

Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. *[Clarification: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major roles that each factor plays in causing the rise in global temperatures.]* ([MS-ESS3-5](#))

Big Ideas - Students will understand that...

Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a coherent account of its geological history.

The theory of Plate tectonics is supported by patterns of earthquake locations, evidence of seafloor spreading, the tracking of magnetic patterns in undersea rocks and coordinating them with Earth's magnetic axis data, the warping of the land under loads (such as lakes and sheets of ice) which proves that the upper mantle can bend and flow.

Plate movement is responsible for continental and ocean floor movement as well as their features. It is also responsible for the distribution of mineral and rock within Earth's crust.

MS-ESS3-1	Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
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.
MS-ESS3-4	Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
MS-ESS3-5	Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Essential Questions - What provocative questions will foster inquiry and transfer of learning

Why aren't minerals and groundwater distributed evenly across the world?

How can we predict and prepare for natural disasters?

How can basic chemistry be used to explain the mechanisms that control the global temperature the atmosphere?

Why is it important to manage natural resources wisely?

Content - Students will know...

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources.
- All human activities draw on Earth's land, ocean, atmosphere, and biosphere resources and have both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.
- Minerals, fresh water, and biosphere resources are distributed unevenly around the planet as a result of past geologic processes.
- Cause-and-effect relationships may be used to explain how uneven distributions of Earth's mineral, energy, and groundwater resources have resulted from past and current geosciences processes.
- Resources that are unevenly distributed as a result of past processes include but are not limited to petroleum, metal ores, and soil.
- Mineral, fresh water, ocean, biosphere, and atmosphere resources are limited, and many are not renewable or replaceable over human lifetimes.
- The distribution of some of Earth's land, ocean, atmosphere, and biosphere resources are changing significantly due to removal by humans.
- Natural hazards can be the result of interior processes, surface processes, or severe weather events.
- 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.
- 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.
- Data on natural hazards can be used to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
- Data on natural hazards can include the locations, magnitudes, and frequencies of the natural hazards.
- Graphs, charts, and images can be used to identify patterns of natural hazards in a region.
- Graphs, charts, and images can be used to understand patterns of geologic forces that can help forecast the locations and likelihoods of future events.
- Technologies that can be used to mitigate the effects of natural hazards can be global or local.
- Technologies used to mitigate the effects of natural hazards vary from region to region and over time.
- All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.

- Increases in human population and per-capita consumption of natural resources impact Earth's systems.
- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.
- Cause and effect relationships may be used to predict how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- The consequences of increases in human populations and consumption of natural resources are described by science.
- Science does not make the decisions for the actions society takes.
- Scientific knowledge can describe the consequences of human population and per-capita consumption of natural resources impact Earth's systems but does not necessarily prescribe the decisions that society takes.
- Stability in Earth's surface temperature might be disturbed either by sudden events or gradual changes that accumulate over time.
- Human activities and natural processes are examples of factors that have caused the rise in global temperatures over the past century.
- Human activities play a major role in causing the rise in global temperatures.
- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming).
- Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior, and on applying that knowledge wisely in decisions and activities.
- Evidence that some factors have caused the rise in global temperature over the last century can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities.

Skills - Students will be able to...

- Construct a scientific explanation based on valid and reliable evidence of how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geosciences processes.
- Obtain evidence from sources, which must include the student's own experiments.
- Construct a scientific explanation based on the assumption that theories and laws that describe the current geosciences process operates today as they did in the past and will continue to do so in the future.
- Analyze and interpret data on natural hazards to determine similarities and differences and to distinguish

between correlation and causation.

- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.
- Ask questions to clarify human activities and natural processes that are major factors in the current rise in Earth's mean surface temperature.
- Ask questions to identify and clarify a variety of evidence for an argument about the factors that have caused the rise in global temperatures over the past century.

Stage 2: Assessment Evidence

Assessment

End of Unit Assessments (multiple choice and constructed responses)

Mini-lab Performance-based Assessments (rubrics)

Essential Questions Responses

Page Keeley Science Probes (formative assessments)

Chapter 9 assessments including tests and quizzes

Chapter 14 Lesson 3 assessments including tests and quizzes

Chapter 18 assessments including tests and quizzes

MiniLabs

Inquiry Labs

Essential Question Responses

Lab activity worksheets

Performance Assessment: Develop a model to show the cycling of Earth's materials through the rock cycle

Earth's Structure Foldable

Stage 3: Learning Plan

Learning Activities

Academic vocabulary activities: journals, e-flash cards, puzzles, origins, word parts, e-games

Mini-labs (student engagement)

Launch labs (teacher demo)

Inquiry labs (use of inquiry skills)

Interactive technology: classroom presentations, science videos, transparencies, visual literacy models, whiteboard

Reading Strategies: make tables, guiding questions, organize ideas, illustrate ideas, quick answers, make lists, make outlines, infer meaning, compare and contrast

Performance Assessment: The Dangers of Mt. Rainier

Accommodations for students with IEPs and learning difficulties:

- visual sentence frames using academic vocabulary for discussion
- graphic organizers and sentence starters
- graphic organizers for comparing and contrasting 3 types of rocks
- Model using examples of rocks to classify according to characteristics
- Model the structure and layers of the Earth by using a diagram
- Use visuals to show important vocabulary for students to make connections
- Draw pictures for vocabulary words for visual learners
- Have students share their text to text, text to world, and text to self connections
- One on one teacher support for comprehension and fluency

- Modeling and scaffolding to highlight specific vocabulary and key concepts
- close reading chapters/chunks
- rereading key sections for fluency and comprehension
- colored overlays and reading windows to reduce visual distractions
- Sentence starters for writing assignments
- Vocabulary word banks and strategies (Say it, Define it, Act it)
- Think alouds and Think-Pair-Share
- Modified tests/quizzes
- Use of technology to allow students to be read the text, allow for highlighter use, and stop students to think about key ideas/concepts
- Closed notes packet

For ELL students:

- visuals for vocabulary
- word wall
- additional word work such as illustrating vocabulary and playing vocabulary games
- partner reading
- choral reading
- Think-aloud while modeling writing
- analyze sample summaries before writing
- color-coded sticky notes for close reading to identify which sticky notes pertain to vocabulary
- questions about text, etc.
- When students make an error in speaking, answer or restate what they said using the correct form without drawing attention to the mistake.

For gifted students:

- Have students complete extended research projects on a related issue of their choice as it pertains to a content area
- Students perform a written/oral presentation to describe in detail the layers of the Earth and present to classmates.
- Students classify rocks according to classification, do extensive research and explain how we use those rocks in our everyday life.

Resources

Glencoe Earth and Space iScience, McGraw Hill, 2012

Chapter 9

Chapter 14 Lesson 3

Chapter 18

Paige Keeley Science Probes

Brain POP shorts

Various literature selections connected to science topics

Various video clips connected to science topics

ConnectEd.Mcgraw-hill.com resources

NJDOE Model Curriculum

Quizlet.com

Padlet.com

ebackpack.com

Page Keeley Science Probes

Brain POP shorts

Various literature selections connected to science topics

Unit Reflections & Teacher Notes
