4 Science Unit 4: Earth's Features & Processes (The Birth of Rocks)

Content Area: **Science**
Course(s):
Time Period: **Marking Period 2**
Length: **9 Weeks**
Status: **Published**

Unit Overview

In this unit, students investigate features and processes of the Earth's surface. Students explore the rapid process of volcanic eruptions! In contrast, students also explore the gradual Earth processes of weathering and erosion. Students apply their knowledge and design solutions to mitigate the impacts of these processes on humans.

Standards

Scientific & Engineering Practices

- Students analyze and interpret data from recent volcanic eruptions. They use their findings as evidence for an argument that volcanoes are (or are not) likely to erupt in their backyard.
- Student conduct an investigation to construct an explanation for why some volcanoes explode and why some do not. Students model thick and thin lava to conduct their investigations.
- Students conduct an investigation by modeling how rocks erode over time. Students construct an explanation for why rocks erode.
- Students design solutions to protect their "homes" from rock slides. Students argue for the merits of their design.

Crosscutting Concepts

- Students identify patterns about the location of the world's volcanoes and use these patterns as evidence to support an argument about why a volcano may or may not erupt in their backyard.
- Students reason about the cause and effect of the type of lava (cause) and the nature of the eruption (effect) as well as the shape of the volcano (effect).
- Students consider the cause and effect of ice and root wedging on rock as it is broken down into small pieces.
- Engineering a solution to landslide hazards depends on scientific knowledge about the causes of landslides.

4-ESS1-1	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
4-ESS2-1	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.

4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.

Materials

Core Materials:

- Mystery Science
  - Could a volcano pop up where you live?
  - Why do volcanoes explode?
  - Will a mountain last forever?
  - How could you survive a landslide?
- Teacher Created Labs

Supplemental Materials:

- BrainPop resources
- NewsELA
- GRC Lessons
- TBSAID
- Nearpod Activities

Technology

Technology Literacy

• 9.4.5.TL.1: Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each.

• 9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.

• 9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images graphics, or symbols.

Technology - Engineering Design

• 8.2.5.ED.1: Explain the functions of a system and its subsystems.

• 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.

• 8.2.5.ED.3: Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

Technology - Data & Analysis

• 8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

• 8.1.5.DA.2: Compare the amount of storage space required for different types of data.

• 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the

data.

• 8.1.5.DA.4: Organize and present climate change data visually to highlight relationships or support a claim.

• 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.

Technology - Effects on the Natural World

• 8.2.5.ETW.2: Describe ways that various technologies are used to reduce improper use of resources.

• 8.2.5.ETW.3: Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.

• 8.2.5.ETW.4: Explain the impact that resources, such as energy and materials used to develop technology, have on the environment.

• 8.2.5.ETW.5: Identify the impact of a specific technology on the environment and determine what can be done to increase positive effects and to reduce any negative effects, such as climate change.

Evidence of Learning/Assessment

Formative Assessment

- Teacher Observation
- Quizzes
- Exit Tickets
- Labs

Summative Assessment

- Benchmark Tests
- Alternative Assessments: Performance Tasks & Projects

Accommodations & Modifications

Special Education

Follow IEP Plan which may contain some of the following examples…

- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices

- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passages

504

Follow 504 Plan which may contain some of the following examples…

- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passages

ELL

- Translation device/dictionary
- In class/pull out support with ESL teacher
- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers
- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passages

At-risk of Failure

- Extra time during intervention
- In class/pull out support with special ed teacher
- Additional time during intervention time
- Preferred seating
- Questions read aloud
- Extended time for completing tasks
- Graphic organizers

- Vocabulary support
- Mnemonic devices
- Songs/videos to reinforce concepts
- Study Guides
- Limit number of questions
- Scribe
- Newsela leveled reading passage

Gifted & Talented

- Independent projects
- STEM Projects
- Leveled Reading with Newsela

Interdisciplinary Connections

Connections to NJSLS - English Language Arts

• RI.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1), (3-LS3-2)

• RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3- 1), (3-LS3-2)

• W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1), (3-LS3-2) • SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1), (3-LS3-2)

• RI.3.7 Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1)

• SL.3.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1)

Connections to NJSLS - Mathematics

• MP.2 Reason abstractly and quantitatively. (3-LS3-1), (3-LS3-2)

• MP.4 Model with mathematics. (3-LS3-1), (3-LS3-2)

• 3.MD.B.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1), (3-LS3-2)

• 3.NBT Number and Operations in Base Ten (3-LS1-1)

• 3.NF Number and Operations—Fractions (3-LS1-1)

Career Readiness, Life Literacies, and Key Skills

Critical Thinking and Problem Solving:

• 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).

• 9.4.5.CT.2: Identify a problem and list the types of individuals and resources (e.g., school, community agencies, governmental, online) that can aid in solving the problem (e.g., 2.1.5.CHSS.1, 4-ESS3-1).

• 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems. • 9.4.5.CT.4: Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global

Career Ready Practices

- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.