Unit 1: The Birth of Rocks: Earth Features & Processes

Content Area: **Science**
Course(s):
Time Period: **September**
Length: **Trimester 1**
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.

Priority Standards

SCI.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.
SCI.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.
SCI.4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
SCI.4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.
SCI.3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Unit Learning Targets

Lesson 1: Volcanoes & Patterns of Earth's Features

I can analyze and interpret data from maps to describe patterns of the Earth's Surface

Lesson 2: Volcanoes & Rock Cycle

I can explain the cause and effect of changes in a landscape over time and different rock formations / fossils in rock layers.

Lesson 3: Weathering & Erosion

I can explain the cause and effect between changes in rock / landscapes and the e effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Lesson 4: Sedimentary Rock & Fossils

I can explain how patterns in rock formations and fossils in rock layers show changes in a landscape over time.

Lesson 5: Erosion, Natural Hazards & Engineering

I can explain the cause of natural Earth processes / climate change and the effect they have on humans.

I can generate and compare solutions to a problem the criteria and constraints of the problem.

Essential Questions

Lesson 1: Volcanoes & Patterns of Earth's Features

Could a volcano pop up where you live?

Lesson 2: Volcanoes & Rock Cycle

Why do some volcanoes explode?

Lesson 3: Weathering & Erosion

Will a mountain last forever?

Lesson 4: Sedimentary Rock & Fossils

What did your town look like 100 million years ago?

Lesson 5: Erosion, Natural Hazards & Engineering

How could you survive a landslide?

Performance Task: Rocks & Earth's Surface

How can you figure out where a rock came from?

Materials & Resources for Labs/Activities

Anchor Phenomenon: Fossil Finds

1. Ashfall Fossil Beds Evidence Chart: Mystery Science Document #160 (will use throughout entire unit)
2. Ashfall Fossil Beds Evidence Chart Answer Key: Mystery Science Document #165
3. See-Think-Wonder Worksheet: Mystery Science Document #2301
4. The Birth of Rocks Teacher Guide: Mystery Science Document #142
5. Ashfall Fossil Beds Explanation: Mystery Science Document #151
6. Ashfall Fossil Beds Explanation Answer Key: Mystery Science Document #164

Lesson 1: Volcanoes & Patterns of Earth's Features

1. Volcano Discoveries Worksheet: Mystery Science Document #45
2. Volcano Discoveries Answer Key: Mystery Science Document #283
3. Volcano Mapping Worksheet: Mystery Science Document #42
4. Volcano Mapping Answer Key: Mystery Science Document #435
5. Colored Pencils or Crayons

Lesson 2: Volcanoes & Rock Cycle

1. Lava Experiments Worksheet: Mystery Science Document #77
2. Lava Mat Printouts: Mystery Science Document #109
3. Table Coverings or Trash bags
4. Clear Plastic Cups
5. Flour
6. Measuring Cup
7. Paper Plates
8. Plastic Spoons
9. Plastic Straws
10. Gallon Ziploc Bags

Lesson 3: Weathering & Erosion

1. Sugar Shake Data Worksheet: Mystery Science Document #21
2. Markers
3. Paper Plates

4. Plastic Containers w/ Lids
5. Sugar Cubes

Lesson 4: Sedimentary Rock & Fossils

1. Colossal Canyon Printouts: Mystery Science Document #25023
2. Colossal Canyon Answer Key: Mystery Science Document #25026
3. Fossil Cards Printouts: Mystery Science Document #25024
4. Glue Sticks
5. Scissors

Lesson 5: Erosion, Natural Hazards & Engineering

1. Save My Slide-City Home Worksheet: Mystery Science Document #122
2. Post-it Notes

Performance Task: Rocks & Earth's Surface

Story of a Rock Worksheet: Mystery Science Document #252

Story of a Rock Answer Key: Mystery Science Document #255

Story of a Rock Rubric: Mystery Science Document #254

Unit Assessments

Lesson 1: Volcanoes & Patterns of Earth's Features

Exit Ticket: Mystery Science Document #302

Answer Key: Mystery Science Document #613

Lesson 2: Volcanoes & Rock Cycle

Exit Ticket: Mystery Science Document #26

Answer Key: Mystery Science Document #614

Lesson 3: Weathering & Erosion

Exit Ticket: Mystery Science Document #221

Answer Key: Mystery Science Document #441

Lesson 4: Sedimentary Rock & Fossils

Exit Ticket: Mystery Science Document #25296

Answer Key: Mystery Science Document #25297

Lesson 5: Erosion, Natural Hazards & Engineering

Exit Ticket: Mystery Science Document #196

Answer Key: Mystery Science Document #477

Performance Task: Rocks & Earth's Surface

Story of a Rock Worksheet: Mystery Science Document #252

Story of a Rock Answer Key: Mystery Science Document #255

Story of a Rock Rubric: Mystery Science Document #254

Unit 1: The Birth of Rocks - Earth's Processes & Features

Summative Assessment: Mystery Science Document #2270

Answer Key: Mystery Science Document #2271

Mystery Science Google Forms Assessments:

Google Form Versions of Mystery Science Assessments

Learning Plan (Skills & Activities)

TIME	Lesson	Priority Standard

Week 1	Anchor Phenomenon: Fossil Finds	• **4-ESS1-1:** ***Identify evidence from patterns in rock formations and fos in rock layers to support an explanation for changes in a landscape ove time.***
		• **4-ESS2-1:** ***Make observations and/or measurements to provide eviden of the effects of weathering or the rate of erosion by water, ice, wind, o vegetation***
		• **4-ESS2-2:** ***Analyze and interpret data from maps to describe patterns Earth's features.***
Week 2	Lesson 1: Volcanoes & Patterns of Earth's Features	• **4-ESS2-2:** ***Analyze and interpret data from maps to describe patterns Earth's features.***

Week 3	Lesson 2: Volcanoes & Rock Cycles	**• <u>4-ESS1-1</u>:** ***Identify evidence from patterns in rock formations and fos*** ***in rock layers to support an explanation for changes in a landscape ove*** ***time.***

Week 4:	Lesson 3: Weathering & Erosion	**• <u>4-ESS2-1:</u>** ***Make observations and/or measurements to provide eviden of the effects of weathering or the rate of erosion by water, ice, wind, o vegetation***
Week 5	Lesson 4: Sedimentary Rock & Fossils	**• <u>4-ESS1-1</u>:** ***Identify evidence from patterns in rock formations and fos in rock layers to support an explanation for changes in a landscape ov time.***

		<u>4-ESS3-2:</u> ***Generate and compare multiple solutions to reduce the impa of natural Earth processes on humans.***
Week 6	Lesson 5: Erosion, Natural Hazards & Engineering	**<u>3-5-ETS1-2:</u>** ***Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.***

Week 7	Unit Review & Summative Assessment	**• 4-ESS1-1:** ***Identify evidence from patterns in rock formations and fos in rock layers to support an explanation for changes in a landscape ove time.*** **• 4-ESS2-1:** ***Make observations and/or measurements to provide eviden of the effects of weathering or the rate of erosion by water, ice, wind, o vegetation*** **• 4-ESS2-2:** ***Analyze and interpret data from maps to describe patterns Earth's features.*** **4-ESS3-2:** ***Generate and compare multiple solutions to reduce the impa of natural Earth processes on humans.***
Week 8	Performance Task: Rocks & Earth's Surface	**3-5-ETS1-2:** ***Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.*** **• 4-ESS1-1:** ***Identify evidence from patterns in rock formations and fos in rock layers to support an explanation for changes in a landscape ove time.*** **• 4-ESS2-1:** ***Make observations and/or measurements to provide eviden of the effects of weathering or the rate of erosion by water, ice, wind, o vegetation*** **• 4-ESS2-2:** ***Analyze and interpret data from maps to describe patterns Earth's features.*** -

Strategies For Multi-Language Learners

- Breaking down the task
- Dictionaries in First Language
- Individual and small group instruction
- Loaded vocabulary and previewing text
- Meaningful real life connections
- Modeling
- Repeated Practice
- Step-by-step prompts
- Think Aloud
- Warm Up Activities
- Clarify directions
- Reading questions/passages aloud

Strategies For Students Needing Intervention

- Additional time on assignments
- Review of directions
- Review sessions
- Provide notes
- Support auditory presentation with visuals
- Work in progress check
- Tiered assessment
- Choice of test format (multiple-choice, essay, true-false)
- Read directions to student
- Highlight directions and key words
- Provide opportunities for cooperative partner work
- Choice boards
- Graphic organizers
- Flexible groupings
- Visuals Aids
- Small group instruction
- Word banks
- Extra time

Strategies For Enrichment

- Higher-level cooperative learning activities
- Provide higher-order questioning and discussion opportunities
- Tiered assessments
- Provide texts at higher reading level
- Extension activities
- Choice boards
- Mystery Science Mini Lessons

Technology Integration

- Higher-level cooperative learning activities
- Provide higher-order questioning and discussion opportunities
- Tiered assessments
- Provide texts at higher reading level
- Extension activities

Interdisciplinary Connections

LA.RI.4.4	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
LA.RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
LA.RI.4.9	Integrate and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) information from two texts on the same topic in order to write or speak about the subject knowledgeably.
LA.W.4.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
LA.W.4.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
MA.4.MD.A	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
MA.4.MD.A.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
MA.4.MD.B	Represent and interpret data.
MA.4.MD.C	Geometric measurement: understand concepts of angle and measure angles.
LA.L.4.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

21st Century Life & Career Ready Practices

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.