

Helena-West Helena School District
Physical Science
Unit 4: Our Earth/Our Impact

Enduring Understanding:

- Primary succession and secondary succession are two types of succession.
- Natural disasters can change communities in an ecosystem
- The resources humans obtain for ecosystems include abiotic resources and biotic resources.
- Continental drifts, wind, water, and living things are all means of distributing species. Other factors, such as physical barriers, competitions, and climate, can limit species dispersal.
- Mid-ocean ridges form long chains of mountains that rise up from the ocean floor.

Essential Questions(s):

- How do ecosystems change over time?
- How do changes in ecosystems affect the survival of organisms?
- How do human activities affect ecosystems?
- What resources do humans obtain from ecosystems?
- What is biodiversity's value?
- What factors affect biodiversity?
- How do humans affect biodiversity?
- What factors affect species dispersal?
- What was Wegener's hypothesis about the continents?
- What are mid-ocean ridges?
- What is sea-floor spreading?
- What happened at deep-ocean trenches?
- What is the theory of plate tectonics?
- How does stress change Earth's crust?
- How do faults form?
- How does plate movement create new landforms?
- What are seismic waves ?
- How are Earthquakes measured?
- How is an epicenter located?

Time Frame/Concepts & Content: 9 weeks

Chapter 7: Balance within Ecosystem

Lesson 1: Changing Ecosystem

Lesson 2: Humans and the Environment

Lesson 3: Biodiversity

Lesson 4: Biogeography

Chapter 9: Plate Tectonic

Lesson 1: Drifting Continents

Lesson 2: Sea-floor Spreading

Lesson 3: The Theory of Plate Tectonics

Chapter 10: Earthquakes

Lesson 1: Forces in Earth's Crust

Lesson 2: Earthquakes and Seismic Waves

Lesson 3: Monitoring Earthquakes

Student Learning Expectations:

- Students will develop and use models to describe how ecosystems change over time.
- Students will construct an argument based on evidence that changes in the ecosystem affect the survival or organism.
- Students will gather and synthesize information to identify resources humans obtain from ecosystems.
- Students will apply scientific ideas to explain how human activities affect ecosystems.
- Students will apply scientific ideas to recognize the value of biodiversity.
- Students will use mathematical representations to identify the factors that affect biodiversity.
- Students will construct a scientific explanation based on evidence for how humans affect biodiversity.
- Students will apply scientific ideas to ideas to identify the factors that affect species dispersal.
- Students will analyze and interpret data in the distribution of fossils and rocks, continental shapes, and sea-floor structures to explain Alfred Wegner's hypothesis about the movements of the continents.
- Students will construct an explanation from evidence for the formation of mid-ocean ridges.
- Students will apply scientific principles to explain how sea-floor spreading affects Earth's crust.
- Students will develop and use models to explain the existences of deep-ocean trenches and explain the princess of subduction.
- Students will construct an explanation based on evidence of geoscience princesses to describe the theory of plate tectonics.
- Students will construct a scientific explanation based on evidence for how stress in the crust changes Earth's surface.
- Students will develop and use models to describe the three major types of faults.
- Students will use graphical displays to compare and contrast the land features that result from plate movement.
- Students will integrate qualitative and scientific technical information to describe how the energy for an earthquake travels through the earth.
- Students will apply scientific ideas to identify the scales used to measure the strength of an earthquake.
- Students will apply scientific principles to explain how scientists locate the epicenter of an earthquake.
- Students will apply scientific principles to explain how seismographs work.
- Students will analyze and interpret data to explain the patterns that seismographic data reveal.

Standards:**Major**

PSI-ESS1-5: Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.

PSI-ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and scene-floor features.

PSI-ESS2-7: Construct an argument based on evidence about the simultaneous coevolution of Earth's system and life on Earth

PSI-LS4-5: Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

PSI-ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrences of natural hazard, and changes in climate have influenced human activity.

PSI-ESS3-2: Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

PSI-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Supporting: Recurring

HS-ETS1-1: Analyze major global challenges to specify qualitative and qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

HS-ETS1-2: Evaluate competing design solutions using a systemic process to determine how well they meet the criteria and constraints of the problems.

HS-ETS1-3: Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

HS-ETS1-4: Use a computer simulation to model the impact of proposed solutions to complex real-world problems with numerous criteria and constraints of interactions within and between systems relevant to the problem.

Key Terminology:

Chapter 7: succession, primary succession, pioneer species, secondary succession, resources, greenhouse effect, biodiversity, keystone species, extinction, endangered species, threatened species, habitat destruction, habitat fragmentation, poaching, captive breeding, biogeography, continental drift, dispersal, exoctic species.

Chapter 9: continental drift, Pangaea, fossil, mid-ocean ridge, deep-ocean trench, subduction, plate,divergent boundary, convergent boundary, transform boundary, plate tectonics, fault, rift alley.

Chapter 10: stress, tension, compression, shearing, normal fault, reverse fault, strike-slip fault, plateau, earthquake, focus, epicenter, P wave, S wave, surface wave, seismograph, Modified Mercalli Scale, magnitude, Richter scale, moment magnitude scale, seismogram.

Activities & Assessments:

Quick writes, Exit tickets, Lab analysis, Graphs, Data Presentations, Card Sort(Vocabulary), Digital Lab notebook, Quizlet, QRC Codes, Lesson Quiz, Scientific Investigations, Teacher/Student Models, Student Response Questions, Concept Map(Vocabulary)

Chapter 7: Scenario Investigation: Fantasy Food Chain

Chapter Lab Investigation: Consequences of Human Activity

Inquiry Warm-Ups: Population, Can You Hide a Butterfly, How Communities Change, How Do You Interact with Your Environment, How Much Variety Is There.

Quick Labs: Growing and Shrinking, Elbow room, Adaptations for Survival, Bird Beak Adaptations, Primary or Secondary, How Do Humans Impact Ecosystems?, Consequences of Human Activity, Technology and the Environment, Modeling Keystone Species, Grocery Gene Pool, Human and Biodiversity.

Chapter 9: Scenario Investigation: Flight 7084 to Barcelona

Chapter Lab Investigation: Modeling Sea-Floor Spreading

Inquiry Warm-Ups: How Are Earth's Continents Linked Together? What is the Effect of a Change in Density?, Plate Interactions

Quick Labs: Moving the Continents, Mid-Ocean Ridges, Reversing Poles, Mantle Convection Currents.

Chapter 10: Stem Activity: Shake Rattle and Roll

Chapter Lab Investigation: Finding the Epicenter

Inquiry Warm-Ups: How Does Stress Affect Earth's Crust? How Do Seismic Waves Travel Through Earth? How Can Seismic Waves Be Detected?

Quick Labs: Effects of Stress, Modeling Faults, Modeling Stress, Properties of Seismic Waves, Measuring Earthquakes, Design a Seismograph, Earthquake Patterns

Materials and Resources:

Lesson plan, Textbook, Videos, Chart paper, Paper/pencils/ pens/ coloring pencils, Science-Consortium, [Discovery Channel](#) Interactive Science Journal for students, Science News, [Kahoots](#), [QRC Codes](#) Edpuzzle.com, [On-line Virtual Labs](#), [PHet](#), [The Physics classroom.com](#), Labster, [chemcollective.org](#), [openstax.org](#), [Periodic Table](#), [Khan Academy](#), Apex,