

ARTS IN MOTION CHARTER SCHOOL | 8th Grade Science CURRICULUM MAP

Projects	Essential Questions	Enduring Understandings	Cognitive Skills	CCSS	Final Product
Geological Field Study	<ul style="list-style-type: none"> How are rocks formed? Why are they so different? How can we use clues to solve a geological mystery? 	<ul style="list-style-type: none"> The materials of the Earth's crust are continually being transformed by natural forces from one rock type to another. Physical properties and appearance of the rock give clues to its geological history. Relative position of rocks in strata provides clues which help us infer the age and sequence of events. 	<ul style="list-style-type: none"> Critiquing the Reasoning of Others Designing Processes and Procedures Identifying Patterns and Relationships Justifying / Constructing an Explanation Making Connections & Inferences Modeling 	<ul style="list-style-type: none"> NGSS.MS-ESS2-1 NGSS.MS-ESS2-2 NGSS.MS-ESS2-3 NGSS.MS-ESS2-4 NGSS.MS-ESS2-5 NGSS.MS-ESS2-6 	<ul style="list-style-type: none"> Personal Field Report Geological Site Survey Peer Review- Geological Site Survey
Scale Animations	<ul style="list-style-type: none"> What patterns in the universe can we discover if we change the scale of time or distance or point of view in our observations? Are there things going on we don't see because we aren't looking long enough, quick enough, close enough or wide enough? How do we express or understand really large or really small numbers? 	<ul style="list-style-type: none"> The many objects in the universe participate in cycles driven by rules of gravity, orbits and rotations. Most astronomical cycles occur over such a long period that they can only be observed by recording for a long time and then playing back at a faster rate. Distances between objects in the universe are large by everyday measures. The universe has patterns of organization that are visible within each scale of view. 	<ul style="list-style-type: none"> Identifying Patterns and Relationships Interpreting Data/Info Modeling Multimedia in Oral Presentation Precision 	<ul style="list-style-type: none"> NGSS.MS-ESS1-1 NGSS.MS-ESS1-2 NGSS.MS-ESS1-3 NGSS.MS-ESS1-4 	<ul style="list-style-type: none"> Animation or Storyboard Script
Evoworld 2.0	<ul style="list-style-type: none"> How does change over time affect the landscapes and organisms on our planet? How can we create the setting and characters for a science fiction game inspired by nature? 	<ul style="list-style-type: none"> Planets and populations of organisms change over time. The geological record provides evidence of how planets and organisms have changed. Adaptations arise due to the process of natural selection. 	<ul style="list-style-type: none"> Justifying / Constructing an Explanation Making Connections & Inferences Multimedia in Oral Presentation Selection of Evidence 	<ul style="list-style-type: none"> NGSS.MS-LS2-1 NGSS.MS-LS2-2 NGSS.MS-LS2-3 NGSS.MS-LS2-4 NGSS.MS-LS2-5 NGSS.MS-LS3-1 NGSS.MS-LS3-2 NGSS.MS-LS4-1 NGSS.MS-LS4-2 NGSS.MS-LS4-3 	<ul style="list-style-type: none"> Wikipedia of your Video Game World Pitch your Video Game Presentation
Solar Cells	<ul style="list-style-type: none"> Which model is the most cost and energy 	<ul style="list-style-type: none"> The energy from the sun can be measured in watts per meter. 	<ul style="list-style-type: none"> Interpreting Data/Info Making Connections & 	<ul style="list-style-type: none"> NGSS.MS-PS4-1 NGSS.MS-PS4-2 	<ul style="list-style-type: none"> Essay on Cost and Energy Efficient

	<p>efficient design to power a building, car, or plane?</p>	<ul style="list-style-type: none"> Solar cells intercept this electromagnetic energy and convert it into electricity. The output from solar cells depends on the area of sunlight that is collected which is influenced by the angle of the incoming rays, the angle of the collector, and seasonal conditions. Reflectors and lenses can be used to concentrate light from a large area to smaller focal point. 	<p>Inferences</p> <ul style="list-style-type: none"> Modeling Precision 	<ul style="list-style-type: none"> NGSS.MS-PS4-3 	<p>Design</p> <ul style="list-style-type: none"> Design your Model
<p>Broomball-tastic Forces and Motion</p>	<ul style="list-style-type: none"> How do forces affect motion? 	<ul style="list-style-type: none"> Whenever the motion of an object changes, it is because there was a net force on that object. Forces only exist because of the interaction between two objects, and if there is a force on one of those objects, there must have been a force on the other object as well. 	<ul style="list-style-type: none"> Interpreting Data/Info Justifying / Constructing an Explanation Making Connections & Inferences Modeling 	<ul style="list-style-type: none"> NGSS.MS-PS2-1 NGSS.MS-PS2-2 NGSS.MS-PS2-3 NGSS.MS-PS2-4 NGSS.MS-PS2-5 	<ul style="list-style-type: none"> Broomball Physics Explanation Broomball Moves Model
<p>Let's Talk Genetics</p>	<ul style="list-style-type: none"> How should humans use genetic technology? How can genetic technologies impact society? 	<ul style="list-style-type: none"> Organisms are living systems made up of even smaller systems. Small changes in one part of the living system might cause large changes in another part. The uses of technologies and any limitations on their use are driven by individual and societal needs, desires, and values, as well as by the findings of scientific research. 	<ul style="list-style-type: none"> Discussion / Contribution Justifying / Constructing an Explanation Norms / Active Listening Preparation 	<ul style="list-style-type: none"> NGSS.LS3A NGSS.LS3B NGSS.LS4B NGSS.LS4D NGSS.MS-LS3-1 NGSS.MS-LS4-5 	<ul style="list-style-type: none"> Preparation Notes for Socratic Discussion Active Participation in Socratic Discussion

ARTS IN MOTION CHARTER SCHOOL | 8th Grade Science UNIT PLAN

Project	Geological Field Study
Suggested Time	<ul style="list-style-type: none"> ● 4 Weeks
Essential Questions	<ul style="list-style-type: none"> ● How are rocks formed? ● Why are they so different? ● How can we use clues to solve a geological mystery?
Enduring Understandings	<ul style="list-style-type: none"> ● The materials of the Earth's crust are continually being transformed by natural forces from one rock type to another. ● Physical properties and appearance of the rock give clues to its geological history. ● Relative position of rocks in strata provides clues which help us infer the age and sequence of events.
Cognitive Skills	<ul style="list-style-type: none"> ● Critiquing the Reasoning of Others ● Designing Processes and Procedures ● Identifying Patterns and Relationships ● Justifying / Constructing an Explanation ● Making Connections & Inferences ● Modeling
Focus Areas	<ul style="list-style-type: none"> ● History of Planet Earth 1
CCSS	<ul style="list-style-type: none"> ● NGSS.MS-ESS2-1 ● NGSS.MS-ESS2-2 ● NGSS.MS-ESS2-3 ● NGSS.MS-ESS2-4 ● NGSS.MS-ESS2-5 ● NGSS.MS-ESS2-6
Checkpoints	<ul style="list-style-type: none"> ● Rock Exploration ● Food Safety ● Play Ya Cake ● Geotrek ● Recipe template
Final Product	<ul style="list-style-type: none"> ● Personal Field Report (See attached Sample) ● Geological Site Survey ● Peer Review- Geological Site Survey

ARTS IN MOTION CHARTER SCHOOL | 8th Grade Science LESSON PLAN

Project	Geological Field Study	Essential Questions	<ul style="list-style-type: none"> • How are rocks formed? • Why are they so different? • How can we use clues to solve a geological mystery? 	Final Product	<ul style="list-style-type: none"> • Personal Field Report • Geological Site Survey • Peer Review- Geological Site Survey
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Checkpoint	<ul style="list-style-type: none"> • Rock Exploration
Cognitive Skills	<ul style="list-style-type: none"> • Designing Processes and Procedures • Identifying Patterns and Relationships
Objective	<ul style="list-style-type: none"> • Students will begin to organize your knowledge about rocks and geology so that when you begin creating your geology cake, you have all the information you need available.
Activities	<ul style="list-style-type: none"> • Checkpoint
Resources	<ul style="list-style-type: none"> • N/A
Assessment	<ul style="list-style-type: none"> • Performance task assessment using cognitive skills (See attached Sample)

Rock Exploration

Objectives:

- Identifying Patterns and Relationships (COG Skill)
- Identify characteristics of 3 rock types and a variety of fossils
- Explore cooking materials and methods which can be used to imitate rock types
- Model radio dating through the use of a simulation
 - Radio Dating Lab
- Identify the appropriate means to date a rock
- Research and describe processes that shape and form rocks

For each station you will employ the COGS - Identifying Patterns and Relationships. In this context, this means *looking for general features of the rocks* you are looking at, and *finding telltale signs that would help you identify a rock type*.

Resources to help you complete this task:

1. "History of Planet Earth 1 (ESS1.C)" Playlist on PLP
2. [USGS Geology in the Parks](#)
3. [Earth Science - "Minerals Rocks" Section](#)
4. [Rock Cycle YouTube Video](#)

This document will serve as notes to help you on the final project- your Field Report. The better the notes you take now, the easier it will be to complete this project successfully.

#1 - Research for Igneous Baking

What Resources Do I Have? What websites can we use to help us with this information?
1. _____
2. _____

What are Igneous Rocks? (Check out the History of the Planet Earth Playlist)

Term	Definition	Examples
Igneous		
Lava Rock		
Extrusive		
Intrusive		

What do Igneous Rocks look like? (Draw a picture)

Lava Rock	Obsidian Rock

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What patterns and relationships do you observe in this rock type (igneous) that might help someone recognize the rock?

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Brainstorm - How can you tell a story of igneous rocks with baking/ cooking?

What materials can you use? What baking/ cooking processes do you need to use to model the formation of igneous rocks?

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#2 - Research for Sedimentary Rocks

What Resources Do I Have?

What websites can we use to help us with this information?

1. _____

2. _____

What are Sedimentary Rocks? (Check out the History of the Planet Earth Playlist)

Term	Definition	Examples
Sedimentary Rocks		

What do Sedimentary Rocks look like? (Draw a picture)

River deposited rock	Lake or Ocean deposited rock	Wind deposited rock

How are these types of sedimentary rocks formed? Describe the process.

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What patterns and relationships do you observe in this rock type (sedimentary) that might help someone recognize the rock?

Brainstorm - How can you tell a story of sedimentary rocks with baking/ cooking?

What materials can you use? What baking/ cooking processes do you need to use to model the formation of sedimentary rocks?

#3 - Research for Metamorphic Baking

What Resources Do I Have?

What websites can we use to help us with this information?

1. _____

2. _____

What are Metamorphic Rocks? (Check out the History of the Planet Earth Playlist)

Term	Definition	What Does That Look Like?
Metamorphic Rocks		

Marble		
Schist		

What do Metamorphic Rocks look like? (Draw a picture)

Marble	Schist

How are these types of metamorphic rocks formed? Describe the process.

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What patterns and relationships do you observe in this rock type that might help someone recognize the rock.

Brainstorm - How can you tell a story of metamorphic rocks with baking/ cooking?

What materials can you use? What baking/ cooking processes do you need to use to model the formation of metamorphic rocks?

#4 - Research for Fossil Baking

What Resources Do I Have?

What websites can we use to help us with this information?

1. _____
2. _____

- [Gummy Bear Fossils](#)
- [Easy Mold Making](#)
- [Gummy Candy Bug Recipe \(Step by Step Photos\)](#)

What are Fossils? (Check out the History of the Planet Earth Playlist)

Term	Definition	Examples
Fossils		

What do Fossils look like? (Draw a picture)

Vertebrate	Invertebrate

How are these types of fossils formed? Describe the process.

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Brainstorm - How can you tell a story of fossils rocks with baking/ cooking?

What materials can you use? What baking/ cooking processes do you need to use to model the formation of fossils rocks?

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How are fossils and rock layers dated? (Check out the History of the Planet Earth Playlist)

Term	Definition	How to represent them in baking
Law of Superposition		
Relative Age		
Absolute Age		
Faults		
Unconformity		

Radioactive Dating		
Index fossils		

#5- Research for Earth Processes

Process	Definition	How to represent them in baking
Extrusion		
Intrusion		
Cooling		
Weathering		
Erosion		
Sedimentation		
Compacting		
Cementing		
Deposition		
Foliation		
Folding		

Subsidence		
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Personal Field Report

Your Name _____

Site Name _____

General appearance of site- make qualitative and quantitative observations about your personal field site. Do not try and interpret what you see, just make observations!

Qualitative Observations	Quantitative Observations

Rock Types - List the rock types that you believe are clearly represented at the site. Explain what material is used to symbolize that rock. Explain your reasoning based on the clues that led you make this connection. Use photographs to illustrate your observations.

Rock type	Shown with this Material	Reasoning
Igneous		
Metamorphic		
Sedimentary		
Fossil		

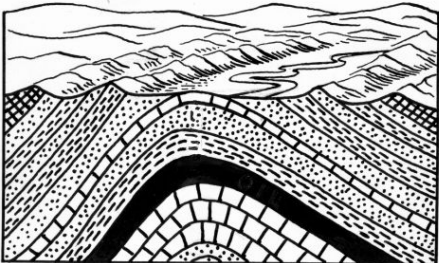
Earth Processes - What earth forming processes are illustrated in the site? Include observations and evidence that process has occurred.

Earth Process	Evidence for Process

Geological History - Describe the formation of the site using geological processes terminology. Discuss the relative age of the layers or features and your method for determining the age.

Questions / Further Research - List unanswered questions you have about the site or other information you would like to have to fully understand the geological history or makeup.

Use the space below to make a **geological map** of the site (similar to the example to the right), identifying layers, features, rock types and noting approximate dates.



Also **create a key** for the rock features shown on the map.

*This may be a cross section, aerial view or both.

Key

Pattern	Represents

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