Unit 3: Processes that Shape the Earth

Unit #:	APSDO-00034873	Duration:	10.0 Day(s)	Date(s):	

Team:
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Grades:
4
Subjects:
Science

Unit Focus

In this unit, students will learn that patterns in rock formations and fossils tell about the history of the Earth. Students will develop an understanding that weathering and erosion, which are subject to different factors, can change those formations and the environment around them. Instruction will also focus on the observable land traits that occur as a result of tectonic plate movements and where these occur. Finally, students will learn some steps humans can take to reduce the impact of natural hazards on their environment. Summative assessments include a performance task with a written component that assesses mastery of content and skills. Supporting instructional materials for this unit may include mentor text(s), print and online resources, related laboratory equipment and materials, and teacher generated inquiry tasks.

Stage 1: Desired Results - Key Understandings

Established Goals

Next Generation Science Standards (DCI)
Science: 4

- 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. *ESS3.4.B1*
- Living things affect the physical characteristics of their regions. *ESS2.4.E1*
- Local, regional, and global patterns of rock formations reveal changes over

Transfer

T1 (T1) Integrate knowledge from a variety of disciplines and apply it to new situations to make sense of information, formulate insightful questions, and/or solve problems.
T2 (T4) Develop a valid scientific conclusion, assess its validity and limitations, and determine future course of actions to inspire further questions.

Meaning

Understandings

U1 (U133) Wind, water, ice, gravity, and living organisms can change the shape of the land.
U2 (U134) Maps show where things are

Essential Questions

Q1 (Q101) How does land change and what are some things that cause it to change?
Q2 (Q132) How does the study of weather and climate influence human behavior?

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. *ESS1.4.C1*

- 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. *ESS2.4.A1*
- The locations of mountain ranges, deep ocean trenches, ocean floor structures, 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. *ESS2.4.B1*

located. One can map the shapes and kinds of land and water in any area.
U3 (U135) Water on Earth exists as a solid (ice), liquid (water), and gas (water vapor).
U4 (U132) Earth events can occur quickly; others occur very slowly, over a time period much longer than one can observe.
U5 (U102) The study of rocks, fossil records, tectonic processes, and other objects in our solar system (e.g., asteroids, meteorites) help us to organize, understand, and interpret the formation and geological history and timescale of Earth.
U6 (U911) Scientists examine evidence to look for relationships (e.g., patterns, trends) to formulate insightful questions and solve problems.
U7 (U940) Conclusions can only be as strong as the quality and quantity of the evidence and analyses on which they are based.

Q3 (Q163) How can natural hazards be predicted?
Q4 (Q165) How have natural hazards and geologic events shaped our history?
Q5 (Q137) How do maps help us to understand the present and past location of geological features?
Q6 (Q135) How do scientists observe, record, study, and predict changes in the Earth?
Q7 (Q138) How does water shape and affect the Earth?
Q8 (Q102) What factors cause the Earths interior and surface to change?
Q9 (Q924) What questions do I wonder about? How can I use science to figure out the answer?
Q10 (Q942) What conclusions can I draw from the patterns/trends in my data? How do I know my conclusion is valid?

Acquisition of Knowledge and Skill

Knowledge	Skills
K1 Earth's surface is composed of many individual tectonic plates that move and interact to create Earth's landforms (e.g., mountain ranges, ocean trenches, volcanoes) **K2** Water, ice, wind, and vegetation can result in weathering	**S1** Draw a conclusion of the history of an area by using fossils, shells, and other artifacts buried in rock **S2** Explain that landforms can occur in patterns based on the boundaries between tectonic plates **S3** Explain which landforms result from different kinds of tectonic plate movement **S4**

		Create a model to illustrate what happens when tectonic plates move **S5** Analyze and interpret maps to locate different land and water features of the Earth **S6** Predict what effect different factors will have on the rate of erosion **S7** Develop a simulation to demonstrate the process of erosion **S8** Brainstorm some of the steps that humans can take to reduce the impact of natural hazards on the environment **S9** Design a model/situation to reduce the impact of natural Earth processes on humans (e.g., earthquake destruction)