

1. Essential Element

Activity/Lesson Title: Rock Cycle Changes

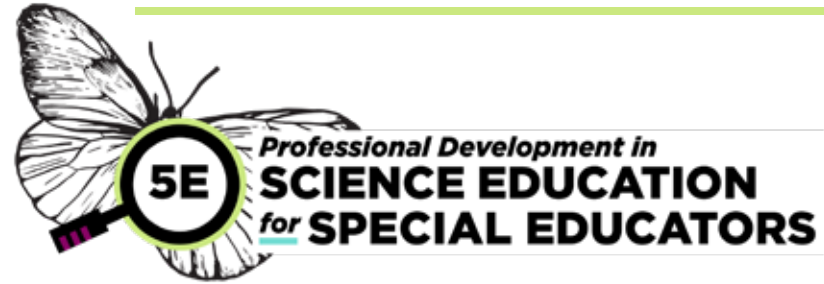
EE: EE.MS.ESS2-1: Use a model to describe the change within the rock cycle between igneous, metamorphic, and sedimentary rock.

Teacher: Ann

Grade Level: Middle (6-8)

Student: Liam

Level: Target



2. Science and Engineering Practice

SEP 2: Developing and Using Models

SEP description: Supports students as they use a model to describe phenomena.

3. Disciplinary Core Idea

Earth's Materials and Systems

Core Idea description: All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the Sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.

4. Crosscutting Concept

Stability and Change

Concept Description: Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, both large and small.

5. Linkage Level Descriptors

Initial: Identify the process that forms igneous rock (e.g., volcanoes).

Precursor: Use a model to describe the change from igneous rock to sedimentary rock.

Target: Use a model to describe the changes within the rock cycle between igneous, metamorphic, and sedimentary rock.

6. Student's Typical Accessibility Supports

- Interactive programs, models, and manipulatives
- Videos
- Communication and academic language supports (like a journal or vocabulary poster)
- Templates for data collection

7. Student Prior Experiences, Prior Knowledge

- The student collects rocks.
- The student likes volcanoes.
- The student likes hands-on science.
- The student has prior knowledge of using models to describe relationships and changes.

8. Phenomenon to Explore

Question: How do different types of rocks form?

9. Possible Alternative Conceptions

Some students may think (incorrectly) that

- All rocks are the same, and rocks do not change.
- Rocks and minerals are the same.
- Weathering and erosion are the same.
- All processes in the rock cycle occur at the same rate.
- Rocks were formed where they are found.

10. UDL Options and Solutions to Potential Barriers

- Use substitute materials such as crayons or chocolate to simulate a rock cycle.
- Use a variety of formats and materials, such as videos of the rock cycle and models to describe the rock cycle.
- Use manipulatives to build models of the rock cycle.
- Provide a graphic organizer so the student can label parts of the rock cycle to help manage information.

11. Engage

Think

- *How can I make sure to access students' prior learning?*
- *How can I use the CCC to connect everyday language with the scientific language of the phenomenon?*
- *How can I support student participation by scaffolding the SEP?*

Teacher Will

- Ask students questions about what they know about rocks and how the different types of rocks in a collection are formed.
- Ask questions of students as they view a video about volcanic rocks.

Students Will

- Respond to teacher prompts about rocks, and the students will think about how they formed.
- Watch a video about how volcanoes form rocks and respond to questions.

12. Explore

Think

- *What is difficult or inaccessible about the phenomenon, and how can I make it more accessible in the Explore phase?*
- *How can students collect data in a way that helps answer a scientific question?*
- *How can I encourage students to observe carefully and ask good questions instead of looking for only the "right answer"?*

Teacher Will

- Assist students in simulating the rock cycle using crayons, wax paper, and a microwave.
- Ask students questions to have them identify the different "rocks" formed.

Students Will

- Complete an investigation with assistance to simulate how the rocks form and change (using crayons, pressure, and heat).
- Identify similarities and differences of "rocks" before and after they changed.
- Take observation notes on different types of changes that occur in the cycle when heat or pressure is applied.

13. Explain

Think

- *How can I help students connect science topics, phenomena, data, and everyday experiences? How can I help my students differentiate everyday language from scientific language? What reasoning helps students see or explain the invisible?*

Teacher Will

- Discuss how each phase of their experiment simulated what happens in nature to form rocks.
- Ensure that students understand what caused changes in the rock cycle: heat and pressure.
- Assist students in using the crayon model and labeling photos of rocks to identify the types of rocks in the rock cycle using academic terms (sedimentary, igneous, metamorphic).

Students Will

- Identify the types of rocks that each phase in the cycle represents.
- Complete a CER statement.

Claim: Rocks change over time.

Evidence:

- » I saw how rocks change with heat and pressure using the crayon model.
- » I saw photos of rocks at different stages of the rock cycle.

Reasoning: Heat and pressure cause rocks to form and change over time.

14. Elaborate

Think

- *How can I help enrich or extend student ideas? Are there related science concepts that would support and extend student learning?*

Teacher Will

- Ask the student to think about what they could do to change the metamorphic crayon "rock" into an igneous rock and whether they could make it sedimentary again.
- Ask the student to repeat the investigation using different materials (like types of chocolate or Skittles) and predict whether the outcomes will be the same.

Students Will

- Discuss how to change a metamorphic "rock" into an igneous rock, and whether it's possible to make the "rock" sedimentary again. Use evidence to present their ideas.
- Repeat the investigation using different materials and predict the outcomes.

15. Evaluate

Think

- *What do I need to see or hear from my students that assures that they have learned the science content? What information do I need to gather to inform my teaching as I move through the lesson?*

Teacher Will

- Provide an exit ticket identifying what is needed to cause rock to change (heat and pressure) at end of the lesson.
- Use the student responses and CER to inform the evaluation.

Students Will

- Complete the exit ticket.
- Respond to questions posed by the teacher summarizing the investigation, what they did, and what they learned from it.
- Complete the CER.