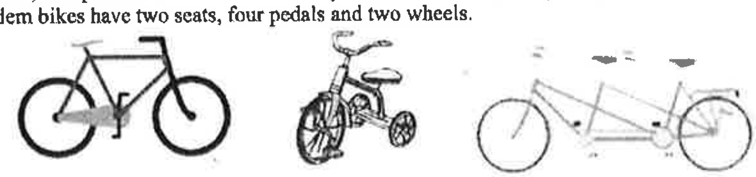
STUDENT C – Level 2

Performance Task

The Cycle Shop

Student C performed at Level 2 with a score of 4 . The student was able to model the situations with equations, but was unable to use the equations to find solutions.

You work for a small business that sells bicycles, tricycles, and tandem bikes. Bicycles have one seat, two pedals and two wheels. Tricycles have one seat, two pedals, and three wheels. Tandem bikes have two seats, four pedals and two wheels.



Bicycle Tricycle Tandem Bike

In part 1, the student correctly found the number of tricycles and formed an equation to represent the relationship in two variables. A-REI.3, A-REI.6 , MP4

1. On Monday you counted 48 tricycle wheels.

   How many tricycles were in the shop? 16 trikes.

   Write an algebraic equation that shows the relationship between the number of wheels (w) and the number of tricycles (t).

   $w \div 3 = t$

2. On Wednesday there were **no** tandem bikes in the shop. There were only bicycles and tricycles. There are a total of 24 seats and 61 wheels in the shop. How many bicycles and how many triangles are in the shop?

   7 trikes, 21 bikes

   Show how you figured it out.

The student modeled the situation with two correct equations and two unknowns. MP4

The student was unsuccessful solving the system. The student failed to use the distributive property accurately.

$2b + 3t = 61$ $1b + 1t = 24 - 1t$

$1b = 24 + {}^{-}1t$

$2(24 + {}^{-}1t) + 3t = 61$

$48 + 2t = 61$

$-48 \quad -48$

$2t = 13$ $t = 13 \div 2$

$t = 6\frac{1}{2} \approx 7$

High School Algebra: The Cycle Shop
Annotated Student Work

STUDENT C – Level 2 continued

3. A month later, there are a different number of bicycles, tricycles tandem bikes in the shop. There are a total of 144 front steering handlebars, 378 pedals, and 320 wheels.

How many bicycles, tricycles and tandem bikes are in the shop?

48, 48, 48

Explain your solution.

$t + b + d = 144$ $2t + 2b + 4d = 378$

$3t + 2b + 2d = 320$

$3\overline{)320}$ 106

$3\overline{)144}$ 48

$8\overline{)378}$ 47
32
58

The student was able to represent the situation using three equations and three variables. A-CED.3 MP4

The student was unable to use the equations to determine a solution. A-REI.6 MP7, MP1

High School Algebra: The Cycle Shop
Annotated Student Work

Level 2 Implications for Instruction

Part two requires a more complex chain of reasoning than part 1. Students need to sort and reason about two unknowns and two constraints. When students first use variables, they are not precise in what the variable stands for in the situation. If a student use **b** in an equation, does it mean:

- the number of bikes?
- the number of seats on a bike?
- the number of wheels on a bike?
- one bike?

Students are often not sure of what the variable they chose actually represents. Students need to be explicit about their variable assignments. Once a variable is clearly defined by the students, then they must consider coefficients, other variables and constants in making meaning of the situation.

Students need experiences in creating mathematical models for contextual situations. The modeling experience may involve writing number sentences, making numerical tables, creating charts or diagrams, drawing or creating graphs and/or drawing pictures to characterize a situation. Students will benefit from connecting and linking the representations to make sense how the representations model the situation. Students learn to model situations by making sense of the problem and then tinkering with representations through trial and error.

Students need to talk through why a mathematical model makes sense in representing a problem. This can be done in pairs, small groups or by the whole class. More instructional emphasis should be placed on finding and understanding why a representation makes sense, rather than merely finding the answer to problems in context.

High School Algebra: The Cycle Shop
Annotated Student Work

Level 1: Demonstrates Minimal Success (Score Range 0 – 2)

The student's response shows few of the elements of performance that the tasks demand. The work shows a minimal attempt on the problem and struggles to make a coherent attack on the problem. Communication is limited and shows minimal reasoning. The student's response rarely uses definitions in their explanations. The student struggles to recognize patterns or the structure of the problem situation.

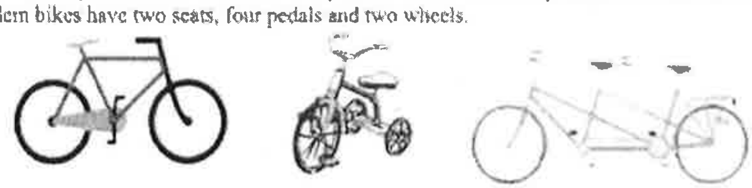
STUDENT D – Level 1

Student D performed at Level 1, minimal success with a score of 0. The student attempted all the parts of the task, but was not able to achieve a point.

Performance Task

The Cycle Shop

You work for a small business that sells bicycles, tricycles, and tandem bikes. Bicycles have one seat, two pedals and two wheels. Tricycles have one seat, two pedals, and three wheels. Tandem bikes have two seats, four pedals and two wheels.



Bicycle Tricycle Tandem Bike

1. On Monday you counted 48 tricycle wheels.

$3 \times 48 = 144$

How many tricycles were in the shop? 144

Write an algebraic equation that shows the relationship between the number of wheels (w) and the number of tricycles (t).

$t = 3w$

In part 1, the student makes a classic mistake translating a word problem into an algebraic equation. Since a tricycle has 3 wheels, the student writes the equation t = 3w instead of the correct relationship w = 3t. This is an error in correctly modeling the situation. MP4

2. On Wednesday there were no tandem bikes in the shop. There were only bicycles and tricycles. There are a total of 24 seats and 61 wheels in the shop. How many bicycles and how many triangles are in the shop?

12 bikes & 12 trikes

Show how you figured it out.

Bikes	Seats	Wheels
1	1	2
	12	24
12	12	
12		

bikes 12
trikes 12
24

In part 2, the student starts to make a table, but is content to merely look at just one of the two constraints (total of 24 seats). The student only checks equal values for the two cycles. The student lacks the ability to reason abstractly and quantitatively.

High School Algebra: The Cycle Shop
Annotated Student Work

STUDENT D – Level 1 continued

In part 3, the student appears to try and simplify the problem. This occasionally happens when students are unsuccessful creating a model of the situation. The student finds numbers from the stem of the problem and performs one-step operations to calculate an answer. MP4

3. A month later, there are a different number of bicycles, tricycles tandem bikes in the shop. There are a total of 144 front steering handlebars, 378 pedals, and 320 wheels.

   How many bicycles, tricycles and tandem bikes are in the shop?

   48

   Explain your solution.

   48
   3|144
   12
   24

   6|320

High School Algebra: The Cycle Shop
Annotated Student Work

STUDENT E – Level 1

Performance Task

The Cycle Shop

Student E performs at Level 1 with a score of 2. The student shows some success modeling the situations but there are errors in successfully using the structures to find solutions.

You work for a small business that sells bicycles, tricycles, and tandem bikes. Bicycles have one seat, two pedals and two wheels. Tricycles have one seat, two pedals, and three wheels. Tandem bikes have two seats, four pedals and two wheels.

Bicycle **Tricycle** **Tandem Bike**

In part 1, the student arrives at the correct answer and shows work, but writes an incorrect equation reversing the variables. This could be an issue of accuracy or misrepresenting equations. A-REI.1

1. On Monday you counted 48 tricycle wheels.

   How many tricycles were in the shop? 16

   Write an algebraic equation that shows the relationship between the number of wheels (w) and the number of tricycles (t).

   48 = 3(16)   T = 3W

2. On Wednesday there were no tandem bikes in the shop. There were only bicycles and tricycles. There are a total of 24 seats and 61 wheels in the shop. How many bicycles and how many triangles are in the shop?

   17 BIKES, 7 TRIKES

   Show how you figured it out.

B	W
1	2
2	4
3	6
7	14
12	24
17	34

17 BIKES

$61 + 24 = 85$

$2(17) = 34$

T	S	W
1	1	3
2	2	6
3	3	9
4	4	12
5	5	15
6	6	18
7	7	21

$61 - 21 = 40$

$24 - 7 = 17$

In part 2, the students creates a t-table and uses a guess and check strategy. The student seems to only focus on one constraint (tricycles) and finds numbers of seats and wheels without checking the second constraints. The student's work shows lack of reasoning.

Performance Task The Cycle Shop P1

High School Algebra: The Cycle Shop
Annotated Student Work

STUDENT E – Level 1 continued

In part 3, the student represents only one of the three equations correctly. It is not clear the student understands what the variables represent. This student needs more experience representing situations with equations. A-REI.6, MP4

3. A month later, there are a different number of bicycles, tricycles tandem bikes in the shop. There are a total of 144 front steering handlebars, 378 pedals, and 320 wheels.

   How many bicycles, tricycles and tandem bikes are in the shop?

   ____

   Explain your solution.

$B + T + W = 144$
$B + T + W = 378$
$B + T + W = 320$

$$\begin{array}{r} 320 \\ -144 \\ \hline 176 \end{array}$$

High School Algebra: The Cycle Shop
Annotated Student Work

Level 1 Implications for Instruction

Students need support in problem solving and looking for structure in mathematical situations. They need experiences in identifying the unknowns in a situation and determining the relationship between the quantities. Having students engage in conversations with other students about what is unknown and the relationship between quantities is an important step in developing understanding of a problem situation.

Representing the relationship of two quantities in an equation is an important step. This can first be learned by writing number sentences for specific values and their relationships. Only after representing a specific case can students understand an equation that involves unknown quantities. Students need multiple experiences at modeling situations by using equations. Understanding why an equation is incorrect for a situation allows students to make sense of the process in a different manner.

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP INSTRUCTIONAL SUPPORTS

The instructional supports on the following pages include a unit outline with formative assessments and suggested learning activities. Teachers may use this unit outline as it is described, integrate parts of it into a currently existing curriculum unit, or use it as a model or checklist for a currently existing unit on a different topic.

Unit Outline

INTRODUCTION: This unit outline provides an example of how teachers may integrate performance tasks into a unit. *Teachers may (a) use this unit outline as it is described below; (b) integrate parts of it into a currently existing curriculum unit; or (c) use it as a model or checklist for a currently existing unit on a different topic.*

Grade 9 Algebra 1: Solving Systems of Equations

UNIT TOPIC AND LENGTH:

- The length of the unit includes suggested time spent on the classroom instruction of lessons and administration of assessments. Please note that this outline does not include individual lessons. The units should run between 20 and 25 standard periods of instruction. Five of the periods will involve the pre-assessment (0.5 periods), introducing and supporting problem solving on the long lesson (2 periods), teaching the formative assessment lesson (2 periods) and the final assessment (0.5 periods).

COMMON CORE LEARNING STANDARDS:

- **A-CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- **A-CED.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*
- **A-REI.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify the solution method.
- **A-REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- **A-REI.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
- **MP.1** Make sense of problems and persevere in solving them.
- **MP.3** Construct viable arguments and critique the reasoning of others.
- **MP.4** Model with mathematics.
- **MP.7** Look for and make use of structure.

BIG IDEAS/ENDURING UNDERSTANDINGS:	ESSENTIAL QUESTIONS:
Student will understand: ➢ How to represent a system with tables, graphs and equations. ➢ How to solve a system of equations. ➢ How to use the unknown, constraints and their relationships to model a system.	➢ How can situations be modeled as a system of linear equations and how to find solutions using all constraints?

CONTENT:

- The big idea of the unit is modeling situations using algebraic tools such as tables, graphs, equations and use to solve systems.
- Students determine relationships of objects and operations needed to develop a system.
- Students apply the new knowledge to solving problems in context.

SKILLS:

- Student will use graphs, tables and equations to model simultaneous linear systems.
- Students will use algebraic techniques to find solutions to two variable linear systems.
- Students will compare and contrast graphs of their systems.

ASSESSMENT EVIDENCE AND ACTIVITIES:

INITIAL ASSESSMENT :

The unit begins with the touchstone performance task ***Fencing***. The task is designed to measure what students bring to the unit in regards to their knowledge of solving a basic system of two linear equations with two unknowns. Please reference ***Fencing*** for full details.

FORMATIVE ASSESSMENT:

The Formative Assessment Lesson is entitled ***Solving Linear Equations in Two Variables***. A different pre-assessment task should be administered prior to the two-day lesson, either in class or for homework. Student should spend no more than 10 minutes on the task. Teachers review the student work prior to teaching the lesson. The FAL comes with complete teacher notes and the student pages. Please reference ***Solving Linear Equations in Two Variables*** for full details.

FINAL PERFORMANCE TASK:

The final performance assessment is entitled ***The Cycle Shop***. It should be administer during a class period. Most students will complete the task in about 20 – 25 minutes, although time should not be a factor. The teacher should provide a reasonable amount of time for all students to finish. The students should be allowed to use any tools or materials they normally use in their classroom. The task can be read to the students and all accommodations delineated in IEP should be followed. Please reference ***The Cycle Shop*** for full details.

LEARNING PLAN & ACTIVITIES:

- The unit is designed with a pre-assessment task, an expert investigation, a formative assessment lesson and a final assessment. The mathematics of the unit involves writing equations from context and describing relationships using two variables. Students will learn how to model situations by deriving simultaneous equations and solving the systems through tabular, graphical or algebraic means. This unit is designed to accompany the curriculum a teacher currently uses to teach the topics listed. That includes instruction in modeling linear systems in two variables using equations, graphs and tables. It also includes developing techniques in solving systems through intersections of lines, or using methods to solve equations. The elements in the unit will provide activities to foster formative assessment practices, conceptual understanding and non-routine problem solving.

- The expert investigation is entitled ***The Wheel Shop***. It contains four separate but mathematically related problems labeled Part B, Part C, Part D, and Part E. All students should start with the Part B task and then proceed at their own speed to Part C and perhaps Part E. It is more important for the student to work deeply on a part and complete a write up than to merely work through and find answers. It is the student's responsibility to be reflective and thorough in their explanations, findings and justifications. The investigation comes with administration and teacher notes, the expert investigation, report guidelines and rubric.

Re-engagement: The unit begins with a pre-assessment called sponsored walk. After the teacher analyzes the student performances decision of how to proceed through the lesson is important. Instead of going back to re-teach skill and concepts lacking, it is much more powerful for the teacher to use the work students have already done on a contextual problem to help them build upon their understanding from previous thinking. That process is called "re-engagement". It is powerful to use student work because students become very engaged in the process of figuring out what someone else is thinking. This process of analyzing and contrasting student thinking raises the cognitive demand for students and supports them to be more reflective about their own thinking. The re-engagement lesson will depend upon the results form the students in each individual class. Thus, each lesson will look very different from class to class. Students have already done the task on their own and now the important ideas need to be brought out and examined. In the process, students must have the opportunity to confront and understand the error in the logic of their misconceptions. Often, as teachers, we try to prevent errors by giving frequent reminders, such as "line up the decimal point". But actually errors provide great opportunities for learning for all students. Students don't let go of misconceptions until they understand why they don't make sense. For the student, there is underlying logic to their misconceptions.

Re-engagement – Confronting misconceptions, providing feedback on thinking, going deeper into the mathematics.

1. Start with a foundational problem to bring all the students along; this allows students to clarify and articulate important mathematics in order to better understand the entirety of the task.
2. Share different student approaches and ask all students to make sense of each strategy. Have all students compare the strategies to look for the mathematical connections and relationships.
3. Have students analyze misconceptions and discuss why they don't make sense. In the process students can let go of misconceptions and clarify their thinking about big mathematical ideas.
4. Have students determine how a strategy could be modified to get the correct solution. Have students look for the seeds of mathematical thinking in the selected student work.

Think/Write/Pair/Share is a high leverage strategy that respects individual time to process and organize ideas before engaging in peer-to-peer discussions. This process can be used throughout the unit as a vehicle for students to self reflect, construct new meaning by building on the ideas of others, and strengthen their arguments.

Journal Entries for Reflection: Using a prompt such as, *"How has my thinking changed as a result of what I have discussed with my peers?" or "How can I improve my argument or explanation using evidence and content vocabulary?"* can provide valuable opportunities for students to tweak their own solutions, during class or for homework, and subsequently, deepen their understanding of content.

Purposeful Questioning and Feedback are instructional supports that can help refocus students' attention on specific aspects of their work. Some suggestions based on misunderstandings and misconceptions are included in the Formative Assessment Lesson ***Solving Linear Equations in Two Variables***. Although these error patterns/questions relate to this specific assessment task they can be easily modified to address similar misconceptions that are revealed from any other problems or tasks used.

RESOURCES:

- Normal materials used in math class include manipulatives such as cards for matching activity, square tiles, counters, and cm graph paper.
- All the materials referenced in the assessments, formative assessment lesson and expert investigation are included. Most supplementary materials are located in the appendix, including the established scored benchmark papers and some student work examples.
- What isn't included in print materials can be found on a TBA websites.

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP

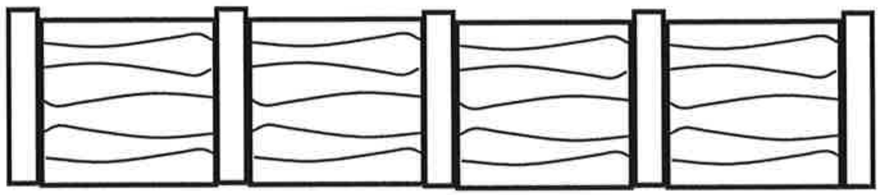
INITIAL TASK: FENCING

Fencing

This problem gives you the chance to:
- interpret given information
- choose and use an appropriate method to solve a problem

Jon buys fencing for his yard.

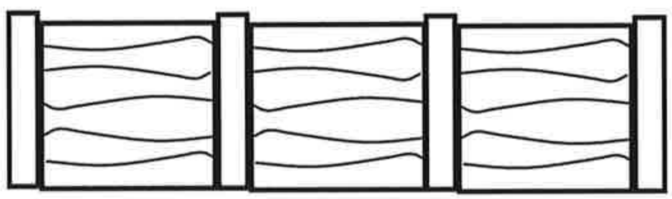
He pays $122 for 5 fence posts and 4 fence panels.



He pays $570 for 21 fence posts and 20 fence panels.

How much does he pay for 4 fence posts and 3 fence panels? $__________________

Show how you figured it out.



COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP

FORMATIVE ASSESSMENT LESSON: SOLVING LINEAR EQUATIONS IN TWO VARIABLES

NYC Department of Education
Dennis M. Walcott Chancellor

Mathematics Assessment Project

Formative Assessment Lesson Materials

Solving Linear Equations in Two Variables

MARS Shell Center
University of Nottingham & UC Berkeley
Beta Version

If you encounter errors or other issues in this version, please send details to the MAP team c/o map.feedback@mathshell.org.

Solving Linear Equations in Two Variables

Mathematical goals

This lesson unit is intended to help you assess how well students are able to formulate and solve problems using algebra and, in particular, to identify and help students who have the following difficulties:

- Solving a problem using two linear equations with two variables.
- Interpreting the meaning of algebraic expressions.

Common Core State Standards

This lesson involves *mathematical content* in the standards from across the grades, with emphasis on:

A-CED: Create equations that describe numbers or relationships.
A-REI: Solve systems of equations.

This lesson involves a range of *mathematical practices*, with emphasis on:

2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.

Introduction

This lesson is structured in the following way:

- Before the lesson, students work individually on the assessment task *Notebooks and Pens*. You then review their work and create questions for students to answer in order to improve their solutions.
- During the lesson, students work individually on a task that requires them to interpret and solve two equations in two variables. Students then compare and discuss their solutions in small groups.
- In the same small groups, students evaluate some sample solutions of the same task.
- In a whole-class discussion, students explain and compare the alternative solution strategies they have seen and used.
- Finally, students use what they have learned to revise their work on *Notebooks and Pens*.

Materials required

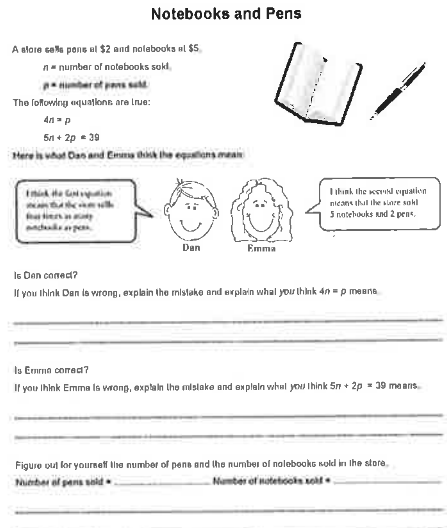
- Each individual student will need two copies of the assessment task *Notebooks and Pens,* and a copy of the lesson task *Cash Registers.*
- Each small group of students will need a blank sheet of paper, and copies of the four sheets *Sample Student Work.*
- Graph paper should be kept in reserve and used only when requested.
- Projector resources are provided to support the whole-class discussion.

Time needed

Approximately fifteen minutes before the lesson, a one-hour lesson, and ten minutes in a follow-up lesson (or for homework). Timings given are only approximate. Exact timings will depend on the needs of the class.

Before the lesson

Assessment task: *Notebooks and Pens* (15 minutes)


Notebooks and Pens

A store sells pens at \$2 and notebooks at \$5.

n = number of notebooks sold.

p = number of pens sold.

The following equations are true:

$4n = p$

$5n + 2p = 39$

Here is what Dan and Emma think the equations mean:

Is Dan correct?

If you think Dan is wrong, explain the mistake and explain what *you* think $4n = p$ means.

Is Emma correct?

If you think Emma is wrong, explain the mistake and explain what *you* think $5n + 2p = 39$ means.

Figure out for yourself the number of pens and the number of notebooks sold in the store.

Number of pens sold = ________ Number of notebooks sold = ________

Have the students do this task in class or for homework a day or more before the formative assessment lesson. This will give you an opportunity to assess the work and to find out the kinds of difficulties students have with it. You will then be able to target your help more effectively in the follow-up lesson.

Give each student a copy of *Notebooks and Pens.*

Introduce the task briefly and help the class to understand the problem and its context.

> *Read through the questions, and try to answer them as carefully as you can.*
>
> *Show all your work, so that I can understand your reasoning.*

It is important that students are allowed to answer the questions without assistance, as far as possible.

Students should not worry too much if they cannot understand or do everything, because there will be a lesson using a similar task, which should help them. Explain to students that by the end of the next lesson, they should expect to answer questions such as these confidently. This is their goal.

Assessing students' responses

Collect students' responses to the task. Make some notes on what their work reveals about their current levels of understanding. The purpose of doing this is to forewarn you of issues that will arise during the lesson itself, so that you may prepare carefully.

We suggest that you do not score students' work. The research shows that this will be counterproductive, as it encourages students to compare their scores and distracts their attention from what they can do to improve their mathematics.

Instead, help students to make further progress by summarizing their difficulties as a series of questions. Some suggestions for these are given on the next page. These have been drawn from common difficulties observed in trials of this lesson unit.

We suggest that you write a list of your own questions, based on your students' work, using the ideas below. You may choose to write questions on each student's work. If you do not have time to do this, select a few questions that will be of help to the majority of students. These can be written on the board at the end of the lesson.

Common issues:	**Suggested questions and prompts:**
Student assumes that the letter stands for an object not a number For example: The student says that the statements are correct. Or: The student realizes the equations are incorrect, but is unable to explain why.	• *What does the letter p represent?* • *Write the equation as a sentence. Does your sentence match what Dan/Emma said?* • *If n = 3, what would p equal in the first equation? Which is greater: n or p?* • *Are there more notebooks than pens? How do you know?*
Student only uses one equation For example: The student finds a value or values for n and p that fits one equation but not the other, such as $n = 1$ and $p = 4$ for the first equation.	• *For this equation, is there another pair of values for n and p? And another? How do you know which value is correct?* • *How can you check that your values for n and p work for both equations?*
Student produces unsystematic guess and check work For example: The student works out three or four seemingly unconnected combinations of values for n and p.	• *What is a sensible value to try for n (or p)? Why?* • *Can you organize your work in a table?*
Student provides poor explanation For example: The student presents the work as a series of unexplained numbers and/or calculations.	• *Would someone unfamiliar with your type of solution easily understand your work?* • *Have you explained how you arrived at your answer?*
Student makes algebraic mistakes For example: The student makes a mistake when manipulating the algebra in the equations.	• *How can you check that your answer is correct?*
Student solves the two equations correctly Student needs an extension task.	• *Can you now use a different method, for example, a table, a graph, or algebra?* • *Is this method better than your original one? Why?*

Suggested lesson outline

Individual work: *Cash Registers* (10 minutes)

Give each student the task sheet *Cash Registers*. Help students to understand the problem, and explain the context of the task briefly.

Spend ten minutes on your own answering these questions.

What does "simultaneously" mean?

Show all your work on the sheet.

Cash Registers

The drawer of a cash register contains some quarters and some dollar bills.

x = the number of quarter coins in the cash register.
y = the number of dollar bills in the cash register.

The following two equations are true:

$3x = y$
$4x + y = 70$

1. Explain in words the meaning of each equation.
2. Find two pairs of values for x and y that satisfy the first equation.
3. Find two pairs of values for x and y that satisfy the second equation.
4. Find pairs of values for x and y that satisfy both equations *simultaneously*.

Students who sit together often produce similar answers and, when they come to compare their work, they have little to discuss.

For this reason we suggest that, when students do this task individually, you ask them to move to different seats. Then, for the collaborative task, allow them to return to their usual places. Experience has shown that this produces more profitable discussions.

Collaborative small-group work: *Cash Registers* (10 minutes)

Organize the class into small groups of two or three students and hand out a fresh sheet of paper to each group. Students should now have another go at the task, but this time they will combine their ideas.

I want you now to work together in your groups.

Your task is to produce an answer together that is better than your individual ones.

Throughout this activity, encourage students to articulate their reasoning, justify their choices mathematically, and question the choices put forward by others.

As students work you have two tasks, to note student approaches to their work, and to support their thinking.

Note student approaches to their work

How do students choose to tackle this task? Notice the variety in approaches. Notice any common errors. You can use this information to focus your questioning in the whole-class discussion towards the end of the lesson.

Support student thinking

Try not to make suggestions that prompt students towards a particular answer. Instead, ask questions to help students clarify their thinking.

You may find that some students interpret the letters as "quarters" and "dollars" rather than the number of quarters and number of dollars. For example, they may say things like:

"$3x = y$ means three times as many quarters as dollars."
"$4x + y = 70$ means 4 quarters plus dollars equals 70."
"There is $70 in the till."

The following questions and prompts may be helpful for both students struggling with the task and those making quick progress:

What do the letters x and y represent?

Replace x and y in this equation by words and now say what the equation means.

Are there more dollar bills or more quarters in the cash register? How do you know?

Do you have any values for x and y that work for the first equation? How can you check to see if they also work for the second one? If these don't fit, what other values for x and y can you use?

Why have you chosen these values for x and y?

Suppose there are 5 quarters in the drawers of the cash register, so x = 5. From the first equation, how many dollar bills are there? [15.] From the second equation, how many dollar bills are there? [50.] There cannot be both 15 and 50 dollar bills!

Can you find a value for x that will give the same answer in both cases?

How can you check that your answer is right?

Can you use these equations to calculate the amount of money in the cash register?

If the whole class is struggling on the same issue, you may want to write a couple of questions on the board and organize a brief whole-class discussion. You could also ask students who performed well in the assessment to help struggling students.

Collaborative analysis of *Sample Student Work* (15 minutes)

When all groups have made a reasonable attempt, ask them to put their work to one side. Give each group copies of the *Sample Student Work.* This task will give students the opportunity to discuss and evaluate possible approaches to the task, without providing a complete solution strategy.

Ideally, all groups will review all four pieces of work. However, if you are running out of time, choose just two solutions for all groups to analyze, using what you have learned during the lesson about what students find most difficult.

Encourage students to think more deeply using the following questions. (These are reproduced on the projector resource *Assessing Sample Student Work.*)

You are the teacher and have to assess this work.

Correct the work and write comments on the accuracy and organization of each response.

- *What do you like about the work?*
- *What method did the student use? Is it clear? Is it accurate? Is it efficient?*
- *What errors did the student make?*
- *How might the work be improved?*

During this small-group work, support the students as before. Also, check to see which of the explanations students find more difficult to understand. Note similarities and differences between the sample approaches and those the students used in the group work.

Plenary whole-class discussion: comparing different approaches (15 minutes)

Hold a whole-class discussion to consider the different approaches used in the sample work. Focus the discussion on those parts of the task that the students found difficult. Ask representatives from each group to explain and critique one student's method from the *Sample Student Work.* During the discussion you may find it helpful to use the projector resources, which are slides showing the different sample solutions.

Which approach did you like best? Why?

Which approach did you find most difficult to understand? Why?

Next lesson: Improve individual responses to *Notebooks and Pens* (10 minutes)

Have students do this task at the beginning of the next lesson if you do not have time during the lesson itself. Some teachers like to set this task for homework.

Return the students' individual work on the assessment task *Notebooks and Pens* along with a second blank copy of the task sheet.

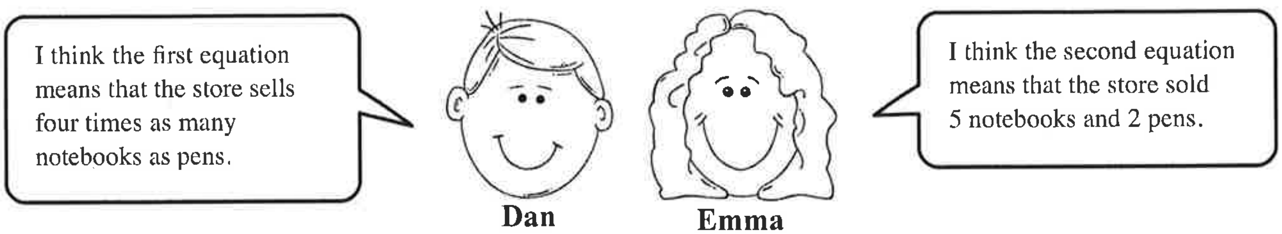
Look at your original responses and think about what you have learned this lesson.

Using what you have learned, try to improve your work.

If you have not written questions on individual pieces of work then write your list of questions on the board. Students are to select from this list only the questions appropriate to their own work.

Solutions

Assessment task: *Notebooks and Pens*



Dan is incorrect:

Dan has misinterpreted n to mean, "notebooks sold" rather than "*the number of* notebooks sold."

So he has read the equation "$4n = p$" as "there are four notebooks sold for every single pen sold."

The equation actually means, "4 times the number of notebooks sold equals the number of pens sold," or "the store sells four times more pens than notebooks."

Emma is incorrect:

Emma has also misinterpreted n to mean "notebooks" rather than "*the number of* notebooks."

In the second statement, $5n$ does not mean, "there are 5 notebooks." It means "5 times the number of notebooks."

Since each notebook costs \$5, $5n$ gives you the amount of money taken from selling notebooks, and since each pen costs \$2, $2p$ gives you the amount of money taken from selling pens. So $5n + 2p = 39$ means that \$39 was taken altogether from selling notebooks and pens at these prices. However, the equation does not, in isolation, tell you how many notebooks or pens were sold.

Using the first equation to substitute $4n$ for p in the second equation gives $n = 3$ and $p = 12$.

3 notebooks and 12 pens were sold.

Cash Registers

1. The number of dollar bills is three times the number of quarters.
   Four times the number of quarters plus the number of dollar bills totals 70.
2. Possible values: (4, 12) or (8, 24).
3. Possible values: (12, 22) or (7, 42).
4. $x = 10, y = 30$

Comments on *Sample Student Work*

$3x = y \quad y = 3x$ $\quad 4x + y = 70$
$4\cancel{x} + y = 7$ ✗
Try $x = 1$ $y = 3$
Try $x = 2$ $y = 6$ $\quad 8 + 6 = 14$
Try $x = 3$ $y = 9$ $\quad 12 + 9 = 21$ ✗
Try $x = 4$ $y = 12$ $\quad 16 + 12 = 28$

Ava used "guess and check" with both equations

Strengths: Her work is systematic and easy to follow.

Weaknesses: Her method is inefficient and, although it is systematic, she has not reflected on each answer to determine the next set of values to check.

Her lack of progress leads to her abandoning the task.

Ava could add an explanation about her solution method.

$3x = y$
$4x + y = 70$
$3x + y = 0$
$4x + y = 70$ +
$7x + 2y = 70$
$x = 5$ $\quad 7 \times 5 = 35$
$35 + 2y = 70$
$2y = 35$
$y = 17.5$ - must be a whole number
$x = 6$ $\quad 7 \times 6 = 42$
$42 + 2y = 70$
$2y = 28$
$y = 14$

Ethan used an elimination method

Strengths: This method can work if equations are manipulated carefully.

Weaknesses: Ethan makes a mistake when rearranging the first equation. Consequently, when the two equations are added together, a variable is not eliminated, but instead Ethan has created an equation with two variables.

Ethan briefly used guess and check. This gives many solutions. Ethan has simply opted to figure out two solutions. Both answers are incorrect. Ethan has not explained his working or why he was happy with the second set of values.

If the first equation had been $3x + y = 0$, what would still be wrong with Ethan's method?

Would this method ever obtain just one solution?

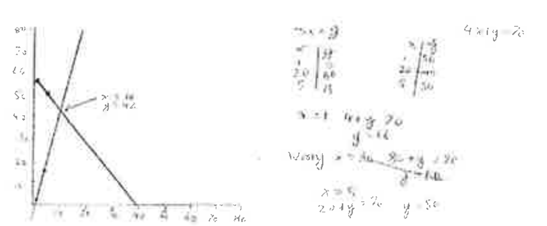
$3x = y$ $\quad x = \frac{y}{3}$
$4x + y = 70$
$4 \times \frac{y}{3} + y = 70$
$\times 3 \quad 4y + y = 210$
$5y = 210$
$y = 42$ $\quad x = \frac{42}{3} = 14$

Joe used a substitution method

Strengths: This is an efficient method.

Weaknesses: Joe failed to multiply all the terms on the left-hand side of the equation by three, so he obtained an incorrect answer.

If Joe had substituted $3x$ for y into the second equation the solution would have been very straightforward.



Mia used a graphical approach

Strengths: This method can work.

Weaknesses: In this case a graphical approach is not a very efficient strategy.

Mia has made an error in her second table: $y = 66$ not 56.

Mia could have used the co-ordinates (20,−10) to help plot the second line. There are no labels on either axis. The scale of Mia's graph means that the lines are not plotted accurately.

Was Mia right to abandon (20, −10) as a point to be used to plot the second line?

Notebooks and Pens

A store sells pens at \$2 and notebooks at \$5.

n = number of notebooks sold.

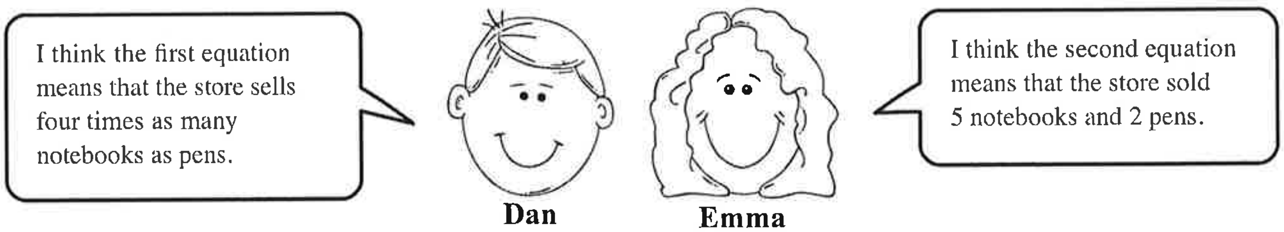
p = number of pens sold.

The following equations are true:

$4n = p$

$5n + 2p = 39$

Here is what Dan and Emma think the equations mean:



Are Dan and Emma correct?

....

If you think Dan is wrong, explain the mistake and explain what *you* think the equation means.

....

....

If you think Emma is wrong, explain the mistake and explain what *you* think the equation means.

....

....

Figure out for yourself the number of pens and the number of notebooks sold in the store.

....

....

....

Cash Registers

The drawer of a cash register contains some quarters and some dollar bills.

x = the number of quarter coins in the cash register.
y = the number of dollar bills in the cash register.

The following two equations are true:

$3x = y$
$4x + y = 70$

1. Explain in words the meaning of each equation.

2. Find two pairs of values for x and y that satisfy the first equation.

3. Find two pairs of values for x and y that satisfy the second equation.

4. Find pairs of values for x and y that satisfy both equations *simultaneously*.

Sample Student Work: Ava

3 $x = y$ $y = 3x$

Try $x = 1$ $y = 3$

Try $x = 2$ $y = 6$

Try $x = 3$ $y - 9$

Try $x = 4$ $y = 12$

$4x + y = 70$

$4\cancel{x} + y = 7$

$8 + 6 = 14$

$12 + 9 = 21$,

$16 + 12 = 28$

You are the teacher and have to assess this work.

- What do you like about Ava's work?
- What method did she use? Is it clear? Is it accurate? Is it efficient?
- What errors did Ava make?
- How might her work be improved?

Sample Student Work: Ethan

$3x = y$
$4x + y = 70$

$3x + y = 0$
$4x + y = 70$ +

$7x + 2y = 70$

$x = 53$ $\quad 7 \times 5 = 35$
$35 + 2y = 70$
$2y = 35$
$y = 17.5$ - must be a whole number

$x = 6$ $\quad 7 \times 6 = 42$
$42 + 2y = 70$
$2y = 28$
$y = 14$

You are the teacher and have to assess this work.

- What do you like about Ethan's work?
- What method did he use? Is it clear? Is it accurate? Is it efficient?
- What errors did Ethan make?
- How might his work be improved?

Sample Student Work: Joe

$$x = \frac{y}{3}$$

$$3x = y$$

$$4x + y = 70$$

$$4 \times \frac{y}{3} + y = 70$$

$$\times 3 \quad 4y + y = 210$$

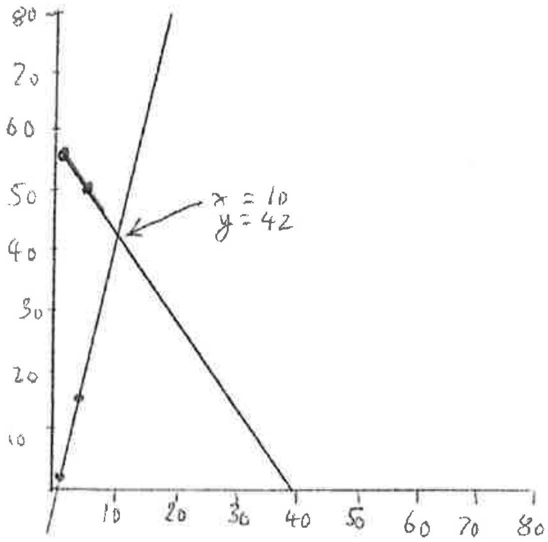
$$5y = 210$$

$$y = 42 \qquad x = \frac{42}{3} = \underline{14}$$

You are the teacher and have to assess this work.

- What do you like about Joe's work?
- What method did Joe use? Is it clear? Is it accurate? Is it efficient?
- What errors did Joe make?
- How might the work be improved?

Sample Student Work: Mia



$3x = y$

x	y
1	3
20	60
5	15

$4x + y = 70$

x	y
1	56
~~20~~	~~-10~~
5	50

$x = 1$ $4 + y$ 70
$y = 66$

Wrong $x = \cancel{20}$ $80 + y = 70$
$\cancel{y = -10}$

$x = 5$
$20 + y = 70$ $y = 50.$

You are the teacher and have to assess this work.

- What do you like about Mia's work?
- What method did she use? Is it clear? Is it accurate? Is it efficient?
- What errors did Mia make?
- How might her work be improved?

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP INVESTIGATION: THE WHEEL SHOP

Department of Education
Dennis M. Walcott, Chancellor

EXPERT INVESTIGATION

The Wheel Shop

Level B:

The Wheel Shop sells other kinds of vehicles. There are bicycles and go-carts in a different room of the shop. Each bicycle has only one seat and each go-cart has only one seat. There are a total of 21 seats and 54 wheels in that room.

How many bicycles and how many go-carts are in the Wheel Shop?

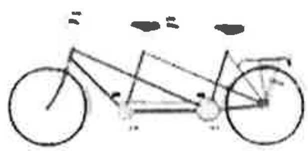
Explain how you figured it out.

EXPERT INVESTIGATION

The Wheel Shop

Level C:

Three months later some vehicles have sold and new models have been brought into the Wheel Shop. Now, there are a different number of bicycles, tandem bicycles, and tricycles in the shop. There are a total of 135 seats, 118 front handle bars (that steer the bike), and 269 wheels.



How many are bicycles, tandem bicycles and tricycles are there in the Wheel Shop?

EXPERT INVESTIGATION

The Wheel Shop

Level D:

In the back stockroom at the Wheel Shop, the number of seats and horns equaled the number of wheels. The number seats and handle bars equaled the number of horns. Twice the number of wheels is equal to three times number of handle bars. Determine the relationship of horns to seats.

COMMON CORE-ALIGNED TASK
WITH INSTRUCTIONAL SUPPORTS

Mathematics

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP
SUPPORTS FOR ENGLISH LANGUAGE LEARNERS

Department of
Education
Dennis M. Walcott, Chancellor

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP

Supports for ELLs

Title: The Cycle Shop **Grade:** High School (Algebra 1)

Linguistic Access:

In these supportive materials, a distinction between the vocabulary and the language functions is needed to expand understanding and provide multiple representations of the math content. Both need to be clarified to ensure comprehension of the performance tasks. This can be done by introducing the most essential vocabulary and language functions before these tasks. The following vocabulary and language functions are suggested:

Vocabulary Words/Phrases:

Tier I (non-academic language): tandem, pedal, steering-handlebar, wheels, shop, fence, post, panels, yard, cash register, drawer

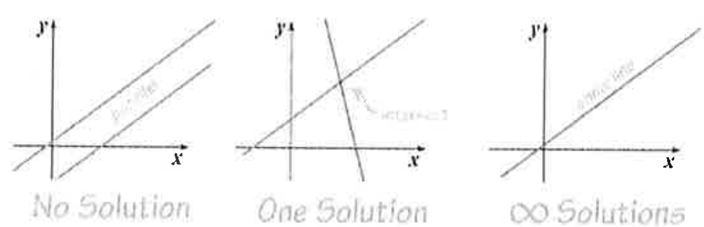
Tier II (general academic language): describe, explain, justify, diagram, quarters

Tier III (math technical language and concepts that must be carefully developed): algebraic equation, simultaneously

Language Functions: explain, describe, justify, formulate and express, show how you figured it out

Content Access:

To provide content access to ELLs, it is suggested that they engage in solving system of equations graphically to allow the concept to mature before engaging them in solving systems algebraically (i.e., substitution and/or elimination methods).



Allow ELLs to make sense of and understand that a system of equations that has at least one solution is referred as "consistent." A consistent system can be either independent or dependent. When a consistent system is independent, it has exactly one solution. In contrast, a consistent system that is dependent has infinitely many solutions. Finally, a system of equations that has no solution is "inconsistent." The best way to avoid confusing these terms is by developing a deep conceptual understanding of what they really mean.

One group activity that can help ELL students deepen their understanding is to provide them with a set (12 to 15) of equations. Each equation should be written on a small, rectangular piece of paper and placed in an envelope. Give this envelope to a group of ELL students and ask them to sort them into three piles (sets): "Always True," "Sometimes True," and "Never True." Then, ask them to write about the characteristics of each pile they generated. "What do the equations in one pile have in common?" "Is there a pattern?" "Can you explain why?"

In working with ELLs, it is recommended that teachers make multiple references to graphical solutions of systems of equations. Have ELLs identify the solutions in a set of graphs like the figure provided here. Working from the graph, ask ELLs to set up and solve the system of equations algebraically. Use graphing calculators to further show graphic solutions and verify their algebraic solutions.

This instructional material includes a formative-assessment lesson (beginning on page 31). When using a formative-assessment lesson, is important that teachers do not deprive ELL students of a "productive struggle." The formative-assessment lesson begins with a "pre-lesson" assessment. The purpose of this pre-lesson assessment is not to sort or rank ELL students, but rather to help teachers make inferences on how ELLs may have digested the mathematics they have been taught and the robustness of their knowledge base. This allows educators to get a window into ELLs' understanding of the mathematics at hand. By looking at students' work, educators will see patterns of students' approaches and misconceptions, and then use this information (data) for shaping subsequent instructional moves and engineering activities that promote productive struggle. This is followed with a "post-lesson" assessment, which presents teachers with the opportunity to have their students become experts in the selected schema.

Scaffolds and Resources:

- Activate prior knowledge of the concepts of a system equation. What makes it a system? What are some prototypes? What are some imperfect prototypes?

- Include, as much as possible, non-linguistic representations (e.g., illustrations, photos, models, real objects, pictures, etc.) to assist ELLs in understanding the context of the problems selected.
- An excellent resource for mathematics secondary school teachers, especially for teaching the language of math and scaffolding math learning, is the book *Making Mathematic Accessible to English Language Learners* by John Carr and et al.

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP
SUPPORTS FOR STUDENTS WITH DISABILITIES

HIGH SCHOOL ALGEBRA: THE CYCLE SHOP

Instructional Supports Using UDL Guidelines

Teacher Guide: Solving Simultaneous Equations
This series establishes a good understanding of what is meant by *solving simultaneous equations.* This is the process of finding a pair of co-ordinates or a point on the Cartesian plane that satisfies both equations. A graphical solution is provided as a visual reference for what it actually means to find a point that satisfies two equations simultaneously. However, graphs can be inaccurate and algebraic methods are needed as well. Through exploring different examples, one discovers that some simultaneous equations don't have a solution and some have an infinite number of solutions. Once several methods of solving simultaneous equations have been worked through, these skills are applied to some contextual problems. http://www.mindset.co.za/learn/node/48322/23/55066

Background Information for Teachers

Math Planet: Methods of Solving Simultaneous Linear Equations *(with accompanying videos for teacher viewing)*

1. **The substitution method for solving linear systems**

A way to solve a linear system algebraically is to use the substitution method. The substitution method functions by substituting the one ***y***-value with the other. We're going to explain this by using an example.

$$\begin{cases} y = 2x + 4 \\ 3x + y = 9 \end{cases}$$

We can substitute y in the second equation with the first equation since y = y.

$$\begin{aligned} &3x + y = 9 \\ &3x + (2x + 4) = 9 \\ &5x + 4 = 9 \\ &5x = 5 \\ &x = 1 \end{aligned}$$

This value of x can then be used to find y by substituting 1 with x e.g. in the first equation

$$y = 2x + 4$$
$$y = 2 \cdot 1 + 4$$
$$y = 6$$

The solution of the linear system is (1, 6).

You can use the substitution method even if both equations of the linear system are in standard form. Just begin by solving one of the equations for one of its variables.

http://www.mathplanet.com/education/algebra-1/systems-of-linear-equations-and-inequalities/the-substitution-method-for-solving-linear-systems

2. The elimination method for solving linear systems

Another way of solving a linear system is to use the elimination method. In the elimination method you either add or subtract the equations to get an equation in one variable.
When the coefficients of one variable are opposites you add the equations to eliminate a variable and when the coefficients of one variable are equal you subtract the equations to eliminate a variable.
Example:

$$\begin{cases} 3y + 2x = 6 \\ 5y - 2x = 10 \end{cases}$$

We can eliminate the x-variable by addition of the two equations.

$$\begin{array}{ll} 3y + 2x & = 6 \\ +\, 5y - 2x & = 10 \\ \hline =\, 8y & = 16 \\ \quad y & = 2 \end{array}$$

The value of y can now be substituted into either of the original equations to find the value of x

$$3y + 2x = 6$$
$$3 \cdot 2 + 2x = 6$$
$$6 + 2x = 6$$
$$x = 0$$

The solution of the linear system is (0, 2).
To avoid errors make sure that all like terms and equal signs are in the same columns before beginning the elimination.

http://www.mathplanet.com/education/algebra-1/systems-of-linear-equations-and-inequalities/the-elimination method-for-solving-linear-systems

3. Graphing linear systems

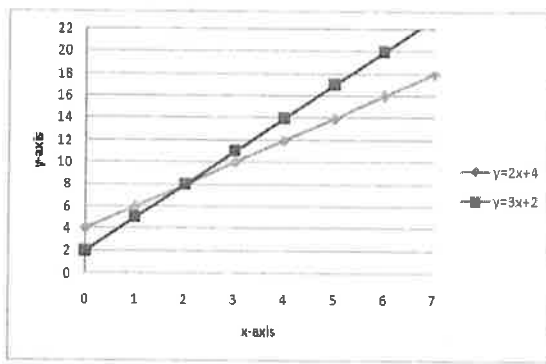
A system of linear equation comprises two or more linear equations. The solution of a linear system is the ordered pair that is a solution to all equations in the system.

One way of solving a linear system is by graphing. The solution to the system will then be in the point in which the two equations intersect.

Example:

Solve the following system of linear equations

$$\begin{cases} y = 2x + 4 \\ y = 3x + 2 \end{cases}$$



The two lines appear to intersect in (2, 8)

http://www.mathplanet.com/education/algebra-1/systems-of-linear-equations-and-inequalities/graphing-linear-system

Principle I: Provide Multiple Means of Representation

The "what" of learning. How does the task present information and content in different ways? How do students gather facts and categorize what they see, hear, and read? How are they identifying letters, words, or an author's style?

Guideline 1: Offer alternatives for perception

- Checkpoint 1.3 – ***Offer alternatives for visual information***

  - Provide access to text-to-speech technology

    Digital text
    Convert any scanned reading material into digital text with a scanner that has optical character recognition. This allows it to be read aloud by text to speech software and also customized to meet visual needs (enlarged font, shaded background, etc.).

    Text-to-speech (TTS) software with electronic references
    Providing a read aloud through TTS supports learners' comprehension and vocabulary. Many students with dyslexia have better listening than reading comprehension. TTS programs, especially those with highlighting as the text is read provides a model of fluent reading, supports vocabulary development, and frees attention for annotation and active comprehension.

    Annotations and study skill features
    Literacy software with text-to-speech and study skill features can assist learners to be active readers. Teach readers how to annotate with virtual *post-it notes*, *bookmarking*, *highlighting*, and *color coding*.

    Algebra Help
    Online tool that helps students solve math problems. Can be read aloud by screen readers.
    http://www.algebrahelp.com/calculators

Guideline 2: Provide options for language and symbols

- Checkpoint 2.1 – ***Clarify vocabulary and symbols***

  - ***Pre-teach vocabulary and symbols*** by connection with learners' experience and prior knowledge: *equation*; *linear*; *linear equation*; *linear expression*; simultaneous; simultaneous *equation*; *substitution method*; *elimination method*; *equality*; *inequality*; *variable*; *coefficients*; *approximate*; *formulate*; *algebraic expressions*; *mathematical practices*; *cash register*; *bicycle*; *tricycle*; *tandem*; *and tandem bike*

- Use ***vocabulary checklist*** to document new or unfamiliar words and phrases and engage students in interactive discussions:

Word / Phrase	What I think it means	Dictionary Definition
linear		
equation		
equality		
inequality		
variable		
approximate		
formulate		
simultaneous		
eliminations		

- **Study Guides and Strategies**
  Students can review, test, and *check their understanding* of the various operations used in linear equation problems
  http://www.studygs.net/mathproblems3.htm

- **Study Guides and Strategies**
  Working with word problems, students practice identifying *variables* and *operations* correctly. Solutions are provided.
  http://www.studygs.net/mathproblems1.htm
  http://www.studygs.net/mathproblems2.htm

- **Match the choices by connecting the words to the best sentences.**
  http://www.spellingcity.com/algebra.html

- **The Language of Mathematics**
  http://www.mathsisfun.com/mathematics-language.html

- **A Math Dictionary for Kids** ~ Great interactive math examples.
  http://www.teachers.ash.org.au/jeather/maths/dictionary.html

- **Translating Word Problems** ~ Keywords to help with word problem translation.
  http://www.purplemath.com/modules/translat.htm

- **Symbols in Algebra**
  http://www.mathsisfun.com/algebra/symbols.html

- **Video: Translating Words into Symbols**
  Translating words into symbols is equivalent to modeling a situation using an equation and variables. Similarly, algebraic equations and inequalities can represent the quantitative relationship between two or more objects.
  http://www.learner.org/vod/vod_window.html?pid=2096

- **Provide definitions with accompanying audio pronunciation and examples**

	Linear Equation (LIN•e•ar e•QUA•tion)
	Definition: an algebraic equation in which the variable quantity or quantities are in the first power only and the graph is a straight line
	Example: 20 = 2(w + 4) + 2w and y = 3x + 4

http://www.algebralab.org/Glossary/glossaryterm.aspx?word=Linear Equation

	Algebraic Equation (al•ge•BRA•ic e•QUA•tion)
	Definition: a mathematical sentence in which two expressions are connected by an equality symbol.
	Example: 4x + 2 = 10

http://www.algebralab.org/Glossary/glossaryterm.aspx?word=Algebraic Equation

- **Provide a firm grounding in high school algebra terminology**
  A high school student in the ninth grade confronts equations and symbols manipulated with arithmetic operations, while a 12th grade student advances to the analysis and use of functions. Understanding the relations of numbers and symbols, the algebra operations performed with them, and their expression in graphs provides grounding for using algebra in science.
  http://www.spellingcity.com/algebra.html

❖ Checkpoint 2.4– ***Promote understanding across languages***

- ***Make all key information in the dominant language available in first languages*** for English Language Learners by linking key vocabulary words to definitions and pronunciations in both dominant and native languages.

    ✓ **Dictionary.com** (with LOTE translations)
    http://dictionary.reference.com/

    ✓ **The Free Dictionary** (with LOTE translations)
    http://www.thefreedictionary.com/

Guideline 3: Provide options for comprehension

❖ Checkpoint 3.1 – ***Activate or supply background information***

- ***Pre-teach critical prerequisite concepts through demonstration or models*** to explore:

    ✓ *how to **formulate** and **solve** problems using algebra*
    ✓ *how to reason **abstractly** and **quantitatively***
    ✓ *how to discern differences between **algebraic** and **numerical** expressions:*

    1. An algebraic expression is a mathematical expression that consists of variables, numbers and operations. The value of this expression can change.

    2. A numerical expression represents a single value. It consists of one or more numbers and operations.

- ***Make conjectures***: Rather than jumping in to solve a problem using memorized equations, students use *inductive reasoning* to estimate or guess answers and then use their understanding of math to test their conjectures.

- ***Verbalize concepts***: Verbalizing math concepts—orally or in writing—helps clarify and solidify their meaning as students explain patterns, concepts, tables, graphs, drawings, and diagrams.

- ***Interactivate: Solving Equations***
The following discussions and activities are designed to help students understand the concepts behind and methods of solving equations. This lesson is best implemented with students working in groups of 2-4.
http://www.shodor.org/interactivate/lessons/SolvingEquations/

Checkpoint 3.3 – ***Guide information procession, visualization, and manipulation***

- ***Introduce graduated scaffolds that support information processing strategies***

    - **Lessons: Math in Videogames - Standards | Get The Math**
    Reasoning with Equations and Inequalities: Understand solving equations as a process of reasoning and explain the reasoning. Using video segments and web interactives from ***Get the Math,*** students engage in an exploration of mathematics, specifically proportional reasoning and sense making, to solve real world problems. In this lesson, students focus on understanding the Big Ideas of Algebra: patterns, relationships, equivalence, and linearity; learn to use a variety of representations, including modeling with variables; build connections between numeric and algebraic expressions; and use what they have learned previously about numbers and operations, measurement, proportionality, and discrete mathematics as applications of algebra. Methodology includes guided instruction, student-partner investigations, and communication of problem-solving strategies and solutions.
    http://www.thirteen.org/get-the-math/teachers/math-in-videogames-lesson- plan/overview/75/

    - **QuickMath** will automatically answer the most common problems in algebra, equations and calculus faced by high-school and college students.

        - ✓ The ***equations section*** lets you solve an equation or system of equations. You can usually find the exact answer or, if necessary, a numerical answer to almost any accuracy you require.

        - ✓ The ***inequalities section*** lets you solve an inequality or a system of inequalities for a single variable. You can also plot inequalities in two variables.

        - ✓ The ***graphs section*** contains commands for plotting equations and inequalities.
        http://www.quickmath.com/

Principle II: Provide Multiple Means of Action and Expression.

The "how" of learning. How does the task differentiate the ways that students can express what they know? How do they plan and perform tasks? How do students organize and express their ideas.

Guideline 4: Provide options for physical action

❖ Checkpoint 4.1 – ***Vary the methods for response and navigation***

- ***Use concrete objects or pictures to conceptualize and solve problems.*** This promotes visual thinking and helps students "see" the sense of the math concept.

  ✓ **Algebra Tiles**
  Using tiles to represent variables and constants, learn how to represent and solve algebra problems. Solve equations, substitute in variable expressions, and expand and factor. Flip tiles, remove zero pairs, copy and arrange, and make your way toward a better understanding of algebra
  http://illuminations.nctm.org/ActivityDetail.aspx?ID=216

  ✓ **Online Graph Paper**
  http://illuminations.nctm.org/ActivityDetail.aspx?ID=205

- ***Use technology.*** Online rulers, protractors, calculators, spreadsheets, statistical packages, and dynamic geometry software help students dig deeper into math concepts

- ***Use simulation.***
  http://www.ehow.com/how_7999527_use-simultaneous-equation-secondary-school.html

Guideline 5: Provide options for expression and communication

❖ Checkpoint 5.2 – ***Use multiple tools for construction and composition***

- **Provide virtual or concrete mathematics manipulatives**

  1. PowerPoint presentation by high school math teacher that highlights how to engage Algebra learners with manipulatives
     http://www.trianglehighfive.org/pdf/004_dont_hate_manipulate.pdf

  2. Solving linear equations (whole numbers)
     http://nlvm.usu.edu/en/nav/frames_asid_201_g_4_t_2.html

3. Solving linear equations (integers)
   http://nlvm.usu.edu/en/nav/frames_asid_324_g_4_t_2.html

4. GraphTablet (Win)
   Free program for creating custom graph paper
   http://www.graphtablet.com/graphtablet.html

5. Algebra Tiles
   Model and solve equations
   http://go.hrw.com/hrw.nd/gohrw_rls1/pKeywordResults?keyword=Mb1+Tools

6. Online Graph Paper
   Free online PDFs of various graph papers. Includes an online generator so you can create customized graph paper and print it out
   http://incompetech.com/graphpaper/

- **Writing and Graphing Linear Equations**
  http://207.10.202.168/GED_TC/download/Building%20and%20Graphing%20an%20Equation.pdf

- **Interactive Math: Simultaneous Linear Equations.**
  http://www.intmath.com/systems-of-equations/1-simultaneous-linear-equations.php

- **Interactive Math: Graphical Solutions of Linear Equations**
  http://www.intmath.com/systems-of-equations/3-graphical-solution-linear-systems.php

- **Printable Graph Paper**
  Click and print graph paper onto cardstock
  http://mason.gmu.edu/~mmankus/Handson/grid.htm

- **Online Graphing Calculator**
  http://webgraphing.com/multiple_plotting_basic.jsp

- **GoMath**
  Online tool that helps students solve math problems. Includes algebra and geometry calculators.
  http://www.gomath.com/

- **Algebra Solver**
  Interactive, algebraic problem solver and graphing tool
  http://www.algebrasolver.com/index.shtml

How to Solve a Simultaneous Set of Linear Equations	
Systems of linear equations are sometimes called simultaneous linear equations. Before attempting to solve a set of equations, make sure the number of variables--x, y, z--matches the number of equations in the set. For two linear equations, two variables--x and y--are present. Linear equations can be solved through substitution or elimination methods.	
1	**Decide whether the equations are more easily solved through substitution or elimination methods. Both approaches work; this decision is purely a matter of preference. In this example, elimination will be used.**
2	**Find a common multiple for the coefficient--numbers in front of--a variable. Say the equations are 3x - 7y = 8 (equation 1) and 4x + 5y = 11 (equation 2). The x-coefficients are 3 and 4; the y-coefficients are -7 and 5.**
3	**Pick which variable to eliminate and cross-multiply the equations by the coefficients for that variable. In the example given, 3x - 7y = 8 and 4x + 5y = 11, assume we decide to eliminate the y-variable.**
4	**Multiply equation 1 by the equation 2 y-coefficient--5--to get: 3(5)x - 7(5)y = 8(5). Simplify to get 15x - 35y = 40. Repeat the process with equation 2. This time, multiply the original equation 2 by -7 to get 4(-7)x + 5(-7)y = 11(-7). Equation 2 simplifies to -28x - 35y = -77. Note that the y-coefficients for both equations are now -35. Multiply one of the equations--it does not matter which one--by "-1." This is to transform one of the "-35" coefficients to a positive 35 for easy cancellation. Using the modified equation 1, the multiplication gives 15(-1)x - 35(-1)y = 40(-1), or -15x + 35y = -40. The equations are ready for elimination.**
5	**Add coefficients for matching variables. For x, add -15 and -28. -15 + -28 = -43. For y, 35 + -35 = 0. The numeric constants add to -40 + -77 = -117. The added equation is, therefore, -43x + 0y = -117. Since 0y = 0, the y-variable is eliminated in the addition. The equation summation simplifies to -43x = -117.**
6	**Divide by the x-coefficient to find x-value. The result is x = -117/-43 = 2.721. Substitute the x-value into either of the original equations. Using equation 2, 4x + 5y = 11 becomes 4(2.721) + 5y = 11. Subtract the "4(2.721)" term from both sides to get 5y = 11 - 4(2.721), which is 5y = 11 - 10.884, 5y = 0.1163. By same process as finding the x-value, the y-value is y = 0.1163/5 = 0.02325.**
7	**Check that solutions fit the other original equation. In this case, equation 1 needs to be checked. 3x - 7y = 8, 3(2.721) - 7(0.02325) = 8.163 - 0.1625 = 8.00025. Very small discrepancies, like that between 8 and 8.00025 are due to round-off error. Since 8.00025 is very close to the ideal value of 8, we can be confident that answers of x = 2.721 and y = 0.02325 are correct.**

http://www.ehow.com/how_7405756_solve-set-two-linear-equations.html

Principle III: Provide Multiple Means of Engagement

The "why" of learning. How does the task stimulate interest and motivation for learning? How do students get engaged and how are they challenged, excited or interested?

Guideline 7: Provide options for recruiting interest

- Checkpoint 7.2 – ***Optimize relevance, value, and authenticity***

  Design activities so that the learning outcomes are authentic, communicate to real audiences, and reflect a purpose that is clear to the participants such as:

  - **Practice Writing a Linear Equation: Real World Situations (with solutions)**
    http://www.algebralab.org/practice/practice.aspx?file=Algebra_Gulliksen2.xml

Guideline 9: Provide options for self-regulation

- Checkpoint 9.3***: Develop self assessment and reflection.***

  Use activities that include means by which learners get feedback and have access to alternative scaffolds (e.g., charts, templates, feedback displays) that support understanding progress in a manner that is understandable and timely.

  - **Practice Solving Systems of Linear Equations (with solutions)**
    http://www.algebralab.org/lessons/lesson.aspx?file=Algebra_LinearEqSystems.xml

  - **Solving Linear Equations (Review, Practice, and Self-Assess)**
    This section illustrates the process of solving linear equations. It also shows students how to check their answers algebraically and graphically. In addition, students can not only review more examples, but also test themselves by working similar problems.
    http://www.sosmath.com/algebra/solve/solve0/solve0.html

  - **Math Tutor Video Tutorials**
    Watch and listen to a tutor working through important topics
    http://www.mathcentre.ac.uk/types/#h32

- **Teach Yourself Booklets**
  Written to accompany the ***Math Tutor*** videos, these provide in-depth treatment of important topics, with theory, worked examples and exercises
  http://www.mathcentre.ac.uk/types/#h4

- **Solve a Simultaneous Set of Two Linear Equations**
  This page will show you how to solve two equations with two unknowns using the *substitution method*. Students are guided to plug in the equations and variables to solve. Solution to the problem, and necessary steps involved to solve the problem, are provided.
  http://www.webmath.com/solver2.html

- **Video: Simultaneous Linear Equations Solved by Elimination**
  http://www.waldomaths.com/video/SimEq01a/SimEq01a.jsp

- **Mindset Learn: Home of the Brain**
  A series of lessons on simultaneous equations. The content includes how to solve simultaneous linear equations by three distinct methods and also includes the solving of word problems.
  http://www.mindset.co.za/learn/s23/t15578/t55066

- **Teachers Choice: Mathematics "How To" Library**
  This website explores how to solve simultaneous linear equations using the *elimination method*
  http://www.teacherschoice.com.au/maths_library/algebra/alg_10.htm

- **Math Teacher**
  This website explores how to solve simultaneous linear equations using substitution, elimination, and graphical methods.
  http://www.mathsteacher.com.au/year9/ch05_simult/01_sub/method.htm

- **Oswego City School District Regents Exam Prep Center**
  Students can practice solving linear systems algebraically using either the substitution or addition/subtraction method. Solutions by addition and subtraction and solutions by substitution are provided.
  http://regentsprep.org/Regents/math/ALGEBRA/AE3/PracAlg.htm

Buying Chips and Candy	Rubric	
	points	section points
1. Gives a correct explanation such as: It stands for the 375 cents that Ralph spent. (Must have correct units)	2	2
2. Writes a correct equation such as: **4p + 2b = 300** *Partial credit* For an almost correct equation. (Left hand side of equation must be correct)	2 (1)	2
3. Gives correct answers: **45 cents** or **\$0.45** **and** **60 cents** or **\$0.60** Shows correct work such as: $8p + 4b = 6$ subtract $3p + 4b = 375$ $5p = 225$ $P = 45$ $4 \times 45 + 2b = 300$ $2b = 120$ $b = 60$ *Partial credit* For some correct work.	2x1ft 2 ft (1 ft)	4
4. Gives a correct answer: **no** **and** Shows a correct calculation such as: 0.60 + 0.45 = 1.05	2 ft	2
Total Points		**10**

Buying Chips and Candy

Ralph and Jody go to the shop to buy potato chips and candy bars.

Ralph buys 3 bags of potato chips and 4 candy bars. He spends \$3.75.
Jody buys 4 bags of potato chips and 2 candy bars. She spends \$3.00.

Later Clancy joins Ralph and Jody and asks to buy one bag of potato chips and one candy bar from them. They need to work out how much he should pay.

Ralph writes $\mathbf{3p + 4b = 375}$

1. If p stands for the cost, in cents, of a bag of potato chips and b stands for the cost, in cents, of a candy bar, what does the 375 in Ralph's equation mean?

____

2. Write a similar equation, using p and b, for the items Jody bought.

____

3. Use the two equations to figure out the price of a bag of potato chips and the price of a candy bar.

potato chips______________

candy bar ______________

Show your work.

4. Clancy has just \$1. Does he have enough money to buy a bag of potato chips and a candy bar?

____

Explain your answer by showing your calculation.

____

____

____

Best Buy Tickets

Rubric

	Points	Section points
Shows correct reasoning and calculations such as the following: *May solve using algebra*		
Sure Print: The cost for n tickets in dollars is $C = 2n/25$	2	
Best print: $C = 10 + n/25$	2	
Method 1: May draw graphs and find the point of intersection, ($n = 250$).	4	
Method 2 (algebraic)	or	
When the two costs are equal $2n/25 = 10 + n/25$ $n = 250$	4	
Shows that when $n < 250$ Sure Print is cheaper When $n > 250$ Best Print is cheaper	2	10
***Or** May decide to solve arithmetically*	or	or
Decides to list costs for different numbers of tickets.	2	

Number of tickets	Sure Print	Best Print
50	4	12
100	8	14
150	12	16
200	16	18
250	20	20
300	24	23

	Points	Section points
(table above)	5	
States that the lists show that when $n = 250$ the costs are equal	1	
States that when $n < 250$ Sure Print is cheaper When $n > 250$ Best Print is cheaper	2 x 1	10
Total Points		**10**

Best Buy Tickets

Susie is organizing the printing of tickets for a show her friends are producing.
She has collected prices from several printers and these two seem to be the best.

SURE PRINT
Ticket printing
25 tickets for $2

BEST PRINT
Tickets printed
$10 setting up
plus
$1 for 25 tickets

Susie wants to go for the best buy

She doesn't yet know how many people are going to come.

Show Susie a couple of ways in which she could make the right decision, whatever the number.

Illustrate your advice with a couple of examples.

Please continue your work on the page opposite

Best Buy Tickets (continued)

Illustrative Mathematics

8.EE Extending the Definitions of Exponents, Variation 1

Alignment 1: 8.EE.A.1

Marco and Seth are lab partners studying bacterial growth. They were surprised to find that the population of the bacteria doubled every hour.

a. The table shows that there were 2,000 bacteria at the beginning of the experiment. What was the size of population of bacteria after 1 hour? After 2, 3 and 4 hours? Enter this information into the table:

Hours into study				0	1	2	3	4
Population (thousands)				2				

b. If you know the size of the population at a certain time, how do you find the population one hour later?

c. Marco said he thought that they could use the equation $P = 2t + 2$ to find the population at time t. Seth said he thought that they could use the equation $P = 2 \cdot 2^t$. Decide whether either of these equations produces the correct populations for $t = 1, 2, 3, 4$.

d. Assuming the population doubled every hour before the study began, what was the population of the bacteria 1 hour *before* the students started their study? What about 3 hours before?

e. If you know the size of the population at a certain time, how do you find the population one hour *earlier*?

f. What number would you use to represent the time 1 hour before the study started? 2 hours before? 3 hours before? Finish filling in the table if you haven't already.

g. Now use Seth's equation to find the population of the bacteria 1 hour before the study started. Use the equation to find the population of the bacteria 3 hours before. Do these values produce results consistent with the arithmetic you did earlier?

h. Use the context to explain why it makes sense that $2^{-n} = (\frac{1}{2})^n = \frac{1}{2^n}$. That is, describe why, based on the population growth, it makes sense to define 2 raised to a negative integer exponent as repeated multiplication by $\frac{1}{2}$.

Commentary:
This is an instructional task meant to generate a conversation around the meaning of negative integer exponents. While it may be unfamiliar to some students, it is good for them to learn the convention that negative time is simply any time before $t = 0$.

Students will struggle to put their explanation for part (h) together. A teacher might want to have the students do parts (a) - (g) as a precursor to providing an explanation like the one given in the solution for part (h).

Solution: Solutions

a. What was the size of population of bacteria after 1 hour? After 2, 3 and 4 hours? Enter this information into the table:

Hours into study	0	1	2	3	4
Population (thousands)	2	4	8	16	32

b. You multiply it by 2, since it doubled.

c. The values predicted by Seth's equation agree exactly with those in the table above; Seth's equation works because it predicts a doubling of the population every hour. Marco's doesn't because it doesn't double the new population you have – instead it is doubling the time. Marco's equation predicts a linear growth of only two thousand bacteria per hour.

d. Since the population is multiplied by 2 every hour we would have to divide by 2 (which is the same as multiplying by $\frac{1}{2}$) to work backwards. The population 1 hour before the study started would be

$$\frac{1}{2} \cdot 2 = 1 \text{ thousand},$$

and the population 3 hours before the study started would be

$$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot 2 = 0.25 \text{ thousand} = 250.$$

e. Since the population is multiplied by 2 every hour we would have to divide by 2 (or multiply by $\frac{1}{2}$) to work backwards.

f. Time before the study started would be negative time; for example one hour before the study began was $t = -1$.

Hours into study	-3	-2	-1	0	1	2	3	4
Population (thousands)	$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4} = 0.25$	$\frac{1}{2} \cdot 1 = 0.5$	1	2	4	8	16	32

g. Since one hour before the study started would be $t = -1$, we would simply plug this value into Seth's equation:

$$2 \cdot (2)^{-1} = 2 \cdot \left(\frac{1}{2}\right) = 1 \text{ thousand}.$$

Three hours before would be $t = -3$. Using the equation:

$$2 \cdot (2)^{-3} = \frac{2}{2^3} = 0.25 \text{ thousand},$$

giving us the same answers as we got through reasoning.

h. Since the bacteria double every hour, we multiply the population by two for every hour we go forward in time. So if we want to know what the population will be 8 hours after the experiment started, we need to multiply the population at the start ($t = 0$) by 2 eight times. This explains why we raise 2 to the number of hours that have passed to find the new population; repeatedly doubling the population means we repeatedly multiply the population at $t = 0$ by 2.

In this context, negative time corresponds to time *before* the experiment started. To figure out what the population was before the experiment started we have to "undouble" (or multiply by $\frac{1}{2}$) for every hour we have to go back in time. So if we want to know what the population was 8 hours before the experiment started, we need to multiply the population at the start ($t = 0$) by

$\frac{1}{2}$ eight times. The equation indicates that we should raise 2 to a power that corresponds to the number of hours we need to go back in time. For every hour we go back in time, we multiply by $\frac{1}{2}$. So it makes sense in this context that raising 2 to the -8 power (or any negative integer power) is the same thing as repeatedly multiplying $\frac{1}{2}$ 8 times (or the opposite of the power you raised 2 to). In other words, it makes sense in this context that

$$2^{-n} = \left(\frac{1}{2}\right)^n = \frac{1}{2^n}.$$

Illustrative Mathematics

8.EE Giantburgers

Alignment 1: 8.EE.A.4

This headline appeared in a newspaper.

Every day 7% of Americans eat at Giantburger restaurants

Decide whether this headline is true using the following information.

- There are about 8×10^3 Giantburger restaurants in America.
- Each restaurant serves on average 2.5×10^3 people every day.
- There are about 3×10^8 Americans.

Explain your reasons and show clearly how you figured it out.

Solution: Solution

If there are about 8×10^3 Giantburger restaurants in America and each restaurant serves about 2.5×10^3 people every day, then about

$$8 \times 10^3 \cdot 2.5 \times 10^3 = 20 \times 10^6 = 2 \times 10^7$$

people eat at a Giantburger restaurant every day.

Since there are about 3×10^8 Americans, the percent of Americans who eat at a Giantburger restaurant every day can be computed by dividing the number of restaurant patrons by the total number of people:

$$2 \times 10^7 \div 3 \times 10^8 = \frac{2}{3} \times 10^{-1}$$

Since

$$\frac{2}{3} \times 10^{-1} = \frac{2}{3} \times \frac{1}{10} = \frac{2}{30} = \frac{1}{15} = 0.06\overline{6},$$

our estimate is that $6\frac{2}{3}\%$ of Americans eat a Giantburger restaurant every day, which is reasonably close to the claim in the newspaper.

Illustrative Mathematics

A-REI Two Squares are Equal

Alignment 1: A-REI.B.4, A-REI.D.11

Solve the quadratic equation

$$x^2 = (2x - 9)^2$$

using as many different methods as possible.

Commentary:
This classroom task is meant to elicit a variety of different methods of solving a quadratic equation (A-REI.4). Some are straightforward (for example, expanding the square on the right and rearranging the equation so that we can use the quadratic formula); some are simple but clever (reasoning from the fact that x and (2x - 9) have the same square); some use tools (using a graphing calculator to graph the functions $f(x) = x^2$ and $g(x) = (2x - 9)^2$ and looking for values of x at which the two functions intersect). Some solution methods will work on an arbitrary quadratic equation, while others (such as the last three) may have difficulty or fail if the quadratic equation is not given in a particular form, or if the solutions are not rational numbers.

It is recommended that teachers allow students the opportunity to discuss this problem in small groups of three or four students each. The small-group discussion will help students generate more solutions and reflect more carefully on the reasoning in each. Depending on how the class discussion develops, this task can touch on A-REI.4.a, A-REI.4.b, and A-REI.11.

In each solution below, we have taken care to show all of our reasoning about the equation and the solution process. The standards in domain A-REI ask students not only to carry out a procedure for solving a quadratic equation, but to understand such a procedure as a logical process in which an equality or a set of possible equalities at each step follows from the previous steps. Teachers should model this reasoning process when discussing problems with students.

Solution: Method 1

We have

$$x^2 = (2x - 9)^2.$$

Expanding the right side yields $x^2 = 4x^2 - 36x + 81$. The two sides of this equation will still be equal if we subtract x^2 from each; therefore, we have $3x^2 - 36x + 81 = 0$. We can factor out a 3 to get $3(x^2 - 12x + 27) = 0$. Since the product of 3 and $x^2 - 12x + 27$ is zero, one of the factors must be zero; this means that $x^2 - 12x + 27 = 0$.

We can factor $x^2 - 12x + 27$ to obtain the equation

$$(x - 3)(x - 9) = 0.$$

Again, we have a product of two factors that is equal to zero; thus one of the two factors must be zero. So either $x - 3 = 0$ or $x - 9 = 0$. If $x - 3 = 0$, then $x = 3$. If $x - 9 = 0$, then $x = 9$. So the only possible solutions are $x = 3$ and $x = 9$. Substituting both of these into the original equation confirms that both are indeed solutions. Therefore, the solution set is $\{3, 9\}$.

Solution: Method 2

We begin the same way we started in Method 1, expanding the right side and rearranging terms to obtain $3x^2 - 36x + 81 = 0$. This time, we subtract 81 from each side to find that $3x^2 - 36x = -81$. Since the two sides of the equation are equal, they will remain equal if we divide each side by 3. So we have $x^2 - 12x = -27$.

We will now solve the equation by completing the square. We recognize that, when expanded, the perfect square $(x - 6)^2$ contains the terms x^2 and $-12x$; it also contains a constant term of 36. So we will transform the left side into a perfect square by adding 36 to each side of the equation:

$$x^2 - 12x + 36 = -27 + 36 \qquad \Rightarrow \qquad (x - 6)^2 = 9$$

Since the square of $(x - 6)$ is 9, $(x - 6)$ must be 3 or -3. If $x - 6 = 3$, then $x = 9$. If $x - 6 = -3$, then $x = 3$. So x must be either 9 or 3. We can substitute these numbers into the original equation to confirm that they are both solutions. Therefore, the solution set is $\{3, 9\}$.

Solution: Method 3

Again, we start the same way we began Method 1, expanding the right side and rearranging terms to obtain the equation

$$3x^2 - 36x + 81 = 0.$$

Since we have written the equation in the form $ax^2 + bx + c = 0$ with $a = 3, b = -36$, and $c = 81$, we may now apply the quadratic formula to see that

$$
\begin{aligned}
x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\
&= \frac{36 \pm \sqrt{36^2 - 4 \cdot 3 \cdot 81}}{6} \\
&= \frac{36 \pm \sqrt{1296 - 972}}{6} \\
&= \frac{36 \pm 18}{6} \\
&= 6 \pm 3.
\end{aligned}
$$

Therefore, the possible values of x are 9 and 3. Substituting these values into the original equation confirms that they are both solutions; therefore, the solution set is $\{3, 9\}$.

Solution: Method 4

Since we have a square on each side of the equation, we know that we can rearrange the equation to produce a difference of two squares on one side. This is advantageous because we can factor an expression of the form $a^2 - b^2$ into $(a - b)(a + b)$.

Since the two sides of the given equation are equal, we know that they will remain equal if we subtract x^2 from each side:

$$(2x - 9)^2 - x^2 = 0$$

We can now factor the left side to obtain $((2x - 9) - x)((2x - 9) + x) = 0$ that is, $(x - 9)(3x - 9) = 0$

We now have a product of two factors that is equal to zero; therefore, one of the two factors must be zero. If $x - 9 = 0$, then $x = 9$. If $3x - 9 = 0$, then $3x = 9$, and thus $x = 3$. Thus the only possible values of x are 9 and 3. We can substitute both of these into the original equation to see that they are indeed solutions. Therefore, the solution set is $\{3, 9\}$.

Solution: Method 5

If two real numbers have the same square, then they must either be the same number or be opposites of each other. Therefore, we must have either $x = 2x - 9$ or $x = -(2x - 9)$.

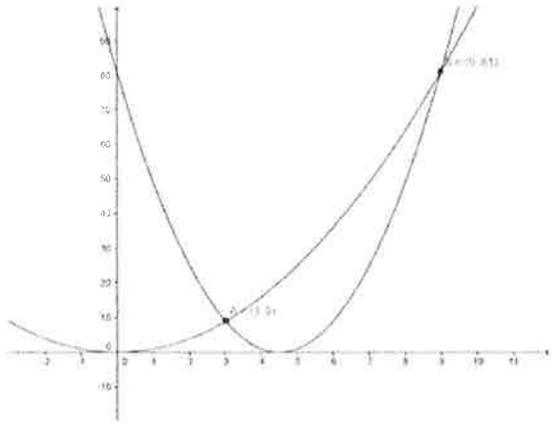
If $x = 2x - 9$, then $x - 9 = 0$, and thus $x = 9$.

If $x = -(2x - 9)$, then $x = 9 - 2x$. So $3x = 9$, and thus $x = 3$.

Thus the only possible solutions to the equation are $x = 9$ and $x = 3$. We can use the original equation to check that each of these is indeed a solution. Therefore, the solution set is $\{3, 9\}$.

Solution: Method 6

Let $f(x) = x^2$ and let $g(x) = (2x - 9)^2$. We are looking for values of x at which the functions $f(x)$ and $g(x)$ have the same value. Therefore, we will try graphing the two functions on the same coordinate plane:



We are looking for values of x where $f(x)$ and $g(x)$ are the same; this is equivalent to looking for values of x at which the graph of $f(x)$ and the graph of $g(x)$ have the same height. In other words, we are looking for where the two graphs intersect. From the graph, we see that the two intersection points are (3, 9) and (9, 81).

The fact that the two graphs intersect at (3, 9) means that when $x = 3$, both $f(x)$ and $g(x)$ are equal to 9. Thus x^2 and $(2x - 9)^2$ are equal when $x = 3$, and thus $x = 3$ is a solution to the equation $x^2 = (2x - 9)^2$. Similarly, the intersection point at (9, 81) means that when $x = 9$, both x^2 and $(2x - 9)^2$ are equal to 81. So $x = 9$ is also a solution.

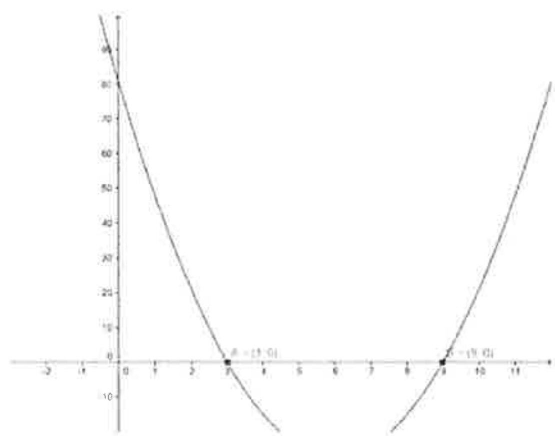
In order to see that these are the only two solutions, we must convince ourselves that the two intersection points we see are the only intersection points of the two graphs. One way to see this is to observe that each graph is a parabola, and the parabola $g(x) = (2x - 9)^2$ is steeper than the parabola $f(x) = x^2$ for values of x outside the viewing window.

Therefore, the solution set is $\{3, 9\}$.

Solution: Method 7

We want to find values of x for which $x^2 = (2x - 9)^2$; that is, for which $(2x - 9)^2 - x^2 = 0$. Therefore, we define $h(x) = (2x - 9)^2 - x^2$, and look for values of x at which $h(x) = 0$.

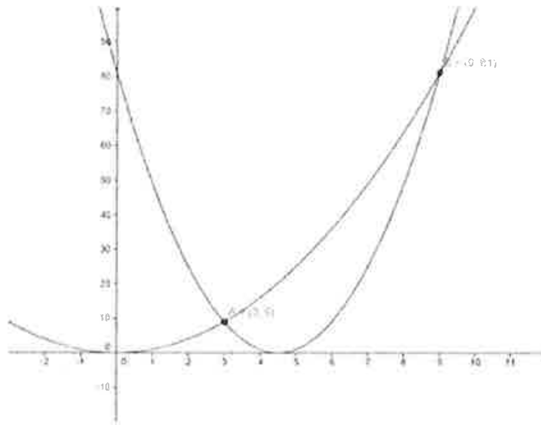
We graph the function $h(x)$:



To determine when $h(x) = 0$, we need to find values of x at which the height of the graph of $h(x)$ is zero; that is, at which the graph crosses the x-axis. This appears to occur at $x = 3$ and at $x = 9$. By substituting both of these values into the original equation, we find that both are indeed solutions. Because the function $h(x)$ is quadratic, we know that its graph is a parabola and can cross the x-axis at most twice. Therefore, we know that $x = 3$ and $x = 9$ are the only solutions. The solution set, then, is $\{3, 9\}$.

Solution: Testing code, please disregard this solution

Let $f(x) = x^2$ and let $g(x) = (2x - 9)^2$. We are looking for values of x at which the functions $f(x)$ and $g(x)$ have the same value. Therefore, we will try graphing the two functions on the same coordinate plane:



We are looking for values of x where $f(x)$ and $g(x)$ are the same; this is equivalent to looking for values of x at which the graph of $f(x)$ and the graph of $g(x)$ have the same height. In other words, we are looking for where the two graphs intersect. From the graph, we see that the two intersection points are (3, 9) and (9, 81).

The fact that the two graphs intersect at (3, 9) means that when $x = 3$, both $f(x)$ and $g(x)$ are equal to 9. Thus x^2 and $(2x - 9)^2$ are equal when $x = 3$, and thus $x = 3$ is a solution to the equation $x^2 = (2x - 9)^2$. Similarly, the intersection point at (9, 81) means that when $x = 9$, both x^2 and $(2x - 9)^2$ are equal to 81. So $x = 9$ is also a solution.

APPENDIX D: Intrinsic Schools – Policies for Student Discipline, Section 2.2

Intrinsic Schools will follow the CPS student code of conduct.

INTRINSIC SCHOOLS CURRICULUM DEVELOPMENT TIMELINE

- All new teachers will be hired by Spring 2014.
- Master Teachers will train new hires on school-wide rubrics (common writing, collaboration, and presentation rubrics) with authentic student work.
- New hires will review current curriculum planning templates and the complete 9th grade curriculum map.
- Collaborative curriculum planning will commence in Summer 2014. Grades 7 and 10 curriculum maps will be completed by late August 2014.
- All teaching staff will receive training on technology tools and programs throughout the summer.
- At the onset of the school year, content area teams and the curriculum coordinator will meet weekly to review plans and will adjust/refine as necessary.

V. LEAST RESTRICTIVE ENVIRONMENT

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
Indicate how the full range of Special Education environment and related services in the Least Restrictive Environment will be determined. (34 CFR 300.114(a)(2)(ii)) (34 CFR 300.116(b)) (34 CFR 300.116(d)) (34 CFR 300.324(a)(1)(i-iii)) (34 CFR 300.503(b)(6))	We will work closely with our families and feeder schools to review the details of IEPs for incoming students and allocate appropriate resources to meet their individual needs. We will work closely with the Office of Diverse Learner Supports and Services to ensure that Intrinsic has all of the necessary documentation for students identified as requiring special education services and supports. Our technology-enabled model will naturally enable some accommodations, modifications, and differentiation for all students as a regular part of their learning experience. We believe every student should receive support based on their specific and individual need, not their label. Technology will also enable us to collect data, deliver "just-in-time" instruction, and continue to close any learning gaps to facilitate student learning in meeting and exceeding rigorous state and national grade-level standards. Real time data will be available to students, their families, and staff. Weekly goal-setting in response to performance data and teacher feedback will be a common practice for students across content areas and grade levels. The team will monitor IEPs and personalized learning plans to inform instruction and to determine interventions that yield the best results for each student. We will work with CPS to ensure the needs of our students are optimally met. When it is determined that a student requires either a more or less restrictive setting in order to access the general education curriculum, parents will be notified and an IEP meeting will be convened to discuss and address any potential changes in the student's program to ensure appropriateness of the least restrictive environment (LRE). Students' LRE will be systematically assessed and reviewed throughout the school year via analysis of progress monitoring and observational data, as outlined in each IEP. On a case by case basis, we will determine whether the current setting continues to be educationally beneficial for each student.	Principal and/or Curriculum Coordinator Instructional Support Team Intrinsic School Counselor/Case Manager Special Education Teacher(s) CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator)	☐ Approved ☐ See below

IV. PARENTAL INVOLVEMENT

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
Describe the provisions for parent involvement in the Special Education process, indicating what efforts are made for parental education, notification and participation. (34 CFR 300.34(c)(8)) (34 CFR 300.322(b-f)) (23 IAC 226.530)	Intrinsic will involve parents in the Special Education process by requesting their consent to evaluate their child. All consent forms will be provided in the parent's native language. Parents will be invited to participate as a team member that meets to write the evaluation team report. Parents will be notified that they may bring other advocates/support persons to the IEP meeting as well. Parents will be involved in determining services and supports to be provided by the school in order for their child to access the general education curriculum. In addition, we will communicate with families on their student's progress on a regular basis. When changes are made to the types of support a student receives, the school will contact the family. Parents are involved in the fabric of the school and given the information and tools necessary to support their children. Furthermore, families will be informed of their right to request a special education evaluation at any time during the RtI process and will be involved in the decision-making. Workshops will be provided to parents informing them of their procedural rights and safeguards and the IEP process in the student's first year of special education eligibility. The team will continue to review data and use information to make decisions regarding LRE and appropriateness of special education services and supports.	Principal and/or Curriculum Coordinator Intrinsic School Counselor/Case Manager	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
c) **Timelines** – describe how timelines are or will be met for: c.1 initial evaluation; c.2 yearly review or c.3 development of IEPs; c.4 tri-annual reevaluations; c.5 sending required Notice and Consent forms to parents; and c.6 progress reported on IEP annual goals. (34 CFR 300.301(c)(1)(i-ii)) (34 CFR 300.303) (34 CFR 300.304(a)) (34 CFR 300.320(a)(3)) (34 CFR 300.321(b)(1)) (34 CFR 300.322(a)) (34 CFR 300.324(b)(1)(i)) (34 CFR 300.503) (23 IAC 226.110(d)) (23 IAC 226.110(j)) (23 IAC 226.120) (23 IAC 226.180(d)) (23 IAC 226.220(a)) (23 IAC 226.520) (23 IAC 226.530)	For students referred for an IEP evaluation, the following timelines will guide decision-making: - Initial Evaluation will be completed within 60 days from the date of parental consent, response sent to the request and an IEP team meeting scheduled with the appropriate parties. - The school is responsible for notifying parents as early as possible and for obtaining all required Notice and Consent forms. Parents will be notified at least 10 days prior to any conference or meeting regarding their child. IEP meetings will be scheduled at a mutually agreed upon time between the parents and school personnel - All IEPs will be reviewed annually with the IEP team, a full case study will be done no later than 3 years from the prior IEP meeting at which eligibility was discussed. - In developing the initial IEP, which will be completed within 60 school days from receipt of written parental consent and within one year of the prior IEP, the team will consider the following: 1) the strengths of the child, 2) the concerns of the parents for enhancing the education of their child, 3) the results of the initial evaluation of the child (or most recent evaluation, including evaluations presented by the parent), and 4) the academic, developmental and functional needs of the child. The initial placement will take place within 10 calendar days from date the IEP was developed unless waived by parent. Intrinsic Schools will utilize the CPS electronic tracking system to ensure timeliness of initial reviews, annual reviews, triennial reviews, and/or special reevaluations. - Evaluation reports will be completed 5 calendar days prior to the IEP meeting. For students eligible for services, progress reports (IEP report cards) will assess students' progress on the goals outlined within the IEP. These reports will be completed by teacher teams and other service providers and will be mailed home with student report cards quarterly. At Intrinsic, we will hold student-led conferences for all students, including with students with disabilities, twice a year (October and April), in which students, parents, and teachers	Principal and/or Curriculum Coordinator Instructional Support Team Intrinsic School Counselor/Case Manager CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator)	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
b) **Evaluation** – describe how the areas for evaluation are determined; (34 CFR 300.304(c)(4)) (34 CFR 300.307) (34 CFR 300.309) (23 IAC 226.110(c)(3)(B))	Referral Decision will be made within 14 school days of receipt of a referral and will determine whether an evaluation is warranted. If warranted, the Consent for Evaluation/Assessment Planning form must be completed and sent to parents with the same 14 school day time period. Policies and procedures that comply with state regulations are defined regarding the use of RtI to determine special education eligibility (based on students' educational needs). If a student is referred for a full and individual evaluation, the support team (composed of parents/ guardians, teachers, administrators) will determine which of the eight domains (health, vision, hearing, academic performance, social/emotional status, general intelligence, communication status and motor abilities) are relevant to the student's suspected disability and which data is needed from the RtI process, when applicable, to identify relevant areas for further study. Information from this meeting will be used to drive the evaluation process.	Principal and/or Curriculum Coordinator Instructional Support Team Intrinsic School Counselor/Case Manager CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator)	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
a) Referral system – describe steps for Initial evaluation and Reevaluation; (34 CFR 300.301) (34 CFR 300.303) (34 CFR 300.304) (34 CFR 300.306) (23 IAC 226.110)	Part of Intrinsic Schools' PD series will include an overview and discussion of how to recognize specific disabilities and the referral process. The Intrinsic Schools Counselor/Case Manager will lead the referral effort and be responsible for ensuring appropriate timelines and completion of paperwork. First step in identifying a student for special education services is a referral. Parents, teachers, support staff, clinicians, healthcare professionals, community members or other concerned adults may submit a written referral for a special education evaluation when they feel a child may have a disability. The referral should be addressed to the teacher, the principal or school counselor/case manager. After the request is received, the school will determine if an evaluation is warranted within 14 days. If an evaluation is warranted, parents will be notified using the Parent Notification of Decision Regarding the Request for an Evaluation form. When deemed appropriate, the IEP team will complete an initial evaluation in the areas of academic achievement, cognitive functioning, communication status, health, hearing/vision, motor abilities, and social/emotional status. Upon the completion of the initial review, Intrinsic School will provide written notice to parents/guardians requesting consent to administer assessments, along with the consent for evaluation using the Parent/Guardian Consent for Evaluation form within 14 days of the request for an evaluation. Upon obtaining written consent, Intrinsic will explain the parents'/guardians' rights and provide them with a copy of the Explanation of Procedural Safeguards. Intrinsic will complete the evaluation and develop the IEP within 60 school days from date the written parent/guardian consent is obtained.A reevaluation will be conducted for each student with a disability who is receiving special education and/or related services at least every three years from the date of the last eligibility determination. The triennial reevaluation will be completed by date of the third anniversary of the student's last reevaluation.	Principal and/or Curriculum Coordinator Instructional Support Team Intrinsic School Counselor/Case Manager CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator)	☐ Approved ☐ See below

II. CHILD FIND

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
Explain how Child Find activities are implemented to identify any students who may be eligible for special education services and how these activities are coordinated between the charter school and the district. Also, include a reference to ensuring timeliness of identification by the student's third birthday. (34 CFR 300.111(a)(1)(i-ii)) (23 IAC 226.100(a)(1-3))	Intrinsic Staff and Members of the Board will receive an orientation on Child Find. Intrinsic Staff will give parents a Child Find brochure that explains the referral process and the contact information when they register their child. Intrinsic Staff will include Child Find brochures in information packets that go home with the students at the beginning of the year. Intrinsic Staff will place an article describing the Child Find referral process and name of the contact person in all school newsletters. Child Find brochures will be available in the main office at all times. Child Find activities will be highlighted and discussed during parent meetings.	Principal, Instructional Support Team	☐ Approved ☐ See below

I. APPLICATION PROCESS

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
Explain what activities are implemented to ensure that parents understand that all children, including children with disabilities, are eligible to participate in the lottery and that the school will provide a continuum of services to address the student's special education needs. (34 CFR 300.209(a)) (105 ILCS 5/27A – 4(a)) (23 IAC 226.60)	As a part of our community engagement strategy, we will meet with CPS Chiefs of Schools to identify areas with high concentration of K-5 schools in need of additional middle school options. We will form partnerships with K-5 schools and their existing key community partners. Once identified, we will host sessions at partner K-5 schools to inform parents of all children, including students will disabilities, of their eligibility to participate in the Intrinsic Schools lottery. At these sessions, we will present the Intrinsic Schools model, introduce Intrinsic staff and answer questions/concerns. Intrinsic Schools will post an FAQ on our website and distribute it to students and parents during presentations and community events. Brochures, applications, and all other Intrinsic School advertisements make reference to the school's open availability and non-discrimination of students with disabilities. Intrinsic Schools' vision and mission prides itself on fostering a school culture that recognizes their responsibility to educate all students including students with disabilities, embraces and supports inclusive practices, and promotes high expectations for all students. The following question is included in the FAQ: How will Intrinsic Schools support students with special needs? General and special education teachers will work together to ensure that modifications and accommodations are being followed as outlined in the student's Individual Education Program (IEP). All IEPs will be implemented as written and monitored for appropriateness as the year progresses. Intrinsic Schools will provide a full continuum of services in addition to ensuring that student progress be monitored and IEPs reflect the least restrictive environment .	CEO, Intrinsic Schools CMO Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator)	☐ Approved ☐ See below

ILLINOIS STATE BOARD OF EDUCATION
Special Education & Support Services
100 North First Street, E-228
Springfield, Illinois 62777-0001

CHARTER SCHOOL INITIAL APPLICATION FOR SPECIAL EDUCATION SERVICES

ISBE 23 ILLINOIS ADMINISTRATIVE CODE 226.10 SUBTITLE A SUBCHAPTER f SUBPART A: GENERAL

Section 226.10 Purpose

This Part establishes the requirements for the treatment of children and the provision of special education and related services pursuant to the Individuals with Disabilities Education Improvement Act (also referred to as "IDEA") (20 USC 1400 et seq.), its implementing regulations (34 CFR 300, as amended by 71 Fed. Reg. 46540 (August 14, 2006, no later amendments or editions included)), and Article 14 of the School Code [105 ILCS 5/Art.14]. This Part also distinguishes between requirements derived from federal authority and those imposed additionally pursuant to Article 14 of the School Code or the authority of the State Board of Education. The requirements of IDEA, its implementing regulations, and this Part shall apply in every instance when a child is or may be eligible for special education and related services. (Source: Amended at 31 Ill. Reg. 9915, effective June 28, 2007).

Pursuant to the authority of the Illinois State Board of Education under 105 ILCS 5/27A-7(a)(15), the proposal must outline a plan for the provision of special education services.

CHARTER SCHOOL NAME Intrinsic Schools	DISTRICT NAME AND NUMBER Chicago 299	
ADDRESS (Street, City, State, Zip Code) Intrinsic Schools 17 North State Street 6th Floor Chicago, IL 60602	TELEPHONE (Include Area Code) 773 250-7845	FAX (Include Area Code) 312 873-4772
	DATE OF APPLICATION SUBMISSION September ,2013	
GRADES TO BE SERVED 7-12	TOTAL NUMBER OF STUDENTS TO BE SERVED 900	
CONTACT NAME Melissa Zaikos	CONTACT TELEPHONE (Include Area Code) 312-384-9903	CONTACT E-MAIL mzaikos@intrinsicschools.org

ISBE USE ONLY:

Review # ____________ Date ________________________

Instructions for required corrections AND clarification:

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
a) Services – describe how all services and resources required by a student's IEP will be provided, including but not limited to accommodations, LRE setting, and related services; Provide assurances that in compliance with state and federal law, (i) the charter school will not discriminate based upon a child's need for special education services; and (ii) any decision made that a child will not be educated at the Charter School because of the need for special education and related services will only be made after the IEP team's consideration of the educational environment options *(taking into consideration all available educational resources such as accommodations AND related services)* and the IEP team's determination that the Charter School's educational program and services do not meet the child's individual needs. (34 CFR 300.116(a)(1)) (34 CFR 300.116(b)(1)) (34 CFR 300.320(a)(1)(i)) (34 CFR 300.320(a)(4)) (34 CFR 300.320(a)(7)) (34 CFR 300.321(a)) (34 CFR 300.322(c-d)) (34 CFR 300.324(a)(1)(ii)) (34 CFR 300.324(a)(2)) (23 IAC 226.210) (23 IAC 226.220(c))	At Intrinsic Schools, we are committed to empowering all students to reach their fullest potential, including students receiving special education services, classified as English Language Learners (ELL), and/or who may be in high-risk situations including but not limited to homelessness, low achievement, poverty, behavioral issues, truancy, drugs, pregnancy, and emotional issues. In accordance to all applicable state and federal statutes, including Title II of the ADA of 1990, the IDEA, Section 504 of the Rehabilitation Act of 1973, and Article 14 of the Illinois School Code, Intrinsic Schools will provide a free and appropriate education to all students enrolled. Students with disabilities will receive the appropriate services without cost to parents/family, including extended year services, when applicable. All student recruitment material will make clear that students with disabilities are encouraged and welcome to apply. Our schedule is designed to be adaptable based on student needs and real-time data. As we review incoming IEPs, we will schedule students in accordance with the goals defined in each student's plan. Special education teacher schedules will be flexible to best meet the needs of our students. Through analysis of progress monitoring and observational data, we will systematically assess the LRE as outlined in each IEP. Our learner-driven model will seek to provide all students with the least restrictive environment for them to successfully reach the rigorous expectations outlined in our school's mission. We will seek support from the district and its related service providers in order to best serve the needs of our students and adhere to the provisions outlined in each child's IEP.	Principal and/or Curriculum Coordinator Instructional Support Team Intrinsic School Counselor/Case Manager Special Education Teacher(s) CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator)	☐ Approved ☐ See below

VI. INDIVIDUALIZED EDUCATIONAL PROGRAM (IEP)

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
b) **Functional Assessments of Behavior** – describe this provision; (34 CFR 300.324(a)(2)(i)) (34 CFR 300.530(d-f)) (23 IAC 226.75)	Observational data will serve as initial data points for problem behaviors. If a student is referred for consistent and frequent behavior problems, a team of individuals including the principal or curriculum coordinator, teachers, parents, and the student will meet to: 1. Identify the specific nature of the problem behavior, 2. Determine the underlying factors contributing to the problem behavior 3. Plan for tiered interventions to address the problem behavior, and 4. Determine benchmarks and/or progress monitoring towards improving the problem behavior. At Intrinsic Schools we believe in disciplining with dignity, teaching with logic, and developing a school culture where students are motivated intrinsically to behave appropriately and engage in their work. These strategies have proven successful in our experiences working with CPS schools towards decreasing discipline referrals and increasing student achievement and engagement.	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator) Intrinsic Schools Social Worker Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
c) **Behavior Intervention Plans** – describe how these will be implemented; (34 CFR 300.530(d-f)) (23 IAC 226.750(a))	Behavior Intervention Plans will be implemented following each Functional Assessment of Behavior to address the function and/or root cause of the problem area and to determine an appropriate plan of intervention. Ongoing monitoring of student behavior will gauge the efficacy of the intervention. At Intrinsic, culture-building activities will address five major areas: self-awareness, responsible decision-making, relationship skills, social awareness, and self-management. We will also use technology to support the social and emotional needs of our students. All students will fill out brief online surveys giving teachers and administrators information about their social well-being on an on-going basis. Teachers will have instant information about which student may require additional attention from the teacher and which student may require more significant support from a social worker or outside partner. Teachers who piloted such a system shared that students were remarkably candid and self-identified many issues that otherwise would have gone undetected. This targeted and ongoing support will contribute to supporting each child toward meeting their individual behavior goals. Appropriate school staff will have copies of the student's Behavior Intervention Plan and follow the course of action prescribed in the plan. If the intervention does not produce desired results and the behavior continues or escalates, the parent will be notified within the appropriate time frame and meet with the IEP team to review the current Behavior Intervention Plan to determine any additional or different actions/interventions.	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator) Intrinsic Schools Social Worker Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
d) **Discipline** – describe what and how discipline will be managed with special education students; (34 CFR 300.530(b-e)) (34 CFR 300.532(b-e))	Our team has significant experience dealing with student discipline and behavioral issues in schools across Chicago. We will implement the Uniform School Discipline Code as outlined by CPS. We also believe in implementing a proactive, positive behavioral support system as a preventative measure and to build students' socio-emotional problem-solving skills. We will continuously ask students for feedback regarding areas of need. Administration may suspend students with disabilities and cease educational services for a total of up to 10 consecutive or 10 cumulative school days in one school year without providing special education procedural safeguards. Saturday, and before- and after-school detentions will not count toward the 10-day limit. Additionally, if students with disabilities continue to participate in the general education curriculum and receive their IEP services, in-school suspensions will not count toward the 10-day limit. Intrinsic School will implement the following steps to continue to meet the educational needs of students who are suspended over 10 school days: When administration anticipates a referral for expulsion or for emergency alternative placement, the following steps will be taken: 1. Provide written notice to the parent/guardian or surrogate parent of the intervention or consequence being considered and the date of the IEP Manifestation Determination Review (MDR) conference, which will be held within 10 school days of the date of the decision to discipline the student. Intrinsic School will also provide parent/guardian/ surrogate with a written copy of Notice of Procedural Safeguards. 2. The IEP team will: A. Determine whether the misconduct is related to the student's disability by reviewing all current and relevant information, including evaluation and diagnostic results, information from the parent/ guardian, observations of the student, classroom conduct and observations, and the student's IEP. The behavior will be determined a manifestation of	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator; Legal Department Staff) Intrinsic Schools Social Worker Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

VI. INDIVIDUALIZED EDUCATIONAL PROGRAM (IEP)

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
e) **Transition planning** – describe the methods used for agencies' involvement, participation of agencies in IEPs, and tracking post-graduation implementation; (34 CFR 300.320(b)) (34 CFR 300.321(b)) (34 CFR 300.43) (34 CFR 300.600(d)(2)) (34 CFR 300.601(a-b)) (23 IAC 226.230(c))	During the IEP year in which the student turns 14½, and each year after that, a transition plan will be included in the student's IEP. Students who reach this age will be informed that they have a right to be part of the IEP team, giving him or her a voice in future planning. A transition services representative will be invited to attend the IEP transition meeting, with the consent of the parent/guardian. The IEP team will ensure the IEP includes appropriate, measurable, post-secondary goals based upon age-appropriate assessments related to employment, education or training, and, as needed, independent living; the transition services that are needed to assist the child in reaching those goals, including courses of study and any other needed services to be provided by entities other than the school. A statement will be included identifying who will provide services needed to meet the student's transition goals. IEP plans will also include student's strengths, preferences, and interests. Our goal is to prepare all Intrinsic students for 21st century, post-secondary success. We will assist students and their families navigate the college and career landscape in the following areas: College Knowledge, College Guidance, Financial Literacy, and Transitional Services. Specifically, we will have designated staff knowledgeable in finding the most appropriately matched college for students with disabilities. Transition activities will include career exploration opportunities, job-seeking skills training, host informational family workshops in coordination with other agencies that provide services to students and adults with disabilities.	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator) Intrinsic Schools Social Worker Intrinsic Schools College Counselor Special Education Teacher(s)	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

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f) **Transportation** – describe provisions for this service; (34 CFR 300.34(c)(16)) (34 CFR 300.107(b)) (23 IAC 226.750(b))	If transportation is required, according to a student's IEP, the school will work with CPS and the Department of Transportation Services to ensure timely, efficient, and safe transportation service. Each student's transportation needs will be discussed and reviewed at IEP meetings/annual reviews to ensure that appropriate transportation is provided as a related service as needed, with the goal of fostering independence as possible based on student need and progress.	Principal CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator) CPS - Office of Transportation Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

VI. INDIVIDUALIZED EDUCATIONAL PROGRAM (IEP)

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
g) **Extended School Year** – describe how extended school year services will be provided. (34 CFR 300.106(a-b)) (34 CFR 300.320(a)(5)) (34 CFR 300.320(a)(4)(ii))	Extended school year (ESY) services shall be provided to each student with a disability whose unique needs require special education and related services in excess of the regular school year in order to address the effects of regression/ recoupment and to ensure a free appropriate public education. Eligibility The IEP team shall determine and note in the student's IEP whether the student requires ESY services to address 1. regression/recoupment, a likelihood of significant regression of previously learned skills during a break in instruction and limited recoupment of these skills, and/or 2. loss of critical skills over an extended break in special education services, and/or 3. any other special circumstances or factors that indicate the need for ESY services in accordance with the IDEA and ISBE standards and regulations. Baseline classroom and other data will be collected. Following a natural break in service, e.g., winter break, spring break, classroom data will again be collected to determine the impact of regression/recoupment. When applicable, the student's IEP Team shall determine the type, amount, and/or duration of the services necessary as part of the child's extended school year program on an individualized basis. Our schedule and school calendar is also organized to provide students will extra support throughout various times during the week throughout the school year. If needed, we will work with CPS to provide extended school year services to students who may require them.	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator) Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
a) **ISAT/PSAE/IAA Determination –** indicate how ISAT/PSAE/IAA testing is determined by the IEP team; (34 CFR 300.320(a)(6)) (23 IAC 226.230(a)(2))	Most Intrinsic students will take the ISAT/PSAE rather than the IAA. Intrinsic Schools will follow state guidelines to determine eligibility for IAA; otherwise all students will participate in the ISAT/ PSAE and will be provided the allowable accommodations as defined in their IEPs. Students who are unable to take the ISAT/PSAE due to their disability, will be evaluated by the IEP team according to the student's need. As determined by the IEP, students with the most significant cognitive disabilities may take the IAA if participation in the state's regular assessments, ISAT/PSAE, is not appropriate, even with accommodations, and they meet all of the criteria listed: 1. The student has intellectual functioning well below average that exists concurrently with impairments or deficits in adaptive functioning; 2. the student's instruction is linked to grade level content, but is narrowed in scope and reduced in complexity. It is reflective of the critical functions found in the Alternate Assessment Framework; and 3. when compared to other students with disabilities, the student requires more frequent and intensive instruction presented in incremental steps in order to apply and transfer skills across settings. Once the team determines a student requires alternative assessment, the school will submit accommodation requests to testing administrators for their approval.	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator) Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
b) ISAT/PSAE accommodations – indicate how ISAT/PSAE accommodations will be made for students with disabilities whose IEPs require accommodations; (34 CFR 300.320(a)(6))	All IEPs will reviewed prior to testing. When applicable, Intrinsic School will acquire and secure the appropriate resources to meet the allowable accommodations and/or modifications specified in each students' IEP. Intrinsic School will gather data to determine what the allowable accommodations and modifications are for each assessment. A system will be in place to monitor that all allowable accommodations and/or modifications specified per IEPs are in place and have been implemented. All documentation will be submitted in a timely manner so that students participate fully in state and district tests as indicated in IEPs.	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator) Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

VIII. CONFIDENTIALITY OF RECORDS

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
Provide method of access to records, access controls in place, and guidelines for appropriateness of special education documents in temporary files. (FERPA) (20 USC 1232g) (23 IAC 226.740)	Special education files are not part of a student's permanent record and will only be released to parties outside of the school with a written release of information from a parent or guardian,a student over the age of 18, or individuals specifically designated as a representative of the parents. The special education electronic files will reside in the CPS Student Information System and are password protected. Personnel working directly with special education students will have access to the electronic IEP and will sign a form stating that they have received access to them. In addition, parents, students over 18, or individuals specifically designated as a representative of the parents will receive appropriate access to student records.	Principal and/or Curriculum Coordinator Intrinsic School Counselor/Case Manager Special Education Teacher(s)	☐ Approved ☐ See below

IX. SPECIAL EDUCATION PERSONNEL

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
Describe how the charter school will perform background checks as well as credential verification of its prospective special education personnel. (105 ILCS 5/10-21.9) (34 CFR 300.18)	All perspective special education candidates must hold Illinois State Certificates in their area of expertise. The administrator in charge will ensure that their certificates are current by checking with the ISBE Educator Licensure webpage. In addition, all potential candidates must undergo a background check prior to being hired. Candidates will follow the guidelines for obtaining a background check as outlined by CPS. Only candidates who hold the required certificates and pass the background check will be considered for hiring.	Principal and/or Curriculum Coordinator CPS - Office of Diverse Learner Supports and Services (Clinician Support; Specialized Services Administrator)	☐ Approved ☐ See below

X. SPECIAL EDUCATION PERSONNEL

CHARTER SCHOOL NAME

Intrinsic Schools

ISBE REQUIREMENTS	PROPOSED STEPS FOR IMPLEMENTATION OF SERVICES ACCORDING TO REQUIRED INFORMATION	TITLE OF STAFF AT CHARTER SCHOOL AND DISTRICT WHO WILL WORK IN PARTNERSHIP TO ENSURE IMPLEMENTATION OF SERVICES	FOR ISBE USE ONLY
Describe how the charter school will determine class size to remain in compliance with federal and state requirements. (23 IAC 226.730(a-c))	At Intrinsic Schools, general education classrooms will not exceed 30% students with disabilities. For separate special education classes, we will follow state guidelines, which requires a determination to be based on the amount of required special education services (ARS). For the middle school, the age range in separate special education classes will not exceed four years. For high schools, the age range will not exceed six years.	Principal and/or Curriculum Coordinator	☐ Approved ☐ See below

APPENDIX L: Intrinsic Schools Calendar, Section 2.4

2015-16 School Calendar

Day	July-15	August-15	September-15	October-15	November-15	December-15	January-16	February-16	March-16	April-16	May-16	June-16
1		WKND	I	I	WKND	I	INT	I	I	I	WKND	I
2		WKND	I	I	I	I	WKND	I	I	WKND	I	I
3			I	WKND	I	I	WKND	I	I	WKND	I	I
4	WKND		I	WKND	I	I	I	I	I	I	I	WKND
5	WKND		WKND	I	Q/T	WKND	I	I	WKND	I	I	WKND
6			WKND	I	PD	WKND	I	WKND	WKND	I	I	I
7			H	I	WKND	I	I	WKND	I	Q/T	WKND	I
8		WKND	I	I	WKND	I	I	I	I	PD	WKND	I
9		WKND	I	I	I	I	WKND	I	I	WKND	I	I
10		PD	I	WKND	I	I	WKND	I	I	WKND	I	I
11	WKND	PD	I	WKND	H	I	I	I	I	I	I	WKND
12	WKND	PD	WKND	I	I	WKND	I	H	WKND	I	I	WKND
13		PD	WKND	I	I	WKND	I	WKND	WKND	I	I	Q/T
14		PD	I	I	WKND	I	I	WKND	I	I	WKND	LD
15		WKND	I	I	WKND	I	I	H	I	I	WKND	PD
16		WKND	I	I	I	I	WKND	I	I	WKND	I	PD
17		PD	I	WKND	I	I	WKND	I	I	WKND	I	PD
18	WKND	PD	I	WKND	I	I	H	I	I	I	I	WKND
19	WKND	PD	WKND	I	I	WKND	I	I	WKND	I	I	WKND
20		PD	WKND	I	I	WKND	I	WKND	WKND	I	I	
21		PD	I	I	WKND	INT	I	WKND	INT	I	WKND	
22		WKND	I	I	WKND	INT	Q/T	I	INT	I	WKND	
23		WKND	I	I	I	INT	WKND	I	INT	WKND	I	
24		PD	I	WKND	I	INT	WKND	I	INT	WKND	I	
25	WKND	PD	I	WKND	H	INT	I	I	INT	I	I	WKND
26	WKND	PD	WKND	I	H	WKND	I	I	WKND	I	I	WKND
27		PD	WKND	I	H	WKND	I	WKND	WKND	I	I	
28		PD	I	I	WKND	INT	I	WKND	I	I	WKND	
29		WKND	I	I	WKND	INT	I	I	I	I	WKND	
30		WKND	I	I	I	INT	WKND	N/A	I	WKND	H	
31		FD	N/A	WKND	N/A	INT	WKND	N/A	I	N/A	I	N/A
# Instr. Days	0	1	21	22	16	14	19	19	18	20	21	10

H	9	ED-PD	0	RC	0	TI	0	EM	0
PD	20	ED-RC	0	RCD	0	INT	15	G	0
Instructional days (state min = 180)			181						

Please enter the codes below into the calendar above. Remove "I" codes for days that correspond to any of the other codes listed below and for days that occur prior to the start or after the end of your school year. Please add "I" codes for days of instruction occuring prior to the start or after the end of the CPS school year. CPS Holidays have already been marked with an H and Intercessions have already been marked with an INT.

Legend - Do not use colors

I	Instructional day
FD	First day of school
Q/T	End of quarter or trimester
PD	Professional Development/Staff Development: No students present
H	Holiday: No school
ED-PD	Early dismissal: 1/2 day attendance for students due to PD
ED-RC	Early dismissal: 1/2 day attendance for students due to report card pickup
RC	Report card pick-up/Parent Teacher conference: No students present
RCD	Report card distribution: Students present
LD	Last day of school
TI	Teacher Institute
INT	Intersession
EM	Emergency day
G	Graduation date(s) if applicable

CPS 2015-16 Holidays

September 7	*Labor Day*
November 11	*Veterans Day*
November 26-27	*Thanksgiving*
January 18	*ML King's Birthday*
February 12	*Lincolns Birthday*
February 15	*President's Day*
May 30	*Memorial Day*

CPS Regular Calendar 2015-16 Intersessions

December 21-January 1	*CPS Winter Break*
March 21-March 25	*CPS Spring Break*

Please enter the information requested below

Time building is opened		
School start time		*This time should be the same as on the bell schedule tab*
School end time		*This time should be the same as on the bell schedule tab*
Time building is closed		
Date summer school begins (if applicable)		
Date summer school ends (if applicable)		
Student Application Deadline for the 2016-17 School Year		
Lottery Date for the 2016-17		

INSTRUCTIONS - Please fill in times in the following format H:MM AM (i.e. put a space between the number and the AM/PM). For lunch times less than 60 minutes, please input 12: in front of the minutes and indicate AM, ie. (12:40 AM).

APPENDIX L: Intrinsic Schools High School Schedule 2015-2016, Section 2.4

High School Bell Schedule

	Sample		Monday		Tuesday		Wednesday		Thursday		Friday	
PERIOD NO. 1 START and END TIME	*8:30 AM*	*10:10 AM*	*8:30 AM*	*10:10 AM*	*8:30 AM*	*10:10 AM*	*8:30 AM*	*10:10 AM*	*8:30 AM*	*10:10 AM*	*8:30 AM*	*9:00 AM*
PERIOD NO. 2 START and END TIME	*10:10 AM*	*11:50 AM*	*10:10 AM*	*11:50 AM*	*10:10 AM*	*11:50 AM*	*10:10 AM*	*11:50 AM*	*10:10 AM*	*11:50 AM*	*9:00 AM*	*9:30 AM*
PERIOD NO. 3 START and END TIME	*11:50 AM*	*12:20 PM*	*11:50 AM*	*12:20 PM*	*11:50 AM*	*12:20 PM*	*11:50 AM*	*12:20 PM*	*11:50 AM*	*12:20 PM*	*9:30 AM*	*10:00 AM*
PERIOD NO. 4 START and END TIME	*12:20 PM*	*12:50 PM*	*12:20 PM*	*12:50 PM*	*12:20 PM*	*12:50 PM*	*12:20 PM*	*12:50 PM*	*12:20 PM*	*12:50 PM*	*10:00 AM*	*10:30 AM*
PERIOD NO. 5 START and END TIME	*12:50 PM*	*2:30 PM*	*12:50 PM*	*2:30 PM*	*12:50 PM*	*2:30 PM*	*12:50 PM*	*2:30 PM*	*12:50 PM*	*2:30 PM*	*10:30 AM*	*11:00 AM*
PERIOD NO. 6 START and END TIME	*2:30 PM*	*4:10 PM*	*2:30 PM*	*4:10 PM*	*2:30 PM*	*4:10 PM*	*2:30 PM*	*4:10 PM*	*2:30 PM*	*4:10 PM*	*11:00 AM*	*11:30 AM*
PERIOD NO. 7 START and END TIME											*11:30 AM*	*11:50 AM*
PERIOD NO. 8 START and END TIME											*11:50 AM*	*12:20 PM*
PERIOD NO. 9 START and END TIME											*12:20 PM*	*12:50 PM*
PERIOD NO. 10 START and END TIME												
END TIME OF LAST PERIOD		*4:10 PM*		*4:10 PM*		*4:10 PM*		*4:10 PM*		*4:10 PM*		*12:50 PM*
LENGTH OF LUNCH PERIOD (h:mm)		*0:30*		*0:30*		*0:30*		*0:30*		*0:30*		*0:30*

DO NOT ALTER - Information below will be automatically calculated.

	Sample	Monday	Tuesday	Wednesday	Thursday	Friday
LENGTH OF SCHOOL DAY:HOURS	*7:40*	7:40	7:40	7:40	7:40	4:20
LENGTH OF INSTRUCTIONAL DAY: HOURS	*7:10*	7:10	7:10	7:10	7:10	3:50
LENGTH OF SCHOOL DAY:MINUTES	*460:00*	04:00	460:00	460:00	460:00	260:00
LENGTH OF INSTRUCTIONAL DAY: MINUTES	*430:00*	22:00	430:00	430:00	430:00	230:00

*Minutes that include opening activities and/or other non-instructional activities as part of the model selected for your school.

**Instructional day excludes the time required to enter and leave the building, passing time, lunch periods and any other non-instructional activities.

INSTRUCTIONS - Please fill in times in the following format H:MM AM (i.e. put a space between the number and the AM/PM). For lunch and/or recess times, less than 60 minutes, please input 12: in front of the minutes and indicate AM, ie. (12:40 AM).

APPENDIX L: Intrinsic Schools Elem. School Schedule 2015-2016, Section 2.4

Elementary School Bell Schedule

	Sample	Monday	Tuesday	Wednesday	Thursday	Friday
START OF INSTRUCTION: BELL START TIME	*8:30 AM*	*8:30 AM*	*8:30 AM*	*8:30 AM*	*8:30 AM*	8:30 AM
END OF INSTRUCTION: BELL END TIME	*4:10 PM*	*4:10 PM*	*4:10 PM*	*4:10 PM*	*4:10 PM*	12:50 PM
LENGTH OF LUNCH PERIOD (h:mm)	*0:30*	*0:30*	*0:30*	*0:30*	*0:30*	*0:30*
LENGTH OF RECESS (if applicable) h:mm	*0:30*	*0:30*	*0:30*	*0:30*	*0:30*	*0:30*

DO NOT ALTER - Information below will be automatically calculated.

LENGTH OF SCHOOL DAY:HOURS	*7:40*	7:40	7:40	7:40	7:40	4:20
LENGTH OF INSTRUCTIONAL DAY: HOURS	*6:40*	6:40	6:40	6:40	6:40	3:20
LENGTH OF SCHOOL DAY:MINUTES	*460:00*	460:00	460:00	460:00	460:00	260:00
LENGTH OF INSTRUCTIONAL DAY: MINUTES	*400:00*	400:00	400:00	400:00	400:00	200:00

*Minutes that include opening activities and/or other non-instructional activities as part of the model selected for your school.

**Instructional day excludes the time required to enter and leave the building, passing time, lunch periods and any other non-instructional activities.

APPENDIX M: Intrinsic Schools – Daily Schedule, Section 2.4

	Monday	Tuesday	Wednesday	Thursday
08:30 - 10:10	"A" Classes	"B" Classes	"A" Classes	"B" Classes
10:10 - 11:50	"A" Classes	"B" Classes	"A" Classes	"B" Classes
11:50 - 12:20 12:20 - 12:50	Community Mtg/Lunch	ADV/Lunch	ADV/Lunch	ADV/Lunch
12:50 - 2:30	"A" Classes	"B" Classes	"A" Classes	"B" Classes
2:30 – 4:10	"A" Classes	"B" Classes	"A" Classes	"B" Classes

	Friday
08:30 - 09:00	"A" Classes
09:00 - 09:30	"B" Classes
09:30 - 10:00	"A" Classes
10:00 - 10:30	"B" Classes
10:30 - 11:00	"A" Classes
11:00 - 11:30	"B" Classes
11:30 – 11:50	Community Meeting
11:50 - 12:20 12:20 **– 12:50**	ADV/Lunch
12:50 - 3:50	Professional development

APPENDIX N: Intrinsic Schools – Teacher Schedule, Section 2.4

	Monday	Tuesday	Wednesday	Thursday
08:30 - 10:10	English I	Supervise – online (45 min) Prep (45 min)	English I	Supervise – online (45 min) Prep (45 min)
10:10 - 11:50	English I	English I	English I	English I
11:50 - 12:20 12:20 - 12:50	Comm Mtg/Lunch	ADV/Lunch	Comm Mtg/Lunch	ADV/Lunch
12:50 - 2:30	English I	English I	English I	English I
2:30 – 4:10	Supervise – online (45 min) Prep (45 min)	English I	Supervise – online (45 min) Prep (45 min)	English I

	Friday
08:30 - 09:00	English I
09:00 - 09:30	English I
09:30 - 10:00	English I
10:00 - 10:30	English I
10:30 - 11:00	English I
11:00 - 11:30	English I
11:30 – 11:50	Community Meeting
11:50 - 12:20 12:20 – **12:50**	ADV/Lunch
12:50 - 3:50	Professional development

APPENDIX O: Intrinsic Schools – Student Schedule, Section 2.4

	Monday	Tuesday	Wednesday	Thursday
08:30 - 10:10	8:30-9:20: Online Reading 9:20-10:10 WL/Reading (Humanities)	Art	8:30-9:20: Online Reading 9:20-10:10 WL/Reading (Humanities)	Art
10:10 - 11:50	World Studies	Science	World Studies	Science
11:50 - 12:20 12:20 - 12:50	Comm Mtg/Lunch	ADV/Lunch	ADV/Lunch	ADV/Lunch
12:50 - 2:30	Math	12:50 - 1:40: Online Math 1:40 - 2:30 WL/Reading (Humanities)	Math	12:50 - 1:40: Online Math 1:40 - 2:30 WL/Reading (Humanities)
2:30 – 4:10	PE	English	PE	English

	Friday
08:30 - 09:00	English
09:00 - 09:30	World Studies
09:30 - 10:00	Math
10:00 - 10:30	Science
10:30 - 11:00	Conferences (Cafenasium)
11:00 - 11:30	WL/Reading (Seminar)
11:30 – 11:50	Community Meeting
11:50 - 12:20 12:20 – **12:50**	ADV/Lunch

APPENDIX O: Intrinsic Schools – Student Schedule, Section 2.4

12:50 - 3:50	Field Experiences

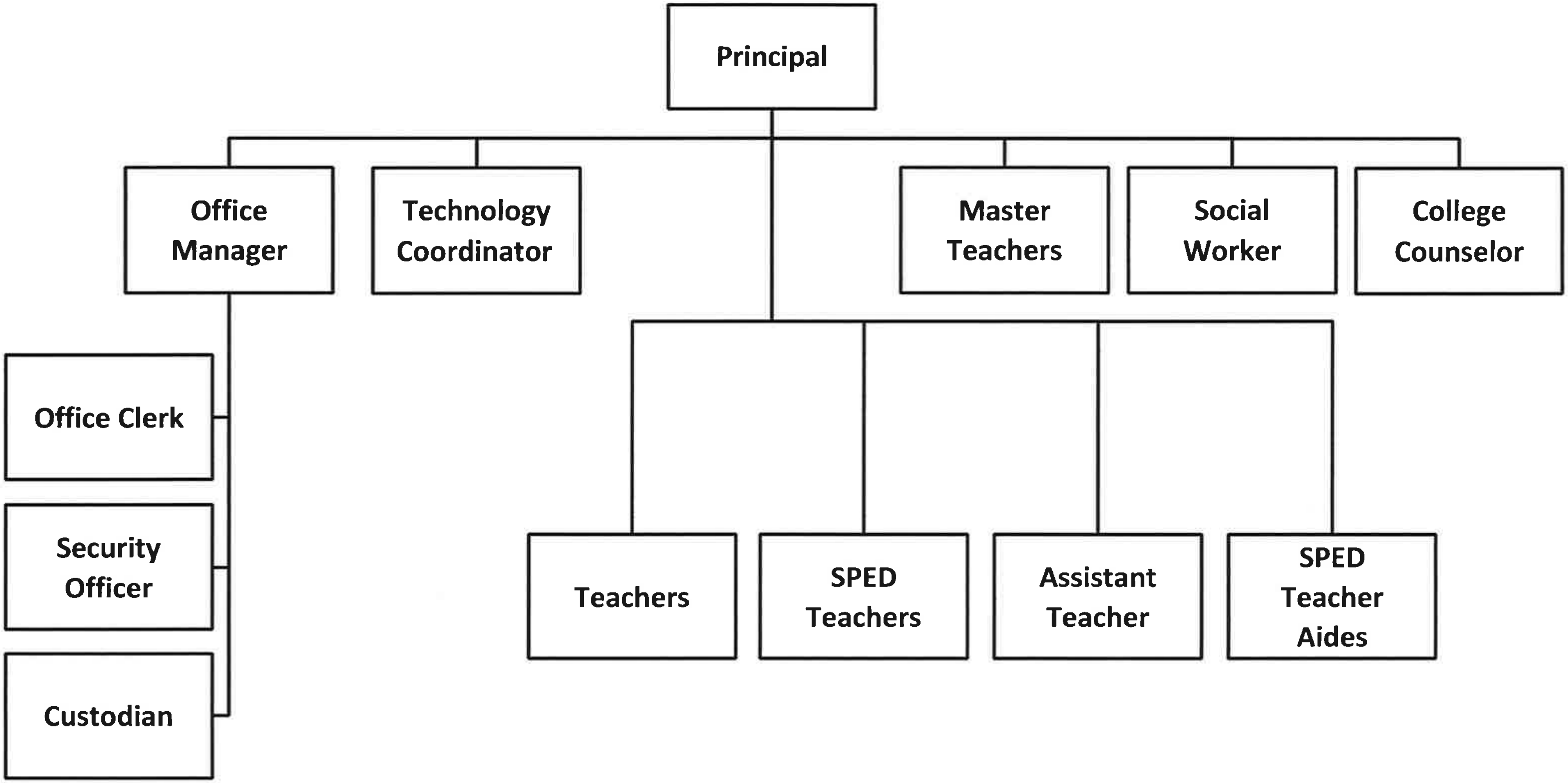
APPENDIX P: Intrinsic Schools – Five Year Staffing Plan, Section 2.5

Intrinsic Schools 5-Year School Staffing Model

Positions	Incubation FY15	Y1 FY16	Y2 FY17	Y3 FY18	Y4 FY19	Y5 FY20
Principal	0.5	1	1	1	1	1
Master Teacher	0.5	4	4	5	5	5
Teachers		1.5	8.5	15.5	23.5	25.5
SPED Teachers		1	4	5	5	6
SPED Teacher Aides			1	2	2	2
Teacher Aides (non-SPED)		2	6	10	13	14
College Counselor		0.5	1	1	1	1
Social Worker		0.5	1	1	1	1
Tech Coordinator				1	1	1
Office Manager/Compliance Coordinator		1	1	1	1	1
Clerk		1	1	1	1	1
Custodians		1	2	2	2	2
Security		1	2	2	2	2

APPENDIX Q: Intrinsic Schools – School-Level Organizational Chart

INTRINSIC SCHOOLS ORGANIZATIONAL CHART: SCHOOL LEVEL



Position: COLLEGE COUNSELOR

Intrinsic Schools *is a new CMO that opened its first high school in Chicago in 2013. We will prepare all students for 21st century post-secondary success and create independent and intellectually curious learners. Intrinsic will leverage technology to build foundational skills, deepen learning and cultivate autonomous and persevering learners. Students will be grouped into pods of 90 students and spend roughly half the day in a humanities block and half in a STEM block. Students will move fluidly between adaptive digital content, multi-media content, small group instruction, group projects and independent work. Students will be in mixed ability groups for some activities and also receive targeted instruction at their level. The Intrinsic environment will balance high expectations with room to pursue individual interests with purpose. We will blend the focus on achievement at no-excuses charter schools and the room to be inquisitive found at Montessori schools.*

Each school will be staffed with a master teacher in each discipline. We believe that deep content knowledge and pedagogical expertise will be critical in the design of the school. Master teachers will report to the Principal, who is tasked with harnessing the talents of the instructional team and creating conditions for success.

COLLEGE COUNSELOR — Job Responsibilities

- Create programs to inform parents of the college counseling process including financial planning, financial aid, etc.
- Working with teachers to incorporate key college application milestones into advisory support
- Create external relationships with university admissions officers to inform them about our school and encourage them to consider our students for acceptance
- Create partnerships with outside organizations that provide college application support programs such as ACT test prep, financial planning, mentoring, application and essay review
- Own database of student interests to be matched to summer enrichment programs that will help to prepare students for college
- Own all data related to college applications and college persistence
- Find or create tools to help students identify "match" schools based on their academic profile and financial means
- Provide feedback to staff on university expectations and help to inform the design of student digital portfolios

Qualifications

- Prior experience as a college counselor or university admissions officer
- Track record demonstrating ability to influence college acceptance and persistance rates
- Bachelor's degree required, Master's degree preferred.
- Ability to prioritize multiple projects and deadlines
- Ability to communicate courteously and effectively to different audiences (orally and in writing)
- Knowledge and experience using MS Word, Powerpoint, Excel and Outlook
- Knowledge and experience with IMPACT student information system, preferred

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- Organizational: Ability to organize and track casework with a large student body.
- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals

- Constant learner: remains abreast of latest educational research and is open to new ideas and feedback.
- Able to reflect and adjust to dynamic and rapidly changing environment
- Experienced working with diverse populations; either conversant in Spanish or willing to learn
- Unafraid of technology

Compensation

Competitive and based on experience

Interested candidates should contact Melissa Zaikos, CEO of Intrinsic Schools, at melissazaikos@gmail.com.

This job description is not intended to be a complete list of all responsibilities, duties or skills required for the job and is subject to review and change at any time, with or without notice, in accordance with the needs of Intrinsic Schools. Since no job description can detail all the duties and responsibilities that may be required from time to time in the performance of a job, duties and responsibilities that may be inherent in a job, reasonably required for its performance, or required due to the changing nature of the job shall also be considered part of the jobholder's responsibility.

Position: MASTER TEACHER

Intrinsic Schools is a new CMO that opened its first high school in Chicago in 2013. We will prepare all students for 21st century post-secondary success and create independent and intellectually curious learners. Intrinsic will leverage technology to build foundational skills, deepen learning and cultivate autonomous and persevering learners. Students will be grouped into pods of 90 students and spend roughly half the day in a humanities block and half in a STEM block. Students will move fluidly between adaptive digital content, multi-media content, small group instruction, group projects and independent work. Students will be in mixed ability groups for some activities and also receive targeted instruction at their level. The Intrinsic environment will balance high expectations with room to pursue individual interests with purpose. We will blend the focus on achievement at no-excuses charter schools and the room to be inquisitive found at Montessori schools.

Each school will be staffed with a master teacher in each discipline. We believe that deep content knowledge and pedagogical expertise will be critical in the design of the school. Master teachers will report to the Principal, who is tasked with harnessing the talents of the instructional team and creating conditions for success.

MASTER TEACHER — Job Responsibilities

- Lead and drive instruction utilizing data and technology
- Manage fluid pod classroom of approximately 90 students engaged in a variety of tasks simultaneously
- Lead and manage other classroom staff (teacher and teacher aide)
- Collaborate with other master teachers to refine school model, make major curriculum decisions
- Coach and mentor other teachers, give feedback, and hold them accountable to individually-set goals
- Plan, create and conduct professional ongoing development

Qualifications

- Strong instructional background - minimum of 5 years teaching experience
- Track record of using data in the classroom and driving student outcomes
- Experience using technology in the classroom
- Experience conducting and facilitating professional development sessions
- Experience serving in leadership capacity (school committees, coaching/mentoring roles, etc.)
- Master's degree preferred

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- Low ego – Realizes the talents of fellow staff members and demonstrates solid judgment on when to defer to team members. Sees him/herself as responsible for making others successful.
- High energy - Demonstrates enthusiasm and optimism
- Team player – Places goals of the school and CMO before personal goals
- Constant learner – Remains abreast of latest educational research and is open to new ideas and feedback. Able to reflect and adjust to dynamic and rapidly changing environment
- Risk taker – Takes risks for the benefit of students
- Experienced in working with diverse population and either conversant in Spanish or willing to learn
- Unafraid of technology

Compensation

Competitive and based on experience

Interested candidates should contact Melissa Zaikos, CEO of Intrinsic Schools, at melissazaikos@gmail.com.

This job description is not intended to be a complete list of all responsibilities, duties or skills required for the job and is subject to review and change at any time, with or without notice, in accordance with the needs of Intrinsic Schools. Since no job description can detail all the duties and responsibilities that may be required from time to time in the performance of a job, duties and responsibilities that may be inherent in a job, reasonably required for its performance, or required due to the changing nature of the job shall also be considered part of the jobholder's responsibility.

Position: OFFICE CLERK

Intrinsic Schools *is a new CMO that opened its first high school in Chicago in 2013. We will prepare all students for 21st century post-secondary success and create independent and intellectually curious learners. Intrinsic will leverage technology to build foundational skills, deepen learning and cultivate autonomous and persevering learners. Students will be grouped into pods of 90 students and spend roughly half the day in a humanities block and half in a STEM block. Students will move fluidly between adaptive digital content, multi-media content, small group instruction, group projects and independent work. Students will be in mixed ability groups for some activities and also receive targeted instruction at their level. The Intrinsic environment will balance high expectations with room to pursue individual interests with purpose. We will blend the focus on achievement at no-excuses charter schools and the room to be inquisitive found at Montessori schools.*

Each school will be staffed with a master teacher in each discipline. We believe that deep content knowledge and pedagogical expertise will be critical in the design of the school. Master teachers will report to the Principal, who is tasked with harnessing the talents of the instructional team and creating conditions for success.

Office Clerk — Job Responsibilities

- Responsible for office receptionist duties – answering the phone, directing parents / other visitors, and facilitating room reservations for meetings that take place at the school
- Facilitates and maintain organization of the school office
- Works with office manager to meet compliance deadlines as outlined by CPS and grant foundations
- Facilitate purchasing, ordering and receiving for the office and school
- Support the office manager, principal and other school staff in organization and administrative tasks
- Other duties, as assigned

Qualifications

- Ability to prioritize multiple projects and deadlines
- Ability to communicate courteously and effectively to different audiences (orally and in writing)
- Knowledge and experience using MS Word, Powerpoint, Excel and Outlook
- Ability to type at least 50 WPM
- Experience as office assistant or senior receptionist within corporate or school setting
- Knowledge and experience with IMPACT student information system, preferred
- Bachelor's degree, preferred

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals
- Constant learner: remains abreast of latest educational research and is open to new ideas and feedback. Able to reflect and adjust to dynamic and rapidly changing environment
- Experienced working with diverse populations; either conversant in Spanish or willing to learn
- Unafraid of technology

Compensation

Competitive and based on experience

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Position: OFFICE MANAGER

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Each school will be staffed with a master teacher in each discipline. We believe that deep content knowledge and pedagogical expertise will be critical in the design of the school. Master teachers will report to the Principal, who is tasked with harnessing the talents of the instructional team and creating conditions for success.

OFFICE MANAGER — Job Responsibilities

- Establish and maintain organization of the school office
- Act as liaison to CPS administrative office, school vendors and non-instructional partners
- Ensure that the school meets all compliance deadlines as outlined by CPS and grant foundations
- Create and implement school-wide operational systems to improve the organization and efficiency of the school
- Manage and train office staff
- Supervise purchasing, ordering and receiving for the office and school
- Support the Principal and school staff in organization and administrative tasks
- Other duties, as assigned

Qualifications

- Ability to prioritize multiple projects and deadlines
- Ability to communicate courteously and effectively to different audiences (orally and in writing)
- Knowledge and experience using MS Word, Powerpoint, Excel and Outlook
- Ability to type at least 50 WPM
- Experience as office manager or senior receptionist within corporate or school setting
- Experience as a managing other staff members
- Knowledge and experience with IMPACT student information system, preferred
- Bachelor's degree

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals
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Position: PRINCIPAL

INTRINSIC
SCHOOLS

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PRINCIPAL — Job Responsibilities

Instruction (20%)

- Sets high academic standards & maintains program coherence
- Monitors student data trends (academic, cultural, student autonomy)
- Participates in instructional planning and professional development with teachers
- Makes final decisions on instructional issues, in collaboration with master teachers
- Assists teachers in building replicable structures for collaboration and innovation

Human Capital (20%)

- Hires all school–based staff via a collaborative process with significant input from others
- Evaluates teachers with input from master teachers
- Determines staff professional development needs in conjunction with master teachers and ensures that staff have access to needed development
- Evaluates all non-instructional staff
- Facilitates 360 review process for all employees

Culture (20%)

- Builds a positive, trusting and respectful school culture
- Consistently "tinkers" with school model based on student feedback
- Creates structures to ensure that all students and families understand the path to college/post-secondary success, facilitates structured opportunities for families to take necessary steps on that path
- Monitors data on student autonomy to ensure students are successfully taking ownership of their education
- Monitors staff satisfaction and manages retention
- Ensures that school physical environment reflects the school culture – spaces are clean, uncluttered, inviting and inspirational

Community Engagement (30%)

- Builds strong relationships with families
- Establishes and builds external partnerships

- Resolves issues related to interpretation of student code of conduct

Operations and Management (10%)

- Supervises school-based Director of Finance & Operations
- Creates school schedule
- Manages school budget with support from Director of Finance & Operations

Qualifications

- Strong instructional background
- Demonstrated success in closing the achievement gap
- Demonstrated success in supervising or leading a team of educators
- Master's degree preferred

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- Low ego: realizes the talents of the staff and demonstrates solid judgment on when to defer to team members. Sees him/herself as responsible for making others successful.
- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals
- Constant learner: remains abreast of latest educational research and is open to new ideas and feedback. Able to reflect and adjust to dynamic and rapidly changing environment
- Risk taker: takes risks for the benefit of students
- Experienced in working with diverse population and either conversant in Spanish or willing to learn
- Unafraid of technology

Compensation

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Position: SOCIAL WORKER

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Each school will be staffed with a master teacher in each discipline. We believe that deep content knowledge and pedagogical expertise will be critical in the design of the school. Master teachers will report to the Principal, who is tasked with harnessing the talents of the instructional team and creating conditions for success.

SOCIAL WORKER — Job Responsibilities

- Work to identify and resolve any and all social and emotional issues with students.
- Provide casework management for individual students and, as appropriate, family members.
- Respond to referrals from other mental health professionals or recommendations from Intrinsic staff.
- Investigate potential issues with students and determine required services.
- Serve as the liaison between students and any outside organizations from which the student receives services.
- Provide counsel for parents of students receiving services.

Qualifications

- Required Social Worker Endorsement to practice in Illinois as a K-12 social worker.
- Prior experience working with 7^{th} – 12^{th} grade students.
- Graduate degree in social work.
- Ability to prioritize multiple projects and deadlines
- Ability to communicate courteously and effectively to different audiences (orally and in writing)
- Knowledge and experience using MS Word, Powerpoint, Excel and Outlook
- Experience as office manager or senior receptionist within corporate or school setting
- Experience as a managing other staff members
- Knowledge and experience with IMPACT student information system, preferred

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- Communication: Ability to communicate with multiple stakeholders effectively.
- Patience: Ability to work with difficult situations that are not easily resolved.
- Organizational: Ability to organize and track casework with a large student body.
- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals
- Constant learner: remains abreast of latest educational research and is open to new ideas and feedback.
- Able to reflect and adjust to dynamic and rapidly changing environment
- Experienced working with diverse populations; either conversant in Spanish or willing to learn

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Position: TEACHER ASSISTANT

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TEACHER ASSISTANT — Job Responsibilities

- Assists pod instructors in facilitating instruction and managing the classroom
- Facilitate small group instruction
- Collaborate with other pod teachers to troubleshoot issues within the classroom and create instructional plans for specific students

Qualifications

- At least one year of experience working with youth
- Experience using technology
- Current participation in Instructor Certification Program, preferred
- Bachelor's degree preferred

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals
- Constant learner: remains abreast of latest educational research and is open to new ideas and feedback.
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Position: TEACHER

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TEACHER — Job Responsibilities

- Drive instruction utilizing data and technology
- Work with master teacher to manage fluid pod classroom of approximately 90 students engaged in a variety of tasks simultaneously
- Collaborate with other pod teachers to troubleshoot issues within the classroom and create instructional plans for specific students

Qualifications

- Prior classroom experience and/or significant experience working within a particular field (e.g. Physics or Chemistry)
- Understanding of how to use data to improve instruction and student achievement
- Experience using technology
- Bachelor's degree required

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- Low ego: realizes the talents of fellow staff members and demonstrates solid judgment on when to defer to team members. Sees him/herself as responsible for making others successful.
- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals
- Constant learner: remains abreast of latest educational research and is open to new ideas and feedback. Able to reflect and adjust to dynamic and rapidly changing environment
- Risk taker: takes risks for the benefit of students
- Experienced in working with diverse population and either conversant in Spanish or willing to learn
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Position: IT COORDINATOR

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IT COORDINATOR — Job Responsibilities

- Implement Intrinsic's blended learning strategy at the school-level and work to improve it.
- Collaborate with school leadership, teachers, and students to ensure technology supports instruction and to continuously improve the model.
- Roll out centrally developed technology software and tools to staff.
- Conduct pilot programs per staff requests and needs and evaluate results from those programs.
- Maintain systems and processes for collecting data.
- Provide staff with timely access to accurate data.
- Implement centrally designed data management system.
- Ensure all data collection systems work properly.
- Create school level systems and processes that allow users to easily access and use data.
- Ensure technology works.
- Provide help desk support to students and staff.
- Integrate solutions into the operations of the school.
- Ensure network works properly.

Qualifications

- A former teacher that majored in computer science (or something similar) and has a passion for technology driven instruction.
- A former IT professional with a passion for education and improving outdated academic models. that has worked in some type of educational setting.
- A former IT professional that made a career change to teaching.
- A former teacher that made a career change to IT.
- Anyone that understands both schools and technology.

Personal Characteristics

- Aligned to the mission and vision of Intrinsic Schools
- Comfortable balancing high-level strategic planning with the details of implementation.
- Low ego: realizes the talents of fellow staff members and demonstrates solid judgment on when to defer to team members. Sees him/herself as responsible for making others successful.

- High energy: demonstrates enthusiasm and optimism
- Team player: places goals of the school and CMO before personal goals
- Constant learner: remains abreast of latest educational research and is open to new ideas and feedback. Able to reflect and adjust to dynamic and rapidly changing environment
- Risk taker: takes risks for the benefit of students
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Compensation

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APPENDIX S: Intrinsic Schools – Resumes for Any Identified Candidates Not Serving on the Design Team, Section 2.5

We do not currently have any candidates for the school outside of the design team.

INTRINSIC SCHOOLS PROFESSIONAL DEVELOPMENT CALENDAR	
TIME	**TOPICS**
June – July 2015	National Conferences Performance Assessment Training Collaboration between master teachers and new teachers (1 day for each new teacher)
August 3– 21, 2015	New Teacher Induction Master Teachers work on Curriculm planning Preparation for first day and school year
Weekly Meetings	2 hours and 40minute staff development based on early release.
PD Day 1	Preparation for student led-conference Curriculum Mapping and Pacing
PD Day 2	Data Analysis – Academic, Behavioral, Socio-Emotional student data (results, implications, comparisons, and developing plans for improving student outcomes and increasing autonomy) Horizontal and Vertical Curriculum Planning
PD Day 3	Collaborative assessment of student writing Expert and/or Teacher-Led Seminar based on needs and interests
PD Day 4	Expert and/or Teacher-Led Seminar based on needs and interests

APPENDIX U: Intrinsic Schools – Documents on Teacher Evaluation, Section 2.5

The Intrinsic team is currently working to adapt the Danielson model to our blended learning environment. We do not have any additional documents at this time.

NEW STUDENT APPLICATION
FOR YEAR 2013-2014
(Pending Board Approval)

INTRINSIC SCHOOLS

Complete one application for each student you wish to enroll. *(Only Chicago residents may apply.)*
Completed applications **must** be received by Friday, March 22, 2013.

STUDENT and FAMILY INFORMATION: (PLEASE PRINT - As it appears on birth certificate):

Student First Name: ______________ Middle Name: ______________ Last Name: ______________

Home Address: ______________ Apt. Number: ______ Chicago, IL Zip Code: ______________

Birth date (mm/dd/yyyy): ______________ Birthplace: ______________ Current School: ______________

Current Grade (School year 2012-2013): ______________ Grade Applying for Fall 2013-2014: ______________

Parent/Guardian Full Name: ______________ Relationship to Student: ______________

Daytime Phone: ______________ Other Phone: ______________ Email: ______________

SIBLING INFORMATION: Please list any siblings (brothers/sisters ONLY) who are applying to Intrinsic Schools.

1. Name ______________ Current School ______________ Grade ______ ☐ Applying
2. Name ______________ Current School ______________ Grade ______ ☐ Applying
3. Name ______________ Current School ______________ Grade ______ ☐ Applying

How did you hear about Intrinsic Schools? ☐ Fair/Open House ☐ School Representative ☐ Word of Mouth
Other: ______________

I hereby grant Intrinsic Schools permission to use the pupil record of the student named above for evaluation and research purposes, under the condition that all information from this record be used under strict conditions of anonymity and confidentiality.

Parent/Guardian Signature: ______________ Date: ______________

Applications received after the deadline will be added to the waiting list in the order in which they are received.

Send completed application to: NACSA
att: Intrinsic Schools
105 W. Adams Street, Suite 3500
Chicago, IL 60603

or E-mail completed application to: inquiries@instrinsicschools.org

Send questions to: inquiries@instrinsicschools.org

www.intrinsicschools.org
www.facebook.com/IntrinsicSchools

APLICACIÓN PARA NUEVOS ALUMNOS
PARA EL AÑO 2013-2014
(Pendiente de aprobación de la Junta de Educación)

INTRINSIC
SCHOOLS

Favor de llenar una aplicación para cada estudiante que quisiera inscribir. *(Solamente Residentes de Chicago pueden aplicar.)*
La aplicación completa debe ser recibida el Viernes, 22 de Marzo 2013.

INFORMACIÓN DE ALUMNO Y FAMILIA (FAVOR DE ESCRIBIR EN LETRA DE MOLDE):

Primer Nombre: ______________ Segundo: ______________ Apellido: ______________

Domicilio: ______________ No. de Apartamento: ________ Chicago, IL Código Postal: ________

Fecha de Nacimiento (m/d/a): ________ Lugar de Nacimiento: ______________ Escuela Actual: ________

Grado Actual (año escolar 2012-2013): ______________ Grado al cual está aplicando para el año 2013-2014: ________

Nombre del Padre/Tutor: ______________ Relación al Alumno: ______________

Teléfono de Día: ________ Teléfono Alternativo: ________ Correo Electrónico: ______________

Hermanos(as): Liste el nombre del hermano (a), la escuela, y el grado actual. Marque si está aplicando en Intrinsic Schools.

1. Nombre ______________ Escuela Actual ______________ Grado ____ ☐ Aplicando
2. Nombre ______________ Escuela Actual ______________ Grado ____ ☐ Aplicando
3. Nombre ______________ Escuela Actual ______________ Grado ____ ☐ Aplicando

Cómo supo usted de Intrinsic Schools? ☐ Feria/Open House ☐ Representante de la escuela ☐ Amigo(a)/Familia
Otro: ______________

Yo le doy permiso a la organización de Intrinsic Schools de usar los documentos de mi hijo(a) para el propósito de evaluación, con la condición que todos los documentos se mantendrán anónimos y confidenciales.

Firma del Padre/Tutor: ______________________ Fecha: ______________

Aplicaciones recibidas después la fecha de entrega serán agregadas a la lista de espera en la orden en cual son recibidas.

Mande la aplicación completa a: NACSA
att: Intrinsic Schools
105 W. Adams Street, Suite 3500
Chicago, IL 60603

o por correo electrónico a: inquiries@instrinsicschools.org

Mande preguntas a: inquiries@instrinsicschools.org

www.intrinsicschools.org
www.facebook.com/IntrinsicSchools

June 7, 2013

Dear Parents,

Welcome to Intrinsic Schools! This letter will provide all of the information you will need to enroll your child for the upcoming school year.

Registration Forms: Enclosed are all the forms and a list of personal documents that are required for enrollment at Intrinsic Schools. Forms, copies of documents, and the school fee are due by **as soon as possible**. You may send them by:

FAXING THEM TO 312-873-4772
EMAILING THEM TO svelasquez@intrinsicschools.org
MAILING them to NACSA, Attn: Intrinsic Schools
105 West Adams Street, Suite 3500
Chicago, Il 60603
Or dropping them off in person at the above address (call us ahead of time and we can meet you in the lobby)

School Fee: The student fee for the 2013-2014 school year is $100. Payments can be made with check or money order payable to Intrinsic Schools (no cash unless paid in person). If you are unable to pay in full, you can make a down payment and pay the remaining amount before the first day of school.

PLEASE INCLUDE COPIES OF THE FOLLOWING ITEMS:

□ **COPY OF PARENT'S PHOTO ID**

□ **COPY OF 2 PROOFS OF RESIDENCY**

□ **COPY OF STUDENT'S BIRTH CERTIFICATE**

□ **COPY OF CURRENT PHYSICAL EXAM and IMMUNIZATIONS (DUE BY THE FIRST WEEK OF SCHOOL)**

□ **COPY OF YOUR CHILD'S IEP/504 PLAN IF APPLICABLE**

□ **$100 STUDENT FEE (PARTIAL PAYMENTS ACCEPTED)**

FILL OUT AND SIGN THE FOLLOWING FORMS:

□ **EMERGENCY CONTACT INFORMATION**

□ **RESIDENCY VERIFICATION FORM**

□ **MEDIA CONSENT FORM**

□ **RACE AND ETHNICITY SURVEY FORM**

□ **PHYSICIAN'S REQUEST FOR ADMINISTERING MEDICATION TO STUDENT FORM**

ALSO, ALL STUDENTS NEED TO COMPLETE AN ONLINE SURVEY. THE LINK TO THE SURVEY IS

https://www.surveymonkey.com/s/intrinsic2013

Parent/Student Orientation Day: We will hold a make-up session for families who did not attend our session on May 11th. The time and place is still to be determined.

Thank you,

Suzanne Velasquez-Sheehy

INTRINSIC SCHOOLS

EMERGENCY CONTACT INFORMATION

Student Name ________________________________ Date of Birth ______________________

Address____________________________________ Zip Code__________________________

Parent/Guardian ____________________Phone______________email___________________

Parent/Guardian ____________________Phone______________email___________________

Legal Guardianship:

Student lives with_________________________ **Relationship to the child**_____________________

In case of emergency, illness or accident, please give an order of priority of who should be called:

NAME/Relationship to Student	WORK PHONE	CELL PHONE
Name: Relationship:	(###) ###-####	
Name: Relationship:		
Name: Relationship:		

Please bring legal documentation to the school if a parent is not permitted to pick up a student.

If this student has a specific medical, physical, or other condition that a teacher, counselor, or Administrator should be aware of, please indicate below:

_____Food Allergies and reactiions____

_____Non-food Allergies and reactions____

_____Asthma _____Seizures _____Diabetes (Type 1) _____Diabetes (Type 2)

Other Medical Condition:____

Parent/Guardian Signature_________________________________ Date_______________

INTRINSIC SCHOOLS

RESIDENCY VERIFICATION FORM

The student's parent(s) or legal guardian(s) must reside(s) in the city of Chicago to attend Intrinsic Schools.

Student's Name:____Grade:________
(First) (Middle) (Last)

Address:____Zipcode:_________________

Parent / Legal Guardian Name: ____________________Phone:______________________

Student lives with: ______ Parent(s) ______Relative(s) ______Court appointed legal guardian

To establish parent/legal guardian identity, one of the following valid documents must be provided:

Driver's License/State ID Passport Other identification with photo

To establish legal guardianship, one of the following valid documents must be provided:

Birth Certificate Court order authorizing guardianship

To establish residency, you must present two of the following:

Utility Bills, Insurance Bill, Government Issued Documentation, Current Lease Agreement/Mortgage statement

Shared Housing - **Homeowner/Renter must provide the documents and show a picture I.D.** If the homeowner/renter is not able to be present, then a letter signed by them listing the family members who reside at the address must be notarized and submitted. **The parent/guardian must provide two documents which establish residence at the address listed.**

_______________________________________ ____________________

Parent Signature Date

CHECK SUBMITTED COPIES:

_____Birth Certificate _____Parent ID _____2 proofs of residency

INTRINSIC SCHOOLS

MEDIA CONSENT FORM AND RELEASE

Date ______________________________

I hereby consent to have ____, born _______________

(Student's name) *(Date of birth)*

photographed, videotaped, audio taped or interviewed by Intrinsic Schools or the news media when school is in session or when my child is under the supervision of the Intrinsic Schools personnel. I understand in the course of the above described activities that Intrinsic Schools might like to celebrate my child's accomplishments and work. Therefore, I further consent for Intrinsic Schools the release of information on my child's name, academic/non-academic awards and information concerning my child's participation in school-sponsored activities, organizations and athletics.

I also consent to the Intrinsic Schools' use of my child's name, photograph or likeness, voice or creative work(s) on the Internet or on a CD or any other electronic/digital media or print media.

As the child's parent or legal guardian, I agree to release and hold harmless Intrinsic Schools, its members, trustees, agents, officers, contractors, volunteers and employees from and against any and all claims, demands, actions, complaints, suits or other forms of liability that shall arise out of or by reason of, or be caused by the use of my child's name, photograph or likeness, voice or creative work(s),on television, radio or motion pictures, or in the print medium, or on the Internet or any other electronic/digital medium.

It is further understood and I do agree that no monies or other consideration in any form, including reimbursement for any expenses incurred by me or my child, will become due to me, my child, our heirs, agents, or assigns at any time because of my child's participation in any of the above activities or the above-described use of my child's name, photograph or likeness, voice or creative work(s).

I understand that I may cancel my consent by providing written notice to the principal.

____

Signature of Parent or Guardian or Student if age 18 or over

I do not consent to my child being photographed, videotaped, audio taped and/or interviewed by the Intrinsic Schools personnel or the news media when school is in session or when my child is under the supervision of Intrinsic Schools. I **do not** consent for Intrinsic Schools to use creative work(s) generated and/or authored by my child on television, radio or motion pictures, or in the print medium, or on the Internet or any other electronic/digital medium.

____

Signature of Parent or Guardian or Student if age 18 or over

Student ID__________________

INTRINSIC
SCHOOLS

RACE AND ETHNICITY SURVEY

Last Name____________________________ **First Name**_____________________ **Middle Initial**____

Birthdate___________________ **Gender**_____ **Grade**______
(mm/dd/yyyy)

Street Address_______________________________ **Apt.**________ **Zip**___________

Please enter both questions below. Part A asks about the student's ethnicity. Part B asks about the student's race.

Part A: Is student Hispanic or Latino? (A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race). Choose only one:

_____**No, not Hispanic/Latino**

_____**Yes, Hispanic/Latino**

The question is about ethnicity, not race. No matter what answer you selected, continue and respond to the question below by marking one or more boxes to indicate what you consider this student's race to be.

Part B: What is the student's race? Choose one or more.

_____**American Indian or Alaska Native** (A person having origins in any of the original peoples of North and South America, including Central America, and who maintains tribal affiliation or community attachment).

_____**Asian** (A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam).

_____**Black or African-American** (A person having origins in any of the black racial groups of Africa).

_____**Native Hawaiian or Other Pacific Islander** (A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands).

_____**White** (A person having origins in any of the original peoples of Europe, the Middle East, or North Africa).

INTRINSIC
SCHOOLS

PHYSICIAN'S REQUEST FOR ADMINISTRATION OF MEDICATION TO STUDENT

____________________ ________________ ______________
Name of Student   Birth Date   ID Number

____________________ ________________ ______________
Address   Telephone Number   Zip Code

The above named student has ______________________________
Name of Disease or Syndrome

I am requesting that the above named student be administered the following medication during school hours:

____________________ ____________________
Name of Medication   Type of Medication, i.e. Tablet, Liquid, Inhaler

____________________ ____________________
Dosage   Time to be given

____
Possible Side Effects

The phone number where I may be reached in the event of a reaction to the medication or an emergency is:

Physician's Name________________________ **Hospital Affiliation** ____________
(Please print or type)

Address __________________________**Telephone #** __________**Fax #**__________

Physician's Signature ______________________________**Date** ____________

***This request is valid for 1 year from date of signature. Any change in medication or dose requires a new request form.**

INTRINSIC SCHOOLS

Welcome to Intrinsic Schools! We are so excited to have you as a member of our first graduating class in 2017! In order to learn more about each and every one of you, we are asking you to complete the survey below. Please let us know if you have any questions. You may use the back side of this paper if you need more space.

YOUR PHOTO HERE

NAME: ______________________ BIRTHDAY: ____________ PHONE: ____________

ADDRESS: ______________________ LAST SCHOOL: ______________________

SIBLINGS (list their names and ages): ______________________________

INTERESTS/HOBBIES: ______________________________

WHAT WAS THE LAST GOOD BOOK YOU READ? WHAT DID YOU LIKE ABOUT THIS BOOK? ____________

____

____

WHAT IS YOUR FAVORITE WEBSITE AND WHY? ______________________________

____

WHY DID YOU CHOOSE TO COME TO INTRINSIC? DO YOU HAVE ANY WORRIES? ______________________________

____

WE WANT TO PREPARE ALL INTRINSIC STUDENTS FOR COLLEGE. WHAT EXCITES YOU ABOUT COLLEGE? WHAT CONCERNS, IF ANY, DO YOU HAVE ABOUT COLLEGE? ______________________________

____

WHAT ARE YOUR TOP 3 DREAM JOBS? WHY? ______________________________

____

WHAT IS YOUR FAVORITE SUBJECT(S)? WHY? ______________________________

FAVORITE BAND/MUSIC: ______________ BEST PLACE YOU'VE VISITED: ______________

YOUR GREATEST ACCOMPLISHMENT(S): ______________________________

WHICH LEARNING ENVIRONMENT(S) DO YOU FEEL THE MOST PRODUCTIVE IN? (Check all that apply.)

GROUPINGS: ___ Small-Group ___ Whole Class ___ Partners ___ Individual ___Other(s) (please specify) ______________

LEARNING STYLE: ___Presentations ___ Demonstrations ___ "Hands-On" Activities ___ Other(s) (please specify) ______________

ANY OTHER INFORMATION WE SHOULD KNOW ABOUT YOU: ______________________________

____

APPENDIX W: Intrinsic Schools – Transportation Plan, Section 3.1

TRANSPORTATION PLAN
Intrinsic Schools will be located in an area that is easily accessible via public transportation. As such, transportation to and from school will not be provided. We have, however, set aside $15,000 in the budget to provide CTA passes to homeless students and their families as well as to students who cannot afford to take public transportation to and from school each day. These funds will be used in emergency situations only.

APPENDIX X: Intrinsic Schools – Board Calendar, Section 3.2

Intrinsic Schools Board Meetings all take place from 7:30 -9:30 am at our temporary school site at 17 N. State Street. Meetings are scheduled for the following dates:

August 21, 2013
September 23, 2013
October 23, 2013
January 9, 2013
March 13, 2013
May 16, 2013

APPENDIX AC: Intrinsic Schools – Code of Ethics Policy, Section 3.2

Intrinsic Schools Code of Ethics Policy is embedded into our Board Bylaws.

APPENDIX EE: Intrinsic Schools – Financial Reporting Schedule, Section 4.2

The table below details the Intrinsic Schools financial reporting schedule, the responsible party and the individual(s) who will review the information.

Intrinsic Schools Financial Reporting Schedule			
Reports	**Frequency**	**Responsible Party**	**Reviewed By**
Bank Balances	Weekly	Director of Finance and Operations (DFO)	CEO
Checks Issued	Weekly	DFO	CEO
Payroll Journal	Bi-weekly	Payroll Service Provider	CEO and DFO
Balance Sheet	Monthly	DFO	Board, Finance Committee, CEO
Income Statement	Monthly	DFO	Board, Finance Committee, CEO
Cash Flow Statement	Monthly	DFO	Board, Finance Committee, CEO
Budget Variance Report	Monthly	DFO	Board, Finance Committee, CEO
Year-end Budget Projections	Monthly	DFO	Finance Committee and CEO
Bank Reconciliation Reports	Monthly	DFO	CEO
Accounts Payable Report	Monthly	DFO	CEO
Accounts Receivable Report	Monthly	DFO	CEO
Quarterly Budget Report	Quarterly	DFO	CPS
Audit	Annually	Auditor	Board, Finance Committee, CEO, DFO
990	Annually	Auditor	Board, Finance Committee, CEO, DFO

BYLAWS

DISPUTE RESOLUTION POLICY

CONFLICT OF INTEREST POLICY &

POLICY AGAINST EXCESS BENEFITS TRANSACTIONS

OF

INTRINSIC SCHOOLS

As Duly Adopted by the Board of Directors

this ____day of ______________, 2012

MOSHER & WAGENMAKER, LLC

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Appendix

BYLAWS OF

INTRINSIC SCHOOLS

ARTICLE I. CORPORATE OFFICES

The Corporation shall continuously maintain in the State of Illinois a registered office and a registered agent whose office is identical with such registered office. The Corporation may have other offices within or without the state and need not be identical with the principal office in the State of Illinois. The address of the registered office and registered agent may be changed from time to time by the Board of Directors.

ARTICLE II. CORPORATE PURPOSES AND LIMITATIONS

Section A. General Purposes

The Corporation shall have such educational purposes as are now or may hereafter be set forth in the Articles of Incorporation as follows:

The Corporation is organized to operate a network of primary and secondary schools for grades K through 12. The Corporation's school curriculum will help students develop into independent and intellectually curious learners well prepared for college success.

Section B. Waiver or Reduction of Fees

The Corporation, being organized exclusively for religious, charitable, educational, or scientific purposes under Illinois law, shall strive to make its charitable services and programs available to the appropriate general public without undue obstacles to access. It is the general policy of the Corporation that any fees or charges associated with the charitable services and programs of the Corporation shall be waived or reduced in accordance with each recipient's ability to pay. The administrative staff shall have the necessary discretion to make such waivers or reductions when appropriate to ensure the maximum distribution of the Corporation's charitable services and programs. More specifically, the program fee schedules (if any) shall be set in accordance with 35 ILCS 200/15-65(c) of the Illinois Compiled Statutes.

Section C. Powers and Limitations

1. The Corporation, being organized exclusively for educational purposes, may make distributions to organizations and individuals in furtherance of its corporate purposes and in accordance with section 501(c)(3) of the Code. Under no circumstances shall the Corporation make any distributions that are inconsistent with its purpose statement above.

2. No activity, program, scholarship or other financial opportunity provided by the Corporation as a private school shall be conducted in a manner that might permit or encourage discrimination among its faculty or students on the basis of race, sex, color, national origin or ethnic background. The Board of Directors and administrative staff will manage public notice of this fact and all related administrative processes in full compliance with IRS Revenue Procedure 75-50.

3. No part of the net earnings of the Corporation shall inure to the benefit of, or be distributable to its members, directors, officers, or other private persons, except that the Corporation shall be authorized and empowered to pay reasonable compensation for services rendered and to make payments and distributions in furtherance of the purposes set forth in Section A above.

4. No substantial part of the activities of the Corporation shall be the carrying on of propaganda, or otherwise attempting to influence legislation, and the Corporation shall not participate in, or intervene in (including the publishing or distribution of statements) any political campaign on behalf of any candidate for public office.

5. Notwithstanding any other provision of these articles, the Corporation shall not carry on any other activities not permitted to be carried on (1) by a corporation exempt from federal income tax under section 501(c)(3) of the Internal Revenue Code of 1986 (or the corresponding provision of any future United States Internal Revenue Law) or (2) by a corporation, contributions to which are deductible under section 170(c)(2) of the Internal Revenue Code of 1986 (or the corresponding provision of any future United States Internal Revenue Law).

6. Upon dissolution of the Corporation, the Board of Directors shall, after paying or making provision for the payment of all of the liabilities of the Corporation, dispose of all of the assets of the Corporation, exclusively for the purposes of the Corporation in such manner, or to such organization or organizations organized and operated exclusively for religious, charitable, educational, or scientific purposes, as shall at the time qualify as an exempt organization or organizations under section 501(c)(3) of the Code, as the Board of Directors shall determine. Any such assets not so disposed of shall be disposed of by the appropriate court of law of the county in which the principal office of the Corporation is then located, exclusively for such purposes or to such organization or organizations, as said court shall determine, which are organized and operated exclusively for exempt purposes.

ARTICLE III. MEMBERSHIP

There shall be no members of the Corporation, and the organization shall be governed by a self-perpetuating Board of Directors.

ARTICLE IV. BOARD OF DIRECTORS

Section A. General Powers

The affairs, business and all legal matters of the Corporation shall be managed by its Board of Directors.

Section B. Number and Tenure

The number of directors shall be three (3) and may vary from time to time up to eight (8) by resolution of the Board of Directors without amendment of these bylaws. If a Chief Executive Officer is employed as the principal business administrator, he/she shall be an ex-officio non-voting director of the Board, shall be considered for purposes of notice but not quorum, shall not be elected for a term of office, and shall not be counted as one of the eight (8) directors authorized by this Section. The Board of Directors may from time to time, by amendment of these bylaws, change the minimum and maximum number of directors, but in no case shall the number be less than three (3). Each director shall hold office for a term of three (3) years unless the Board shall expressly resolve to elect a director for a shorter term. Beginning after the date of the implementation of these bylaws, the first Board election shall provide for staggered terms of office so that approximately one-third of the directors, thereafter, shall be elected at each annual meeting of the Board.

Section C. Qualifications

Those who seek to be directors of the Corporation must personally affirm the Corporation's statement of purpose, must abide in all respects with the corporate policies set forth in these bylaws, and must characterize personal commitment to the values of the Corporation.

Section D. Election

Directors shall be elected at the annual meeting of the Board. Each director shall hold office until the first of the following to occur: until his or her successor shall have been duly elected and shall have qualified; or until his or her death or disability, or until he or she shall resign in writing; or until he or she shall have been removed in the manner hereinafter provided.

Section E. Resignation and Removal

Any director may resign at any time by giving written notice to the Chairperson of the Board or Secretary of the Corporation. Such resignation, which may or may not be made contingent on formal acceptance, shall take effect on the date of receipt or at any later time specified therein. Any director may be removed with or without cause at any time by resolution adopted by the Board.

Any director who fails to attend three (3) consecutive meetings, whether regular or special, of the Board without an excused absence, may be removed from the Board at the discretion of the remaining directors. For purposes of this subsection, the nature of the absence, whether excused or unexcused, shall be determined by the Chairperson of the Board. Such determination shall be final and binding on all parties concerned.

Section F. Vacancies

Any vacancy occurring in the Board of Directors to be filled by reason of any increase in the number of directors or resignation or termination of a director shall be filled by the Board of Directors as soon as is practicable. A director so elected to fill a vacancy shall be elected for the unexpired term of his or her predecessor in office.

Section G. Compensation

Directors shall not receive compensation for their services as directors. However, by resolution of the Board of Directors, expenses of attendance, if any, may be reimbursed for each regular or special meeting of the Board of Directors, provided that nothing herein contained shall be construed to preclude any directors from serving the Corporation in any other capacity and receiving reasonable compensation therefore.

ARTICLE V. MEETINGS OF THE BOARD OF DIRECTORS

Section A. Annual Meeting

An annual meeting of the Board of Directors shall be held in the registered office of the Corporation on the first Monday of July each year or at such other time and place as may be designated by the CEO in accordance with the notice provisions herein below, for the purpose of approving an annual budget, election of directors and officers, and for the transaction of such other business as may come before the meeting.

Section B. Special Meetings

Special meetings of the Board of Directors may be called by, or at the request of, the CEO or any two directors. The person or persons authorized to call special meetings of the Board of Directors may fix any place for holding any special meeting of the Board of Directors called by them.

Section C. Notice

Notice of any meeting of the Board of Directors shall be delivered not less than five (5) days nor more than sixty (60) days prior to the date of the scheduled meeting. Written notice shall be delivered to each director at his or her address as shown by the records of the Corporation. If mailed, such notice shall be deemed to be delivered when deposited in the United States mail in a sealed envelope so addressed, with postage thereon prepaid. Notice of any meeting of the Board of Directors may be waived in writing, signed by the person or person entitled to the notice either before or after the time of the meeting. The attendance of a director at any meeting shall constitute a waiver of notice of such meeting except where a director attends a meeting for the expressed purpose of objection to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted, nor the purpose of any regular or special meeting of the Board of Directors, need be specified in the notice or waiver of such meeting, unless specifically required by law or by these bylaws. Notwithstanding the above provisions of this paragraph, the notice requirements may be satisfied by sending a facsimile or email communication in a timely manner to the director's email address on the Corporation's records. Telephone communications may be useful for establishing the time and place of meeting but shall not be used in lieu of the above notice provisions. At any duly convened meeting of the Board a resolution may be approved concerning future meetings of the Board. Timely mailing of the Board minutes to each director may qualify as notice of the next meeting of the Board if the minute concerning the meeting is clearly set-forth and concise in its composition.

Section D. Quorum

A majority of the directors then in office shall constitute a quorum for the transaction of the business at any meeting of the Board of Directors, provided that if fewer than half of the directors are present at the said meeting, a majority of the directors present may adjourn the meeting to another time without further notice.

Section E. Manner of Acting

The act of a majority of the directors present at a duly convened meeting shall be the act of the Corporation unless the act of a greater number is required by statute, these bylaws or the Articles of Incorporation. Directors may not vote by proxy or under any other power of attorney. All board meetings shall be subject to confidentiality requirements as contained in Article XI, Section H herein.

Section F. Telephone Meeting

Any meeting of the directors may be conducted in simultaneous multiple locations if the various locations are effectively connected by telephonic conference call lines. Directors or non-director committee members may participate in and act at any meeting of such board or committee through the use of a conference telephone or other communications equipment by means of which all persons participating in the meeting can communicate with each other. Participation in such meeting shall constitute attendance and presence in person at the meeting of the person or persons so participating.

Section G. Informal Action by Directors

Any action which may be taken at a meeting of the Board of Directors or a committee thereof, may be taken without a meeting if a consent in writing, setting forth the action so taken, shall be approved in writing by all of the directors and all of any non-director committee members entitled to vote with respect to the subject matter thereof, or by all the members of such committee, as the case may be. The consent shall be evidenced by one or more written approvals, each of which sets forth the action taken and provides a written record of approval. All the approvals evidencing the consent shall be delivered to the Corporation's Secretary to be filed in the Corporation's records. The action taken shall be effective when all the directors or the committee members, as the case may be, have approved the consent unless the consent specifies a different effective date. Any such consent approved by all the directors or all the committee members, as the case may be, shall have the same effect as a unanimous vote and may be stated as such in any document filed with the Secretary of State.

ARTICLE VI. COMMITTEES

Section A. Committees with Corporate Authority

The Board of Directors shall have the power to appoint committees and delegate to such committees authority generally reserved to the Board provided such authority is not otherwise directed in these bylaws or prohibited by §805 ILCS 105/108.40 or other state laws. This may include, but is not limited to, negotiating and executing contracts on behalf of the Corporation, or authorizing expenditures. The committees with legal authority to act on behalf of the Corporation must have two or more directors, a majority of its membership must be directors, and all the committee members shall serve at the pleasure of the Board. All committee members shall be appointed by the Board of Directors to serve on a committee with corporate authority.

Section B. Committees without Corporate Authority

Committees without corporate authority may not act on behalf of the Corporation or bind the Corporation to any action. Rather, these committees will generally be responsible for investigating, reporting, and advising the Board on certain activities and program as well as making recommendations to the Board of Directors or officers for approval. For purposes of clarity to the public, committees without corporate authority should be identified as advisory boards, commissions, task forces, or similar names. These committees may be composed of persons appointed by the Board of Directors for specific skills and need not be directors or officers of the Corporation.

Section C. Standing Committees

The term of office for all standing committee members shall be one (1) year beginning each year at the annual meeting of the Board unless specifically designated otherwise in the resolution appointing the committee member.

Section D. Special Committees

The Corporation shall have the power to appoint special committees by a resolution of the Board of Directors. These committees may or may not have authority to act on behalf of the Corporation and shall generally be created to manage a specific task or responsibility of the Corporation which is of limited duration. A resolution of the Board creating an ad hoc or special committee shall specify (1) the task assigned to the committee; (2) whether or not the committee has authority to act on behalf of the Corporation, (3) the duration of the committee which may be generalized to a period necessary to bring the matter to full resolution, and (4) the term of office for the committee members appointed.

Section E. Committee Meetings

Meetings of any committee may be called by the CEO of the Corporation, the chairperson of the committee, or a majority of the committee's voting members. Notice of the time and place of any meeting of a committee shall be given at least three (3) days prior to the meeting. All committee meetings shall be subject to confidentiality requirements as contained in Article XI, Section H herein.

Section F. Resignation and Removal

Any member of a committee may resign at any time by giving written notice to the chairperson of the committee or to the Secretary of the Corporation. Such resignation, which may or may not be made contingent on formal acceptance, shall take effect on the date of receipt or at any later time specified therein. Any member of a committee may be removed at any time by resolution adopted by a majority of the Board of Directors.

Section G. Quorum

Unless otherwise provided in the resolution of the Board designating a committee, the act of a majority of any committee shall be the act of the committee. All committee members, and the CEO of the Corporation, shall be notified in advance of all meetings of the committee.

Section H. Conduct of Meetings

The bylaw provisions which govern meetings, action without meetings, notice and waiver of notice, and quorum and voting requirements of the Board, shall apply to committees of the Board and their members as well. Each committee may adopt rules for its own government not inconsistent with these bylaws or with rules adopted by the Board.

ARTICLE VII. OFFICERS AND AGENTS

Section A. Officers

The officers of the Corporation shall consist of a Chairperson of the Board of Directors ("Chairperson of the Board" or "Chairperson"), a Chief Executive Officer ("CEO"), a Secretary, and a Treasurer. The Chairperson of the Board (who shall be a Board member), the Secretary and the Treasurer shall be elected for a term of one (1) year by the Board at its annual meeting. Such other officers and assistant officers and agents as may be deemed necessary may be elected or appointed by the Board. Any two (2) or more offices may be held by the same person, except that the offices of Chief Executive Officer and Secretary may not be held by the same person concurrently. Directors of the Board may simultaneously serve as officers, but directorship shall not be a required qualification to serve as an officer of the Corporation other than Chairperson of the Board.

Section B. Chairperson of the Board

The Chairperson of the Board shall preside at all Board meetingsand shall exercise and perform such powers and duties as the Board may assign from time to time.

Section C. Chief Executive Officer

Subject to such supervisory powers as the Board may give the Chairperson, and subject to the control of the Board, and subject to the CEO's employment contract, the CEO shall be the general manager of the corporation and shall supervise, direct and control the corporation's activities, affairs and officers as fully described in any applicable employment contract, agreement or job description.

The CEO shall supervise and be principally responsible for the day-to-day administrative management of the Corporation, and ensure that all corporate functions are adequately carried out

Unless the Board requires otherwise, he or she shall sign, with the Secretary or any other officer of the Corporation authorized by the Board, such documents and deeds of the Corporation as necessary or appropriate including, but not limited to, mortgages, bonds, contracts, or other instruments which the Board has authorized to be executed, except in cases where the signing and execution thereof shall be expressly delegated by the Board or by these bylaws to some other officer or agent of the Corporation, or shall be required by law to be otherwise signed or executed, and in general, shall discharge all duties incident to the office of Chief Executive Officer and such other duties as may be assigned to him or her by the Board from time to time.

The CEO shall be an ex officio non-voting director of the Board. The duties and responsibilities of the CEO shall include: (a) carrying out all policies established by the Board; (b) preparing an annual budget showing expected revenue and expenditures as required by the Board; (c) selecting, employing, training, controlling and discharging all other employees of the Corporation; (d) attending all meetings of the Board; (e) supervising the business affairs to insure that funds are collected and obligations are paid out in a timely and advantageous fashion; preparing and presenting to the Board regular reports reflecting accomplishment of corporate goals and the Corporation's mission.

Section D. Secretary

The Secretary shall: (a) be responsible for the keeping of the minutes of the Board and committee meetings in one or more books provided for that purpose; (b) see that all notices are duly given in accordance with the provisions of these bylaws or as required by law; (c) be custodian of and maintain copies of all corporate records, including all notices and voting records, whether in electronic or paper form; and (d) in general, discharge all duties incident to the office of Secretary and such other duties as from time to time may be assigned to him or her by the CEO or by the Board.

In the event that the electronic communication, such as email, is used for notice of meetings and voting on informal actions pursuant to Article V, Sections C and G respectively, the Secretary shall maintain signed consents for every director and other individual entitled to notice under these bylaws. Said consents shall include: (1) express authorization to receive notice by email or other electronic communication; (2) the preferred electronic address for the Corporation to communicate with the individual; and (3) contain such additional information as may be requested by the Board of Directors.

Section E. Treasurer

The Treasurer shall: (a) monitor the financial books of the Corporation; (b) keep regular books of account and make them available for inspection at all times to the directors of the Corporation; (c) render to the Board from time to time as may be required of him or her, an account of the financial condition of the Corporation; and (d) in general, discharge all duties incident to the office of Treasurer, and such other duties as may be assigned to him or her by the CEO or by the Board.

Section F. Vice Presidents, Assistant Treasurers and Assistant Secretaries

At its discretion, the Board may appoint Vice Presidents, Assistant Treasurers and Assistant Secretaries to perform such duties as shall be assigned to them by the Chief Executive Officer, Treasurer or the Secretary. These officers shall report to the Board as requested but shall not serve on the Board or have voting rights unless the person so appointed is already a director of the Corporation. If required by the Board of Directors, the Assistant Treasurers shall give bonds for the faithful discharge of their duties in such sums and with such sureties as the Board of Directors shall determine.

Section G. Delegation of Authority

In case of the absence of any officer of the Corporation, or for any other reason that it may deem sufficient, the Board may either delegate the powers or duties of such officer to any director or employee of the Corporation, for the time being, or may eliminate some or all of such powers or duties of such officer, provided a majority of the entire Board concurs therein.

Section H. Election and Term of Office

The officers of the Corporation, other than the CEO, shall be elected by the Board for a term of one (1) year at the annual meeting of the Board of Directors. If the election of officers shall not be held at such meeting, such election shall be held as soon thereafter as conveniently may be. Each elected officer shall hold office until the first of the following to occur: until his or her successor shall have been duly elected and shall have qualified; or until his or her death or disability, or until he or she shall resign in writing; or until he or she shall have been removed in the manner hereinafter provided. The CEO shall be hired by the Board and hold office as a Board member for the duration of his or her employment in that capacity. Election or appointment of an officer or agent shall not in itself create contract rights.

Section I. Removal

Any officer or agent may be removed by the Board of Directors whenever, in its judgment, the best interest of the Corporation shall be served thereby, but such removal shall be without prejudice to the contract rights, if any, of the person so removed.

ARTICLE VIII. ADVISORY COUNCILS OR BOARDS

The Board of Directors may from time to time appoint advisory boards or special councils for specific purposes that do not require corporate action. The composition of such advisory groups may include persons with professional skills or special experience necessary to advise and inform the Board of Directors. Such advisory groups shall not have the authority to commit the Corporation to any legal contracts or agreements whether or not related to the business of the Corporation. The Board of Directors shall not lend "apparent authority" to such advisory groups and all related corporate resolutions shall expressly limit the groups' authority in this respect.

ARTICLE IX. FINANCIAL POLICIES

Section A. Fiscal Year

The fiscal year of the Corporation shall be from July 1st to June 30th.

Section B. Sale of Assets

A sale, lease, exchange, mortgage, pledge or other disposition of property or assets of the Corporation outside the normal course of business may be made by the Board upon such terms and conditions and for such consideration, which may consist in whole or in part of money or property, real or personal, as may be authorized by the Board; provided, however, that a sale, lease, exchange or other disposition of all or substantially all the property and assets of the Corporation shall be authorized only upon receiving the vote of two-thirds of the directors in office.

Section C. Contracts

The Board may authorize any officer or officers, agent or agents, to enter into any contracts or execute and deliver any instrument in the name of and on behalf of the Corporation, and such authority may be general or confined to specific instances.

Section D. Loans

No loans shall be contracted on behalf of the Corporation and no evidence of indebtedness shall be issued in its name unless authorized by a resolution of the Board. Such authority may be general or confined to specific instances.

Section E. Checks, Drafts, Etc.

All checks, drafts or other orders for the payment of money, notes or other evidence of indebtedness issued in the name of the Corporation, shall be signed by such officer or officers, agent or agents of the Corporation and in such manner as shall from time to time be determined by resolution of the Board. The CEO is hereby authorized to spend up to $5,000 per item for the purchase of non-budgeted goods or services used in furtherance of corporate objectives.

Section F. Deposits

All funds of the Corporation not otherwise employed shall be deposited from time to time to the credit of the Corporation in such banks, trust companies or other depositories as the Board may select.

Section G. Gifts

The Board of Directors or the CEO may accept on behalf of the Corporation any contribution, gift, bequest, or devise for the general purposes or for any special purpose of the Corporation.

ARTICLE X. INDEMNIFICATION OF DIRECTORS AND OFFICERS

Section A. Indemnification in Actions other than by or in the Right of the Corporation

The Corporation shall indemnify any person who was or is a party, or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the Corporation) by reason of the fact that he or she is or was a director, officer, employee or agent of the Corporation, or who is or was serving at the request of the Corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding, if such person acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction, or upon a plea of nolo contendere or its equivalent, shall not, of itself, create a presumption that the person did not act in good faith and in a manner which he or she reasonably believed to be in, or not opposed to, the best interests of the Corporation, or, with respect to any criminal action or proceeding, that the person had reasonable cause to believe that his or her conduct was unlawful.

Section B. Indemnification in Actions by or in the Right of the Corporation

The Corporation shall indemnify any person who was or is a party, or is threatened to be made a party, to any threatened pending or completed action or suit by or in the right of the Corporation to procure a judgment in its favor by reason of the fact that such person is or was a director, officer, employee or agent of the Corporation, or is or was serving at the request of the Corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection with the defense or settlement of such action or suit, if such person acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Corporation, provided that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable for negligence or misconduct in the performance of his or her duty to the Corporation, unless, and only to the extent that the court in which such action or suit was brought shall determine upon application that despite the adjudication of liability, but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses as the court shall deem proper.

Section C. Right to Payment of Expenses

To the extent that a director, officer, employee or agent of the Corporation has been successful, on the merits or otherwise, in the defense of any action, suit or proceeding referred to in Sections A and B of this Article, or in defense of any claim, issue or matter therein, such person may be indemnified against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection therewith.

Section D. Determination of Conduct

Any indemnification under Sections A and B of this Article (unless ordered by a court) shall be made by the Corporation only as authorized in the specific case, upon determination that indemnification of the director, officer, employee or agent is proper in the circumstances because he or she has met the applicable standard of conduct set forth in Sections A and B of this Article. Such determination shall be made: (1) by the Board of Directors by a majority vote of a quorum consisting of directors who were not parties to such action, suit or proceeding; (2) if such a quorum is not obtainable, or, even if attainable, if a quorum of disinterested directors so directs, by independent legal counsel in written opinion.

Section E. Payment of Expenses in Advance

Expenses incurred in defending a civil or criminal action, suit or proceeding may be paid by the Corporation in advance of the final disposition of such action, suit or proceeding as authorized by the Board of Directors in the specific case, upon receipt of an undertaking by or on behalf of the director, officer, employee or agent to repay such amount, unless it shall ultimately be determined that he or she is entitled to be indemnified by the Corporation as authorized in the Article.

Section F. Indemnification not Exclusive

The indemnification provided by the Article shall not be deemed exclusive of any other rights to which those seeking indemnification may be entitled under any agreement, vote of disinterested directors, or otherwise, both as to action in his or her official capacity and as to action in another capacity while holding such office, and shall continue as to a person who has ceased to be director, officer, employee or agent, and shall inure to the benefit of the heirs, executors and administrators of such a person.

Section G. Insurance

The Corporation may purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the Corporation, or who is or was serving at the request of the Corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against any liability asserted against such person and incurred by such person in any such capacity, or arising out of his or her status as such, whether or not the Corporation would have the power to indemnify such person against such liability under the provisions of this Article.

Section H. References to Corporation

For purposes of the Article, references to the "Corporation" shall include, in addition to the surviving corporation, any merging corporation (including any corporation having merged with a merging corporation) absorbed in a merger which, if its separate existence had continued, would have had power and authority to indemnify its directors, officers, and employees or agents, so that any person who is or was a director, officer, employee or agent of such merging corporation or is or was serving at the request of such merging corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, shall stand in the same position under the provisions of this Article with respect to the resulting or surviving corporation as such person would have with respect to such constituent corporation if its separate existence had continued.

Section I. Other References

For purposes of this Article, references to "other enterprises" shall include employee benefit plans; reference to "fines" shall include any excise taxes assessed on a person with respect to an employee benefit plan; and references to "serving at the request of the Corporation" shall include any service as a director, officer, employee or agent of the Corporation which imposes duties on or involves services by such director, officer, employee or agent with respect to an employee benefit plan, its participants, or beneficiaries. A person who acted in good faith and in a manner he or she reasonably believed to be in the best interests of the participants and beneficiaries of an employee benefit plan shall be deemed to have acted in a manner "not opposed to the best interests of the Corporation" as referred to in this Article.

ARTICLE XI. MISCELLANEOUS

Section A. Waiver of Notice of Meetings

Whenever any notice is required to be given to any director or committee member of the Corporation under the provisions of these Bylaws or under the provisions of the Articles of Incorporation or under the provisions of the Illinois General Not For Profit Corporation Act of 1986, a waiver thereof in writing, signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice.

Section B. Amendments

The Articles of Incorporation and these Bylaws may be altered, amended or repealed, and new articles and bylaws may be adopted by a vote of two-thirds of the directors present at any regular or any special meeting called for that purpose. Notice of the proposed amendment (including the suggested text of the change) shall be given in writing to all directors at least twenty (20) days before the meeting at which the vote thereon is to be taken, and shall identify the persons proposing the amendment.

Section C. Severability

The invalidity or unenforceability of any provision in these bylaws shall not affect the validity or enforceability of the remaining provisions.

Section D. Forum for Dispute Resolution

Being an organization committed to doing charitable work, it is the policy of the Board of Directors to seek amicable resolution of disputes that arise within the legal context of the Corporation, its directors, officers, employees, and agents. It is in the best interest of the Corporation that disputes be resolved in a manner that will avoid civil litigation. Attached to these Bylaws as Addendum A is the Dispute Resolution Policy, which shall be the policy of the Corporation. Provided, however, that with respect to breaches of confidentiality as required in Article XI, Section H herein, the Corporation may at its option protect its interests through injunctive and other judicial relief available through litigation.

Section E. Directors, Officers, and Agents Conflict of Interest

Directors should scrupulously avoid transactions in which the director has a personal or material financial interest, or with entities of which the director is an officer, director, or general partner. Therefore, the policy of the Corporation concerning conflict of interest and matter involved with compensation of employees has been set forth and attached hereto as Addendum B to these bylaws.

Section F. Seal

The Corporation shall not maintain a corporate seal.

Section G. Books and Records

The Corporation, at its offices, shall keep correct and complete books and records of account and shall also keep minutes of the proceedings of its Board and committees, and shall keep a record of the names and addresses of all Board and committee members. All books and records of the Corporation may be inspected by a director, or his agent or attorney at any reasonable time.

Section H. Confidentiality

As part of their fiduciary duties owed to the Corporation, all directors, officers, committee members, and other agents of the Corporation are expected to maintain appropriate confidentiality of information related to the Corporation, including donor and supporter lists and related records, fundraising strategies, financial information about the Corporation, organizational plans, marketing information, expense information, personnel matters, and computer passwords (all whether in electronic or paper format), and to prevent unauthorized disclosure to any outside party, except to the extent such information is otherwise disclosed in accordance with the ordinary course of business to the public or third parties or otherwise is required to be disclosed under applicable law. Such confidentiality is expected to be maintained at all times subsequent to service to the Corporation. Each director, officer, and key employee shall annually complete a confidentiality agreement. Notwithstanding the dispute resolution provision contained in Addendum B, the Corporation may enforce this provision as it deems appropriate (including mediation and arbitration at its option), and it shall be entitled to recover attorneys' fees and costs against those found liable for violating this provision.

CERTIFICATION OF ADOPTION OF BYLAWS

The undersigned, being the duly elected Secretary of Intrinsic Schools, an Illinois not for profit corporation, does hereby certify that the attached bylaws of said Corporation were adopted by the official act of the Board of Directors on _______________, 2012 and the same do constitute the bylaws of the Corporation.

Dated this _____ day of __________, 2012.

____
Secretary

ADDENDUM A. DISPUTE RESOLUTION POLICY

In the event a dispute may arise between two or more persons operating under the authority of these Bylaws, and except as provided in Article XI, Section D of the Corporation's Bylaws, the parties to the dispute shall submit the circumstances and issues in dispute for mediation or arbitration as follows.

Article I – Mediation

A. Each party to the dispute shall select a representative, who may be an attorney or other agent or other trusted person, and the parties shall select a mediator who is an impartial and disinterested person to mediate the matter in a fair and impartial manner.
B. The goal of the mediation process and the mediator is to bring about an amicable, voluntary resolution of the dispute, and the parties shall make a good faith effort to work with one another and the mediator to effect such a resolution of their dispute.
C. The mediator may hold joint and separate conferences with the parties. Such conferences shall be private and all communications therein confidential unless the parties otherwise agree.
D. Information disclosed by a party to a mediator in the performance of mediation functions shall not be disclosed voluntarily outside of mediation, except as required by law and otherwise agreed by the parties. All files, records, reports, documents, or other papers prepared by a mediator shall be considered confidential. The mediator shall not willingly produce any such confidential records of, or testify in regard to, any mediation conducted by him, on behalf of any party to any cause pending in any type of proceeding.
E. Compensation for the mediator, if any, shall be paid equally by the parties in dispute.
F. The mediator shall have sole discretion to make the determination that the parties have reached an impasse and no voluntary resolution will be forthcoming.

Article II – Arbitration

A. If the parties cannot come to a voluntary agreement as a result of the mediation and the mediator makes the determination that the parties have reached an impasse and no voluntary resolution will be forthcoming, the parties shall submit the matter for arbitration.
B. Each party to the dispute shall select an impartial, disinterested person to be part of the arbitration panel.
C. The persons so selected shall appoint one or more additional person(s) as may be necessary to provide an odd numbered arbitration panel.
D. When the arbitration panel is assembled the parties in conflict shall be permitted to present evidence and arguments in support of their position and the panel shall deliberate as necessary to resolve the problems. In all matters the panel shall first seek to reconcile the conflicting parties. If reconciliation is not possible, then the panel shall arbitrate a solution and such solution shall be binding upon all parties.
E. Compensation for the arbitration shall be paid equally by the parties.

No person shall bring any dispute under these Bylaws to any court of law or chancery without first proceeding under the above conflict resolution procedure. Unless the determination of the arbitration panel is clearly in conflict with the laws of the State of Illinois or in such venue as appropriate no court shall reverse or otherwise amend the determination except as may be necessary to correct a minor discrepancy.

Attest:____________________ Date: ____________________

&&&, Secretary

ADDENDUM B. CONFLICT OF INTEREST POLICY & POLICY AGAINST EXCESS BENEFITS TRANSACTIONS

Article I – Purpose

The purpose of these policies is to protect the interest of Intrinsic Schools (the "Corporation") and its tax-exempt status when it is contemplating entering into a transaction or arrangement that might benefit the private interest of an officer or director. This policy is intended to supplement but not replace any applicable state laws governing conflicts of interest applicable to nonprofit and charitable corporations.

Article II – Definitions

A. Interested Person. Any director, principal officer, or member of a committee with board delegated powers who has a direct or indirect financial interest, as defined below, is an interested person.

B. Financial Interest. A person has a financial interest if the person has, directly or indirectly, through business, investment or family:

1. An ownership or investment interest in any entity with which the Corporation has a transaction or arrangement, or
2. A compensation arrangement with the Corporation or with any entity or individual with which the Corporation has a transaction or arrangement, or
3. A potential ownership or investment interest in, or compensation arrangement with, any entity or individual with which the Corporation is negotiating a transaction or arrangement.

Compensation includes direct and indirect remuneration as well as gifts or favors that are substantial in nature.

A financial interest is not necessarily a conflict of interest. Under Article III, Section 2, a person who has a financial interest may have a conflict of interest only if the appropriate board or committee decides that a conflict of interest exists.

C. Significant Leadership Interest. A person has a significant leadership interest if he or she is a director, officer, or management worker (whether volunteer or paid staff) of any entity with which the Corporation has a material transaction or arrangement.

Article III – Procedures for Addressing Financial Interests

A. Duty to Disclose. In connection with any actual or possible conflicts of interest, an interested person must disclose the existence of his or her financial interest and must be given the opportunity to disclose all material facts to the directors and members of committees with board delegated powers considering the proposed transaction or arrangement.

B. Determining Whether a Conflict of Interest Exists. After disclosure of the financial interest and all material facts, and after any discussion with the interested person, he/she shall leave the board or committee meeting while the determination of a conflict of interest is discussed and voted upon. The remaining board or committee members shall decide if a conflict of interest exists.

C. Procedures for Addressing the Conflict of Interest.

1. An interested person may make a presentation at the board or committee meeting, but after such presentation, he/she shall leave the meeting during the discussion of, and the vote on, the transaction or arrangement that results in the conflict of interest.
2. The CEO or committee chairperson shall, if appropriate, appoint a disinterested person or committee to investigate alternatives to the proposed transaction or arrangement.
3. After exercising due diligence, the board or committee shall determine whether the Corporation can obtain a more advantageous transaction or arrangement with reasonable efforts from a person or entity that would not give rise to a conflict of interest.
4. If a more advantageous transaction or arrangement is not reasonably attainable under circumstances that would not give rise to a conflict of interest, the board or committee shall determine by a majority vote of the disinterested directors whether the transaction or

arrangement is in the Corporation's best interest and whether the transaction is fair and reasonable to the Corporation, and shall make its decision as to whether to enter into the transaction or arrangement in conformity with such determination.

D. Violations of the Conflicts of Interest Policy.

1. If the board or committee has reasonable cause to believe that a member has failed to disclose actual or possible conflicts of interest, it shall inform the member of the basis for such belief and afford the member an opportunity to explain the alleged failure to disclose.
2. If, after hearing the response of the member and making such further investigation as may be warranted in the circumstances, the board or committee determines that the member has in fact failed to disclose an actual or possible conflict of interest, it shall take appropriate disciplinary and corrective action, including removal from the Board.
3.

Article IV – Disqualification For Persons with a Significant Leadership Interest

An interested person who has a significant leadership interest shall not participate in or vote on any grant-making, financial assistance, or other funding decision affecting an entity for which he or she is a director, officer, or management worker (whether volunteer or paid staff).

Article V – Records of Proceedings

The minutes of the board and all committees with board-delegated powers shall contain:

A. The names of the persons who disclosed or otherwise were found to have a financial or significant leadership interest in connection with an actual or possible conflict of interest, the nature of the interest, any action taken to determine whether a conflict of interest was present, and the board's or committee's decision as to whether a conflict of interest in fact existed.

B. The names of the persons who were present for discussions and votes relating to the transaction or arrangement, the content of the discussion, including any alternatives to the proposed transaction or arrangement, and a record of any votes taken in connection therewith.

Article VI – Compensation and Avoiding Excess Benefits

A. A voting member of the board of directors who receives compensation, directly or indirectly, from the Corporation for services is precluded from voting on matters pertaining to that member's compensation.

B. A voting member of any committee whose jurisdiction includes compensation matters and who receives compensation, directly or indirectly, from the Corporation for services is precluded from voting on matters pertaining to that member's compensation.

C. Persons who receive compensation, directly or indirectly, from the Corporation, whether as employees or independent contractors, are precluded from membership on any committee whose jurisdiction includes compensation matters. No person, either individually or collectively, is prohibited from providing information to any committee regarding compensation.

All compensation arrangements shall be reviewed by the Corporation at least every other year to assure that compensation is reasonable and is the result of arms-length bargaining. Decisions regarding compensation shall be made only after the board or an appropriate independent committee examines relevant financial information regarding compensation received by similarly situated individuals for similar services performed. The board or appropriate committee shall examine the data on compensation paid by at least three comparable organizations in the same or similar communities for similar services (or at least five such comparable organizations in the event that the Corporation receives in excess of $1,000,000 during the current period during which compensation is set or during the previous accounting period) . A copy of such relevant comparable financial information, including a description of how the data was obtained, shall be maintained as a part of the records of board or appropriate committee making such compensation decision.

Article VII – Annual Statements

Each director, principal officer and member of a committee with board delegated powers shall annually sign a statement which affirms that such person:

A. Has received a copy of the conflicts of interest policy;
B. Has read and understands the policy;
C. Has agreed to comply with the policy; and
D. Understands that the Corporation is a charitable organization and that in order to maintain its federal tax exemption it must engage primarily in activities which accomplish one or more of its tax-exempt purposes.

Article VIII – Periodic Reviews

To ensure that the Corporation operates in a manner consistent with its charitable purposes and that it does not engage in activities that could jeopardize its status as an organization exempt from federal income tax, periodic reviews shall be conducted by the Corporation's Executive Committee. The periodic reviews shall, at a minimum, include the following subjects:

A. Whether compensation arrangements and benefits are reasonable and are the result of arm's-length bargaining.
B. Whether provider services result in inurement or impermissible private benefit.
C. Whether partnership and joint venture arrangements and arrangements conform to written policies, are properly recorded, reflect reasonable payments for goods and services, further the Corporation's charitable purposes and do not result in inurement or impermissible private benefit.
D. Whether agreements with other providers, employees, and third party entities further the Corporation's charitable purposes and do not result in inurement or impermissible private benefit.

Attest:___________________________ Date:___________________________
Secretary

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INTERNAL REVENUE SERVICE
P. O. BOX 2508
CINCINNATI, OH 45201

DEPARTMENT OF THE TREASURY

Date: MAY 23 2013

INTRINSIC SCHOOLS
C/O MICHAEL P MOSHER
33 N LASALLE ST STE 3400
CHICAGO, IL 60602

Employer Identification Number:
45-5454261
DLN:
17053307318032
Contact Person:
SANDRA MAK ID# 95023
Contact Telephone Number:
(877) 829-5500
Accounting Period Ending:
June 30
Public Charity Status:
170(b)(1)(A)(ii)
Form 990 Required:
Yes
Effective Date of Exemption:
June 8, 2012
Contribution Deductibility:
Yes
Addendum Applies:
Yes

Dear Applicant:

We are pleased to inform you that upon review of your application for tax exempt status we have determined that you are exempt from Federal income tax under section 501(c)(3) of the Internal Revenue Code. Contributions to you are deductible under section 170 of the Code. You are also qualified to receive tax deductible bequests, devises, transfers or gifts under section 2055, 2106 or 2522 of the Code. Because this letter could help resolve any questions regarding your exempt status, you should keep it in your permanent records.

Organizations exempt under section 501(c)(3) of the Code are further classified as either public charities or private foundations. We determined that you are a public charity under the Code section(s) listed in the heading of this letter.

Please see enclosed Publication 4221-PC, Compliance Guide for 501(c)(3) Public Charities, for some helpful information about your responsibilities as an exempt organization.

INTRINSIC SCHOOLS

We have sent a copy of this letter to your representative as indicated in your power of attorney.

Sincerely,

Holly O. Paz

Holly O. Paz
Director, Exempt Organizations
Rulings and Agreements

Enclosure: Publication 4221-PC

INTRINSIC SCHOOLS

INFORMATION FOR CHARTER SCHOOLS

You are not subject to the specific publishing requirements of Revenue Procedure 75-50, 1975-2 C.B., page 587, as long as you are operating under a contract with the local government. If your method of operation changes to the extent that your charter is terminated, cancelled, or not renewed, you will be required to comply with Revenue Procedure 75-50.

APPENDIX D: Intrinsic Schools – Policies for Student Discipline, Section 2.2

Intrinsic Schools will follow the CPS student code of conduct.

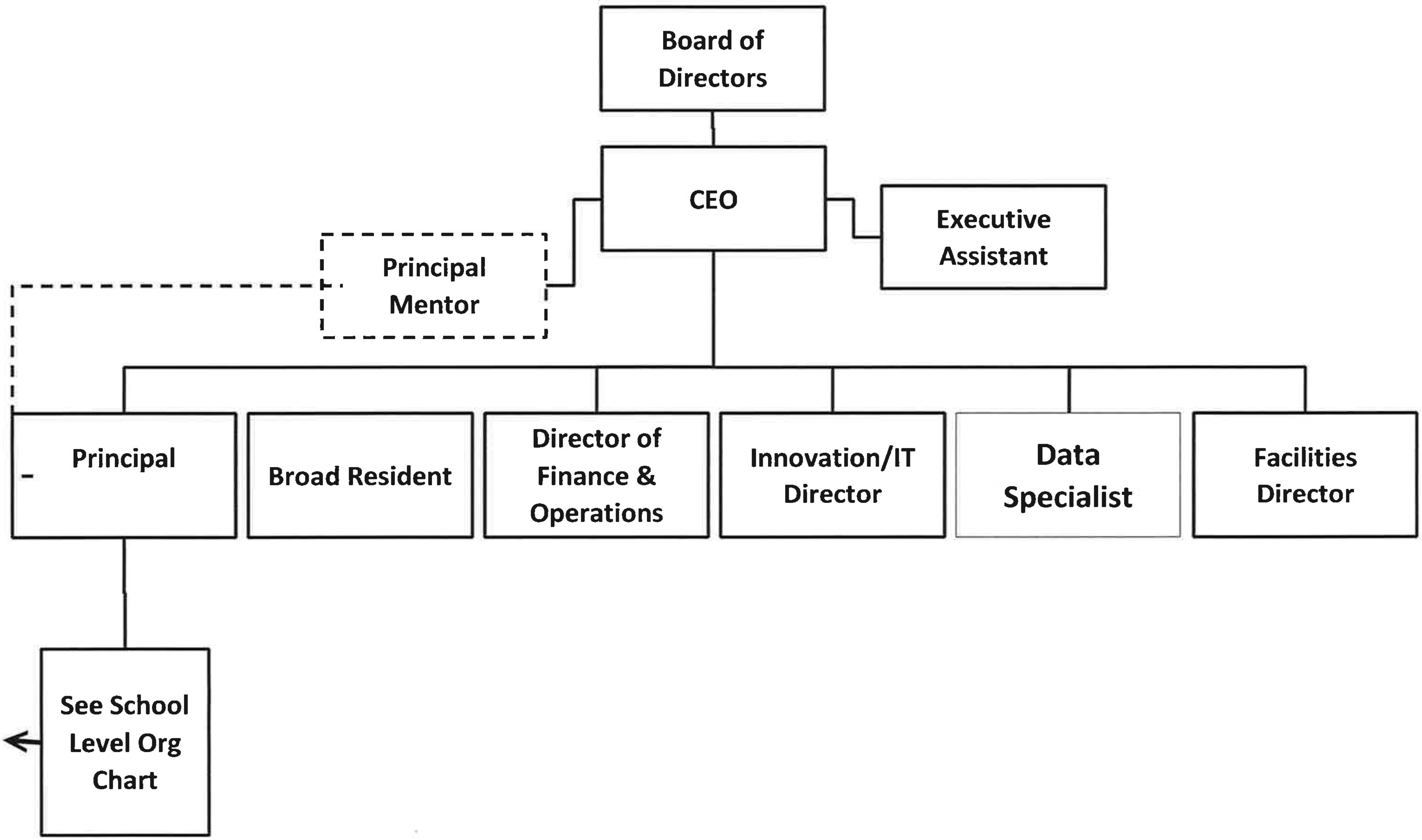
INTRINSIC SCHOOLS CURRICULUM CORE SCOPE AND SEQUENCE Common Core State Standards – Next Generation Science Standards – College Readiness Standards				
GRADE	**MATH**	**SCIENCE^**	**ELA**	**SOCIAL SCIENCE**
7th	Math 7/Pre-Algebra, Algebra	Environmental Science (Nature of Science)	ELA 7: Identity, Community, Environment, and Beliefs	European Renaissance and Early U. S. History
8th	Algebra, Geometry	Engineering/Programming Course (Physical or Digital)	ELA 8: Reinventing the World (Then and Now)	Modern U. S. History
9th	Geometry, Algebra/Trig	Chemistry (Research Process and Literacy of Scientific Writing)	Rhetoric and Composition I: The Power of Definition (Genre Focus)	AP Human Geography, World Studies
10th	Algebra/Trig, Pre-Calculus, AP Computer Science# *(Programming Course prerequisite)*	Physics (Algebra 1 Prerequisite)	Rhetoric and Composition II: The Power of Choice (American Literature Focus)	US History, AP US History, AP Human Geography
11th	Pre-Calculus, AP Statistics, AP Calculus *(Pre-Calculus prerequisite)*, AP Computer Science#	Biology	Great Books: Power of Imagination (World Literature Focus) AP Language#	Modern World History AP World History#, AP US History,
12th	AP Statistics, AP Calculus, AP Computer Science#, College Mathematics Course**	AP Chemistry, AP Physics, AP Biology, Earth/Space Science	Topics in Literature Seminar Series: Choosing to Participate (The Power of One), AP Literature#	Facing History and Ourselves Capstone: Choosing to Participate, AP European History, AP Psychology#

#Online Option ****Dual Enrollment in College begins senior year**

* In mathematics, accelerated students will have the option to begin the year in the most appropriate course in the sequence either via a live seat or an online course.

INTRINSIC SCHOOLS CURRICULUM NON-CORE SCOPE AND SEQUENCE	
GRADE	**COURSE**
7th	PE, Art History & Physical Art
8th	PE, World Language, Multi-media Arts (Business & Entrepreneurship)
9th	PE (Health), World Language, Music History & Digital Music
10th	PE (Drivers Education)/ World Language/ Multi-media Arts (Marketing & Virtual Enterprise)
11th	Elective Core Course, College Portfolio Development: College Applications, Internships
12th	Elective Core Course, Independent Study and Capstone, College: College Applications, Financial Aid, Internships

INTRINSIC SCHOOLS ORGANIZATIONAL CHART:
Board and CMO Level



David J. Epstein

David Epstein is an entrepreneur with wide experience in strategy, organizational and transaction management, trading and arbitrage, law, real estate and architecture. David Epstein currently runs his own strategy consulting firm, Epstein Consulting, where he has provided, strategic, organizational management, marketing, financial, and transaction management services to both start-up and established IT companies. David is also the President of Tolerance Therapeutics, a biotech company focused on the sale and licensing of immunosuppressive and immunopotentiating technology. During his tenure at Tolerance Therapeutics, David has successfully led and managed the sale or licensing of multiple technologies.

Prior to these positions, David cofounded and managed Epia Inc., an options trading firm. In his role as President, David traded on the CBOE options floor and managed the firm's positions and risks as well as junior traders. David started his career at A Epstein and Sons International Inc., a full service international architecture, engineering and construction firm rising to the level of Executive Vice President. At A Epstein, David focused on organizational management, strategic planning and business and systems development, and travelled extensively to manage projects in Paris, London, Warsaw and Tel Aviv.

David received his *juris doctor* degree from Boston University School of Law in 1974, and both a Bachelor of Arts in Social Sciences and Bachelor of Science in Business Administration degrees from the University of California, Berkeley in 1970. David is a member of the Illinois bar (currently inactive status) and is a licensed Illinois real estate broker. David is fluent in French and conversational in Spanish.

Jim Frank, Chief Executive Officer and President, Wheels Inc.

A native of Chicago, Jim joined Wheels in 1967 after receiving a B.A. from Dartmouth College and an MBA from Stanford Business School. He assumed the duties of President and CEO in 1974.

Jim has served as both President and Chairperson of the American Automobile Leasing Association (AALA), and is presently a member of its Board of Directors and Chairman of the Federal Tax and Legislation Committee. As former chair of the AALA Legislative Committee, he participated in numerous successful industry efforts aimed at helping shape regulatory and legislative issues affecting fleets. He also has chaired an Industry Committee which represented the views of fleet users regarding Federal Personal Use Legislation.

Jim was also instrumental in leading fleet management into the computer age, designing and implementing the first IT systems which were used to collect a wide range of information and deliver that data to fleet managers in a way that helped them better manage their fleets. These systems became the foundation of the technology being used today to manage fleets across the U.S.

Jim has served as President of the Michael Reese Medical Research Institute Council Junior Board. He is presently a member of the Board of Trustees of the University of Chicago Hospitals, a member of the Board of Trustees of the University of Chicago, and a member of the Board of Overseers of the Thayer Engineering School at Dartmouth College.

Harriet Meyer

Harriet Meyer, M.A., is a nationally recognized leader in shaping public policies and creating innovative programs that help young, at-risk children and their families. In two decades as President of the Ounce of Prevention Fund, she established the organization as a national leader in advocating for and providing effective, research-driven early childhood education.

In Illinois, Ms. Meyer led the state's push to expand preschool opportunities and investments in early childhood, beginning at birth. She helped to fight for and secure an expansion of early education funding by $90 million over three years, a landmark commitment to serve more young children. In 2003, the Governor of Illinois chose Ms. Meyer to co-chair the Early Learning Council, the first coordinating council for young children to be housed in an Illinois Governor's office. During this tenure, she has helped win passage of Preschool For All, historic legislation making Illinois the first state to offer a quality preschool opportunity to all 3- and 4-year-olds, and that includes a set-aside devoted to programs focusing on at-risk infants and toddlers. Ms. Meyer also co-chaired the Finance Committee of Governor Ryan's Task Force on Universal Preschool. On another front, Ms. Meyer has been instrumental in expanding the use of "doulas" – specially trained home visitors who help young, low-income mothers across Illinois.

On the national level, Ms. Meyer served on the U.S. Department of Health and Human Services Advisory Committee that created our country's Early Head Start program. She presented at the White House Conference on Early Brain Development in 1997, participated in the White House Conference on Early Cognition in 2001, and testified in 2009 before the House Committee on Education and Labor about the importance of expanding access to high quality early childhood programs for the youngest, most vulnerable children.

Under her direction, the Ounce of Prevention Fund opened the first Educare Center in February 2000 on the South Side of Chicago. Educare has become one of the nation's premier early learning program models. Ms. Meyer and the Ounce, in partnership with the Buffett Early Childhood Fund, have supported the replication of the Educare model in over a dozen states, with the newest school set to open in Washington DC in June 2012. In addition to supporting the national expansion of the network of Educare schools in the past ten years, she has provided consultation with key stakeholders to improve early childhood programs and policies across the country.

Before becoming President of the Ounce of Prevention Fund, Ms. Meyer oversaw the physical construction of the organization's comprehensive child care center that became known as the "Beethoven Project." Ms. Meyer received her undergraduate degree from Syracuse University and her graduate degree from Middlebury College after completing most of her studies in Paris. Ms. Meyer also serves as a Board Member of The Irving Harris Foundation and a number of other philanthropic and civic organizations throughout Chicago.

JUSTIN C. MANLY

2711 North Racine Ave • Chicago, IL 60614
manly.justin@bcg.com • 773.841.6535

INDUSTRY EXPERTISE

Consumer Products

Deep advisory experience in Consumer Packaged Goods, spanning a broad range of topics. Clients include executive leadership at 5 of the top 30 Consumer Products companies in North America. Engagements have spanned a broad range of topics including transformation, strategy, innovation, M&A, resource allocation, and cost takeout for US and International businesses

FUNCTIONAL EXPERTISE

Growth and Innovation

Expert in driving growth through organic investment and M&A

- Consumer Innovation Topic Expert for BCG North America; expert in innovation strategy, breakthrough ideation, org structures, processes, and capability requirements
- Collaborate with executives leadership to identify and pursue growth opportunities: New or expanded domains, categories, channels, features, markets, and product uses
- Deep experience defining growth strategies; define growth objectives and specify enabling innovation and M&A strategies

Operations

Skilled in operational improvement and cost take-out

- Experienced in cost reduction techniques including restructuring, footprint optimization, activity-based cost reduction, shared servicing
- Procurement: Spend optimization, make vs. buy, and risk management; co-authored *'Coping with the Commodities Crisis'*, a BCG publication on procurement strategy

EXPERIENCE

2007 - Present

THE BOSTON CONSULTING GROUP — **Chicago, IL**

Principal

- Lead transformation efforts for major beverage manufacturer; primary lead for all commercial aspects of transformation, including business strategy, resource allocation and optimization, brand turnaround, and commercial planning. Close collaboration with senior leadership has led to large-scale change: org-wide shift in portfolio focus and reallocation of $250M brand marketing investment to support EBIT aspirations
- Innovation transformation for leading Consumer paper products company: worked closely with executive, marketing, and innovation teams to build innovation capability; category innovation pilots led to 20x increase in pipeline size and $1B EBIT opportunity
- Led functional cost optimization for major consumer products company; identified opportunity to reduce spend and headcount by 30-40% by reshaping organization structure, eliminating low-value activities, and centralizing back-office functions
- Awarded top performance bonus every year at BCG
- Active in BCG recruitment and training efforts; lead 20 person quant skills training team

2002-2005

PIPER JAFFRAY & CO. — **Bozeman, MT**

Financial Advisor

- Advised private and institutional clients on financial planning and investment management; grew and assets under direct management to $15 million
- Leveraged resources of fixed income group to develop debt hedging strategies for institutional clients; total fixed income transactions surpassed $100 million

EDUCATION

UNIVERSITY OF MICHIGAN — **Ann Arbor, MI**

Stephen M. Ross School of Business

Master of Business Administration with High Distinction, April 2007

DARTMOUTH COLLEGE — **Hanover, NH**

Bachelor of Arts in Economics Modified with Engineering, June 2002

- Analyst experience at Merrill Lynch Technology Investment Banking, New York, NY
- Middle Distance Runner, Dartmouth College Varsity Track & Field Team

ADDITIONAL

- Enjoy spending time with my wife, Emily, and two kids, Eliza and Canon
- Enthusiastic traveler, particularly in the mountainous West

September 2013

Matt Moog is the Founder & CEO of Wavetable Labs a digital business incubator, Founder & CEO of Viewpoints.com, a leading provider of consumer reviews and the Founder of BuiltInChicago.org an online community for digital technology entrepreneurs in Chicago.

Wavetable Labs launched in April 2013. Built In launched in September 2010. And Viewpoints launched in September 2007.

Matt is also an active angel investor. He co-founded the FireStarter Fund in January 2012 with Brian Hand, Troy Henikoff, Sam Yagan and 40 other digital entrepreneurs. Since launch FireStarter Fund has made nine investments including Retrofit, Give Forward, Kapow, Shiftgig, Cartavi, DIYSEO, Hireology, Tap.me and Pangea.

Previously Matt spent ten years at CoolSavings. He joined CoolSavings as the fifth employees in 1996 as the VP of Sales and was promoted to EVP of Sales and Marketing and later to President & CEO. The company went public in May 2000. As CEO he led a turn around that resulted in revenue growing from $21 million to $80 million over five years. In 2005 he led a transaction that took the company private at valuation of $220 million. Under his leadership the share price grew more than 400% over five years.

Prior to CoolSavings, Matt worked for Microsoft for five years in business development helping to launch MSN in 1995.

Currently Matt serves as the Vice Chair of Chicago Public Media, on the board of YPO Chicago where he is the education chair and on the board of Francis Parker School where he is the treasurer and chairs the finance committee, on the board of Intrinsic Schools and on the board of VASCO Data Security a publicly company.

Matt has previously served as an executive board member of the Word of Mouth Marketing Association, on the board of the Direct Marketing Association (DMA) 2005/06 and the Interactive Advertising Bureau (IAB) 2004-2006.

Matt was named to Crain's Tech 25 in 2011 and to Crain's 40 under 40 in 2005. He has been nominated for the Ernst & Young Entrepreneur of the Year Award for both CoolSavings and Viewpoints. Matt has been cited as an industry expert in The New York Times, The Wall Street Journal, The Chicago Tribune, Fortune Small Business, and a variety of other national and regional publications. He has also appeared on Fox News, CNN, CNBC, WGN, CBS 2 Chicago and WTTW to discuss the future of digital media.

Matt holds a BA in Political Science from the George Washington University ('92). Matt is married, to Lucy, with three boys Max , Charlie, and Eli.

Jim Palos

jimpalos3@gmail.com | (312) 523-9076 | 1825 N. Wood Street, Chicago, IL 60622

Profile

- 20+ years of CEO experience
- Veteran in working with Boards and serving on them; built boards of 3 organizations
- Directed 2 start-ups from concept to maturity
- Diverse candidate; fluent in Spanish
- Increased fund-raising income 4x
- Completed successful capital campaign to increase program space by 4x
- Have led small organizations (12 employees) and large (1000 employees)
- Drove accelerated growth in number of community college graduates: 23% in one year

Professional Experience

Wilbur Wright College - Chicago, IL
One of seven City Colleges of Chicago, a two-year, multi-campus community college with 14,000 students, 300 faculty (including 110 full-time), and 1,000 employees. Education programs include Credit, Adult Education, Continuing Education, and Occupational Training.
President **2011 – 2012**

- Led an ambitious change effort – entitled the Reinvention of the City Colleges of Chicago – aimed at radical improvement in student performance.
- Oversaw a 23 percent increase in the number of graduates over the previous year through focus on a culture of retention and introduction of case-management advising.
- Created structures to enhance effectiveness, communication and cross-college collaboration.
- Supervised successful accreditation of Wright College by the Higher Learning Commission, and accreditation of Business and Computer Information Systems program by Accreditation Council for Business Schools and Programs.
- Decreased expense budget of $35M from prior year while increasing support for student learning: grew advising staff by 40 percent (to align Wright College with national norms) and doubled staff for Tutoring Center. Managed this while tuition remained flat.
- In collaboration with District Office instituted additional student resources such as Wellness Center, Transfer Center, Veterans Affairs Center, Recruiters, and Admissions Specialists.
- Worked with five different unions to effectively manage labor relations. Prepared contingency plans for pending strike of clerical staff though the strike did not materialize.
- Participated in development of District-wide *Key Performance Indicators*, mapping out metrics and goals for the District and for Wright College individually.

JP Consulting – Chicago, IL
Principal **2009 - 2011**

- Created monthly speakers series for professional development organization targeting young professionals. Speakers included Rocky Wirtz, Frank Clark, Chip Mulaney, Harry Kraemer, and Pat Ryan, Jr.
- Part of a five-member organizing committee that put on a one-day conference at the University Club aimed at helping men to be better husbands, fathers, and friends. Recruited four national speakers to an event that drew 130 participants.

- Founded the Alumni Diversity Initiative at the Kellogg School of Management, which connects minority alumni with the school's diversity-related goals. The Initiative has 200 members and has become an active tool working with various departments of the school.
- Consulted with a local musical theater production company in establishing links to theater, publishing, and film companies to promote an especially promising script.

Note: At end of 2009 relocated to Chicago to provide focused care to parent with terminal illness.

Institute for Media and Entertainment - New York, NY
Niche business school for the media and entertainment industries. Delivers open-enrollment programs for media executives, as well as customized programs for corporations. Commissions research related to media/entertainment management.
Founder and President **2002 – 2009**
Responsible for all aspects of program design, marketing, and delivery. Worked closely with industry executives and IME faculty in developing academic content. Conducted market research to determine program content and formats.

- Assembled steering committee to design the school. Obtained seed-funding and hired staff.
- Developed marketing plan aimed at gatekeepers, as well as prospective participants in IME programs. Participants come from all major media companies, including Time Warner, News Corporation, Disney, Condé Nast, and The New York Times Company.
- Built partnerships with premier business schools in the U.S. and abroad. Developed links with professional associations in media to leverage their credibility and promote enrollment. Created a quarterly speakers series in association with *The Wall Street Journal* that has featured leaders such as George Soros, Jeff Immelt, T. Boone Pickens, and A.G. Lafley.
- Found a merger partner, linking IME to a top-tier European business school and guaranteeing IME's future. As stipulated in merger agreement, ceded presidency to director from merger partner.
- Lived in Barcelona for one year to facilitate merger and acquire understanding of European management practices.

Latino Education Alliance - Chicago, IL
Founder and Executive Director **2001 – 2002**
Created nonprofit organization to improve educational opportunities and outcomes for Latino children in Illinois. Hired and managed staff of 22 in designing and delivering services.

- Assembled Board of Directors led by chief education officer of the State of Illinois and of the City of Chicago.
- Obtained $1M in seed funding. Gained $1.4M in pro bono assistance for strategic planning (McKinsey & Co.), legal (Baker & McKenzie), and public relations services (Edelman).
- Led design and delivery of services to a network of schools.

Midtown Educational Foundation - Chicago, IL
Delivers after-school and summertime enrichment programs to Latino and African American students in grades 4 – 12. As a youngster in MEF programs, the MEF people and programs hugely affected my life.
Executive Director **1992 – 2000**

- Stabilized the operations and finances of a 25-year old nonprofit after a tumultuous period marked by operating deficits and dismissal of previous Executive Director.
- Built Board of Directors from 8 to 30 members comprised of CEO's and senior executives. Established annual fundraising event generating $850,000 in revenue and priceless goodwill.
- Led the design and execution of strategic planning process that defined new direction for the organization. Established goals, evaluation processes, and measurements.
- Reversed trend of operating losses; achieved surpluses every year.

- Led capital campaign that built two new community centers, which quadrupled program space and allowed three-fold increase in enrollment

Kellogg School of Management - Evanston, IL
Assistant Director of Admissions **1989 – 1991**
Directed minority recruiting efforts with a special focus on Latino applicant pool. Managed the School's marketing efforts for new entrants. Handled general admissions responsibilities.
- Achieved a sustainable fourfold increase in Latino student population. Developed and obtained funding for $300,000 marketing plan to attract minority applicants.
- Provided leadership within Kellogg on minority and diversity issues, fostering dialogue and helping to build programs that enhanced cultural awareness.

Honeywell Bull, Inc. - New York, NY
Regional Business Analyst **1985 – 1987**

Office of Management and Budget, City of New York - New York, NY
Assistant Budget Analyst **1983 – 1985**

EDUCATION

IESE Business School, Barcelona, Spain 2008 – 2009
Advanced Management Program (Executive MBA; only American participant in a class of 32).

Kellogg School of Management, Northwestern University, Evanston, IL 1987 – 1989
MBA with majors in Marketing, Strategy, and Nonprofit Management.

Columbia University, New York, NY 1979 – 1983
Bachelor of Arts degree with a major in Economics.

VOLUNTEER RESPONSIBILITIES & OTHER INFORMATION

Kellogg Alumni Council, Member (1998 – present)
Midtown Educational Foundation, Member of the Board of Directors (1992 – present)
Alain Locke Charter School, Member of Board of Directors (2011 – present)
Intrinsic Schools Charter School Network, Member of Board of Directors (2012 – present)
Illinois State Board of Education, Member (1993-1999, appointed by Governor Jim Edgar)
National Louis University, Member of the Board of Trustees (2001 – 2003)
Leadership Greater Chicago Fellow (1991); President of alumni Board (2000 – 2002)
Fluent in Spanish; fully bi-cultural having been raised in the U.S. within a Hispanic household.

APPENDIX CC: Intrinsic Schools – Code of Ethics Policy, Section 3.2

Intrinsic Schools Code of Ethics Policy is embedded into our Board Bylaws.

APPENDIX EE: Intrinsic Schools – Financial Reporting Schedule, Section 4.2

The table below details the Intrinsic Schools financial reporting schedule, the responsible party and the individual(s) who will review the information.

Intrinsic Schools Financial Reporting Schedule			
Reports	**Frequency**	**Responsible Party**	**Reviewed By**
Bank Balances	Weekly	Director of Finance and Operations (DFO)	CEO
Checks Issued	Weekly	DFO	CEO
Payroll Journal	Bi-weekly	Payroll Service Provider	CEO and DFO
Balance Sheet	Monthly	DFO	Board, Finance Committee, CEO
Income Statement	Monthly	DFO	Board, Finance Committee, CEO
Cash Flow Statement	Monthly	DFO	Board, Finance Committee, CEO
Budget Variance Report	Monthly	DFO	Board, Finance Committee, CEO
Year-end Budget Projections	Monthly	DFO	Finance Committee and CEO
Bank Reconciliation Reports	Monthly	DFO	CEO
Accounts Payable Report	Monthly	DFO	CEO
Accounts Receivable Report	Monthly	DFO	CEO
Quarterly Budget Report	Quarterly	DFO	CPS
Audit	Annually	Auditor	Board, Finance Committee, CEO, DFO
990	Annually	Auditor	Board, Finance Committee, CEO, DFO

APPENDIX FF: Intrinsic Schools – Fiscal Policies, Section 4.2

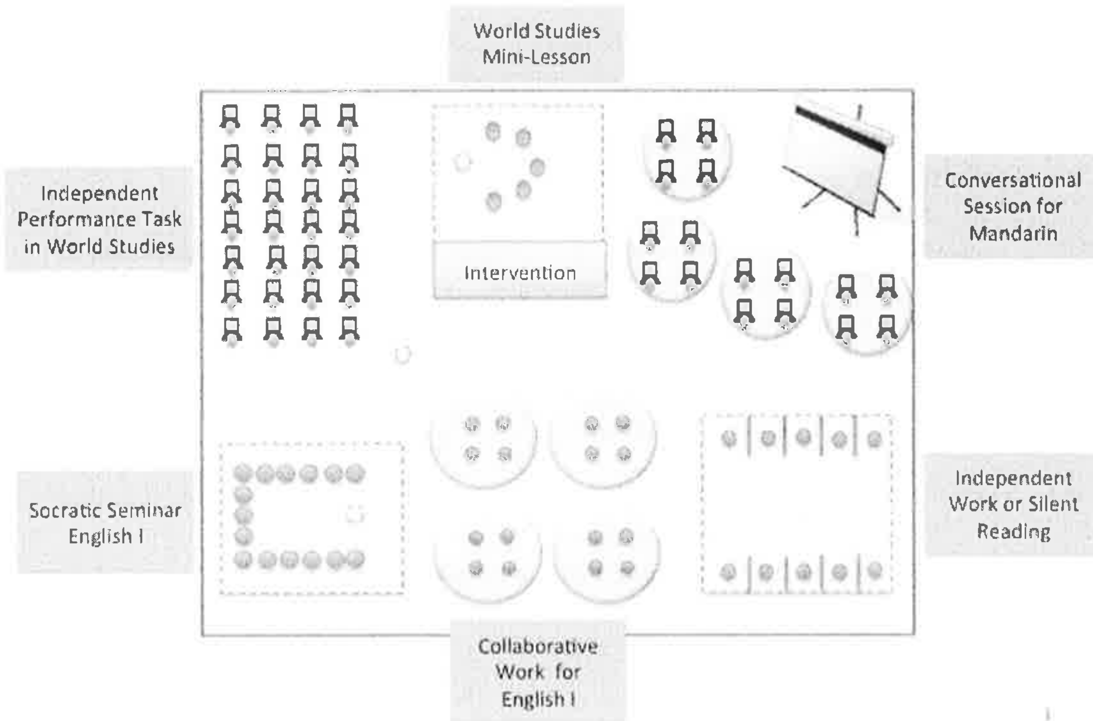
At this time, Intrinsic Schools in still in the process of developing a comprehensive fiscal management handbook. As such, none is provided here.

APPENDIX GG: Intrinsic Schools – Timeline for Securing Facilities, Section 4.3

Per our conversation with the Office of New Schools, we are in the process of finding a site. We fully intend to supply our own facility within the Northern High School Priority area. We expect to find a facility this spring. We intend to incubate in our original school and be in the new facility for the fall of 2016.

Six Double Pods (Humanities and STEM per grade level)

SAMPLE POD SCHEMA – HUMANITIES



- Large flexible spaces, roughly 5000 sq ft.
    - One side STEM and one side Humanities
    - STEM and Humanities share two acoustically isolated spaces (seminar room and science lab)
    - Need some semi-private space for small group intervention – 2 spaces per pod that would accommodate 5 – 6 people
    - Each side of the pod must accommodate 93 students in one location – could be on bleachers, portable seats, etc.
    - Want some space with soft furniture/bean bags for independent reading/work
    - Need tinkering/design lab space for up to 30 students if design lab is not one large central space.
    - Remainder of space to be flexible for student individual and group work with moveable furniture, including table portable partitions for students to have private, independent work space
    - Should be designed for presentation/screens in multiple locations of open space
- Science Needs
    - Gas and ventilation needed in chemistry and biology labs
    - Water access
    - Mobile storage for lab supplies. Want to be able to have students working on different labs if needed.

Other Required Spaces

- Space for whole school meetings, student performance, forums. This space can be flexible and may come from part of multiple adjoining pods.
- Fine Arts Space – Mobile storage for supplies
- Lunch
- Private Offices
  - Counselor
  - Parent conference room/IEP meetings - able to seat 10 people
  - Additional shared private office for small private discussions or conference calls
- Administrative workspace (8 – 10 people)
  - May be open with half-length wall cubes
  - Ideally placed to create greatest collaboration and eliminate possibility of anyone always being in his/her office
  - All adults constantly interacting with students and offices being centrally located
    - Principal – could be open cube
    - Curriculum coordinator
    - Clerk
    - Operations Manager
    - Technology Coordinator
    - CMO Staff of 3-4 people (in the first few years)
    - Student storage space

Other "Wish List" Spaces

- Art Studio
- Library/media center – If not a separate space, we will need storage for some hard books. We would like to have shelving for books throughout the building.
- Outside courtyard or access to outdoors for Environmental Science and Biology