

Name: ANSWER KEY #: \_\_\_\_\_

## Earth's Systems and Earth's Systems Interactions

### **STEMscopes: We are combining two Scopes for this packet (Earth's Systems and Earth's Systems Interactions)**

Earth has various systems working together to sustain life for the organisms that occupy it. Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes.

### **Standards that will be addressed:**

- **5-ESS2-1:** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
- **5-ESS2.A.1:** Earth Materials and Systems: Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

Remember to look at the Science tab on our class website for additional resources, information, and updates.

### **What's Included in the Packet:**

1. STEMscopedia (Earth's Systems)
2. Graphic Organizer: Interactions on Earth
3. Explain: Communicate Organizer
4. Content Connection Videos:
  - a. Prevailing Winds & Weather Patterns
  - b. Hurricanes
5. Science Today: Landslides in Brazil
6. Independent Practice: Odd One Out
7. Concept Attainment Quiz
8. STEMscopedia (Earth's Systems Interactions)
9. Linking Literacy: Earth's Systems Interactions Note-Taking Guide
10. Independent Practice
  - a. Alike and Different
  - b. Mystery Word
11. Concept Attainment Quiz
12. Math Connections

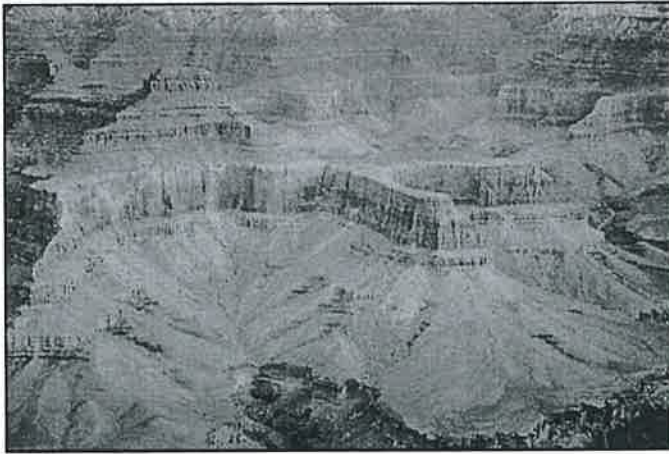
### **Optional Extension Activities:**

- At Home Connection Piece (see class website)
- Web Surfing Science (see STEMscopes account)

### **Grading:**

- Earth's System: CER and Multiple Choice- tentatively scheduled for March 5th
- Earth's Systems Interactions: Short Answer Questions- tentatively scheduled for March 9th
- Packet collection at the end of both Scopes

## Reflect



The Grand Canyon, formed by powerful forces of water, wind weathering, and erosion, allows us to see many layers of the geosphere that normally we would not see.

### What is the hydrosphere?

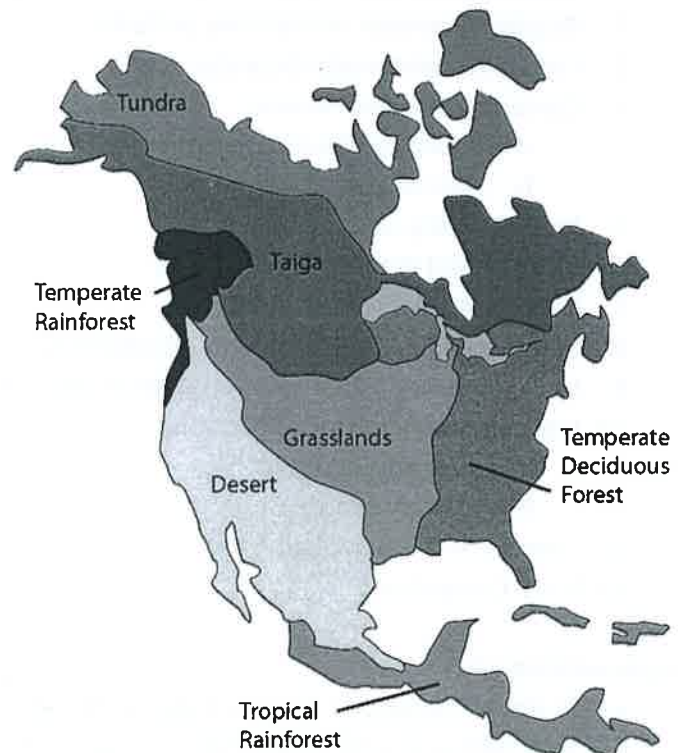
The hydrosphere is the system on Earth that contains all of the ice and water. Freshwater bodies, like lakes and rivers, help make up the hydrosphere. Tributaries that flow to the ocean, as well as glaciers that melt into the ocean, are also part of this hydrosphere system. The world's oceans make up the largest piece of the hydrosphere.

### What is the biosphere?

The biosphere is the system on Earth that contains all living things, including humans. The biosphere has smaller parts called biomes that contain different living organisms. Earth is divided into several biomes, and each of these biomes falls into one of two categories: land or aquatic. Land biomes are large land mass areas, such as the tropical rainforest (jungle), savanna (grasslands), taiga, tundra, mountain, and temperate forests. Aquatic biomes include marine, estuarine, and freshwater.

### What is the geosphere?

The Earth's geosphere is made up of all the solid and molten rock and soil and sediments found on the planet. This serves as the foundation upon which everything else on our planet has built habitats. You can't see all of our geosphere because most of the solid and molten rock is found underneath the solid ground you stand upon every day. The ocean floor is also part of the geosphere, but it lies so far underneath the Earth's oceans that few creatures ever get to see it. Surface rocks and the soils and sediments in which we plant crops or landscape our yard, mine for ore or use to make bricks, are parts of the geosphere that you see and use every day.



## Reflect

### How are land biomes categorized?

Land biomes are categorized by their plants, animals, temperature, and amount of precipitation (climate). Some biomes, such as the tundra and taiga, stay very cold. Other biomes, such as tropical rainforest and temperate forests, are warmer.



### Tropical Rainforest

Tropical rainforests are found in areas along Earth's equator. They have thick *vegetation*, poor soil, warm temperatures year-round, and heavy precipitation (between 80 and 400 inches of rain per year). Tropical rainforests are important because they have the greatest **biodiversity** of all land biomes. Scientists discover new species of plants and animals in rainforests every day! Tropical rainforests have broad-leafed plants, vines, many types of insects, amphibians, reptiles, and mammals.

**biodiversity:** the variety of living things in an area

### Savanna

Savannas are known by several names throughout the world. In parts of Europe, they are called *steppes*. In the United States, we call them *prairies*. These areas are usually flat lands covered with grasses. They serve as grazing lands for many large mammals, such as buffalo, antelope, sheep, and cows. Savannas have very few trees; you can see for long distances here. They have cold winters and warm summers. Savannas have birds, insects, large mammals, and animals that *burrow*.



**burrow:** to dig a home underground



### Taiga

Also known as the boreal forest, this is an area that is covered with cone-bearing trees such as spruce and pine.

**migrate:** to move from one region to another, especially based on seasons

“Taiga” is a Russian word that means “forest.” This biome has very cold, snowy winters and warm, humid summers. They stretch over northern Europe and North America. The plants that live there have thick, waxy coatings over the leaves to prevent them from losing water. Many insects and birds *migrate* to the taiga in the summer. Some animals that live there are snowshoe hares, moose, wolverines, and bobcats.

## Reflect

### Tundra

The tundra biome is a very cold, flat biome. Found at the most northern land areas of the Earth, few plants and animals live here. The soil is permanently frozen, and so it is known as *permafrost*. Although the ground may be covered with ice, the tundra gets very little precipitation. During warmer periods, the ice may melt, forming ponds and marshes where migrating birds and insects may visit. Most of the plants that live here are small, such as mosses, lichens, and shrubs. Small mammals, such as mice and shrews, birds, mosquitoes, and larger mammals such as reindeer live in the tundra.



### Mountain

The mountain biome has a wide range of biodiversity based on location and elevation. It is also known by the name "alpine." Coniferous or evergreen, forests can be found at lower elevations. At higher elevations that are windier and colder, few large plants survive. The rocky, poor soil makes it difficult for plants to grow, and high winds could easily knock down large trees. The air is thin, and the carbon dioxide (CO<sub>2</sub>) that plants need for photosynthesis is in limited supply. Cold-blooded animals do not live there, because it is too cold for them to survive. Warm-blooded animals who live there have special adaptations that help them get the maximum oxygen (O<sub>2</sub>) from the air throughout their bodies. Llamas, mountain goats, and foxes live in mountain biomes.



**hibernate: slowing of body functions to conserve energy during winter**

### Temperate Forests

This biome is also known as the deciduous forest because the trees lose their leaves in the winter. Temperate forests are found in the eastern United States, western Europe, and eastern Asia. Rich soil, significant rainfall (around 50 inches per year), and distinct seasons allow this biome to support a wide variety of plants and animals. In the winter, some animals, such as ground squirrels and bears, *hibernate* because food sources may be limited. Trees such as oak, sweet gum, hickory, and maple provide both food and shelter for many animals. Each spring, these trees will grow new leaves. Animals found there may include owls, deer, snakes, and frogs.

## Reflect

What are characteristics of the aquatic biomes?

### Marine Biome

The marine biome is the largest in the world. Approximately 70% of the Earth's surface is covered by oceans. Plants and animals that live there have adaptations that help them survive in saltwater. The marine biome has two regions: shallow waters and deep ocean. Shallow waters are home to coral reefs. Deep oceans have far fewer species of plants and animals than shallow waters, but they are home to larger animals, such as sea turtles, whales, sharks, and squid. Oceans also contain algae—tiny plants that produce oxygen during photosynthesis. Over half of the oxygen you breathe was made in the ocean by some of the smallest plants on Earth!



Coral reefs have a large amount of biodiversity. Corals, crabs, octopi, and a wide variety of fish call coral reef areas home.

### Freshwater

Freshwater includes ponds and lakes (still water), and rivers and streams (moving water). Some ponds and lakes may be seasonal due to snows melting at higher elevations. Freshwater biomes represent only about 1% of all water found on Earth! Many types of water grasses, algae, and lilies make their homes in freshwater. Plants found in moving water must have a way to attach so that they do not float downstream. Fish, amphibians, reptiles, and birds also live in freshwater biomes. *Wetlands* are land areas covered by water. Many ponds and lakes provide freshwater wetland homes to a wide variety of animals, many of which migrate, like geese.

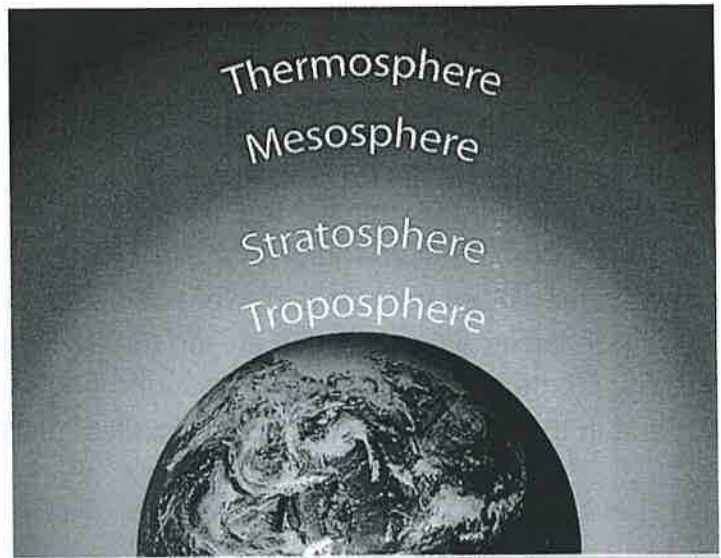
# Earth's Systems

## Reflect

### What is the atmosphere?

The atmosphere is the gaseous layer that surrounds Earth and makes life possible on our planet. This layer of gas protects us from the Sun's radiation and provides us with breathable air. The atmosphere and Sun's energy create the weather patterns on Earth. The atmosphere, hydrosphere, and geosphere all interact as a connected system that shapes the way all living things (the biosphere) experience daily life, weather, climate, and their environment.

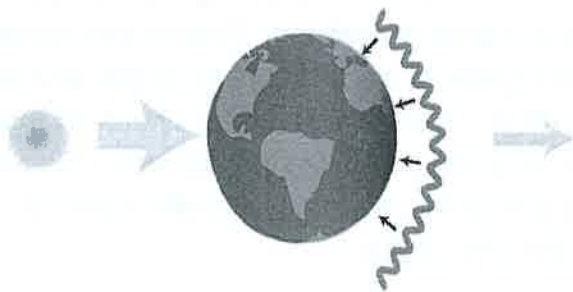
Think of the atmosphere as layers. The layer of atmosphere closest to us is the troposphere, where all weather occurs. It contains more than 80 percent of the gases in the atmosphere and almost all of the water vapor, too. As you go higher in the troposphere, the temperature decreases. Layers above the troposphere are: the stratosphere; mesosphere; thermosphere; and the last layer, the exosphere.



The layers of the Earth's atmosphere are shown. The exosphere, the outermost layer, is not shown.

**Earth Materials and Systems:** Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). The ocean supports a variety of ecosystems and organisms.

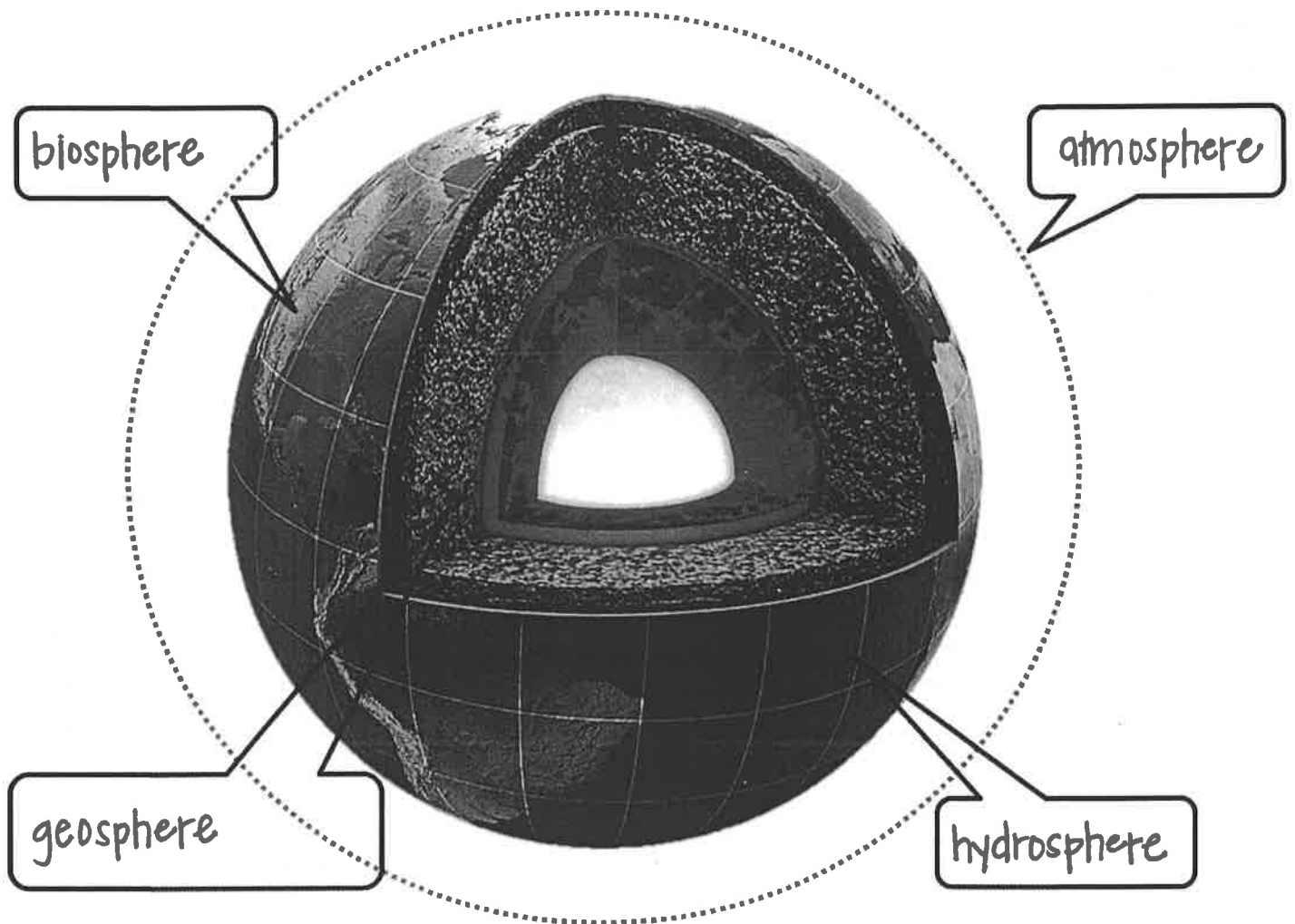
## Look Out!



Our atmosphere does an astronomical job of protecting us from the harmful radiation of space, but it also keeps other gases in. Greenhouse gases like carbon dioxide get trapped in the atmosphere and help keep our planet warm, which is one of the reasons we have life on Earth. However, too many of these gases can make our planet too warm and change weather patterns. We should be mindful of how many greenhouse gases we add to the atmosphere from manufacturing plants, car exhaust, and fires.

# Earth's Systems

Try Now



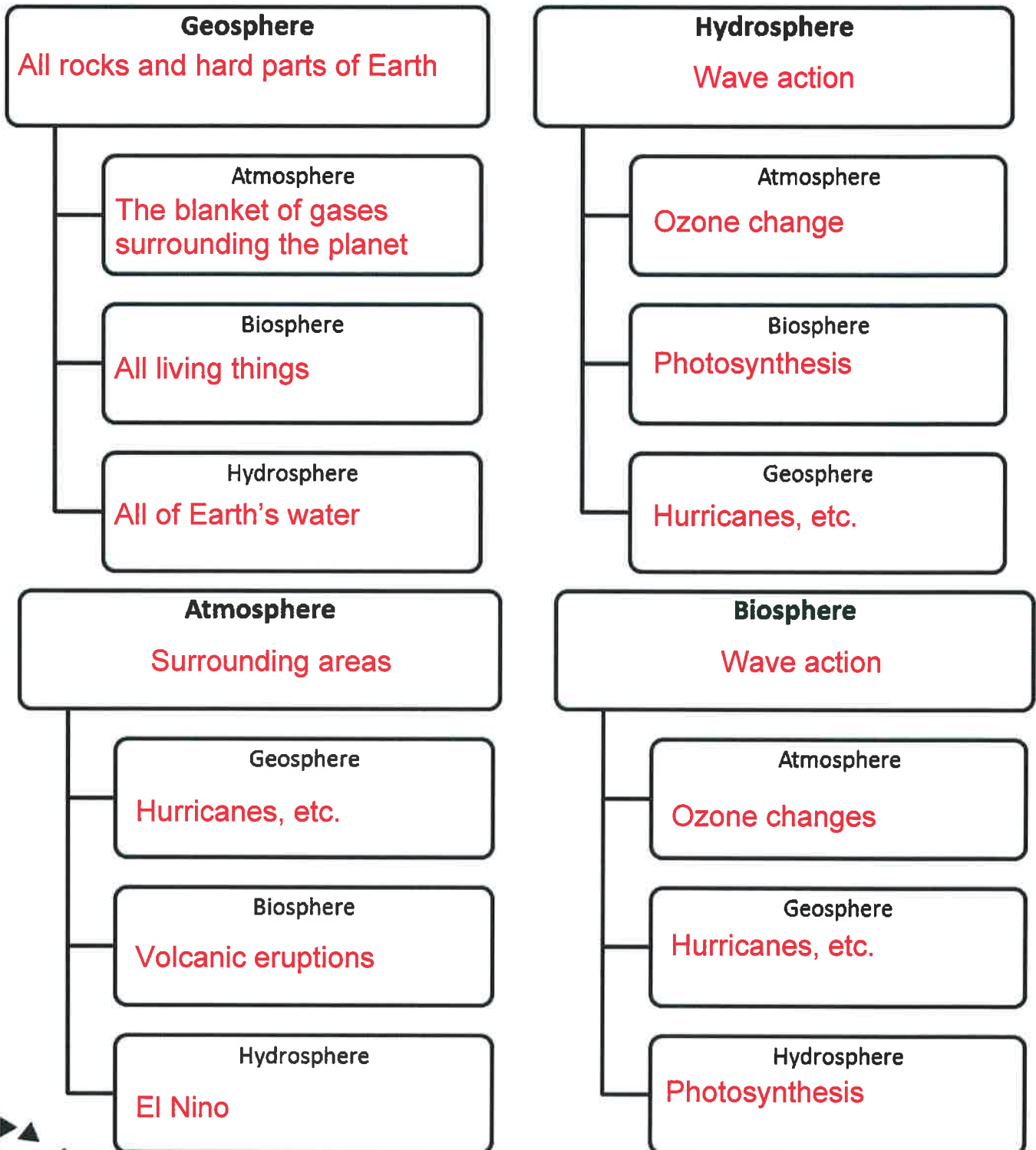
Take a moment and study the diagram above. Can you label all the systems of the planet that you see? Fill in the callout boxes with the Earth system to which it points. Share examples of each Earth system on your drawing.



## Graphic Organizers

Name: Sample Student Answers Date: \_\_\_\_\_ Group: \_\_\_\_\_**Interactions on Earth**

Complete each graphic. The top rectangle is the main sphere of the graphic. Record characteristics of that sphere in the rectangle. In the rectangles connected below, explain or provide an example of how those spheres interact.







## Explain: Communicate

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

### Driving Question:

Do other planets have systems like Earth?

### Informative Speech Goal:

- The speech should be three to five minutes in length
- The speech should be made of three parts: introduction of the topic, body (topic to be discussed), and conclusion to wrap it up.
- The speech should include a multimedia component to depict the systems of the planet.
- Information should include a comparison of:
  - Atmosphere;
  - Geosphere; and
  - Why the planet may not have a hydrosphere or biosphere.

Planet or Moon: \_\_\_\_\_

### Research:

### Outline:

Introduction

Body

Conclusion

*answers will vary  
(notes)*



# Content Connections Video

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

## Prevailing Winds

1. Hundreds of years ago what did people use to help them sail across the ocean? (Pause 0:17)

Winds

2. What are prevailing winds? (Pause 0:23)

Winds that follow a pattern

3. What directions can prevailing winds travel? (Pause 0:44)

East and West

## Weather Patterns (systems Interactions)

1. What was created high up in the Himalayan Mountains? (Pause 0:26)

weather

2. What kind of weather did the Himalayas cause for the deer? (Pause 0:35)

rain

3. Draw a picture of one kind of weather you saw in the video. (Pause 0:46)

drawings will vary.



# Content Connections Video

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

## Hurricanes

1. Hurricanes can have wind speeds up to (Pause 0:40)

200 Kph

2. Hurricanes form over which oceans? (Pause 0:54)

East pacific and atlantic

3. How are hurricanes formed? (Pause 1:24)

Warm, moist air rises and convection occurs. Due to the Coriolis effect, the storm begins to spin.

4. Explain the Coriolis effect. (Pause 1:40)

This effect is what causes wind to flow in circular patterns around the earth rather than straight from the equator to the poles.

5. When is a tropical storm considered a hurricane? (Pause 1:58)

A tropical storm's wind speed ~~must~~ must reach 119 Kph.

6. Describe a hurricane form the air. (Pause 2:19)

A hurricane looks like a disk rotating around a hollow cylinder called an eye.

7. Explain what happens when a hurricane hits land. (Pause 3:04)

It transfers all of its energy to the surrounding area destroying most structures in its path until it runs out of energy.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

### Landslides in Brazil



1. In the table below, list the parts of each sphere that you observe in the video. Describe the role those parts play in causing or preventing landslides.

Sphere	Parts Observed	Role in Causing or Preventing Landslides
Geosphere	Soil and rocks	slide down a slope during a landslide
Hydrosphere	rivers, waterfalls, and rain	running water can cause landslides by making the ground soggy and loose
Biosphere	trees, grass, and people	tree roots and grass can prevent landslides by holding the soil in place



# Independent Practice

Name: \_\_\_\_\_ **Answer Key** \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

## Part I: Odd One Out


1. Cross out helium. The other words describe the elements in a biosphere.
2. Cross out sand. This is not part of the hydrosphere.
3. Cross out water. The other words describe a geosphere.
4. Cross out rock. Molten rock is a thick liquid.
5. Cross out cloud. The other words describe sediment and how it moves.
6. Cross out atom. This is only one piece and not a full system.
7. Cross out axis. The other words describe an ecosystem.
8. Cross out a lightning bolt. The other words are examples of organisms.
9. Cross out mass. The other words describe weather.
10. Cross out solar system. The other words describe different parts of Earth which work together as a system.





# Independent Practice

Name: \_\_\_\_\_ **Answer Key** \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

## Part II: Four Square Model

<b>Definition</b> Any place and its atmosphere on Earth where organisms can live.	<b>Picture</b> 
<b>Biosphere</b>	
<b>Examples</b> Ocean Arctic region Rain forests	<b>Nonexamples</b> Sun Jupiter

<b>Definition</b> All of Earth's water, including surface water, groundwater, and water in the atmosphere.	<b>Picture</b> 
<b>Hydrosphere</b>	
<b>Examples</b> Lakes Aquifer Water vapor	<b>Nonexamples</b> Mountains Air Soda can

<b>Definition</b> The layers of Earth, including rocks and minerals, landforms, and the processes that shape Earth's surface.	<b>Picture</b> 
<b>Geosphere</b>	
<b>Examples</b> Crust Mantle Core	<b>Nonexamples</b> Precipitation Cloud formations



# Concept Attainment Quiz

Name: ANSWER KEY Date: \_\_\_\_\_ Group: \_\_\_\_\_

## I. Vocabulary Matching

- B   The system that includes the rocks and land formations of Earth
- C   The system that includes all the water on Earth
- D   The system that includes all living things
- A   A group of things or parts interconnected to form a more complex whole

- A. System
- B. Geosphere
- C. Hydrosphere
- D. Biosphere

## II. Identification

Use the word bank to fill in the blanks below.

sediment
ecosystems
atmosphere
interactions

1. Earth has major systems that work together. The interactions of these systems affect Earth's surface and processes.
2. The geosphere contains sediment, soil, and molten rock. All of Earth's air makes up the atmosphere.
3. When any one of Earth's systems change, many ecosystems can be disrupted.

# Earth Systems Interactions

## Reflect

The oceans, land, and air (or the atmosphere) are constantly interacting with each other. The oceans shape landforms around the globe. As ocean tides rise and fall twice daily, they erode sand from beaches, melt ice from glaciers, and move sediment around, creating shifting sand bars. Oceans and land are heated by the sun differently, creating changing weather patterns around the world.

Wherever the Sun heats water, evaporation can occur. Water evaporates from lakes, rivers, puddles, soil, and even your body. When sweat dries on your skin, it is because the water in sweat has evaporated into the air. You may have noticed that when sweat evaporates off your skin, it leaves behind a salty taste and feel. Similar to the oceans, sweat is saltwater. The water evaporates, and the salt is left behind on your dry skin.

The water in your shower could have come from anywhere in the world because all of Earth's water is recycled in a process called the *water cycle*. So just how does water from a glacier halfway around the world find its way to your bathroom?

### How does the Sun move water from the oceans through the water cycle?

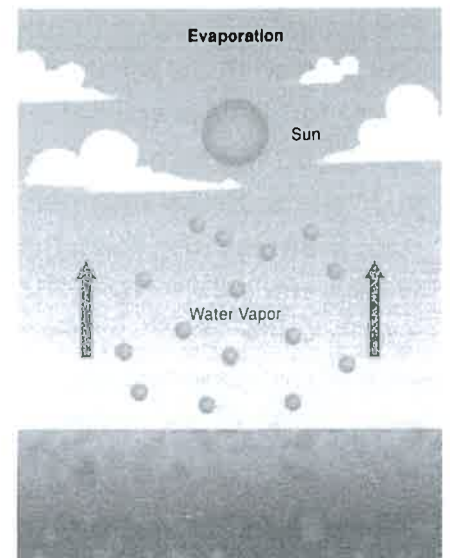
Water is the only substance on Earth that exists in all three states of matter naturally. Water can be solid ice, flowing liquid, or gaseous **water vapor**. When water moves through the water cycle, it changes between these states of matter over and over again. The *water cycle* is the process that water moves through between the air and Earth's surface. Heat energy from the Sun powers the water cycle.

Approximately 71% of Earth's surface is covered in water and most of that (97%) is ocean water. When the Sun heats water at the ocean's surface, the ocean water gains energy. With enough energy, the molecules of liquid water change into water vapor and move into the air. This process is called evaporation. Evaporation is an interaction between the oceans and the air. The water in the ocean is *saltwater*, a mixture of salt and water. When evaporation happens, only the water evaporates. The salt is left behind.



The temperature difference from the air above the water and the air above the land creates the wind we call the *sea breeze*.

**water vapor:** the gas form of water



Energy from the Sun causes water in the oceans to evaporate. The water vapor rises into the air. The salt remains behind.



# Earth Systems Interactions

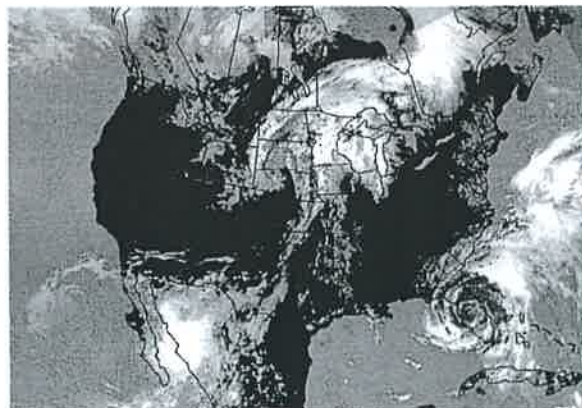
## Reflect

Wind and clouds in the atmosphere interact with landforms to cause weather patterns. Locations around the globe that are very flat and very far from water will experience fewer clouds and less precipitation, unless that weather is traveling across the region from somewhere else. In contrast, regions that are closer to water may experience many more days of clouds and precipitation. The further the location is from the equator, the colder the climate is likely to be, producing frozen forms of precipitation like snow, hail, or sleet.

### What is weather? What are some characteristics of weather?

When we talk about *weather*, we mean the **daily conditions in the atmosphere of a local area**. Many conditions make up the weather. A few are cloud cover, wind, **humidity**, and *temperature*, which is how hot or cold the air is. One condition that is important for planning a vacation is rainfall. Rain is a type of precipitation.

**humidity:** a measure of how much water vapor is in the air; the air feels moist and sticky when humidity is high



In the weather map, you can see clouds and weather interacting with the North American landmass. Interestingly, you can see Hurricane Frances over the state of Florida.

*Precipitation* is water (liquid or solid) that falls to Earth from clouds. Cloud cover and precipitation in the atmosphere form by condensation and are a part of the water cycle. There are many forms of precipitation, including rain, snow, sleet, and hail. They are all slightly different, based on the temperature of the air as the water falls through it. Rain is liquid water that falls in droplets. Snow and hail, on the other hand, are particles of ice that fall when the air is very cold. Sleet is rain that freezes as it falls through the air. Weather is an important part of daily life. It describes the changing conditions of the environment around us. What is the weather like where you are today?

## What Do You Think?

This weather report provides information about the weather in New York City over five days. How does the weather change in New York during this period of time? New York City is near the Atlantic Ocean and has many bays and rivers near it as well. What effect do you think water is having on the city's daily weather?



# Earth Systems Interactions

## Look Out!

All weather is caused by the Sun heating Earth. When the Sun's energy heats the atmosphere unevenly, it causes different air pressures. *Pressure* is the weight of the air. Cold air weighs more than warm air because it is denser. Low-pressure air and high-pressure air cause different weather conditions. Low-pressure air often brings rain, thunderstorms, and hurricanes. High-pressure air usually means clear skies and sunshine. The uneven heating of the atmosphere is the reason we have different weather in most places on Earth during spring, summer, autumn, and winter.

## Reflect

**What is climate? What are some characteristics of climate?**

Weather is constantly changing. Scientists who predict or *forecast* the weather usually cannot make forecasts beyond 10 days. Even weather reports cannot guarantee that the forecasts will be accurate. However, climate in a particular area is consistent. *Climate is the type of weather in an area averaged over a long period of time, such as 30 years or more.*

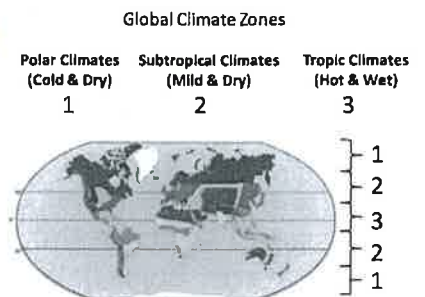
For example, when most people think of Hawaii they picture sunshine, high temperatures, and warm rainfall. Hawaii has a tropical climate. The weather there is usually warm and humid with cool breezes, and it has been that way for many years. This is Hawaii's climate. But that doesn't mean Hawaii doesn't have days with cold temperatures or storms. The climate of an area describes its average temperature, precipitation, humidity, wind, cloud cover, and other weather conditions over long periods of time.



In which climate zone is this place found?

An area's climate is affected by several factors. These may include its distance from water (like oceans or lakes), its latitude on the globe, and its elevation above sea level. There are several different climate zones in the world. Tropical climate zones are found closest to the equator. The climate in a tropical zone is hot and humid with lots of rain. Rainforests are found mostly in tropical climates.

Farther away from the equator is the **temperate** climate zone. Most of the United States has temperate, sometimes called subtropical, climate. The temperatures are neither very high nor very low, with moderate amounts of precipitation. Temperate climates usually have different weather for each of the four seasons.



**temperate:**  
mild, moderate;  
not extreme

# Earth Systems Interactions

## Reflect

Next are the polar climate zones. They are found close to the North and South Poles. These zones are well known for their extremely cold temperatures and snow. Polar climate zones are also quite dry, with little precipitation during the year.

### How does the Sun affect weather patterns that move water and form precipitation?

Higher air temperatures also mean that more precipitation will fall as rain. Snow, sleet, and hail result from low air temperatures. Increases in rainfall can cause rivers to overflow and put areas in greater danger of flooding. How else could rising average global temperatures affect the water cycle?

The Sun's energy and the water cycle play important roles in the weather patterns seen on Earth. We have already seen how the water cycle causes weather conditions, such as cloud cover, rain, and snow through evaporation, condensation, and precipitation.

When the Sun heats the ocean, it also heats the atmosphere and the land. However, different parts of Earth absorb different amounts of heat. As a result, the air is warmer in some places and cooler in others. Cold air is more dense than warm air, so it sinks closer to the surface of Earth. Warm air rises higher into the atmosphere. As it rises, the warm air cools. As it cools, it becomes more dense and sinks back to the ground. As air moves around the atmosphere, weather patterns change from storms and wind to clear and sunny skies.



## What Do You Think?

Some of the water on Earth is frozen in glaciers and other forms of ice. How can frozen water move through the water cycle with the help of the Sun?

### Looking To The Future: Changes To The Water Cycle

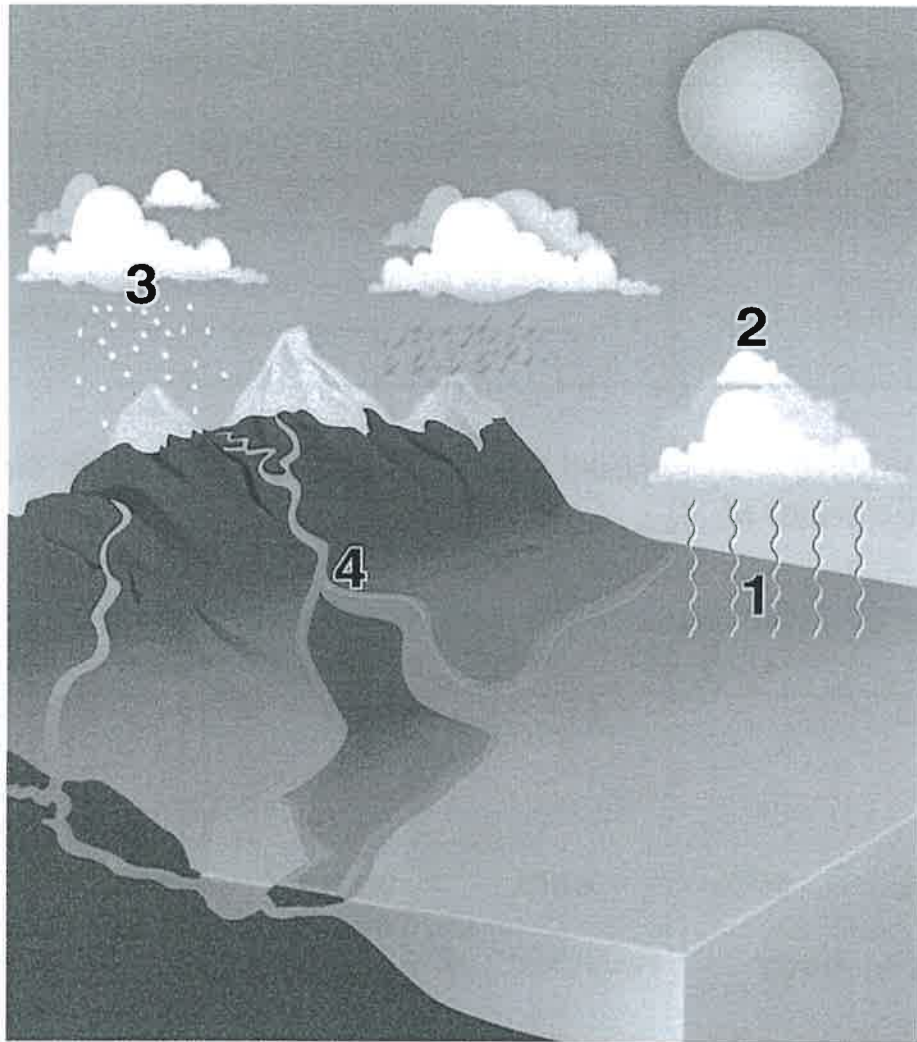
Many scientists agree that the average temperature on Earth is increasing. What does this mean for the water cycle? Rising temperatures mean an increase in evaporation and more water vapor in the atmosphere. This leads to an increase in condensation in the atmosphere. Scientists predict that this will increase overall cloud cover, humidity, and precipitation across the globe.

# Earth Systems Interactions

## Try Now

### What do you know?

The Sun's energy powers the water cycle. Water changes state; its temperature increases and decreases as it moves through different stages of the water cycle. Look at the scene from nature shown here. The numbers represent different parts of the water cycle. For each number, describe what is happening in the water cycle. Then draw arrows showing how water moves in a continuous cycle through each process.



Number	Description
1	Evaporation: liquid water changing to gas
2	Condensation: water as gas changes to liquid
3	Precipitation: water in the liquid state
4	Surface run off: melted snow and rain water flows, eventually reaching the ocean.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

## Earth's Systems Interactions Note-Taking Guide

**Directions:** As you read the article, fill in the blanks with the missing information from the text. A word bank has been provided below.

1. Approximately \_\_\_\_\_ 70 % \_\_\_\_\_ of Earth's surface is covered in ocean water.
2. Cold air weighs more than \_\_\_\_\_ warm \_\_\_\_\_ air because it is denser.
3. Water evaporates from lakes, \_\_\_\_\_ rivers \_\_\_\_\_, puddles, soil, and even your \_\_\_\_\_ body \_\_\_\_\_.
4. The water in your shower could have come from anywhere in the world because all of Earth's water is \_\_\_\_\_ recycled \_\_\_\_\_.
5. The cycling of water is predictable and repetitive in a process called the \_\_\_\_\_ water \_\_\_\_\_ cycle.

### Word Bank

70%      90%      cold      warm      rivers

streams

body      recycled      changed      water      wind

In the space below, write your own sentence using at least one of the words you did not use in the fill in the blank activity.

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## Independent Practice

Name: \_\_\_\_\_ **Answer Key** \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

### Part I: Alike and Different

#### 1. Climate and Weather

Alike: Both of these words have interactions in the hydrosphere.

Different: Climate is the general description of the weather over a long period of time. Weather describe specific aspects which change often.

#### 2. Ecosystem and Biosphere

Alike: Both of these words describe places where organisms interact.

Different: Ecosystems are specific places where both living and nonliving things interact. A biosphere is ALL of the living matter on Earth.

#### 3. Landform and Geosphere

Alike: A landform is a small portion of a geosphere.

Different: Landforms, such as mountains or hills, are formed when parts of the geosphere change. The geosphere includes all the layers of Earth, sediments, rocks, and minerals. The geosphere also includes where erosion, deposition, and weathering take place.

#### 4. Hydrosphere and Atmosphere

Alike: They both interact in the water cycle.

Different: The hydrosphere describes all of the water everywhere inside Earth, on Earth, and in the air surrounding Earth. The atmosphere is a mixture of gases surrounding Earth.

#### 5. Ecosystem and Interaction

Alike: Both words relate to being interconnected.

Different: Ecosystem is where living and nonliving things depend on one another. The interaction is how things affect one another.

### Part II: Mystery Word

1. HYDROSPHERE
2. CLIMATE
3. ECOSYSTEM
4. LANDFORM
5. BIOSPHERE
6. INTERACTION
7. ORGANISM
8. WEATHER
9. GEOSPHERE
10. ATMOSPHERE



# Concept Attainment Quiz

Name: ANSWER KEY Date: \_\_\_\_\_ Group: \_\_\_\_\_

## I. Vocabulary Matching

<p><u>C</u> The short-term conditions that occur in specific regions when energy and water are moved in, out, and through the atmosphere.</p> <p><u>D</u> Features on Earth's surface that include continents, valleys, canyons, and caves.</p> <p><u>B</u> The weather conditions in an area over a long period of time.</p> <p><u>A</u> The living and nonliving things and their interactions within an environment.</p>	<p>A. Ecosystem</p> <p>B. Climate</p> <p>C. Weather</p> <p>D. Formations</p>
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## II. Identification

Use the word bank to fill in the blanks below.

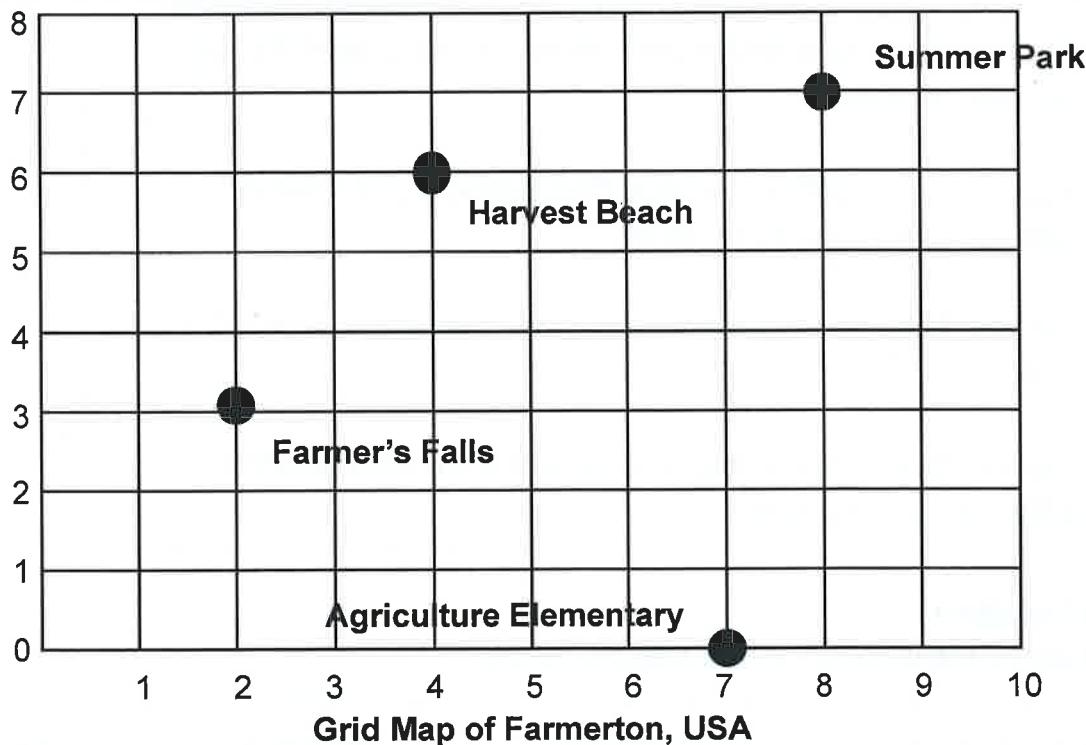
Hydrosphere	Geosphere	Biosphere	Atmosphere
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- The river water from the hydrosphere caused the rocks from the geosphere to erode and form a canyon.
- The atmosphere is not the only system that is affected when a forest fire breaks out. Forest fires affect the atmosphere by releasing smoke and gas, and they affect the biosphere by changing the numbers and types of living things that live in the affected area.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

Below is a grid of the area of a small town in Farmerton, USA. Areas found around town can be seen at different points on the map. Use the coordinate grid below to answer questions 1-4. Provide all answers as ordered pairs for each coordinate point.



1. Farmer's Falls is part of the hydrosphere. Identify the location of the falls on the coordinate grid.

(2, 3)

2. Harvest Beach is part of the geosphere. Identify the location of the beach on the coordinate grid.

(4, 6)

3. Explain how you could move from Agriculture Elementary to Summer Park using (X,Y) coordinates and only moving on lines.

answers will vary

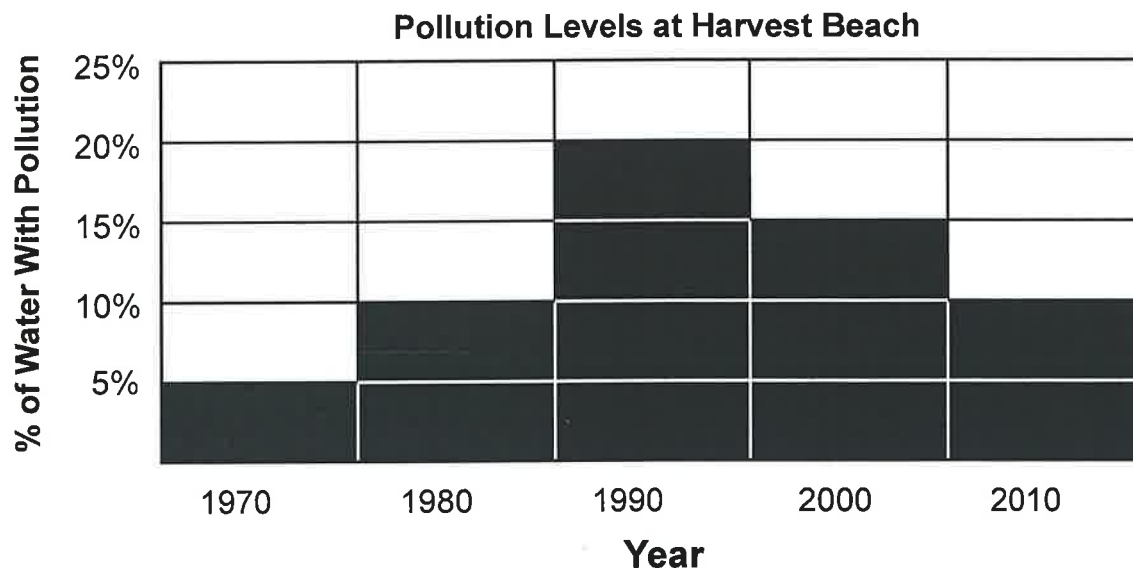
4. Explain how you could move from Farmer's Falls to Harvest Beach, then from Harvest Beach to Summer Park, using (X,Y) coordinates and only moving on lines.

answers will vary





The graph below shows the amount of pollution, in percentage form, in the river near Harvest Beach. The percentages represent the portion of water that contains pollutants to the portion of the water that does not contain pollutants. For example, if the percentage is 20%, this means that 20% of the water sample contains pollutants. This is important to know as the river is part of the hydrosphere. **Use this graph to answer questions 5-9.**



5. What was the percentage change in water with pollution from 2000 to 2010?

decreased by 5%.

6. Which two years had the same percentage of pollution levels?

1980 and 2010

7. Which year had the highest level of pollution?

1990

8. Which year had the lowest level of pollution?

1970

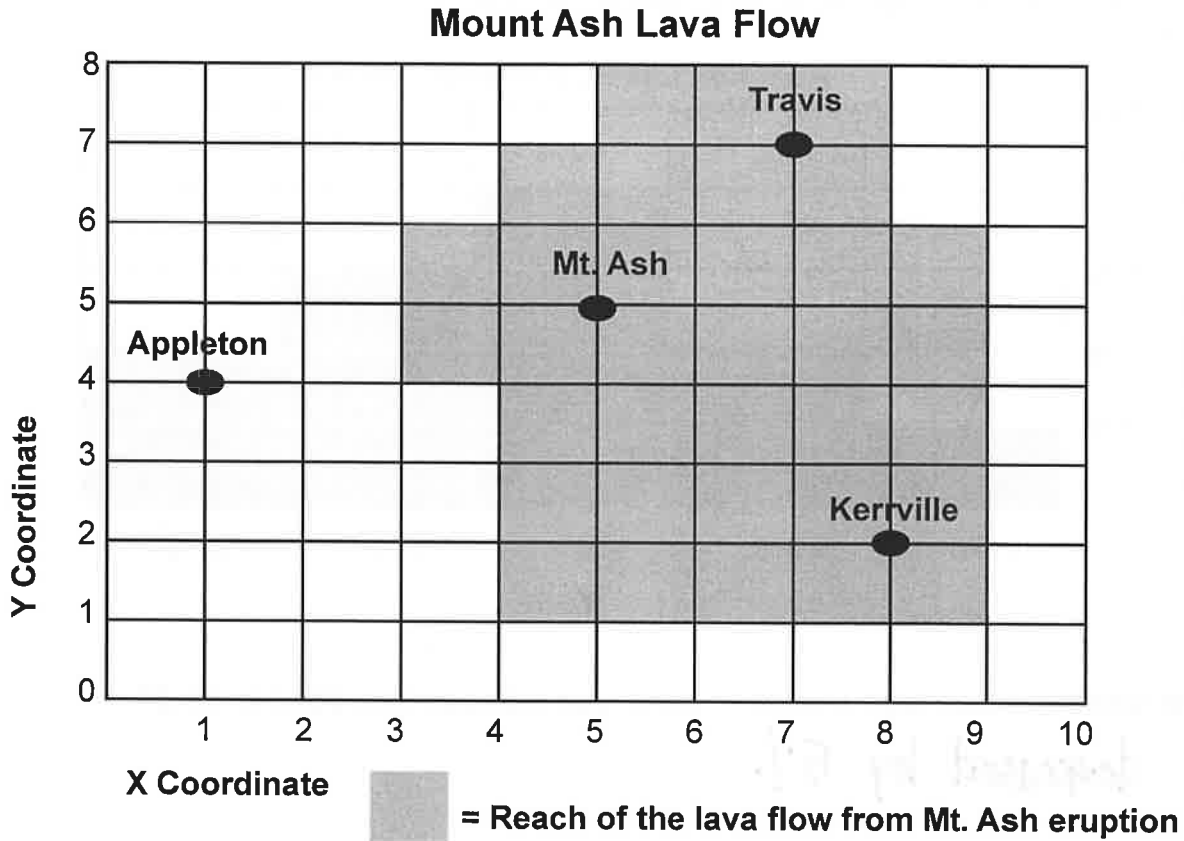
9. Write one factual statement using the information from the bar graph that describes a pattern or information from the data on the graph.

answers will vary



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

Below is a map of an area after a volcanic eruption, including the affected areas.  
Use the coordinate grid below to answer questions 1-3.



1. Mt. Ash is located at what (X,Y) coordinates?

(5,5)

2. If each square in the coordinate grid equals 50 acres of land, how large of an area was affected by the reach of the lava flow from the Mt. Ash eruption?

$34 \times 50 = 1,700$  acres

3. Explain how you would go from Mt. Ash to Travis using (X,Y) coordinates. Travel the shortest path between the two.

(5,5) → (6,6) → (7,7)



4. As water flows, it works to erode the riverbank. If the water erodes 0.5 centimeters every year, how much of the riverbank will erode in 12 years? (Note that centimeters can be shown in the shortened form, cm. So, 0.5 centimeters can also be written as 0.5 cm.)

$$12 \times .5 = 6 \text{ cm}$$

5. Wind also works to erode landforms. If wind erodes the height of a mountain 0.2 cm every 10 years, how much of the mountain's height would the wind erode in 90 years?

$$\frac{90}{10} = 9 \quad 9 \times .2 = 1.8 \text{ cm}$$

6. Trees provide some of the necessary oxygen animals need to survive. A single tree can produce 260 pounds of oxygen each year. How much oxygen can be produced by 1,500 trees in a year? (Note that pounds can be shortened to "lb." So, 260 pounds can also be written as 260 lb.)

$$1,500 \times 260 = 390,000 \text{ lb of oxygen}$$

7. Landslides can be very costly natural disasters. If the average landslide causes 23 structure losses, then what would the average number for structure loss be if 36 landslides occur?

$$36 \times 23 = 828 \text{ structure losses.}$$