Unit 3 - Rock Transformation

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

Unit Overview

Geologists examine rock formations to learn about the history of the rock. In this unit, students play the role of student geologists as they investigate different ways rocks form and change. Using physical models, a digital simulation, and hands-on activities as well as information gathered from data and science texts, students investigate the cycling of matter (rock material) on Earth and how energy from the sun and from Earth's interior drive different rock transformation processes.

Enduring Understandings

Rocks can form in different ways. This causes them to be different types.
When sediment is compacted and cemented together, it forms sedimentary rock.
When magma cools, it hardens to form igneous rock.
Matter gets transformed by energy, but the same matter is still present.
Sediment forms when any type of rock is weathered, a process driven by energy from the sun.
Magma forms when any type of rock is melted, a process driven by energy from Earth's interior.
Uplift and subduction can expose rock formations to different energy sources, which can transform them.
Any type of rock can transform into any type of rock because of plate motion.

Essential Questions

How do rocks form?
What causes sediment and magma to form?
How do rock formations move between the surface and Earth's interior?
How do uplift and subduction lead to the transformation of rocks?

Learning Objectives

Develop a modeling using hard candy to show how rocks form from sediment.
Examine evidence about the rocks of the Great Plains and Rocky Mountains to determine whether they formed from sediment or magma.
Write about how energy affects rocks using unit vocabulary.
Consider and discuss claims about the formation of the Great Plains and Rocky Mountains.
Model how rock transformation processes affect rock materials in a classroom model.
Discuss and write about how plate motion exposes rock formation to energy sources.
Use evidence to explain how the Great Plains and Rocky Mountains could have transformed.
Model how the Rocky Mountains transformed into the Great Plains using the paper Modeling Tool.

Support a claim about why the Great Plains and Rocky Mountains have similar mineral compositions.

Standards: Content

MS-ESS1-1	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.
MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
MS-ESS2-4	Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
MS-ESS2-5	Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
MS-ESS2-6	Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

Standards: Interdisciplinary

Assessment Evidence

Formative	Teacher observations, Class discussions, Lab Activities, Key concepts and vocabulary quizzes, Warm Ups, Open Ended Responses, Modeling, Simulations, Innovators Monthly Research
Summative	In correlation with the NJSLS, students must demonstrate the following as summative assessments: MS-ESS1-3 - Analyze and interpret data to determine scale properties of objects in the solar system. MS-ESS2-2 - Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. Other summative assessments will include but are not limited to: projects, summative tests, lab skills
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

Smartboard, Computers, Websites and digital interactives/models, Multi-media presentations, Video Streaming, Amplify Digital Curriculum, Generation Genius, BrainPop, Mystery Science, Microsoft 365, Primary and Secondary Source Documents, Lab Materials as needed, Amplify Readings, Labs, Simulations

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)
	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
X	Self-Management		

21st Century Skills & Themes

X	Global and Cultural Awareness	X	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		