



Grade 6 Science
Unit # 2 – Earth and Space Science
Topic 8 Plate Tectonics – 19 Days

Unit Overview: Students make sense of phenomena as they explore the disciplinary core ideas through the lens of crosscutting concepts, such as Systems and System Models, Cause and Effect, and Matter and Energy. Students begin their discovery of the physical world with models and observable phenomena and move to explore Earth’s systems and their interactions, weather in the atmosphere, rocks and minerals, plate tectonics, and Earth’s surface systems – erosion and deposition.

Topic Essential Question: How do geological processes change Earth’s surface?

Lessons

- Topic Launch/Quest Kickoff
- Lesson 1 Evidence of Plate Motions
- Lesson 2 Plate Tectonics and Earth’s Surface
- Lesson 3 Earthquakes and Tsunami Hazards
- Lesson 4 Volcanoes and Earth’s Surface
- Topic Close –Assessment, Quest Findings

NYSSLS Performance Expectations

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying temporal and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth’s surface at temporal and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes could include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

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. [Clarification Statement: Examples of data could include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.]

MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards could include those resulting from interior processes (such as earthquakes and volcanic eruptions) and surface processes (such as mass wasting and tsunamis), or from severe weather events (such as blizzards, hurricanes, tornadoes, floods, and droughts). Examples of data could include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies could include global technologies (such as satellite images to monitor hurricanes or forest fires) or local technologies (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

<p>Topic Opener PE: MS-ESS2-2; MS-ESS2-3; MS-ESS3-2 SEP: Analyzing and Interpreting Data DCI: ESS3.B – Natural Hazards</p> <ul style="list-style-type: none"> Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2) <p>CCC: Patterns</p>	<p>Savvas</p> <p>Highlighted labs are important to the understanding of the instructional concepts in this lesson and must be completed during Science instructional time.</p> <ul style="list-style-type: none"> Topic Readiness Test uConnect Lab – How Are Earth’s Continents Linked Together? Quest Kickoff Video Quest Kickoff: To Hike or Not to Hike – How safe is it to hike around Mount Rainier?
<p>Lesson 1 – Evidence of Plate Motions PE: MS-ESS2-3 DCI: ESS1.C: The History of Planet Earth</p> <ul style="list-style-type: none"> Tectonic processes continually generate new ocean sea floor at ridges and destroy old seafloor at trenches. <p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p> <ul style="list-style-type: none"> Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth’s plates have moved great distances, collided, and spread apart. (MS-ESS2-3) <p>CCC: Patterns</p> <p>zSpace Activities (code) Seafloor Spreading (A517) Seafloor Spreading - Teacher Activity Plan In this activity, students will dive deep into the ocean to explore how the spreading seafloor is creating oceanic structures, including ridges, fraction zones, and trenches. They will then use this data about seafloor structures to provide evidence of past plate motion. Seafloor Spreading Graphic Organizer - Student Worksheet Pdf Seafloor Spreading Graphic Organizer - Student Worksheet GoogleDoc</p> <p>Continental Drift (A317) Continental Drift - Teacher Activity Plan In this activity, students will use data such as continental shapes, land features, and the distribution of fossils to describe evidence for past plate motion. Continental Drift Question - Student Worksheet Pdf Continental Drift - Student Worksheet GoogleDoc</p>	<p>Savvas</p> <p>Guiding Objectives:</p> <ul style="list-style-type: none"> Students will identify and describe evidence that: Supports that all the continents were once fused together in a supercontinent called Pangea; supports how land masses drifted apart over time into the continents known today; continental coastlines appear to fit together and mountain ranges on different continents line up; similar plant and animal fossils are found on continents that are separated by oceans; and Earth’s continents experienced different climates than the ones we have today. Students will analyze cause and effect relationships to describe how mid-ocean ridges and deep-sea trenches provide evidence for plate tectonics. <p>Literacy Connection</p> <ul style="list-style-type: none"> Cite Textual Evidence <p>Vocabulary</p> <ul style="list-style-type: none"> mid-ocean ridge subduction sea-floor spreading ocean trench <p>Academic Vocabulary</p> <ul style="list-style-type: none"> hypothesis <p>Connect - TE/SB p. 330</p> <ul style="list-style-type: none"> Connect It! Write: Puzzling Puzzles Quest Connection <p>Investigate - TE/SB pp. 331-336</p> <ul style="list-style-type: none"> uInvestigate Lab – Piecing Together A Supercontinent Video – Ocean Ridges and Trenches Interactivity – Land and Seafloor Patterns Literacy Connection (p.332) Reading Checks (pp. 333; 335) <p>Synthesize - TE/SB pp. 337-338</p> <ul style="list-style-type: none"> Interactivity – Slow and Steady Quest Check-In Lab – Patterns in the Cascade Range Quest Check -In Reading Check (p.337) Model It! (p.337) <p>Demonstrate – TE/SB p.338</p> <ul style="list-style-type: none"> Lesson 1 Check Lesson Quiz 1

Lesson 2 – Plate Tectonics and Earth’s Surface

PE: MS-ESS2-2

SEP: Constructing Explanations and Designing Solutions

DCI:

ESS2.A: Earth’s Materials and Systems

- The planet’s systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth’s history and will determine its future. (MS-ESS2-2)

CCC: Scale, Proportion, and Quantity

zSpace Activities (code)

Continental Drift (A317)

[Continental Drift - Teacher Activity Plan](#)

In this activity, students will use data such as continental shapes, land features, and the distribution of fossils to describe evidence for past plate motion.

[Continental Drift Question - Student Worksheet Pdf](#)

[Continental Drift - Student Worksheet GoogleDoc](#)

Savvas

Guiding Objectives:

- Students will analyze and interpret data to describe evidence that: Earth’s plates are slow and in constant motion due to forces within the mantle; convection drives plate motion.
- Students will develop and use models to demonstrate that: Some features and events on Earth’s surface coincide with plate boundaries; the movement of Earth’s plates has greatly changed the locations of the continents and the size and shape of the ocean basins.
- Students will analyze relationships to predict: The different features and events that occur at different types of plate boundaries; the results of plate movement at different scales.

Literacy Connection

- Integrate with Visuals

Vocabulary

- divergent boundary
- convergent boundary
- transform boundary

Academic Vocabulary

- theory

Connect - TE/SB p. 340

- Connect It!
- Inquiry Warm-Up Lab: Stressing Out!
- Quest Connection

Investigate - TE/SB pp. 341-347

- Video – Tectonic Plate Boundary Types
- **Investigate Lab – Plate Interactions**
- Interactivity – No Fault of Their Own
- Interactivity – Relative Plate Motion
- Reading Check (pp. 343; 345)
- Literacy Connection (p.345)
- Math Toolbox (p.346)
- Model It! (p.344)

Synthesize - TE/SB pp. 348-349

- Interactivity – Stressed to a Fault
- Reading Check (p.348)
- Quest Check In – Interactivity – Mount Rainier’s Threat
- Quest Check-In

Demonstrate – TE/SB p. 349

- Lesson 2 Check
- Lesson 2 Quiz

Lesson 3 – Earthquakes and Tsunami Hazards

PE: MS-ESS2-2; MS-ESS3-2

SEP: Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions

DCI:

ESS2.A – Earth’s Materials and Systems

- The planet’s systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth’s history and will determine its future. (MS-ESS2-2)

ESS3.B – Natural Hazards

- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)

CCC: Patterns; Scale, Proportion, and Quantity

Savvas

Guiding Objectives:

- Students will use and develop models to explain how plate movement and stress produce new landforms.
- Students will analyze and interpret data: As evidence that energy released from interacting plates results in an earthquake; to compare the magnitudes of earthquakes; to relate the energy of an earthquake to the formation of a tsunami.
- Students will use and develop models to demonstrate that: The characteristics of earthquakes and tsunamis can be predicted; the prediction of natural phenomena can be used to mitigate risk.

Literacy Connection

- Evaluate Media

Vocabulary

- stress
- tension
- compression
- shearing
- fault
- earthquake
- magnitude
- tsunami

Academic Vocabulary

- scale

Connect - TE/SB p. 352

- Connect It!
- Poll – Quaking and Shaking
- Quest Connection

Investigate - TE/SB pp. 353-361

● **Investigate Lab – Analyze Earthquake Data to Identify Patterns**

- Interactivity – Earthquake Engineering
- Interactivity – Locating an Earthquake
- Video – Ring of Fire
- Reading Check (pp.354; 356; 358)
- Model It! (p.358)
- Math Toolbox (p.359)
- Literacy Connection (p.360)

Synthesize - TE/SB pp. 361-362

- Interactivity – Placing a Bay Area Stadium
- Reading Check (p.361)
- Quest Check-In Interactivity – Monitoring a volcano
- Quest Check-In

Demonstrate – TE/SB p.362

- Lesson 3 Check
- Lesson 3 Quiz

Lesson 4 – Volcanoes and Earth’s Surface

PE: MS-ESS2-2; MS-ESS3-2

SEP: Analyzing and Interpreting Data; Constructing Explanations and Designing Solutions

DCI:

ESS2.A – Earth’s Materials and Systems

- The planet’s systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth’s history and will determine its future. (MS-ESS2-2)

ESS3.B – Natural Hazards

- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)

CCC: Patterns; Scale, Proportion, and Quantity

zSpace Activities (code)

Types of Volcanoes (A518)

[Types of Volcanoes - Teacher Activity Plan](#)

In this activity, students will explore the types of volcanoes, how they are formed, and how they change the surface of the Earth.

[Types of Volcanoes - Student Worksheet PDF](#)

[Types of Volcanoes - Student Worksheet GoogleDoc](#)

Savvas

Guiding Objectives:

- Students will identify patterns to explain: How plate tectonics is connected to volcanic eruptions and landforms.
- Students will use models to study systems of different sizes in order to explain the role volcanic activity plays in shaping Earth’s surface.
- Students will contrast explanations of the hazards that different types of volcanoes pose.

Literacy Connection

- Integrate with Visuals

Vocabulary

- volcano
- magma
- lava
- hot spot
- extinct
- dormant

Academic Vocabulary

- active
- composite

Connect - TE/SB p. 364

- Connect It!
- Write: Volcanoes Changing Earth
- Quest Connection

Investigate - TE/SB pp. 365-371

● **Investigate Lab – Moving Volcanoes**

- Interactivity – Landforms from Volcanic Activity
- Virtual Lab – Geological Processes and Evil Plans
- Video – Volcanoes and Earth’s Surfaces
- Virtual Lab – Rocks and Minerals: The Story of Earth
- Model It! (p.367)
- Reading Check (p.367)
- Literacy Connection (p.368)
- Math Toolbox (p.371)

Synthesize - TE/SB pp. 372-373

- Interactivity – Volcanoes Changing Earth’s Surface
- Reading Check (p.372)
- Question It! (p.372)
- Quest Check-In Lab – Signs of Eruption
- Quest Check-In

Demonstrate – TE/SB p.373

- Lesson 4 Check
- Lesson 4 Quiz

<p>Topic Close</p> <ul style="list-style-type: none"> • Topic 6 Assessment and Remediation TE/SB pp. 374-377 • Quest Finding and Reflection TE/SB p. 377 <p>CLRI Literacy Connections:</p> <p>Enrichment: Independent Reading “Into the Volcano” by Donna O’Meara</p> <p>Synopsis: “In a helicopter with no doors, you hover over a lava lake the size of two football fields – then land! You run through clouds of scalding steam, dodging lava bombs, to photograph glowing hot lava as it pours into the sea. You set up a camp on the edge of a volcano’s cone, only to be hit with hurricane-force winds, poisonous gasses, and acidic ash. If you were Donna O’Meara, this would be part of your life as a volcano researcher, writer and photographer. Donna’s photographs and accounts of treacherous journeys get readers up close and personal with some of the world’s most dangerous volcanoes.”</p>	<p>Topic 8 Enrichment</p> <p>Topic 8 - Lesson 1 Enrichment</p> <ul style="list-style-type: none"> • Enrichment – Drifting continents • It’s All Connected – The Slow Acceptance of Continental Drift <p>Topic 8 - Lesson 2 Enrichment</p> <ul style="list-style-type: none"> • Enrichment – How Old is Earth’s Crust • Case Study – Australia on the Move <p>Topic 8 - Lesson 3 Enrichment</p> <ul style="list-style-type: none"> • Enrichment – The San Andres Fault • uEngineer It! Designing to Prevent Destruction • Engineering Design Notebook – Wave Proof <p>Topic 8 – Lesson 4 Enrichment</p> <ul style="list-style-type: none"> • Enrichment – Super Volcanoes <p>Topic 8 – Topic Close</p> <ul style="list-style-type: none"> • uDemonstrate Lab – Modeling Sea-Floor Spreading
<p>English Language Learners (ELL) Enhancements To access hyperlinked material, you must be logged into your BPS Google Drive</p>	<p>Listening</p> <ul style="list-style-type: none"> • Cross- Linguistic Practices: Gives students opportunities to make connections between what they hear and their home language (For example, allow students to listen to a passage and identify cognates). • Activating Prior Knowledge Activating prior knowledge means both eliciting from students what they already know and building initial knowledge that they need in order to access upcoming content. • Visuals - GIFs, pictures- will assist students in understanding what they are listening to. Use visual thinking strategies to set the lens for learning. • Video to review or introduce a topic – use closed captioning to help students see the words and pronunciations while they listen to the content. • Word stretching / Vowel stretching when instructing allows students to listen closely to the pronunciation of the word. • Performance Level Descriptors this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of listening. Scroll for grade 6. <p>Speaking</p> <ul style="list-style-type: none"> • Sentence Stems/Frames - to begin a sentence - such as <i>Evolution is...</i> or <i>I think that evolution is...</i> • Academic Conversation Starters: Have a visual of a list of academic sentence starters that students can refer to in a discussion. • Choral Reading - To build fluency, self-confidence and motivation with reading/speaking. • Create movement to go with the word. Movement can be a motivating factor, as well as a kinesthetic tool for conceptualizing the rhythm and flow of fluent reading while triggering brain function for optimal learning. • Performance Level Descriptors This document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of speaking. Scroll for grade 6.

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	<p><u>Reading</u></p> <ul style="list-style-type: none"> ● Supplementary Text to help reinforce concepts. ● <u>Visual Aids</u> - Pictures or models to support vocabulary words and concepts ● Video to review or introduce a topic - use <u>closed captioning</u> to help students read along while they listen to the content. ● <u>4 Square / Frayer models</u> to help students gain a deeper understanding of vocabulary. ● <u>Highlighting</u> important text to assist students in answering questions after the reading. ● <u>Chunking</u>-Break reading of text into chunks or paragraphs ● <u>Vocabulary Morphology</u>- Morphology relates to the segmenting of words into affixes (prefixes and suffixes) and roots or base words, and the origins of words. Understanding that words connected by meaning can be connected by spelling can be critical to expanding a student’s vocabulary. ● <u>Performance Level Descriptors</u> this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of reading. Scroll for grade 6.
	<p><u>Instructional Accommodations (depending on the student’s needs)</u></p> <ul style="list-style-type: none"> ● Extended time for tests in class, projects and assignments ● Directions read. Broken down as necessary ● Model how to complete the activity in the lesson ● Oral simplification of directions or questions ● Translated version of test when available. Student may have both version English and native language version ● Use of <u>approved bilingual glossaries</u> from NYS in each subject

<p>Special Education Modifications</p> <p>Special Education students must have accommodations as per Individual Educational Plan (IEP)</p>	<p><u>Instructional</u></p> <ul style="list-style-type: none"> ● Pre-teach vocabulary ● Use picture vocabulary ● Scaffold Depth of Knowledge questions ● Provide copy of notes/notes in “cloze” form ● Use of Think, Pair, and Share strategy to help process information ● Scaffold written assignments with the use of graphic organizers ● Allow for multiple ways to respond (verbal, written, response board) ● Provide model of performance task ● Modify informational text to fit the needs of the students ● Provide a digital or paper interactive notebook ● Present complex tasks in multiple ways ● Provide mnemonic strategies for scientific concepts
	<p><u>Technology:</u></p> <ul style="list-style-type: none"> ● Audio reading of text ● Text to type functions ● Videos to clarify/visualize science concepts ● Record class lecture/discussions and make accessible to student ● Nearpod- interactive presentations of notes
	<p><u>In Class Assessments</u></p> <ul style="list-style-type: none"> ● Provide multiple options for projects ● Use of timer in class ● Break all complex tasks into chunks

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<p>Step Up to Writing Step Up to Writing Materials can be found in BPS Science K-12 Schoology Folder Grade 6 Resources Grade 6 SUTW materials</p>	<ul style="list-style-type: none">● Easy Two-Column Notes● Breaking Down Definitions● Paragraph Frame- What I Learned● Performance Level Descriptors this document provides teachers with a description of what output they can expect from students based on earned NYSESLAT levels in the modality of writing. Scroll for grade 6.
<p>Culturally and Linguistically Responsive Teaching (CLRT) in the Science Classroom</p>	<ul style="list-style-type: none">● Materials, resources, and/or discussions address diverse cultural backgrounds and real-world applications● Artifacts (posters, charts, etc.) in the science classroom are representative of the cultures of the student population● All students are given an opportunity to engage in science discourse● Teacher demonstrates high expectations for all students