Unit 2 - Earth Systems, Earth and Human Activity and Earth's Place in the Universe

Content Area: **Science**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

n this unit of study, students develop understandings of the effects of weathering and the rate of erosion by water, ice, wind, or vegetation. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts. Students demonstrate grade-appropriate proficiency in planning and carrying out investigations and constructing explanations. Students are also expected to use these practices to demonstrate understanding of the core ideas. In this unit of study, students will also apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps. The crosscutting concepts of patterns, cause and effect, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, and constructing explanations and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas. Lessons in this unit satisfy the climate change mandate.

Enduring Understandings

Students are expected to explain how Earth processes shape the land.
Students are expected to identify, explain, and record evidence of weathering erosion, and deposition.
Students are expected to use maps to learn about Earth's features.
Students are expected to describe patterns about the locations of earthquakes, volcanoes, mountains, and ocean trenches.
Students are expected to determine the relative age of rock layers and explain how rock layers change.
Students are expected to make references about ancient environments and organisms from fossil evidence.
Students are expected to use information from fossils and rock layers to describe how an environment has changed over time and determine the relative ages of those fossils and rock layers.
Students are expected to describe nonrenewable resources and explain the effects of using them
Students are expected to explain the potential risks and benefits of suing wind, water, and solar energy compared to fossil fuels

Essential Questions

How does water shape Earth's surface?
How do other factors shape the Earth's Surface?
How can maps help us learn about Earth's surface?
What patterns do maps show us?
How do rock layers change?

What do fossils tell us about ancient environments?
What are some patterns fossils show us?
What nonrenewable resources are used for energy?
What renewable resources are used for energy?
How can people reduce the impact of land-based hazards?
How can people reduce the impact of water-based hazards?
How could you take steps to reduce the impacts of natural hazards?

Learning Objectives

Students will know/understand:
Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around.
Plate Tectonics and Large-Scale System , earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth.
Living things affect the physical characteristics of their regions.
Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.
Natural Resources: Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.
A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards, but can take steps to reduce their impacts.
Testing a solution involves investigating how well it performs under a range of likely conditions.
Explore careers related to earth science.
Identify the maps or types of maps most appropriate for specific purposes, (e.g., to locate physical and/or human features in a community, to determine the shortest route from one town to another town, to compare the number of people living at two or more locations)
Demonstrate how to use digital geographic tools, maps and globes to measure distances and determine time zones, and locations using latitude and longitude.
Explain how climate change affects the Earth.
Describe several methods that engineers use to predict, minimize or eliminate the effects of natural hazards.
Climate Change – Explain the impact the burning of fossil fuels has on our environment? (Climate Change)

Standards: Content

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 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-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.
4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change on humans.

Standards: Interdisciplinary

RI.CR.4.1	Refer to details and examples as textual evidence when explaining what an informational text says explicitly and make relevant connections when drawing inferences from the text.
RI.CI.4.2	Summarize an informational text and interpret the author's purpose or main idea citing key details from the text.
RI.IT.4.3	Describe the impact of individuals and events throughout the course of a text, explaining events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on evidence in the text.
RI.TS.4.4	Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.
RI.PP.4.5	Compare and contrast multiple accounts of the same event or topic; noting important similarities and differences in the point of view they represent.
RI.MF.4.6	Use evidence to show how graphics and visuals (e.g., illustrations, charts, graphs, diagrams, timelines, animations) support central ideas.
RI.AA.4.7	Analyze how an author uses facts, details and explanations to develop ideas or to support their reasoning.
RI.CT.4.8	Compare and contrast the treatment of similar themes, topics and patterns of events in informational texts from authors of different cultures.
W.IW.4.2.A	Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), text features (e.g., illustrations, diagrams, captions) and multimedia when useful to aid in comprehension.
W.IW.4.2.B	Develop the topic with facts, definitions, concrete details, text evidence, or other information and examples related to the topic.
W.IW.4.2.C	Link ideas within paragraphs and sections of information using words and phrases (e.g., another, for example, also, because).
W.IW.4.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.IW.4.2.E	Provide a conclusion related to the information or explanation presented.
SL.PE.4.1.A	Explicitly draw on previously read text or material and other information known about the topic to explore ideas under discussion.
SL.UM.4.5	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

Assessment Evidence

Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Science Starter's/Do Nows, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research, Lab Activities, Vocabulary Responses, Exit Questions, Interactive Digital Assessments embedded in Exploring Science Digital Book
Summative	Projects, Tests, Quizzes, lab skills demonstrations, projects, and vocabulary quizzes.

Alternative & Benchmark	Alternative - Read to the student and chart oral responses. Word banks, sentence frames, oral responses, graphic organizers, observations, portfolios of student work, orally administered assessments, and anecdotal notes. Benchmark – LinkIt Benchmark Assessment, Teacher Generated Assessments
Assessment Evidence Resource	

Instructional Resources

martboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Brain Pop, Middle School Science, Generation Genius Digital Curriculum, Mystery Science Digital Curriculum, Amplify Digital Curriculum, Microsoft 365, Primary and Secondary Source Documents, Assorted lab materials

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
X	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness		Relationship Skills
X	Responsible Decision-Making		Social Awareness
	Self-Management		

21st Century Skills & Themes

X	Global and Cultural Awareness		Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
X	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
X	Critical Thinking and Problem Solving		Credit Profile		Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		