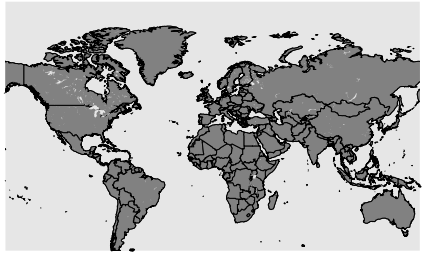
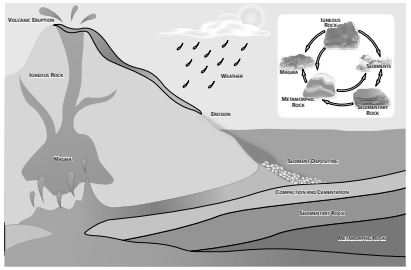
Grade 4 | Unit 5

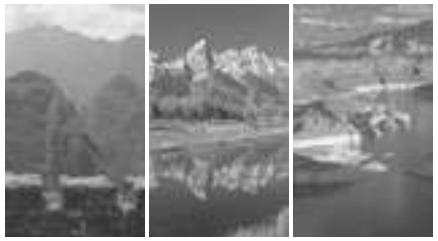
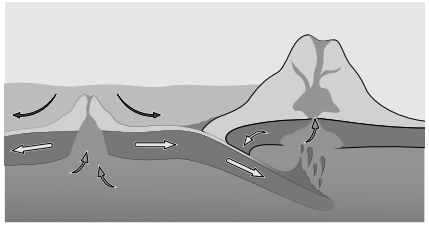
Geology

Answer Key

Evidence Collector's Chart

Chapter #	What is the cause?	What evidence is there?	Letter
1	At some point, Pangaea broke apart and the pieces slowly moved apart over a long period of time.	 similar rocks, fossils on different continents	N
2	Tectonic plates move very slowly due to the heat and pressure in Earth's mantle.	 continents rearranged over time	E
3	Material in the mantle moves beneath stuck rocks at a fault, causing pressure to build over time and then suddenly release as the rocks break and slip past each other, shaking the ground.	 rocks moving at a fault	E

Chapter #	What is the cause?	What evidence is there?	Letter
4	Tremendous pressure and heat in the mantle force magma in a chamber below Earth's crust to move upward through a crack in Earth's surface.	 magma erupts as lava	D
6	Rocks are created, destroyed, and recreated in a continuous cycle.	 igneous, sedimentary, and metamorphic rock	I
7	Over time, weathering breaks rocks into smaller pieces and erosion moves these pieces to new locations.	 processes reshape Earth's surface	C

Chapter #	What is the cause?	What evidence is there?	Letter
8	Tectonic plates subduct underneath one another and move up and down against each other, and magma pushes up into the crust.	 fold, fault-block, and dome mountains	E
9	Tectonic plates interact to create seafloor spreading and underwater subduction zones.	 deep ocean trenches, mid-ocean ridges, hydrothermal vents	V

Riddle:

Answer:

The following chart contains a statement about Alfred Wegener's continental drift hypothesis. Using information from the excerpt, write five pieces of evidence that support Wegener's hypothesis.

Hypothesis	Long ago, continents were joined as one supercontinent that broke apart and the pieces slowly drifted away from each other.
Evidence	1. Rock layers along the northern and eastern coasts of South America match rock layers along Africa's western coast.
	2. Deposits of coal and salt in eastern North America are similar to those in southern Europe.
	3. Fossils of the ancient fern ***Glossopteris*** found in similar rock layers in Africa, India, Australia, South America, and Antarctica
	4. Fossils of the ancient reptile ***Lystrosaurus*** found in southern Africa and India
	5. Fossils of the ancient reptile ***Cynognathus*** found in South America and Africa

Practice Commas

For each item, insert a comma or commas in the appropriate location(s).

Examples: We went to Concord North Carolina to visit friends for spring break.
We went to Concord, North Carolina to visit friends for spring break.

I needed paper pencils erasers and a notebook for school.
I needed paper, pencils, erasers, and a notebook for school.

Seismologist Inge Lehmann was born on May 13 1888.
Seismologist Inge Lehmann was born on May 13, 1888.

1. When I was a child, my family moved from Chicago,Illinois to Madison,Wisconsin.

2. We have two dogs,three cats,a turtle,and a bunny.

3. 801 East High Street
Charlottesville, VA 22902

4. President Obama was elected the 44th President of the United States on November 4, 2008.

5. My dad cooked eggs,bacon,toast,and pancakes for breakfast.

6. We traveled from Boston,Massachusetts to San Diego,California on our cross-country trip.

7. Earth's layers are the inner core,the outer core,the mantle,and the crust.

8. 233 Broadway
New York, NY 10007

9. Her graduation date is scheduled for May 24, 2016.

Write a sentence that includes a date or items in a series. Be sure to use correct capitalization and punctuation.

Answers may vary.

Write an address. Be sure to use correct capitalization and punctuation.

Answers may vary.

Challenge: *Write a sentence that includes at least two of the following:*

a date	a city and state	items in a series

Answers may vary.

-ly: Suffix Meaning "in a _____ way"

Write the correct word to complete each sentence.

easy	easily	loud
careful	carefully	temporary
speedy	accidentally	temporarily

1. Even though his stay was only ___temporary___, I got really attached to the neighbor's dog staying with us for a week while his owners were on vacation.

2. Amber's dad ___accidentally___ put his coffee in her thermos instead of his thermos.

3. I was ___careful___ not to wake up the baby while he was sleeping, so I listened to music quietly through headphones instead of speakers.

4. According to the continental drift hypothesis, continents move very slowly, which is definitely not a(n) ___speedy___ process.

5. The buzzer on my alarm clock is so ___loud___ that it wakes up everyone in the house.

6. The ground ___temporarily___ shakes during an earthquake, as seismic waves travel through Earth's crust and its interior.

Write a sentence using one of the words left in the box.

Answers may vary, but should include one of the following words: easy, easily, carefully.

Write a sentence using one of the words left in the box.

Answers may vary, but should include one of the following words and should not include the same word as used in the previous sentence: easy, easily, carefully.

Similes about Earth's Changes

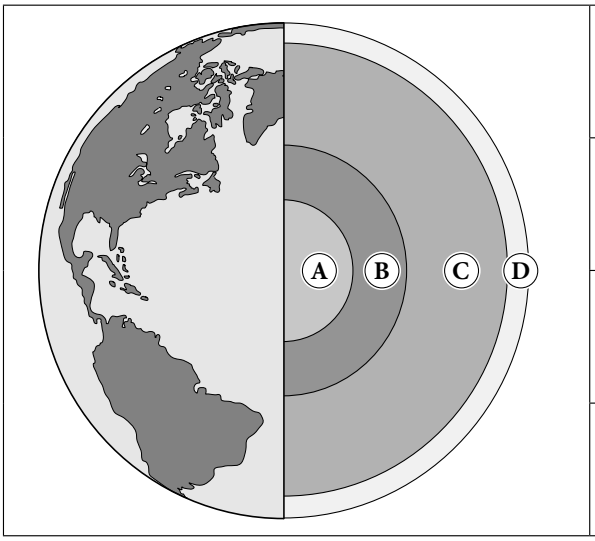
Reread the text on the page noted for each simile. Then, fill in the chart to explain what the simile is comparing and what it means.

Page	Simile from Text	What is the simile comparing?	What does the simile mean?
9	*What if continents were like enormous pieces of ice?*	Continents in oceans to pieces of ice floating in a drink.	Continents are less dense than rocks on the ocean bottom so they can float above those rocks just like ice floats in a drink, which is made with water, because ice is less dense than water.
13	*An earthquake is a bit like a rock plunking into water.*	An earthquake and a rock in water	Seismic waves travel out through the earth from the source of an earthquake just as a rock is a source of waves traveling out from the spot where it hit the water.
16	*The rift was like a seam in a pants leg, where two pieces of fabric come together.*	A rift in mid-ocean ridges and a seam in a pants leg	The seam in a pants leg dips down where the two pieces of fabric come together, so the seam lies a little bit lower than the pieces of fabric. The rift down the mid-ocean ridges dips down between the ridges; the rift lies a little bit lower than the ridges themselves.

Excerpt from "Earth's Layers and Moving Plates"

Read the following excerpt and use it to label Earth's layers in the diagram that follows.

Earth's deepest layer is a solid inner core of very hot metal. This metal may be nearly as hot as the sun's surface. The outer core is also made of hot metal, but it's liquid, not solid. The mantle surrounds the outer core. The mantle is Earth's largest and thickest layer and consists of very hot, very dense rock. The rock is solid in the lower and upper parts of the mantle. In between, however, is a region where the rock is neither liquid nor solid. The slow movement and behavior of this material, caused by heat and pressure, have an impact on Earth's surface. Above the mantle is Earth's outermost layer, the thin, rocky crust. There are two types of crust: oceanic crust and continental crust. Oceanic crust is covered by ocean water. Most of the continental crust is dry land, but some of the crust around the edges is covered by water. Oceanic crust is thinner but heavier than continental crust.



A. inner core

B. outer core

C. mantle

D. crust

Use the correct word from the word bank to fill in each blank in the following paragraphs.

trench	theory	plate	subduction
continental	tectonic	collide	

Sam is excited to tell his family what he is reading and learning about geology at school. His cousins live in the South American country of Chile, and today he learned that there is a deep ocean _____trench_____ along Chile's coast. He explained, "There are two _____tectonic_____ plates that meet along the western coast of South America. One is a ____continental____ plate and one is an oceanic plate. The heavier oceanic plate is sliding beneath the lighter continental _____plate_____. And, this process has a big name I learned today—it's called ____subduction____!"

"I think I know how the Andes Mountains of South America are formed," exclaimed Sam's dad. "When the plates _____collide_____ at plate boundaries along the Pacific Coast, I bet the continental crust crumples and gets pushed higher and higher to form the mountains. I learned about the _____theory_____ of plate tectonics when I was in school, too."

Sam's dad described an earthquake that the country of Chile had recently experienced. Sam said, "Hmmm . . . I wonder if earthquakes have anything to do with moving tectonic plates?"

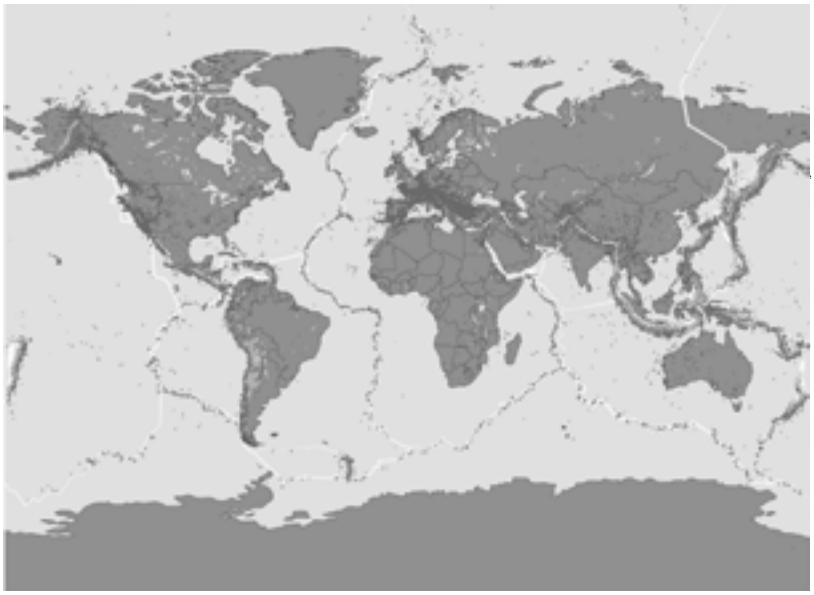
What do you think?

Excerpt from "Earth's Shakes and Quakes"

Read the first full paragraph of the following excerpt aloud to a family member and answer the questions that follow.

objects tumble from shelves, and buildings may even collapse. In 1348 CE, people had no idea what caused earthquakes. Today we know that earthquakes are the result of powerful natural forces at work in Earth's crust and mantle.

As you read in Chapter 2, scientists developed the theory of plate tectonics in the 1960s. The theory explains how Earth's surface and interior change over very long periods of time. Some plates are pulling apart at their boundaries, other plates are colliding, and still others are sliding past each other. A lot happens at plate boundaries, including most earthquakes. In fact, one of the easiest ways to locate plate boundaries is to determine where earthquakes are occurring!



Locations of plate boundaries and past earthquake epicenters

23

1. According to the excerpt, what does the theory of plate tectonics explain?

   The theory explains how Earth's surface and interior change over very long periods of time.

2. The last sentence of the excerpt states, "In fact, one of the easiest ways to locate plate boundaries is to determine where earthquakes are occurring!" How does the image on the page support this statement?

   The dots marking past earthquake epicenters all sit on or near plate boundaries.

Practice Commas

For each item, insert a comma or commas in the appropriate location(s).

1. My dad is from Austin,Texas and my mom is from Minneapolis,Minnesota.

2. She plays tennis,soccer,and basketball.

3. Opening night of his first play is scheduled for June 24,2015.

4. Yellowstone National Park
   P.O. Box 168
   Yellowstone National Park,WY 82190

Write a sentence for each of the following items. Be sure to use correct capitalization and punctuation. Each sentence should include at least one comma in its appropriate location.

1. a date

   Answers may vary.

2. city and state or an address

   Answers may vary.

3. items in a series

Answers may vary.

–ly: Suffix Meaning "in a _____ way"

Write the correct word to complete each sentence.

1. Even though earthquakes are only _____temporary_____, they can still cause significant and sometimes permanent damage.
   (temporary, temporarily, accidental, accidentally)

2. The fire engine was so _____loud_____ that I had to cover my ears as it drove by my house.
   (loud, loudly, careful, carefully)

3. Tsunamis are _____speedy_____—they travel as fast as 500 miles per hour.
   (loud, loudly, speedy, speedily)

4. He _____accidentally_____ dropped a glass, spilling milk all over the floor.
   (easy, easily, accidental, accidentally)

5. Scientist Inge Lehmann was _____careful_____ to do lots of research and analysis before concluding that Earth's core has two parts—a liquid outer core and a solid inner core.
   (careful, carefully, temporary, temporarily)

6. It was _____easy_____ to see that he loved baseball because his face lit up every time he got to play.
   (temporary, temporarily, easy, easily)

Write a sentence using one of the –ly *words.*

Answers may vary.

Write a sentence using one of your own –ly *words.*

Answers may vary.

Challenge: *Write a sentence using one of the root words and its* –ly *word.*

Answers may vary.

Earth's Shakes and Quakes

Answer each question thoughtfully, citing the page number(s) where you found evidence for each question. Answer in complete sentences and restate the question in your answer whenever possible.

1. Fill in the blank:

   Most earthquakes happen at plate boundaries.

   Page(s) 23

2. How much energy is released when blocks of rock that were stuck break and slip past each other?

   All the energy that accumulated in the rocks during the time they were stuck and couldn't move is released when the blocks of rock suddenly break and slip past each other.

   Page(s) 24

3. Circle the two answers that correctly complete the following statement.

   Surface waves cause _____.

   (A.) the ground to shake, heave, sway, and lurch during an earthquake
   B. a fault to form in Earth's crust
   C. most tsunamis
   (D.) the most earthquake damage

   Page(s) 26

4. List one way in which the seismograph and the Richter scale are different.
List one way in which they are similar.

Different:

A seismograph produces wiggly lines to show the energy of seismic waves while the Richter scale applies numbers to measure the magnitude of an earthquake based on the largest seismic wave recorded.

Similar:

Both a seismograph and the Richter scale are used by scientists to determine an earthquake's magnitude.

Page(s) 27-28

5. Write two or three sentences that include one fact about a tsunami and at least two descriptive words from the text.

Answers may vary.

Page(s) 30

Take Notes on Tsunamis

Read through all the questions in the chart so you are clear about what information you should scan the Reader text for related to tsunamis. Take notes by paraphrasing the Reader text or writing information in your own words. Write key information in the shortest form possible.

Questions	Notes
What is a tsunami?	a gigantic wave of seawater
What causes a tsunami?	earthquakes that occur in the crust forming the ocean bottom
Why do tsunamis happen?	earthquakes can cause seafloor to shift, which causes seawater from the ocean bottom to its surface to suddenly start to move
How fast does a tsunami travel?	as fast as 500 miles per hour
Can we stop tsunamis from happening?	no
How can we prepare and protect ourselves?	know the tsunami warning signal where you live, quickly evacuate if tsunami approaches

Tsunami Pamphlet

Draft your pamphlet by composing answers to the questions.

Question: What was THAT?

Answer: A tsunami!

Tsunamis are caused by
earthquakes in the oceanic crust.

Question: What is a tsunami?
Answer:
A tsunami is a giant wave of seawater.

Question: Why do tsunamis happen?
Answer:
Tsunamis happen because the seafloor shifts due to an earthquake occurring in the oceanic crust.

Question: How fast does a tsunami travel?
Answer:
A tsunami can travel as fast as 500 miles per hour.

Question: Can we stop tsunamis from happening?
Answer:
No, we cannot stop tsunamis.

Question: How can we prepare and protect ourselves?
Answer:
Scientists are able to give some warning for tsunamis. Know what the tsunami warning signal is for the area you live in. If a tsunami is approaching, you should evacuate as quickly as you can.

Commas and Quotation Marks

Rewrite each sentence, inserting a comma or commas and quotation marks in the appropriate locations. Be sure to use correct capitalization and end punctuation.

Example: The time he explained is 3:47 pm

"The time," he explained, "is 3:47 pm."

1. You don't have to look hard the teacher said to find rocks

   "You don't have to look hard," the teacher said, "to find rocks."

2. Students might ask what are rocks? before reading the text

   Students might ask, "What are rocks?" before reading the text.

3. Rocks are naturally occurring materials made of solid substances the author explains

   "Rocks are naturally occurring materials made of solid substances," the author explains.

4. The rock cycle according to the text has been going on for several billion years

   "The rock cycle," according to the text, "has been going on for several billion years."

5. Given enough time the text explains all rocks change

   "Given enough time," the text explains, "all rocks change."

6. There are three types of rocks the teacher explained igneous sedimentary and metamorphic

   "There are three types of rocks," the teacher explained, "igneous, sedimentary, and metamorphic."

Root *rupt*

Write the correct word to complete each sentence. You may need to add –ed, –ing, *or* –s *to make the word correctly fit in the sentence.*

uninterrupted	erupt	disrupt
rupture	abrupt	eruption

1. A volcanic eruption is usually sudden and violent.
2. When my friend lied to me, it caused a(n) rupture in our friendship.
3. My parents say it's bad for me to spend uninterrupted hours watching television, so they limit how much I can watch.
4. Old Faithful is a geyser in Yellowstone National Park that erupts several times a day.
5. Sometimes my dog disrupts my sleep when she barks in the middle of the night.
6. During an argument, my brother left the room in a(n) abrupt way instead of continuing the conversation.

Write a complete sentence for each of the following words. Be sure to use correct capitalization and punctuation.

7. *disrupt*

Answers may vary.

8. *abrupt*

Answers may vary.

9. *eruption*

Answers may vary.

Practice Spelling Words

Sort the spelling words into categories based on the root in each word.

uninterrupted	matriarch	hierarchy	abrupt
archrival	calligraphy	eruption	paragraph
autograph	rupture	anarchy	biographer

arch	***graph***	***rupt***
matriarch	calligraphy	uninterrupted
hierarchy	paragraph	abrupt
archrival	autograph	eruption
anarchy	biographer	rupture

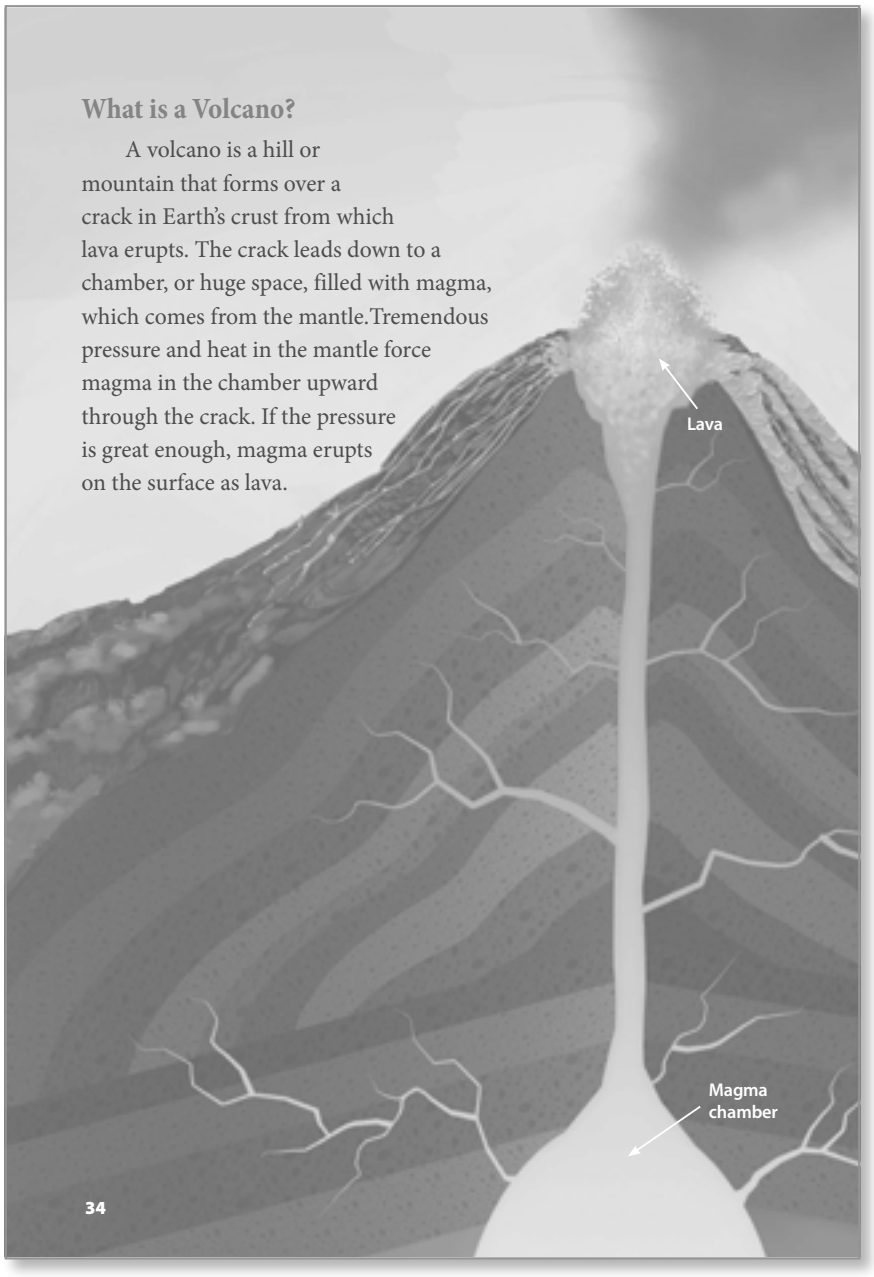
List the spelling words in alphabetical order. Remember to pronounce and spell the words syllable by syllable.

1. abrupt
2. anarchy
3. archrival
4. autograph
5. biographer
6. calligraphy
7. eruption
8. hierarchy
9. matriarch
10. paragraph
11. rupture
12. uninterrupted

Excerpts from *The Changing Earth*

Read the following excerpts and use them to complete the activity that follows.

Earth's Fiery Volcanoes



Using information from the excerpts, make notes on how volcanic activity is explained in the excerpts. Shaded cells indicate that no information is needed there.

Volcanic Activity	"Earth's Fiery Volcanoes"	"Mythic Volcano Spirits: Hawaii's Goddess of Fire"	"Mythic Volcano Spirits: The Origin of Crater Lake"
creation of volcanoes on an island chain	underwater volcano creates island, plate movement moves island and a new island starts	Pele tried to get away from her sister	
eruptions	pressure in mantle causes magma to erupt as lava	Pele gets mad and sends out lava rivers	Monadalkni was angry Loha refused him
formation of a caldera		Pele's sister dug into the volcano side, eventually collapsing the top	Sahale Tyee caused the top of mountain to collapse

1. What similarities do you notice across excerpts?

   Answers may vary.

2. What differences do you notice across excerpts?

   Answers may vary.

Earth's Building Blocks

Answer each question thoughtfully, citing the page number(s) where you found evidence for each question. Answer in complete sentences and restate the question in your answer whenever possible.

1. How might rocks differ from each other?

   Answers may vary, but should include one or more of the following:

   colors, textures, stripes vs. layers, hard vs. crumbly, grain size

   Page(s) 53

2. How does igneous rock form?

   Igneous rock forms when magma cools and solidifies.

   Page(s) 54

3. Which statement distinguishes between the two basic types of igneous rock?

   A. Two igneous rocks are granite and basalt.

   B. Different rocks have different size grains and different textures.

   C. One type forms on Earth's surface and the other forms below Earth's surface.

   D. The slower the rock cools and hardens, the larger its mineral grains will be.

   Page(s) 54

4. How does sedimentary rock form?

   Sedimentary rock forms when, over time, sediments collect in layers, are bound together by solid minerals, and are compacted and cemented together.

   Page(s) 56

5. How does metamorphic rock form?

   Metamorphic rock forms when igneous or sedimentary rocks (or even older metamorphic rocks) are exposed to extreme heat and pressure.

   Page(s) 58

6. What is the rock cycle?
   A. the continuous process of volcanoes erupting
   B. the continuous process of change in which rocks are created, destroyed, and recreated
   C. the continuous process of sedimentary rock changing to become igneous rock
   D. the continuous process of mineral grains making rocks smooth and shiny

   Page(s) 60

Complete the following items after you have finished reading the chapter. Match the following words with the correct definitions and examples. You may use some words more than once. Try to think of the answer to each item first from memory and then check back in the text to verify your answer before filling in the blank.

minerals	limestone	erosion
sedimentary rock	igneous rock	metamorphic rock

7. **Word**: erosion
   Definition: any process or force that moves sediments to new locations

   Page(s) 60

8. **Word**: igneous rock
   Definition: rock that forms when magma cools and solidifies; the most abundant class of rocks

   Page(s) 54

9. **Word**: minerals
   Definition: the building blocks of rocks that consist of solid, nonliving substances

   Page(s) 53

10. **Word**: limestone
Definition: a type of sedimentary rock that often has many fossils and shells of tiny ocean creatures

Page(s) 56

11. **Word**: metamorphic rock
Definition: a type of rock that forms when either igneous or sedimentary rock is changed due to extreme heat and pressure

Page(s) 58

12. **Word**: sedimentary rock
Definition: a type of rock made of tiny bits of rock and sand mixed with small pieces of things that were once alive

Page(s) 56

13. **Word**: igneous rock
Examples: basalt, granite, and obsidian are examples of this class of rock

Page(s) 54

14. **Word**: metamorphic rock
Examples: serpentine, marble, and gneiss are examples of this class of rock

Page(s) 58

15. **Word**: sedimentary rock
Examples: sandstone, limestone, and mudstone are examples of this class of rock

Page(s) 56

Write the correct word or phrase to complete each sentence. Each of the words/phrases will be used once.

compacted	erosion	magma	igneous	metamorphic
obsidian	rock cycle	sedimentary	solidified	texture

1. Lava flowed down the volcano's side and quickly hardened to form a glassy type of igneous rock.
2. Tiny flakes of obsidian fell on the ground as an ancient tool maker worked to create a sharp blade for cutting.
3. The tiny flakes of rock were washed into a nearby stream, where they joined other sediments created by the erosion of rock from the nearby mountains.
4. The sediments formed layers on the stream bed, which compacted over time as the weight of the layers squeezed out the air and water.
5. The sediments cemented together and solidified into rock.
6. Sedimentary rock was buried by even more layers of sediments over millions of years.
7. The heat and pressure from the weight of the overlying rock changed the texture of the minerals in the rock.
8. New metamorphic rock formed and lay buried in the earth for millions of years.

9. Heat from magma below the rock melted it, turning it into igneous rock.

10. As part of its journey through the rock cycle, this piece of rock might someday be found on a beach in Maine or a mountaintop in Tennessee!

Commas and Quotation Marks

For each item, insert commas and quotation marks in the appropriate places.

Example: He said my favorite board game is checkers.
He said, "My favorite board game is checkers."

1. Just then, my dad asked,"What would you like to eat for dinner?"
2. I replied,"I would like to have grilled chicken."
3. "I want spaghetti and meatballs,"exclaimed my sister.
4. "How about,"my mom asked,"we make sandwiches?"
5. "What if we . . ."Dad paused,and then said,"order pizza?"
6. My sister and I both cried,"Yes!"in response.

Read the following passages from Chapter 5 "Mythic Volcano Spirits." Rewrite the sentences marked in bold so they include dialogue. Make sure at least one sentence is rewritten as a split quotation. Be sure to use correct capitalization and punctuation.

Example: Loha refused.
Loha said, "No."

1. *One day Monadalkni spotted the daughter of the Klamath chief, Loha. Monadalkni thought Loha was the most beautiful woman he had ever seen. Immediately he wanted her to be his wife. He came down from the mountaintop and proposed to Loha.* ***He promised her eternal life if she would agree to marry him.*** *Loha refused.*

   Answers may vary.

2. ***She ran to her father and asked for help.*** *The chief of the Klamath people called the tribal elders together. They all agreed that Loha should try to hide from Monadalkni, so she did.*

   Answers may vary.

3. *Monadalkni was very angry when he found out that Loha had refused him yet again. He raged inside his mountain, making it shake and rumble. He threw lightning bolts and spewed fireballs from his mouth. The top of the mountain exploded, which sent hot lava and choking clouds of ash raining down on the land. The Klamath people waded into streams and lakes trying to escape Monadalkni's fiery revenge.* ***They cried out to Sahale Tyee for help.***

   Answers may vary.

Root *rupt*

Write a complete sentence for each of the following words. Be sure to use correct capitalization and punctuation.

1. *erupt*

   Answers may vary.

2. *uninterrupted*

   Answers may vary.

3. *rupture*

   Answers may vary.

Choose the correct word to complete the sentence and write it on the line.

4. The science lesson was _____interrupted_____ when the fire alarm went off
   (erupting, uninterrupted, interrupted, erupted)
   and we all had to quickly walk outside.

5. They _____disrupted_____ a serious discussion by making jokes and
   (erupted, uninterrupted, disrupted, ruptured)
   acting silly, causing everyone to lose focus.

6. An _____eruption_____ of a geyser releases hot water and steam.
(interruption, interrupt, erupt, eruption)

Challenge: Write a complete sentence using two words with the root *rupt*. Be sure to use correct capitalization and punctuation.

Answers may vary, but should include two words with the root ***rupt***.

Practice Spelling Words

Write the correct word to complete each sentence. Words will not be used more than once; some words will not be used.

abrupt	autograph	matriarch	paragraph
eruption	archrival	uninterrupted	hierarchy
calligraphy	biographer	rupture	anarchy

1. He left in a(n) _____abrupt_____ way without even saying goodbye.

2. My grandma has a(n) ____autograph_____ book that includes the signatures of noteworthy actors, sports players, and political figures.

3. A volcanic _____eruption_____ can add new land to Earth's surface but can also cause a large amount of destruction.

4. A man from North Carolina won a world record for jumping rope for a(n) _____uninterrupted_____ period of time—33 hours straight.

5. The ____biographer____ conducted a series of interviews to collect the information he needed to write a book about the baseball player's life.

6. The tennis player finally defeated his _____archrival_____ in a heated match.

7. She wrote a(n) ____paragraph_____ focusing on how earthquakes occur.

8. The queen is the ____matriarch_____ of her kingdom and government.

Sequencing Multiple Adjectives

Article	Adjective(s)					Noun
	General → Specific					
	Opinion/ Observation	Physical Description (size, shape, age, color)	Material	Origin	Purpose	

Reorder the words in the sentence so they are ordered correctly. Be sure to use proper capitalization and punctuation.

Example: wears she pretty a green dress
She wears a pretty, green dress

1. the underwater round data little vessel collects

   The little, round, underwater vessel collects data.

2. big red a round apple fell

   A big, round, red apple fell.

3. we farm old visited a small

   We visited a small, old farm.

4. old the erupted Hawaiian tall volcano

The tall, old, Hawaiian volcano erupted.

Write a sentence using at least two adjectives and an article. Be sure to order the words appropriately and to use proper capitalization and punctuation.

Answers may vary, but should include at least two adjectives and an article.

Review Suffixes *–ly* and *–y* and Roots *graph* and *rupt*

Write the correct word to complete each sentence. Words will not be used more than once.

messy	taste	interrupt	mess
kindly	biography	tasty	busily
abruptly	busy	kind	photograph

1. It was kind of the stranger to pick up the money I dropped and return it to me.

2. Scientists received warning of a tsunami wave far out in the ocean, so they were busily working to warn people before it reached land.

3. She didn't want to interrupt the discussion but it was time for her to leave, so she said they would talk again later.

4. Someone wanted to write a(n) biography about the geologist, but he declined because he was writing his own life story in an autobiography.

5. My dad and my sister do not like the taste of tomatoes but my mom and I love it.

6. They had to leave the soccer game abruptly and seek shelter when an announcement was made of an approaching storm.

7. She kindly agreed to take care of our dog while we went on vacation.

8. My favorite photograph from the slideshow was the one that showed the Grand Canyon.

9. The bookshelf at the library was so _____messy_____ and disorganized that I couldn't find the book I wanted to check out.

10. Her dinner was very _____tasty_____, so she ate it all and even asked for more.

For each word remaining in the word bank, write a sentence using the word.

1. Answers may vary, but should include the word *busy* or *mess*.

2. Answers may vary, but should include the word not used in the previous sentence: *busy* or *mess*.

Practice Spelling Words

Write each spelling word under its definition. Then identify the word's part of speech.

epicenter	tsunami	seismograph	glacier	geyser
conclusion	molten	erosion	fault	tectonic

1. an underground hot spring that periodically erupts, shooting hot water and steam into the air

   Spelling Word: geyser

   Part of Speech: noun

2. melted

   Spelling Word: molten

   Part of Speech: adjective

3. any process or force that moves sediments to new locations

   Spelling Word: erosion

   Part of Speech: noun

4. the point on Earth's surface directly above an earthquake's focus

   Spelling Word: epicenter

   Part of Speech: noun

5. relating to the process of plate movement on Earth's surface

   Spelling Word: tectonic

   Part of Speech: adjective

6. a crack in Earth's crust

   Spelling Word: fault

   Part of Speech: noun

7. an instrument used to track seismic waves traveling through the earth

   Spelling Word: seismograph

   Part of Speech: noun

8. an enormous, slow-moving mass of ice found in polar regions or near tops of tall mountains

   Spelling Word: glacier

   Part of Speech: noun

9. a decision or opinion formed based on information you have

   Spelling Word: conclusion

   Part of Speech: noun

10. a gigantic wave of seawater caused by an earthquake in oceanic crust

    Spelling Word: tsunami

    Part of Speech: noun

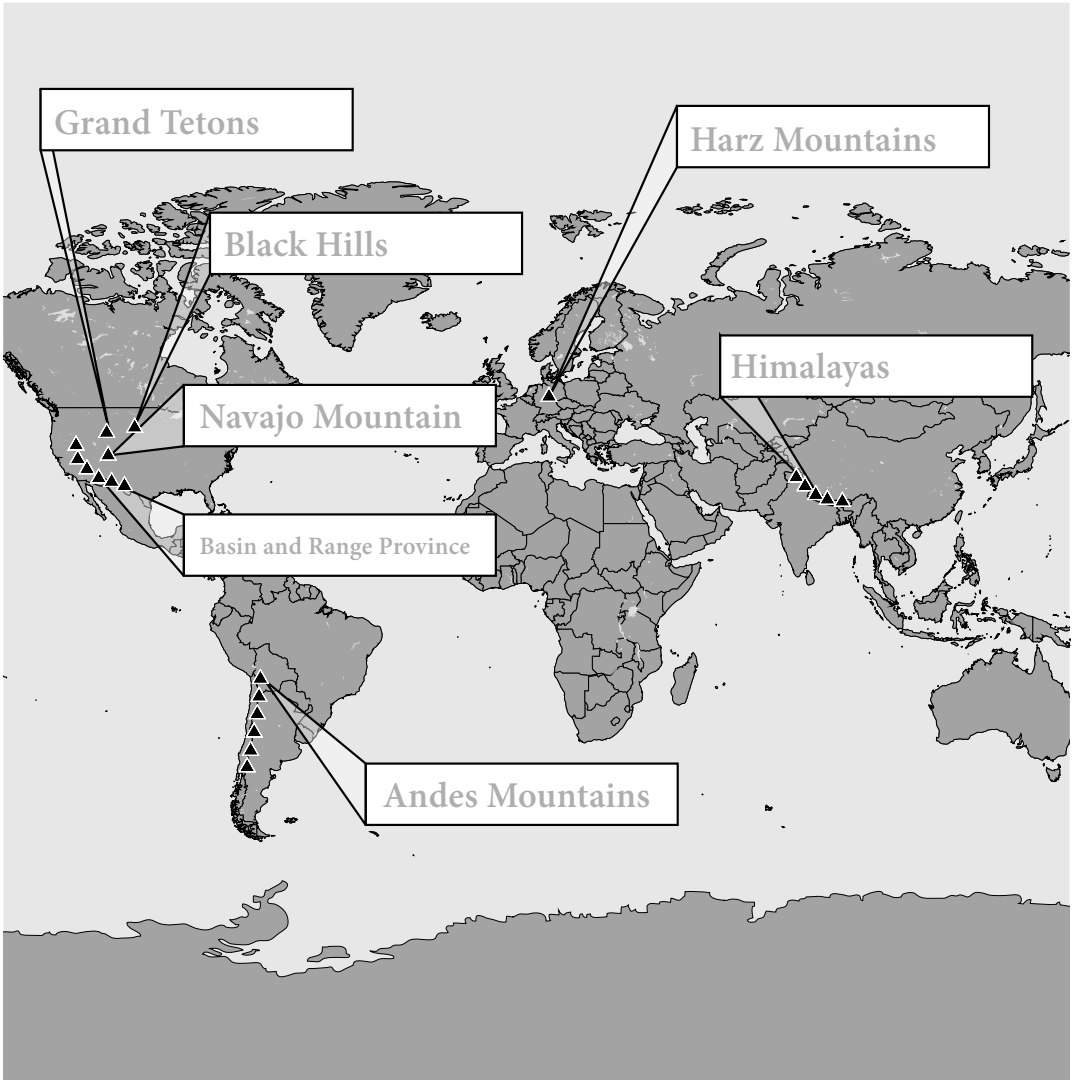
Earth's Mighty Mountains

Answer each question thoughtfully, citing the page number(s) where you found evidence for each question. Answer in complete sentences and restate the question in your answer whenever possible.

	Fold Mountains	Fault-Block Mountains	Dome Mountains
How are they formed?	tectonic places collide, pressure crumples the crust and then crust gets pushed upward, creating folds	gigantic blocks of rock move up and down along faults	magma pushes upward into Earth's crust, cools into igneous rock, causes a bulge
Page(s)	75	78	80
What are common features or characteristics?	sedimentary rock looks like folds	one steep side, with a high cliff, and one sloping side	look like humps of rock with rounded tops, usually isolated on flat plains
Page(s)	76	78	80
What are some examples and where are they located?	Himalayas between India and China in Asia, Andes Mountains in South America	Harz Mountains in Germany; the Grand Tetons in Wyoming; and the Basin and Range Province of Utah, Nevada, and Arizona	Navajo Mountain in Utah, the Black Hills in South Dakota
Page(s)	75, 77	78	80, 81

Use the following word bank to correctly label the map.

Himalayas	Harz Mountains	Black Hills	Andes Mountains
Grand Tetons	Navajo Mountain	Basin and Range Province	



1. What clues tell you that you are close to a vent?

   A plume of black smoke appears.

2. How would you get close enough to observe the vent?

   A robot vehicle would get closer to the vent and take pictures to send back to scientists.

3. What would you discover on the seafloor near the vent?

   One might discover amazing and unusual sea creatures, like giant tube worms, white crabs, football-sized clams, and blind shrimp.

4. Why is it important to conduct your underwater mission?

   Hydrothermal vents are a great place to discover interesting species as well as to gain understanding of the makeup of the earth.

Earth's Undersea World

As you and your partner read Chapter 9, "Earth's Undersea World," answer the following questions.

1. Seafloor spreading explains which of the following?
   - A. the presence of mid-ocean ridges on the seafloor
   - B. Wegener's theory of continental drift
   - C. the formation of hydrothermal vents
   - D. All of the above
   - (E.) A and B only

   Page(s) 84-86

2. Which phrase describes the Mid-Atlantic Ridge?
   - A. a warm, dark area on the sea floor
   - (B.) a long, rugged underwater mountain range
   - C. a cluster of seamounts
   - D. a cluster of hydrothermal vents

   Page(s) 83

The following question has two parts. Answer Part A and then answer Part B.

3. **Part A**: Fill in the following chart to indicate which seafloor feature the animals live around, hydrothermal vents or seamounts.

Animals	Where they live
white crabs	hydrothermal vents
brittle stars	seamounts
schools of fish	seamounts
pale, blind shrimp	hydrothermal vents
sponges	seamounts
deep-sea corals	seamounts
giant tube worms	hydrothermal vents
anemones	seamounts
football-sized clams	hydrothermal vents

Page(s) 86, 88

Part B: Why might these animals live near these particular seafloor features?

Answers may vary, but should include: animals may live near these features because of the tiny, single-celled organisms that grow there as a result of the nutrients brought up by seamounts

4. Match each cause to its effect by writing the correct letter for the effect next to the correct cause.

Causes	Effects
c Seamount emerges from the ocean's surface	a. continental drift
d One tectonic plate slides under another	b. seafloor spreading
b Tectonic plates move apart very slowly	c. islands are formed
a Seafloor spreading	d. a trench is formed
f Water seeps into the earth's crust and is heated by magma	e. mountains are formed
e Tectonic plates collide	f. hydrothermal vents are formed

5. On page 84, the author uses a simile when describing the mountain chain formed by mid-ocean ridges, saying it is *like the stitching on a baseball*. Explain what this simile means.

Answers may vary, but should include that stitching on a baseball goes all around the baseball with no starting point or stopping point, meaning it is continuous. By comparing the mountain chain formed by mid-ocean ridges to stitching on a baseball, the author is saying that the mountain chain goes all over the earth without a starting or stopping point, meaning it is continuous.

Sequencing Multiple Adjectives

Complete each sentence by choosing two adjectives from the ones provided and writing them in the correct order in the blanks. Underline the article(s) in each sentence.

Example: **Adjectives**: strong, young, gray, Italian

A **strong** , **gray** horse galloped in the field.

1. **Adjectives**: new, Japanese, fast

   The fast, new , Japanese race car zipped around the track.

2. **Adjectives**: hardcover, good, old, science

   She looked at a good, old , hardcover, science book about volcanoes.

3. **Adjectives**: canvas, blue, comfortable, walking

   He loves the comfortable, blue , canvas, walking shoes he tried on.

1. Answers may vary but correct order is: fast, new, Japanese.

2. Answers may vary but correct order is: good, old, hardcover, science.

3. Answer may vary but correct order is: comfortable, blue, canvas, walking.

Circle the phrase with the adjectives in the correct order.

Example: a black, large, clever cat
clever, a large black cat
a clever, large, black cat

1. the tall, rocky mountain
   the rocky, tall mountain
   rocky, tall, the mountain

2. a sharp, wooden pencil
   wooden, a sharp pencil
   a wooden, sharp, pencil

3. old, an bicycle, orange
   an old, orange bicycle
   an orange, old bicycle

Write a sentence using at least two adjectives. Be sure to order the adjectives correctly and to use proper capitalization and punctuation.

Answers may vary.

Questions

1. What causes earthquakes in Japan every year?
   - A. Namazu, the giant catfish
   - B. weather patterns
   - C. the Richter scale
   - D. plate movements

The following question has two parts. Answer Part A and then answer Part B.

2. **Part A**: Using the numbers 1–3, rank the three major earthquakes Japan has experienced in the past hundred years or so in order of strength, numbering the strongest earthquake with the number 1.
   - A. 1923, earthquake badly damaged the cities of Tokyo and Yokohama 2
   - B. 2011, the Great Tohoku earthquake 1
   - C. 1995, earthquake devastated the port city of Kobe 3

   Part B: Why was the earthquake you labeled as the strongest in Part A also the most destructive earthquake?

   It was one of the strongest earthquakes known to hit Japan in recorded history, causing violent shaking and much destruction and because it triggered an enormous tsunami that caused the worst damage, with towering waves crashing ashore and surging for inland.

3. In paragraph 5, what does the word *advanced* mean in the following sentence?

> It has one of the most advanced earthquake early warning systems in the world.

A. traditional
B. out-of-date
C. highly developed
D. simple

4. How does Japan's earthquake early warning system detect movements in the earth?
A. When people feel the earth shake, they tell others around them.
B. Seismographs across Japan send information about the slightest movements to a central location.
C. Scientists wait to see if a tsunami forms off the coast as a result of an earthquake.
D. Scientists look for earthquake epicenters on the ocean floor of the coast of Japan.

5. Why did Japan's earthquake early warning system only give 15 seconds of warning to people in the city of Sendai before the 2011 earthquake?

Earthquakes almost always strike suddenly and happen very quickly. This makes it very difficult to warn people about an earthquake far in advance. Even though Sendai was close to the epicenter, the earthquake early warning system was only able to give people 15 seconds of warning that an earthquake was coming.

6. How is the volcano on the island of Niishima off Japan's coast acting as a creative force?

   A. The volcano is causing terrible destruction in Japan, just like earthquakes.

   B. The volcano continues to erupt, creating new rock that makes the island bigger.

   C. The volcano creates new minerals, gases, and seafloor sediments.

   D. The volcano has stopped erupting.

7. In paragraph 8, the author says that the world's youngest island is a volcanic work in progress. What does *volcanic work in progress* mean?

   A. The island is getting smaller due to volcanic activity.

   B. The island is a dangerous place to visit due to volcanic activity.

   C. The island is not done growing due to volcanic activity.

   D. The island is no longer close to Japan due to volcanic activity.

Informational Text Comprehension Score: _____ / 7 points

To receive a point for a two-part question (i.e., 2) students must correctly answer both parts of the question.

Questions

8. What does the word *tremble* mean in the following sentence from paragraph 2?

> The myths tell of times when these animals moved or fought, making the earth tremble.

A. remain still

B. be afraid

C. shake

D. sink

The following question has two parts. Answer Part A and then answer Part B.

9. **Part A**: In paragraph 7, the author says the turtle was true to his word. What does this mean about the turtle?

A. The turtle swam away and never returned.

B. The turtle did what he said he would do.

C. The turtle told the truth to the Great Spirit.

D. The turtle didn't listen to the Great Spirit.

Part B: How was the turtle true to his word?

He was true to his word by bringing several other turtles to the Great Spirit, which is what he said he would do.

10. Why did the Great Spirit tell the turtles not to move?
    - (A.) If the turtles moved, they would destroy the land the Great Spirit created.
    - B. If the turtles moved, they would get angry.
    - C. If the turtles moved, their legs would get stiff and their minds would get bored.
    - D. If the turtles moved, they would help the Great Spirit create land.

The following question has two parts. Answer Part A and then answer Part B.

11. **Part A**: Why did the turtles get angry?
    - A. Their legs got stiff and their minds got bored.
    - B. The Great Spirit told them not to move.
    - C. They wanted to swim.
    - (D.) They couldn't agree on which direction to go.

    Part B: What happened when they got angry?

    Some swam in one direction and the rest in another, causing the land on their backs to rumble and shake and make big cracks appear in the soil.

12. What causes earthquakes according to this Gabrielino Indian myth?
    - A. The Great Spirit creates land on turtle shells.
    - (B.) The turtles start moving in different directions.
    - C. The Great Spirit tells the turtles not to move.
    - D. The turtles agree on which direction to swim in.

13. In the Hoh myth, why does Thunderbird grab Whale out of the water?

A. Whale provided food and oil for the Hoh people.

B. Whale got along well with the other whales in the ocean, which helped the Hoh people.

C. The Hoh people were suffering because Whale was destroying the other whales they depended on.

D. Thunderbird wanted Whale to live on land instead of in the ocean to help the Hoh people.

14. What caused earthquakes according to this Hoh myth?

A. Thunderbird grabbed Whale and yanked him out of the water.

B. Thunderbird stayed high in her mountaintop nest while Whale stayed in the ocean.

C. Whale grabbed Thunderbird and yanked her into the water.

D. Whale and Thunderbird fought as Thunderbird tried to keep her claws gripped around Whale.

Literary Text Comprehension Score: _____ /7 points

To receive a point for a two-part question (i.e., 9 and 11) students must correctly answer both parts of the question.

Reading Comprehension total_____ /14 points

Grammar

For each item, insert a comma or commas in the appropriate location(s). When applicable, insert quotation marks in the appropriate locations.

1. The first expedition to the bottom of the Mariana Trench took place on January 23,1960.

2. The text states,"Earth's tectonic plates have been slowly moving and interacting for billions of years."

3. Mount Rushmore National Memorial
   13000 S. Dakota 244
   Keystone,SD 57751

4. "What if,"wondered Wegener,"continents were like enormous pieces of ice?"

5. Geologists found fossils of an ancient fern in similar rock layers in Africa,India,Australia,and South America.

Circle the phrase with the adjectives in the correct order.

6. old, large, Hawaiian, a volcano

   (a large, old, Hawaiian volcano)

   a Hawaiian, old, large volcano

7. smooth, shiny the obsidian rock

   (the smooth, shiny, obsidian rock)

   the smooth rock, shiny obsidian

8. a powerful, giant tsunami

powerful, giant a tsunami

tsunami a giant, powerful

Grammar Score: _____ */8 points*

Morphology

Write the correct word to complete each sentence.

1. An earthquake can seem to happen _____abruptly_____, but it actually happens because pressure has been building up for some time.
   (loudly, carefully, abruptly, accidentally)

2. A volcanic _____eruption_____ can be calm and quiet or sudden and violent.
   (rupture, eruption, disruption, interruption)

3. Tsunamis can be very _____speedy_____, moving up to 500 miles per hour.
   (tasty, easy, temporary, speedy)

4. It would be interesting to read a(n) _____biography_____ about Alfred Wegener.
   (photograph, biography, rupture, eruption)

5. A mid-ocean ridge can form along a huge _____rupture_____, or crack, in Earth's crust.
   (photograph, biography, rupture, eruption)

6. Scientists make conclusions after _____carefully_____ examining evidence.
   (careful, carefully, busily, busy)

Morphology Score: _____ */6 points*

Mid-Unit Content Assessment

1. The study of the makeup of the earth and the processes that change and shape it is called _____.

   A. archaeology

   B. geology

   C. ecology

   D. geography

2. Which statement best explains the theory of plate tectonics?

   A. Earth's tectonic plates have been slowly moving and interacting for billions of years.

   B. Earth's tectonic plates are far apart and are fixed in place.

   C. Earth's tectonic plates are far apart but are slowly moving closer to one another.

   D. Earth's tectonic plates fit tightly together and are fixed in place.

3. Which of the following is the most accurate statement about myths?

   A. Myths are told to teach important life lessons.

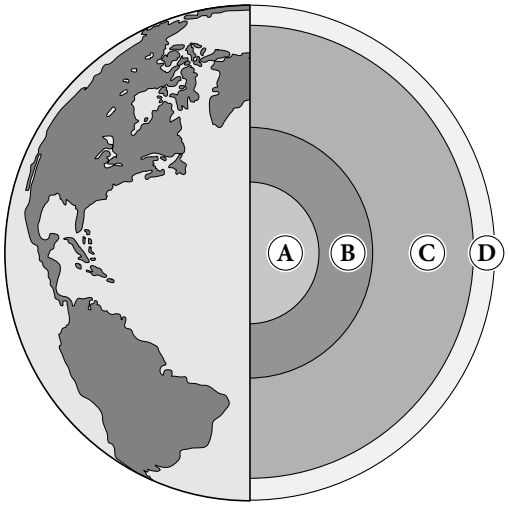
   B. Myths help explain unpredictable natural events.

   C. Myths are told to make children laugh.

   D. Myths are historically accurate accounts of past events.

This question has two parts. Answer Part A and then answer Part B.

4. **Part A**: Place the following labels on the diagram in the appropriate locations: *inner core*, *outer core*, *mantle*, and *crust*.



A. inner core

B. outer core

C. mantle

D. crust

Part B: Write the name of each of Earth's layers next to its characteristics in the following chart.

inner core	outer core	mantle	crust

Earth's Layer	Characteristics
mantle	Earth's largest and thickest layer; consists of very hot, very dense rock
inner core	solid; made of very hot metal; may be nearly as hot as the sun's surface; innermost layer
crust	thin; rocky; outermost layer; two types: oceanic and continental
outer core	liquid; made of very hot metal

5. Place a check mark next to each item in the chart that is a characteristic of tsunamis.

Characteristics of Tsunamis	Yes or No?
Tsunamis form when earthquakes occur in oceanic crust, causing the seafloor to shift.	✓
Tsunamis travel fast—as much as 500 miles per hour.	✓
Tsunamis are easy to stop as long as scientists have enough warning when they begin to form.	
Tsunamis can grow to become as tall as a three- or four-story building.	✓

6. Read the statement in the "What is the cause?" column. Choose the statement that best relates to the information in the "What is the cause?" column and write the letter of the statement in the "What evidence is there?" column.

What is the cause?	What evidence is there?
Tremendous pressure and heat in the mantle force magma in a chamber below Earth's crust to move upward through a crack in Earth's surface.	C

A. A fault-block mountain forms.

B. Glaciers deposit sediments on Earth's surface.

C. Magma erupts from a volcano's top onto Earth's surface as lava.

D. A tectonic plate subducts beneath another plate.

7. Volcano myths often explain volcanic activity by _____.

(A.) describing how gods and goddesses cause volcano-related occurrences

B. providing scientific evidence showing how volcano-related events occur

C. telling how occurrences above Earth's surface cause volcanic activity

D. telling how occurrences below Earth's surface cause volcanic activity

8. Label each of the following volcano descriptions with the appropriate word: *active*, *dormant*, or *extinct*.

   A. extinct a volcano that has not erupted for at least 10,000 years and is not likely to erupt again

   B. active a volcano that has erupted in the past 10,000 years and is likely to erupt again

   C. dormant a volcano that hasn't erupted for a long time but could erupt again

9. Which of the statements best explains the relationship between earthquakes and faults?

   A. Earthquakes cause faults to form along plate boundaries.

   B. Faults are cracks in Earth's crust that form when earthquakes occur.

   C. *Faults* and *earthquakes* are two words to describe the same geological process.

   D. Earthquakes begin with huge blocks of rock moving along faults.

10. Place a check mark next to each item in the chart that Alfred Wegener's continental drift hypothesis helped explain.

Continental drift hypothesis explained that…	Yes or No?
long ago, Earth had one huge landmass called Pangaea	✓
as continents moved apart, their climates changed	✓
drifting continents actually moved due to tectonic plates	
groups of plants and animals that once lived together were separated as the continents moved apart	✓

11. Read the statement in the "What is the cause?" column. Choose the statement that best relates to the information in the "What is the cause?" column and write the letter of the statement in the "What evidence is there?" column.

What is the cause?	What evidence is there?
Water drains down into openings in the ground above a magma chamber. Heat from the magma turns the water scalding hot. As the hot water rises back up through the openings below Earth's surface, it turns into steam, which increases the pressure, forcing the mixture of steam and hot water rushing and bubbling upward.	B

A. A tsunami forms and grows as it moves toward land.

B. A geyser explodes above Earth's surface as a hissing fountain of hot water and steam.

C. An igneous rock breaks down into sediments, later forming sedimentary rock.

D. A crater forms at the top of a volcano.

12. Which of the following word pairs completes the statements?

> Seafloor spreading is the process of oceanic plates moving apart very slowly. When the seafloor dips down as one tectonic plate slides under another, a narrow, extremely deep valley called a(n) _____ is created. When oceanic plates move away from one another and form cracks in Earth's crust, an underwater mountain called a(n) _____ is created.

A. geyser; hotspot

B. hotspot; geyser

C. ocean trench; mid-ocean ridge

D. mid-ocean ridge; ocean trench

13. Moving apart, colliding, and sliding sideways past one another are three ways in which _____ move.

A. continents

B. tectonic plates

C. faults

D. mid-ocean ridges

14. Label the following statements with the appropriate term related to how scientists measure earthquake intensity: *seismograph* or *Richter scale*.

A. Richter scale Numbers describe the intensity of earthquakes based on the largest seismic wave recorded.

B. seismograph Jagged up-and-down lines show the energy of seismic waves.

15. Scientists observed that _____, which provided evidence of changes over time on Earth's surface.

A. land never moved or changed

B. the same types of rocks and fossils were found in different places

C. the climate of Antarctica was extremely cold

D. animals that once lived on land later lived under water

16. Which of the following do geysers, volcanoes, and hot springs have in common?

A. They form along faults.

B. Scientists know when they will erupt.

C. They form both along plate boundaries and above hotspots.

D. They only form along plate boundaries.

_____ */16 points*

End-of-Unit Content Assessment

1. Geysers, volcanoes, and hot springs all share which of the following?
   - A. They form along faults.
   - B. Scientists can predict when they will erupt.
   - C. They form both along plate boundaries and above hotspots.
   - D. They form only along plate boundaries.

2. In which of the following sentences is *conclusion* used correctly?
   - A. Inge Lehmann suspected that Earth might have more than three layers, so she came to the conclusion that it did.
   - B. In his conclusion, the scientist proposed different possibilities of how earthquakes might occur.
   - C. The researcher reached a conclusion after years of collecting evidence.
   - D. Once you reach a conclusion, it is set in stone and no other evidence can be examined.

3. Label each of the following rock descriptions with the appropriate word: *igneous*, *metamorphic*, or *sedimentary*.

   sedimentary — a rock that is made of sediments that have been naturally compacted and cemented together

   igneous — a rock that forms when magma cools and solidifies

   metamorphic — a rock that forms when minerals in other types of rocks are altered due to extreme heat and pressure

4. What is geology?
   - A. the study of relationships between living things and their environment
   - B. the study of the makeup of the earth and the processes that change and shape it
   - C. the study of the characteristics of the earth's surface
   - D. the study of past human life and activities by examining bones, tools, and other objects left behind

5. The theory of plate tectonics states that _____.

   A. Earth's continents were once all joined together as one supercontinent

   B. Earth's continents stay still and do not move

   C. Earth's crust, mantle, and core all form tectonic plates that change very slowly

   (D.) Earth's crust and part of the mantle are broken up into sections that slowly move

6. Label each of the following descriptions with the appropriate term: *physical weathering*, *chemical weathering*, or *erosion*.

   erosion a process that moves sediments to new locations

   physical weathering a process that breaks big rocks into smaller rocks without changing the minerals they contain

   chemical weathering a process that breaks down rocks by changing the minerals they contain

Match the item from the column on the left with the description on the right. Write the letter on the line.

7. c tsunami	a. a deep-sea geyser that forms as seawater sinks down through cracks in the oceanic crust and then releases extremely hot, mineral-rich water back up through cracks in the crust
8. a hydrothermal vent	b. an underwater volcano that forms wherever magma is erupting through oceanic crust
9. b seamount	c. a gigantic wave of seawater caused by an earthquake in oceanic crust

10. A mid-ocean ridge is _____; an ocean trench is _____.

   (A.) an underwater mountain; a narrow, extremely deep valley

   B. a deep-sea geyser; an underwater volcano

   C. a geyser; an underwater mountain

   D. a narrow, extremely deep valley; a deep-sea geyser

11. Seafloor spreading can cause a mid-ocean ridge and an ocean trench to form. Label each of the following causes with the appropriate effect: *mid-ocean ridge* or *ocean trench*.

    A. The seafloor dips down as one tectonic plate slides under another. ocean trench

    B. Magma erupts through huge cracks in Earth's crust as lava. mid-ocean ridge

12. Circle the answer that best supports the following statement.

> The rock cycle explains the changes that occur in rocks over very long periods of time.

    A. Rocks are created and then destroyed in a long process that occurs slowly over time.

    B. Rocks are created, destroyed, and recreated in a continuous cycle.

    C. Weathering and erosion change rocks in a long process that occurs slowly over time.

    D. Rocks are solidified from sediments in a continuous cycle.

13. Fill in the "Type of Volcano" column in the chart with the appropriate type being described: *active volcano*, *dormant volcano*, or *extinct volcano*.

Type of Volcano	Description
extinct volcano	a type of volcano that has not erupted for at least 10,000 years and is not likely to erupt again
active volcano	a type of volcano that has erupted in the past 10,000 years and is likely to erupt again
dormant volcano	a type of volcano that is considered active but hasn't erupted for a very long time

14. What evidence suggested that the continents' locations were once very different than they are today?

A. the same types of rocks and fossils were discovered in different parts of the world

B. maps from long ago showed that the continents were once closer together

C. ancient records were found describing the climate of Antarctica as being warm

D. Alfred Wegener introduced the continental drift hypothesis

15. Moving apart, colliding, and sliding sideways past one another are the three different ways in which _____ interact.

A. faults

B. mid-ocean ridges

C. continents

D. tectonic plates

16. The continental drift hypothesis explains that _____.

A. all the continents exist on plates

B. all of the continents were once joined as Pangaea until they broke apart and slowly moved away from each other

C. hot water under the earth explodes on the surface

D. climates change and animals evolve over long periods of time

17. Which of the words in the following sentence provides the best clue as to the meaning of the word *fossil*?

> Geologists found fossils of an ancient fern in similar rock layers in Africa, India, Australia, and South America.

A. geologists found

B. similar rock layers

C. in Africa, India, Australia, and South America

D. ancient fern

18. Weathering is the process in which _____; erosion is the process in which _____.

A. rocks are mixed with liquid and completely broken down; rocks are packed together tightly

B. rocks are broken down into smaller pieces; sediments are moved from place to place

C. sediments are moved from place to place; rocks are broken down into smaller pieces

D. large amounts of rocks move down the side of a mountain; rocks are broken down and the minerals they contain change

Match the item from the column on the left with the description on the right. Write the letter on the line.

19. d geyser	a. a hill or mountain that forms over a crack in Earth's crust from which lava erupts
20. e hotspot	b. a crack in Earth's crust
21. b fault	c. the violent shaking of the ground caused by huge blocks of rock moving along a fault
22. f rock	d. an underground hot spring that periodically erupts, shooting hot water and steam into the air
23. a volcano	e. a very hot region deep within Earth's mantle where a huge magma chamber forms
24. c earthquake	f. a naturally occurring nonliving solid made of minerals

25. Read the description and examples in each row and write the correct letter in the "Type of Mountain" column.

    A. fold mountains

    B. fault-block mountains

    C. dome mountains

Type of Mountain	Description	Examples
A	mountains formed when rocks are pushed up into huge folds by moving tectonic plates; often contain quite a bit of sedimentary rock	Himalayas between India and China; Alps in Europe; Appalachians of North America; Urals in Russia
C	mountains generally formed when magma pushes upward into Earth's crust from the mantle and cools into igneous rock underground, causing the crust above it to bulge; usually occur as isolated mountains on otherwise flat plains	Utah's Navajo Mountain; Black Hills of South Dakota
B	mountains formed when gigantic blocks of rock move up and down along faults	Germany's Harz Mountains; Grand Tetons in Wyoming; Basin and Range Province of Utah, Nevada, and Arizona

26. What natural occurrence does the following myth passage explain?

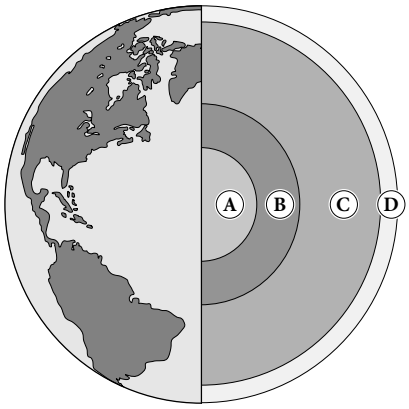
> The Chief of the Above World came to the aid of his people. He fought Monadalkni and the two spirits waged a violent, fiery battle. Sahale Tyee eventually gained the upper hand and forced Monadalkni back down into his mountain. Sahale Tyee caused the top of the mountain to collapse, forever shutting off this entrance to the Below World.

A. an earthquake
B. a volcanic crater being formed
C. a tsunami
D. a volcanic eruption

27. The _____ produces lines to show the energy of seismic waves while the _____ applies numbers to measure the magnitude of an earthquake based on the largest seismic wave recorded.

A. Modified Mercalli Intensity Scale; seismograph
B. seismograph; Richter scale
C. Modified Mercalli Intensity Scale; Richter scale
D. Richter scale; seismograph

28. Place the following labels on the diagram in the appropriate locations: *inner core*, *outer core*, *mantle*, and *crust*.



A. inner core

B. outer core

C. mantle

D. crust

29. Select the most appropriate answer to the following question.

What do myths help explain?

A. everyday occurrences

B. unpredictable natural events

C. cultural customs

D. why people tell stories

30. Which of the following provides evidence of weathering and erosion?

A. Volcanoes like Mount Fuji

B. Geysers like Old Faithful in Yellowstone

C. Island chains like the Hawaiian Island chain

D. Large canyons like the Grand Canyon

_____ */30 points*

Commas

For each item, insert a comma or commas in the appropriate location(s).

Examples: I flew to Santa Fe New Mexico on my first plane ride.
I flew to Santa Fe, New Mexico on my first plane ride.

He couldn't choose between vanilla chocolate or peach ice cream.
He couldn't choose between vanilla, chocolate, or peach ice cream.

The Olympic Games in Rio de Janeiro will begin on August 5 2016.
The Olympic Games in Rio de Janeiro will begin on August 5, 2016.

1. The three types of rocks are igneous, sedimentary, and metamorphic.

2. Willis Tower
   233 S Wacker Drive
   Chicago, IL 60606

3. Edmund Hillary and Tenzing Norgay reached the top of Mount Everest on May 29, 1953.

4. We visited New Orleans, Louisiana on our trip.

5. My favorite fruits are apples, peaches, and blackberries.

6. One of the worst earthquakes in American history took place in San Francisco on April 18, 1906.

7. On February 17, 1977, scientists located a hydrothermal vent along a mid-ocean ridge for the first time.

8. Mount Rushmore National Memorial is located in Keystone, South Dakota.

9. We learned about fold mountains, fault-block mountains, and dome mountains.

Write sentences for each of the following items. Be sure to use correct capitalization and punctuation. Each sentence should include at least one comma in its appropriate location.

1. a date

   Answers may vary.

2. a location

   Answers may vary.

3. items in a series

   Answers may vary.

Commas and Quotation Marks

For each item, insert commas and quotation marks in the appropriate locations.

Example: She told me I'll be back by 5pm before she left.
She told me, "I'll be back by 5pm," before she left.

1. The text states "The discovery of seafloor spreading at mid-ocean ridges was a turning point in geology."
2. "I wonder," he said "if we'll get to play outside today."
3. "You're out!" shouted the umpire to the baseball player.
4. "What do you think," she asked "about seeing a movie this weekend?"
5. "A volcano," according to the text "is a hill or mountain that forms over a crack in Earth's crust from which lava erupts."
6. They asked "Do you need anything from the grocery store?"
7. "Mountains," says the author "are some of Earth's most magnificent features."
8. We both said "Chocolate!" at the same time when asked what kind of ice cream we wanted.

Read the following passage from Chapter 5, "Mythic Volcano Spirits." Rewrite the sentences marked in bold so they include dialogue. Be sure to use correct capitalization and punctuation.

> ***Pele was pleased with her new home. She sent Hi'iaka to fetch her husband-to-be from Kauai. She told her little sister to be back in less than 40 days. She also warned Hi'iaka not to fall in love with Lohi'au herself. In turn, Hi'iaka made Pele promise to protect a grove of beautiful trees that grew on Kilauea.*** *Hi'iaka adored the trees. She was afraid that if Pele lost her temper, she would send out rivers of lava to burn them down.*

Answers may vary.

Sequencing Adjectives

Complete each sentence by choosing two adjectives from the ones provided and writing them in the correct order in the blanks.

Example: **Adjectives**: wooden, big, play, fun

We stay in the **big**, **wooden** cabin during the summer.

1. **Adjectives**: office, brick, new, tall

   We climbed up the stairs of the tall, new, brick, office building.

2. **Adjectives**: American, long, huge, crowded

   We boarded a crowded, huge, long, American airplane.

3. **Adjectives**: enormous, Italian, attractive, ancient

   It was an attractive, enormous, ancient, Italian city.

1. Answers may vary but correct order is: tall, new, brick, office.

2. Answers may vary but correct order is: crowded, huge, long, American.

3. Answer may vary but correct order is: attractive, enormous, ancient, Italian.

Circle the phrase with the adjectives in the correct order.

Example: a purple, new, umbrella

a new, purple umbrella

new, a purple umbrella

1. the fluffy, little, German dog

   little, the German fluffy dog

   the German, little, fluffy dog

2. a blue, long fishing boat

   a long, blue, fishing boat

   a fishing, long, blue boat

3. an oval, ordinary desk

   ordinary, an oval desk

   an ordinary, oval desk

Write a sentence using at least two adjectives and an article. Be sure to order the words appropriately and to use proper capitalization and punctuation.

Answers may vary.

–ly: Suffix Meaning "in a _____ way"

Write the correct word to complete each sentence.

1. She did not mean to forget her homework; it was purely _____accidental_____ that she forgot.
   (accidental, accidentally, careful, carefully)

2. Mountain building is not a _____speedy_____ process; it takes many years for mountains to form.
   (speedy, speedily, loud, loudly)

3. My cat only weighs 7 pounds, so I can _____easily_____ pick him up and carry him around with me.
   (temporary, temporarily, easy, easily)

Write the correct word to complete each sentence.

easy	easily	careful	carefully
speedy	speedily	loud	loudly

4. In looking at a world map, it's pretty _____easy_____ to see how the eastern edge of South America fits into the western edge of Africa like pieces of a puzzle.

5. He _____loudly_____ walked across the room thanks to his squeaky shoes.

6. Seismic waves move more slowly through liquids and more _____speedily_____ through solids.

Write a sentence using one of the words left in the box.

Answers may vary, but should include one of the following words:

***easily*, *careful*, *carefully*, *speedy,* or *loud*.**

Write a sentence using one of your own –ly *words.*

Answers may vary but should include a work with *–ly*.

Write a sentence using one of the root words and the same root word with –ly *added to the end.*

Answers may vary but should include a root word and that word with *–ly* added to it.

Root *rupt*

Write the correct word to complete each sentence.

uninterrupted	erupt	disrupt
rupture	abrupt	eruption

1. If a nearby volcano begins to _____erupt_____, people who live around the Bay of Naples are encouraged to evacuate.

2. It was clear my brother was studying for an assessment, so I tried not to _____disrupt_____ his concentration.

3. A seamount does not become an island in a(n) _____abrupt_____ way; it is a long, slow process.

Write the correct word to complete each sentence.

4. The classroom _____erupted_____ in laughter as a student read a funny story.
(erupted, disrupted)

5. Mid-ocean ridges form an almost _____uninterrupted_____ chain of underwater mountains around the earth.
(abrupt, uninterrupted)

6. My father had to go to the hospital because of a _____rupture_____ in a blood vessel.
(rupture, eruption)

Write a complete sentence for each of the following words. Make sure to use correct capitalization and punctuation.

1. *erupt*
   Answers may vary.

2. *eruption*
   Answers may vary.

3. *abrupt*
   Answers may vary.

4. *disrupt*
   Answers may vary.

5. *uninterrupted*
   Answers may vary.

6. *rupture*
   Answers may vary.

Suffixes *–ly* and *–y* and Roots *graph* and *rupt*

Write the correct word to complete each sentence. Words will not be used more than once. Some words will not be used.

messy	taste	interrupt	mess
kindly	biography	tasty	busily
abruptly	busy	kind	photograph

1. The meal my grandfather prepared for us was very _____tasty_____.
2. I'm sorry to _____interrupt_____ you while you are writing, but I have a question.
3. It's helpful to see a(n) _____photograph_____ of each of the different types of mountains to compare them.
4. Our dog is a(n) _____messy_____ eater and always gets his food all over the floor.
5. We had guests coming over for dinner, so we _____busily_____ cleaned our rooms that afternoon before they arrived.
6. The group members had to _____abruptly_____ stop working on the project when the building started shaking due to an earthquake.
7. Would you _____kindly_____ hand me the biography of Edmund Hillary?
8. It was _____kind_____ of them to send me a birthday card.

Write a complete sentence for each of the following words. Be sure to use correct capitalization and punctuation.

1. *interrupt*

   Answers may vary.

2. *messy*

   Answers may vary.

3. *busily*

   Answers may vary.

4. *abruptly*

   Answers may vary.

5. *biography*

   Answers may vary.

The Rock Towns of Cappadocia

Word(s) from the Chapter	Pronunciation	Page
Cappadocia	/kap*ə*doe*shə/	90
Mount Erciyes	/mount/ /er*sie*əs/	92
Rapa Nui	/ro*po/ /noo*ee/	98
moai	/moe*wie/	98

As you read the enrichment selection, "The Rock Towns of Cappadocia," answer the following questions using complete sentences.

1. How are most hoodoos formed?
   Hoodoos are formed when wind and water slowly carve tuff into ridges, mounds, and sharp pinnacles.

2. Why wasn't it difficult for people to create caves and rock houses in Cappadocia's rock formations?
   Before it is exposed to air, tuff is very soft. Once people scraped away the hard outer surface, they had only to cut away the soft tuff underneath.

3. Why did early Christians settle in Cappadocia?
   Christians were religious refugees, and wanted to settle in a place that was isolated so they could practice their religion safely and in peace.

4. What features might you find in the rock dwellings in Cappadocia?

   Answers may vary, but should include: rooms for eating and sleeping, animal stables, food storage areas, staircases, towers with windows, ventilation systems, and monasteries.

5. Why do you think people wanted to live in these rock dwellings? What were some of the advantages of these unique houses?

   Answers may vary, but should explain that these dwellings provided protection from invaders and the environment. They were easy to make and lasted a long time.

The following question has two parts. Answer Part A first and then answer Part B.

6. **Part A**: What are the moai?

   Moai are huge statues that are partial human figures with large heads, high cheekbones, and heavy brows. The Rapa Nui people carved them on Easter Island out of tuff.

   Part B: How did the Rapa Nui move them once they were finished?

   No one is sure how the Rapa Nui people moved them because many weighed over 80 tons.

Violent Vesuvius

Word(s) from the Chapter	Pronunciation	Page
Pliny	/plin*ee/	102
Misenum	/mis*en*um/	103

As you read the enrichment selection, "Violent Vesuvius," answer the following questions using complete sentences.

1. Why do scientists monitor Vesuvius so closely?

   Scientists monitor Vesuvius so closely because it has been one of Europe's most active volcanoes.

   Page(s) 100

2. What are some signs that might indicate Vesuvius is on the verge of erupting?

   The slightest movement or any unusual shaking, as well as changes in the hot gases from the crater can indicate Vesuvius is on the verge of erupting.

   Page(s) 100

3. Complete the following chart.

Geological Term	Definition
eruption column	an enormous cloud of ash, bits of rock, and toxic gas that shoots skyward from an erupting volcano at hundreds of feet per second
Plinian eruption	an eruption during which the top of the eruption column spreads outward
pyroclastic flow	a sort of avalanche of intensely hot ash, rock fragments, and volcanic gas that rolls down the side of a volcano

Page(s) 107, 109

4. How do we know so much about the eruption of Vesuvius in 79 CE?

We know about the 79 CE eruption of Vesuvius because a Roman named Pliny lived through the disaster and wrote about it in a letter.

Page(s) 102

A Deep-Sea Detective Story

Word(s) from the Chapter	Pronunciation	Page
Galapagos	/gə*lop*ə*goes/	113

As you read the enrichment selection, "A Deep-Sea Detective Story," answer the following questions using complete sentences.

1. Name two discoveries that changed how people thought about geology.

   The discovery of seafloor spreading and the discovery of mid-ocean ridges changed how scientists thought about continents and their movement.

   Page(s) 110

2. What are some clues scientists look for when searching for hydrothermal vents?

   Heat deep in the ocean and brightly colored rocks are both clues that scientists look for, as they indicate a nearby hydrothermal vent.

   Page(s) 111

3. Why do unique animals live near hydrothermal vents but not on most other areas of the deep seafloor?

   The animals survive thanks to bacteria. Vents are home to unusual types of bacteria that use chemicals in hot vent water—instead of sunlight—to make food. Some vent animals eat the bacteria directly. Others eat the bacteria-eaters.

   Page(s) 117

4. Why do you think this chapter is titled "A Deep-Sea Detective Story?"

Answers may vary, but should explain that a detective uses clues to solve a mystery, which is what scientists were doing: they used evidence to search for new undersea discoveries.

Page(s) **Answers may vary.**

Middle-of-Year Grammar Assessment

Read and answer each question. Some of the questions have two parts. You should answer Part A of the question before you answer Part B.

1. **Part A:** In the two sentences below, write *n.* above the nouns and *adj.* above the adjectives.

   Part B: Draw an arrow from each adjective to the noun it describes.

Example: n. Dana imagined a adj. faraway n. land where adj. grumpy n. trolls lived.

adj. n. adj. n. n.
Heavy rain led to a major flood in the valley.

adj. n. adj. n. n.
For the first part of the long trip, Hildy stared out the window at the adj. n.
spotted cows.

2. **Part A:** In the two sentences below, write n. above the nouns and adj. above the adjectives.

   Part B: underline the letters that should be capital letters.

n. n. n. adj. n.
In october, percy traveled to hooterville to visit his youngest daughter.

n. adj. n. n. n.
I know that jeremy lived on the shady side of morgan avenue.

3. Change the adjective in parentheses into an adverb and identify the verb it describes.

Miranda laughed (loud) at her uncle's joke.

Adverb: loudly

The adverb describes the verb: laughed

4. Write a sentence using the verb and adverb provided.

verb: wrote adverb: carefully

Answers will vary.

5. **Part A:** Write adv. above the adverbs in the sentences provided. Then draw an arrow from the adverb to the verb it describes.

Part B: Underline the subject and and draw a squiggly line under the predicate in the sentences provided.

adv.

Matt and his goat ran happily through the fields of Brooklyn.

adv.

The old miner excitedly told stories about settling in California before it was a state.

6. **Part A:** Indicate whether each sentence fragment provided is a subject or predicate.

   Part B: Correct the sentence fragment by rewriting it as a complete sentence.

   Example:

   Fragment: The otter in the stream

   The fragment is a: (subject) predicate

   Corrected Sentence: The otter in the stream climbed onto our raft.

   A. Fragment: slept late on Sunday

      The fragment is a: subject (predicate)

      Corrected Sentence: **Answers will vary.**

   B. Fragment: Mr. Lumbly's science class

      The fragment is a: (subject) predicate

      Corrected Sentence: **Answers will vary.**

7. Rewrite each of the following run-on sentences as two complete sentences.

Meredith always looked forward to math class it was her favorite subject.

Meredith always looked forward to math class. It was her favorite subject.

Andrew grew three inches while he was away at summer camp his school friends were surprised at how tall he was.

Andrew grew three inches while he was away at summer camp. His school friends were surprised at how tall he was.

8. **Part A:** Punctuate the following sentences. The sentence type of each is provided.
   A. Declarative: I prefer apple juice to prune juice.
   B. Interrogative: What time does the assembly start?
   C. Imperative: Please stand closer together.
   D. Exclamatory: I got a kitten for my birthday

9. Circle the sentence type of each of the following sentences.

   A. The temperature today is one degree warmer than yesterday.

   (declarative) interrogative imperative exclamatory

   B. I hate getting sand in my bathing suit!

   declarative interrogative imperative (exclamatory)

   C. What is your middle name?

   declarative (interrogative) imperative exclamatory

   D. Call me first thing tomorrow morning.

   declarative interrogative (imperative) exclamatory

10. Insert a comma or commas in the correct location(s) in the following sentences.

   A. Belinda's three favorite sports are bowling,volleyball and golf.

   B. The Empire State Building
   350 5th Avenue
   New York NY 10118

   C. Neil Armstrong walked on the moon on July 24 1969.

   D. The world's largest ball of twine is located in Cawker City Kansas.

11. Write sentences for each of the following items. Be sure to use correct capitalization and punctuation. Each sentence should include at least one comma in the correct location.

A. Write a sentence containing a date.

Answers will vary.

B. Write a sentence containing a city and state.

Answers will vary.

C. Write a sentence containing three items in a series.

Answers will vary.

12. Which of the following shows the correct way to use a comma and quotation marks to note a quotation from a text.

A. On page 37 of the text, the author states Abraham Lincoln was the sixteenth President of the United States

B. On page 37 of the text, the author states, "Abraham Lincoln was the sixteenth President of the United States."

C. On page 37 of the text, the author states, Abraham Lincoln was the sixteenth President of the United States

D. On page 37 of the text, the author states "Abraham Lincoln was the sixteenth President of the United States."

13. Which of the following shows the correct way to use a comma and quotation marks when quoting direct speech?

    A. Luisa lost her patience and said Let's get this game started!

    B. Luisa lost her patience and said, Let's get this game started!

    C. Luisa lost her patience and said "Let's get this game started!"

    (D.) Luisa lost her patience and said, "Let's get this game started!"

14. Complete the sentences by choosing two adjectives from the ones provided and writing them in the correct order in the blanks.

    Example:

    Adjectives: big, plastic, green, new

    She brought her big , new boat into the bathtub.

    A. Adjectives: handsome, small, spotted, Mexican

    The **small** , **spotted** pony was her favorite

    B. Adjectives: long, Chinese, beautiful, old

    We traveled in a **Chinese** , **beautiful** train.

15. Choose the answer that shows the correct way to sequence multiple adjectives.

    (A.) Jenny read a fascinating, old book over the summer.

    B. Jenny read a fascinating, an old book over the summer.

    C. A fascinating, old book over the summer Jenny read.

    D. Jenny read an old fascinating book over the summer.

Middle-of-Year Morphology Assessment

Read and answer each question. Some of the questions have two parts. You should answer Part A of the question before you answer Part B.

1. If you found a rock that was unusual, what does that mean?

   A. The rock was ordinary.

   B. The rock was not ordinary.

   C. The rock was boring.

   D. The rock was easy to find.

2. Luis settles arguments in a nonviolent way. Describe how Luis settles arguments.

   Possible answer: Luis does not use physical force to settle arguments. He settles arguments with words.

3. Choose the word that best completes the sentences provided.

The treehouse was too small, so we bought some wooden planks to _____ it.

A. circle
B. encircle
C. large
D. enlarge

Lora showed great _____ by swimming across the lake.

A. courage
B. encourage
C. danger
D. endangers

4. Write a sentence using the word *matriarch*.

Answers will vary.

5. What is the meaning of the root *graph*?

A. something alive
B. something written or drawn
C. something that is seen
D. something that is not seen

6. Choose the word that best completes the sentences provided. Then identify the part of speech of the word you chose.

   A. She called the plumber because the pipe was _____. (leak, (leaky))

   The part of speech of the word I chose: **adjective**

   B. A gentle _____ helped keep us cool. (breeze, breezy)

   The part of speech of the word I chose: **noun**

7. Turn the word gloom into a new word using the suffix -y.

   A. What is the new word? **gloomy**

   B. What part of speech is the new word? **adjective**

8. Circle the word that best completes the sentences provided.

   A. The plane reduced its __ before it landed.

   (speed) speedy speedily

   B. After waking up an hour late, Bridgette __ got dressed and ate breakfast.

   speed speedy (speedily)

   C. The __ squirrel easily escaped from the dog.

   speed (speedy) speedily

9. Identify the part of speech of the following words.

   A. ease
   part of speech: **noun**

   B. easy
   part of speech: **adjective**

   C. easily
   part of speech: **adverb**

10. What does the root *rupt* mean?

   A. something written

   B. very old

   C. to break or burst

   D. most powerful