Accessing Prior Knowledge

Name: _____ Date: _____

Looking at Landforms

Write your name under the column that answers the below question.

How was this landform shaped?

Man-Made	Water	Wind

Scope Phenomenon

Name: _____ Date: _____

Interactions in a Forest

1. Describe what is happening in the video.

_____

_____

2. What are three examples of living and nonliving parts of the environment in the video?

_____

_____

_____

3. What might happen if a stream dried up?

_____

_____

_____

_____

4. How are the living organisms interacting with the stream in the video?

_____

_____

_____

_____

5. What do you notice about the land (or geosphere) surrounding the stream (or hydrosphere)?

_____

_____

_____

_____

Explore Student Journal

Name: _____ Date: _____

The Four Spheres of Earth

Student Journal

Make a plan for your diorama.

1. What parts did you include in your diorama for each sphere?

_____
_____
_____

2. What is one thing you learned from the other groups' dioramas?

_____
_____
_____

3. What could you do to make your diorama better?

_____
_____
_____

Explore

Sphere Information Card	
Hydrosphere The hydrosphere is composed of all of the water on or near Earth. Water on Earth can be found in the form of liquid water, ice, or water vapor.	**Biosphere** The biosphere is composed of all living organisms, such as plants, animals, and humans.
Atmosphere The atmosphere is the body of air which surrounds our planet. The air on our planet is 78% nitrogen and just under 21% oxygen; the small amount remaining is composed of carbon dioxide and other gases.	**Geosphere** The geosphere consists of Earth's interior and the solid, rocky crust covering the entire planet, including the ocean floor. This crust is inorganic and is composed of soil, liquid magma, minerals, sediments, and sand.

Explore

Name: _____ Date: _____

The Four Spheres of Earth

Student Rubric

Category	Expert (4)	Competent (3)	Beginner (2)	Novice (1)
Diorama	Diorama is neat and complete. All four of Earth's spheres and their elements are represented.	Diorama is mostly neat and complete. All four of Earth's spheres and their elements are represented.	Diorama is neat and mostly complete. Three of Earth's spheres and their elements are represented.	Diorama is sloppy and incomplete. Only one or two of Earth's spheres and their elements are represented.
Labels	All four of Earth's spheres are correctly labeled.	Three of Earth's spheres are correctly labeled.	Two of Earth's spheres are correctly labeled.	One of Earth's spheres is correctly labeled.
Information	All information is correct and accurately labeled.	All information is correct, and most information is accurately labeled.	Most information is correct, and some information is accurately labeled.	Some information is correct, and some information is accurately labeled.

Explore

The Four Spheres of Earth Key

Teacher Rubric with Sample Student Responses

Category	Expert (4)	Competent (3)	Beginner (2)	Novice (1)
Diorama	Diorama is neat and complete. All four of Earth's spheres and their elements are represented. 1. Biosphere: grass, tree, deer 2. Geosphere: rocks, soil, mountain 3. Hydrosphere: river, lake, cloud 4. Atmosphere: the atmosphere is the air around everything. The cloud is in the atmosphere.	Diorama is mostly neat and complete. All four of Earth's spheres and their elements are represented. 1. Biosphere: grass, tree, deer 2. Geosphere: rocks, soil, mountain 3. Hydrosphere: river, lake, cloud 4. Atmosphere: the atmosphere is the air around everything. The cloud is in the atmosphere.	Diorama is neat and mostly complete. Three of Earth's spheres and their elements are represented. Biosphere: grass, tree, deer Geosphere: rocks, soil, mountain Hydrosphere: river, lake, cloud	Diorama is sloppy and incomplete. Only one or two of Earth's spheres and their elements are represented. Biosphere: grass, tree, deer
Labels	All four of Earth's spheres are correctly labeled. Biosphere Geosphere Hydrosphere Atmosphere	Three of Earth's spheres are correctly labeled. Biosphere Geosphere Hydrosphere	Two of Earth's spheres are correctly labeled. Biosphere Geosphere	One of Earth's spheres are correctly labeled. Biosphere
Information	All information is correct and accurately labeled.	All information is correct, and most information is accurately labeled.	Most information is correct, and some information is accurately labeled.	Some information is correct, and some information is accurately labeled.

Explore Student Journal

Name: _____ Date: _____

Cascade Mountains

Student Journal

Directions
Draw a picture illustrating the model you just acted out as a class.

1. What happened to the water in the ocean when the Sun came out?

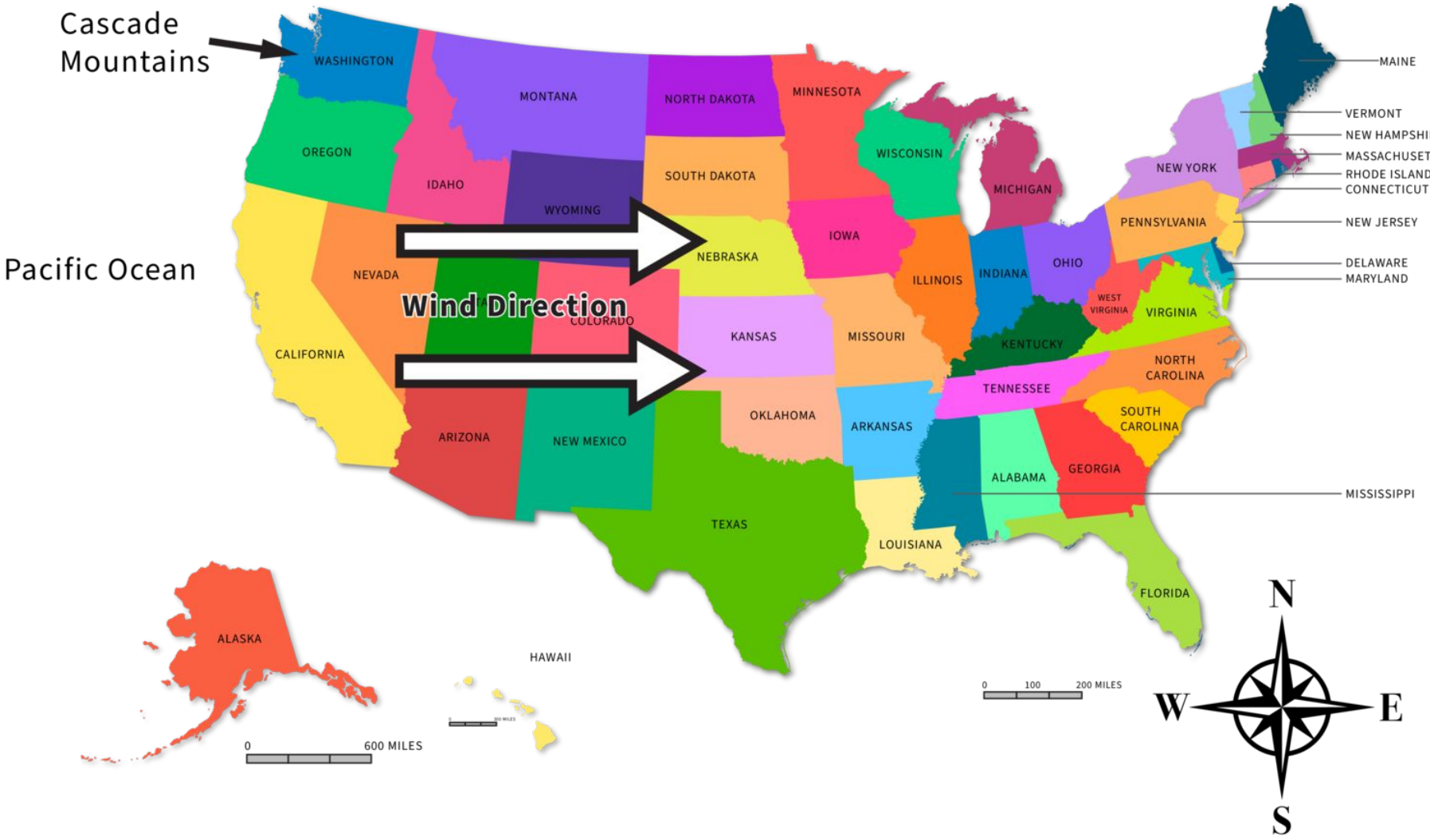
_____
_____
_____

2. Why is the west side green and the east side brown?

_____
_____
_____

Explore

Cascade Mountains



Explore

Cascade Mountains

Explore

West of the Cascade Mountains

Explore

East of the Cascade Mountains

Explore

Cascade Mountains Investigation

Rain

Explore

Cascade Mountains Investigation

Water Vapor

Explore

Cascade Mountains Investigation

Pacific Ocean

Explore

Cascade Mountains Investigation

East

Explore

Cascade Mountains Investigation

West

Explore

Cascade Mountains

Cast:
Mountains: Four tall students
Water Vapor: Three students
Sun: One student
Readers: Six students

Setting:
The front of the room will be the state of Washington. Place a sign on one side of the room that says “East” and a sign on the other side that says “West.” Place a second sign under the “West” sign that says “Pacific Ocean.” Place a fan on the west side blowing toward the east. Remind students that wind blows across the US from west to east. Place four taller students in a line from north to south in the center of the room to represent the Cascade Mountains. One student will be the Sun and will hold a yellow beach ball to represent the Sun. The student should stand near the mountains. Three students will be the water that is evaporated off of the ocean. They will hold a sign that says “water vapor.” The other side of the sign should say “rain.”

Skit:
Students who are water vapor line up along the wall labeled “West.”

Turn the fan on low. It is night.

Sun: (walks out and holds up sign)

Reader 1: What happens to water in the ocean when the Sun comes out?

Reader 2: Which way is it going to move?

Students who are water vapor start moving toward the mountain.

Reader 3: What happens when the water vapor hits the mountain?

Reader 4: What will it do?

Reader 5: What happens to it while it rises?

Reader 6: Why is the west side green and the east side brown?

Interactions of Earth's Systems

Picture Vocabulary

Biosphere

The sum of all living matter on Earth

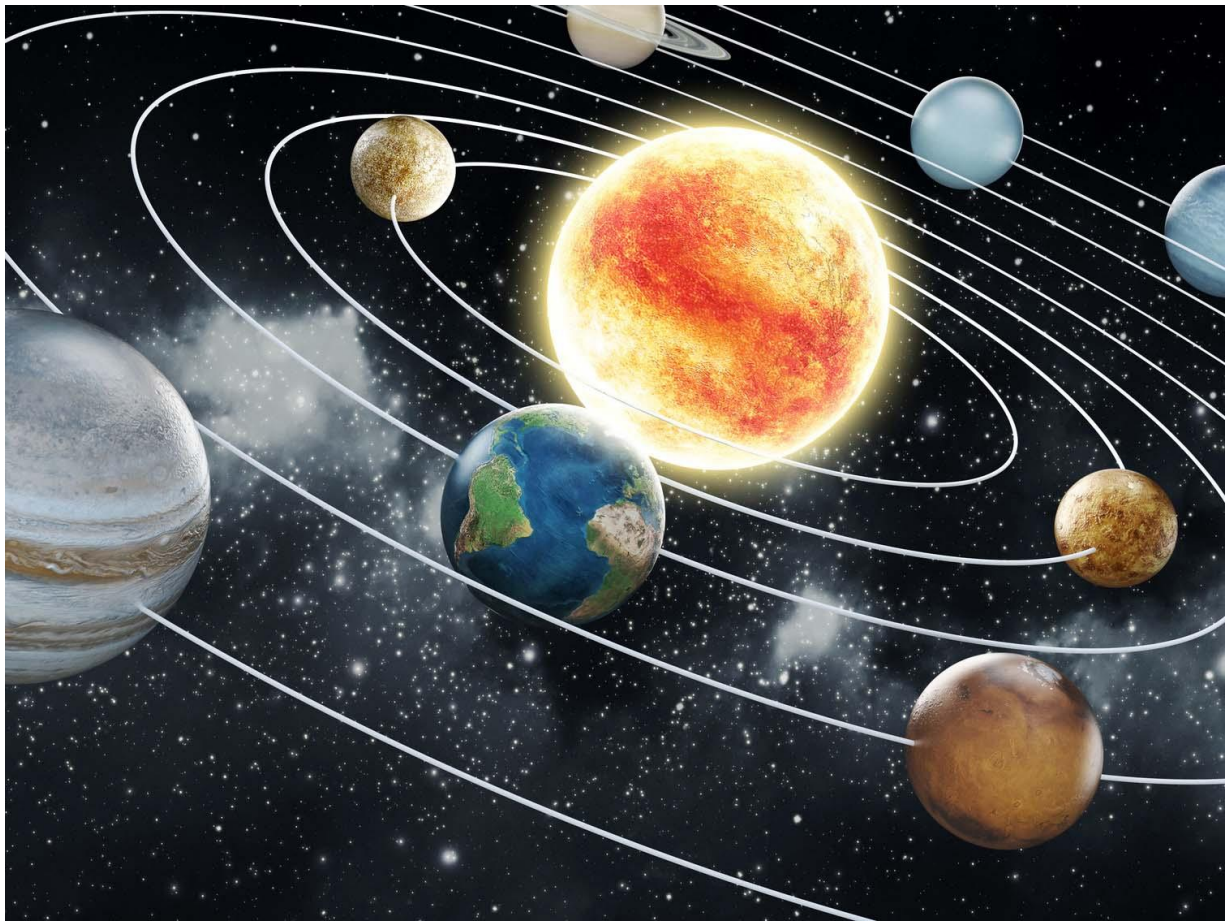
Geosphere

The portion of the system of Earth that includes Earth's interior, rocks and minerals, landforms, and the processes that shape Earth's surface

Hydrosphere

All the water on Earth's surface; includes all water sources above and below the surface

System



A group of interacting parts forming a complex whole

Atmosphere

The layer of gas surrounding planet Earth that is held in place by gravity

Reflect

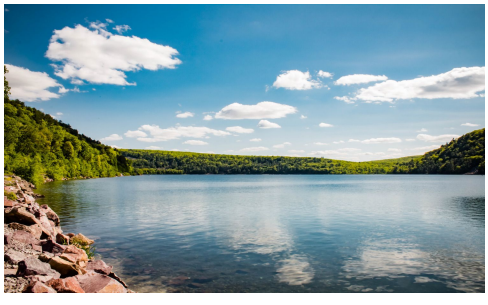
Earth is our home. It has the right conditions for life. Besides sunlight, Earth has air, water, and land that work together to support life. In turn, life on Earth interacts with air, water, and land. Imagine for a moment that Earth was different.

- What would Earth be like if it wasn't a rocky planet?
- What if Earth had no land?
- What if Earth did not possess an atmosphere?
- What if there was no water on Earth?

Earth materials and systems: Earth's major systems are the atmosphere (air), the hydrosphere (water and ice), the geosphere (solid and molten rock, soil, and sediments), and the biosphere (living things, including humans).

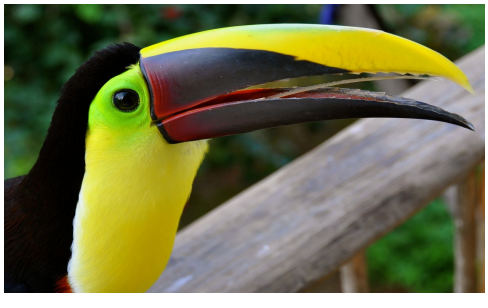
Atmosphere

Hydrosphere



Geosphere

Biosphere



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 some of the Sun's rays and provides us with breathable air. The atmosphere and the Sun's energy create the weather patterns on Earth. Earth's atmosphere is a mix of gases that is just right for supporting life!

What is the hydrosphere?
The hydrosphere is the system on Earth that contains all the ice and water. It includes both fresh water and salt water. It includes water in all states—gas (water vapor), liquid (water), and solid (ice).

Freshwater bodies, such as 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.

Water in all states of matter are included in the hydrosphere.

Rivers and lakes are two parts of the hydrosphere.

What is the geosphere?
Earth's geosphere is made up of all the solid and molten rock, soil, and sediments found on the planet. You can't see all of our geosphere because most of the solid and molten rock are found under Earth's surface. The ocean floor is also part of the geosphere, but it lies so far underneath Earth's oceans that few creatures ever get to see it. The geosphere can be very useful! We use soil to plant crops and make bricks. We use minerals from rocks to create a variety of products.

Mountains (solid rock), lava (molten rock), soil, and sand (sediment) are examples of the geosphere we can see. Most of the geosphere is under the surface of the land or water.

What is the biosphere?
The biosphere is the system on Earth that contains all living things, including humans. Look at the ecosystem in the picture. What plants and animals do you see? Any plants and animals in an ecosystem are part of the biosphere.

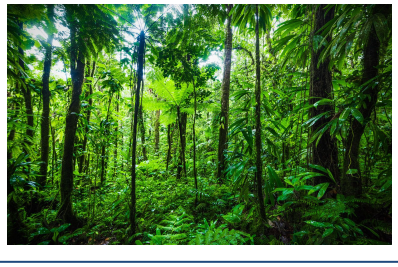
What Do You Think?

How do Earth's systems interact?
Each system interacts with the other systems in a variety of ways.

Look back at the ecosystem above. Do you see examples of any other systems in the picture?

Earth's systems cannot work all by themselves. These systems constantly interact! The plants and animals in the picture above depend on the water around them. What sphere includes animals? The biosphere! Which sphere includes water? The hydrosphere! The ocean supports a variety of ecosystems where different organisms live. This is an example of the hydrosphere and biosphere interacting!

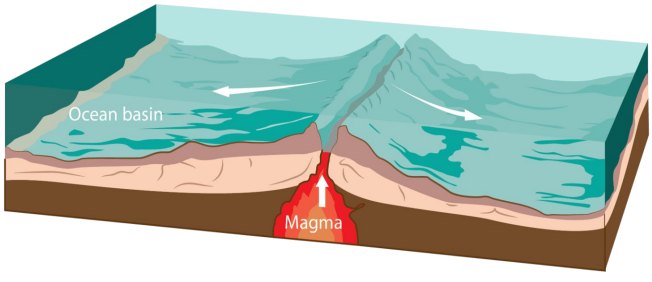
How do the atmosphere and biosphere interact?
Think about the variety of environments around the world. Some are hot and dry, some experience a lot of rain, and some are very cold. These environments have different climates. A climate is the average weather conditions of an area over a long period of time. Weather is the current conditions in the atmosphere, such as the temperature, air pressure, and precipitation. The conditions of the atmosphere over time influence the types of organisms that can live in a certain environment.



Reflect

How do the hydrosphere and geosphere interact?
The hydrosphere affects the geosphere by weathering and eroding rock and soil. This erosion is caused by precipitation, moving rivers, and ocean waves. Water can cool molten rock to form new land.

The Grand Canyon was formed by powerful forces of water as the Colorado River weathered and eroded the rock.



Ocean water cools the magma that seeps through the ocean floor, adding new land to Earth's surface.

The force of the ocean is especially powerful in shaping landforms. Tsunamis can change an entire landscape in minutes. Other waves and tides gradually shape landforms.

Tall mountains can cause one side of a mountain to receive tremendous rainfall while the other receives almost none, like the desert above.

The geosphere interacts with the hydrosphere by being a barrier to water in some areas of Earth. For example, tall mountains can block rainwater from reaching certain areas, creating deserts. This is called the rain shadow effect. The mountain is so tall that it pushes the rain cloud up high into the atmosphere. The cloud rises so far that the water vapor inside it condenses and falls to the ground as precipitation. The water is squeezed out of the cloud before it can pass to the other side of the mountain. This causes one side of the mountain to get plenty of rain while the other side stays dry.

Try Now

With all you have learned about all of Earth's interacting systems, can you guess which organism in the biosphere causes the most change in the hydrosphere, atmosphere, geosphere, and even the biosphere?

If you said humans, you are right. Find a partner and take a moment to brainstorm all the ways that humans interact with each of Earth's systems.

Atmosphere	Hydrosphere	Geosphere	Biosphere

After you are finished, get together with another set of partners and share your lists. Discuss whether human interactions are mostly helpful or harmful and why.

Find a small group and play a card game to review Earth's systems. For materials, you will need four note cards of one color.

Instructions:

- On each of the four note cards of one color, write one of the following categories: **hydrosphere**, **atmosphere**, **geosphere**, and **biosphere**.
- Mix up the cards and place them face down on a desk or table. Do this again between each turn.
- Take turns. When it is your turn, draw two cards. Then, depending upon the cards you drew, explain how the two Earth systems interact. Be specific!
- Make sure you listen attentively to each person. The more you listen, the more you learn!

HYDROSPHERE	ATMOSPHERE	GEOSPHERE	BIOSPHERE

Connecting With Your Child

Living in the Water Cycle

To help your child learn more about the water cycle and how it demonstrates interactions among the **hydrosphere**, **atmosphere**, **geosphere**, and **biosphere**, experience it together in nature. Take your child outside with a digital camera. Have your child take a wide variety of pictures from nature that are related to the water cycle, such as puddles, streams, the ocean, clouds, raindrops, snowbanks, sunlight, and the sky. If a camera is not available, have your child draw sketches and write brief descriptions. Encourage your child to be creative and to include pictures of unique examples of the water cycle, such as soil, leaves, small animals, ice cubes, and people. If possible, have your child take or draw multiple pictures of the same type of object to form a collage that exemplifies the variety found in nature. You can also have your child find examples of the water cycle inside the home. Suggestions of examples include a steamy mirror, a glass of water, and a pot of boiling water. (Take precautions when children are around hot objects).







All these images represent the water cycle in action.

After returning home, print out the pictures (if using a digital camera). Gather poster board, glue, and some markers. Using the pictures, have your child create a personal poster of the water cycle for your own backyard. Arrange the pictures according to the Earth system they best represent. For example, wet soil would represent the geosphere. Use the markers to label and describe the parts of the water cycle. Then, have your child present the project to other family members, explaining what he or she learned about the water cycle and the interactions of Earth's systems.

Here are some questions to discuss with your child:

1. Was it hard to find objects to photograph or draw that represented the water cycle? Why?
2. How do you interact with the water cycle every day?
3. Which of Earth's systems was easiest to find pictures to represent? Why?
4. Which of Earth's systems was most difficult to find pictures to represent? Why?

Linking Literacy

Name: _____ Date: _____

Categorize It

Record how your class sorted the objects on the sticky notes. Use the examples you listed as a class to create your own description of each system below.

Biosphere	Hydrosphere
Examples: Description:	Examples: Description:
Atmosphere	**Geosphere**
Examples: Description:	Examples: Description:

Name: _____ Date: _____

Color-Coded Notes

Directions: Use the note-taking guide to fill in definitions, descriptions, and characteristics of Earth's systems.

Define Geosphere:	Define Hydrosphere:
Geosphere Characteristics:	Hydrosphere Characteristics:
Define Biosphere:	Define Atmosphere:
Biosphere Characteristics:	Atmosphere Characteristics:

Linking Literacy

Name: _____ Date: _____

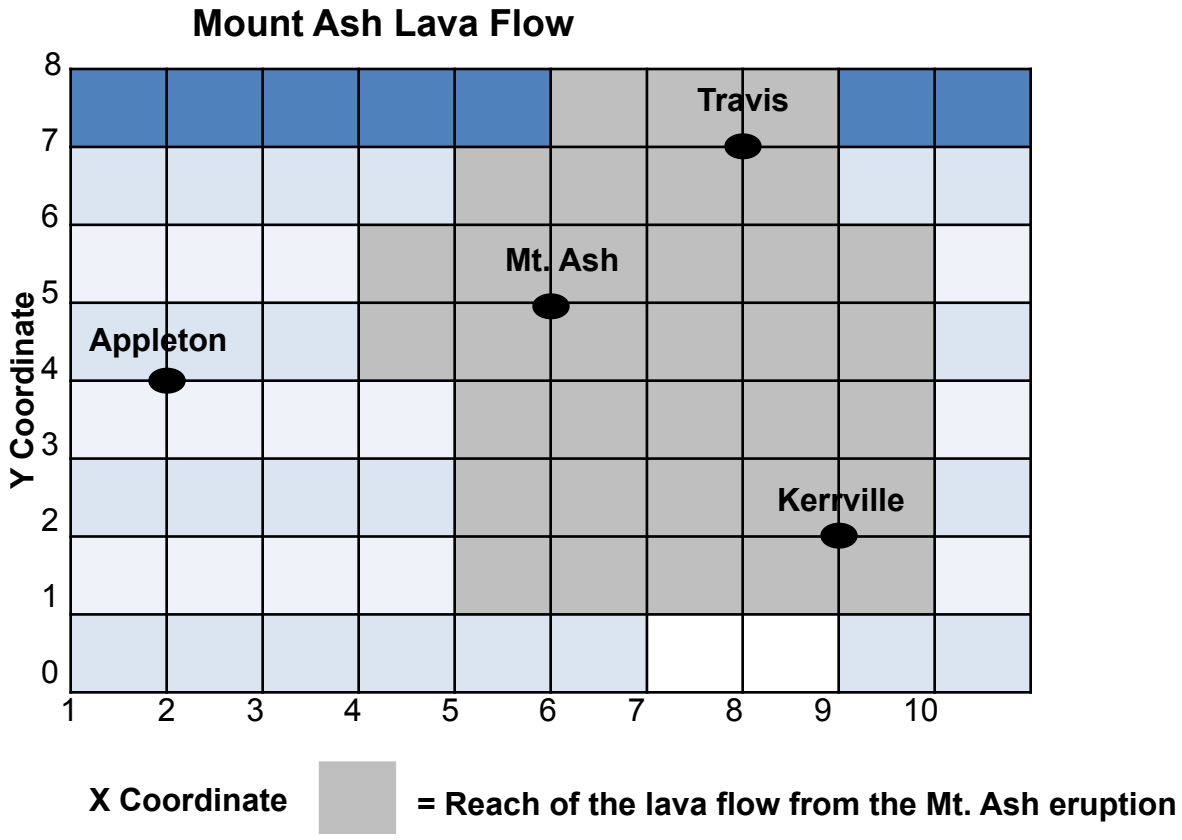
Earth's Systems Comic Strip

Use each box below to draw and describe one of Earth's systems. Be sure to include the hydrosphere, biosphere, geosphere, and atmosphere.

Math Connections

Name: _____ Date: _____

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?

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

3. Explain how you would go from Mt. Ash to Travis using (X,Y) coordinates.

Math Connections

4. As water flows, it works to erode the riverbank. If the water erodes 0.5 centimeters every year, then 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 .5 cm.)

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

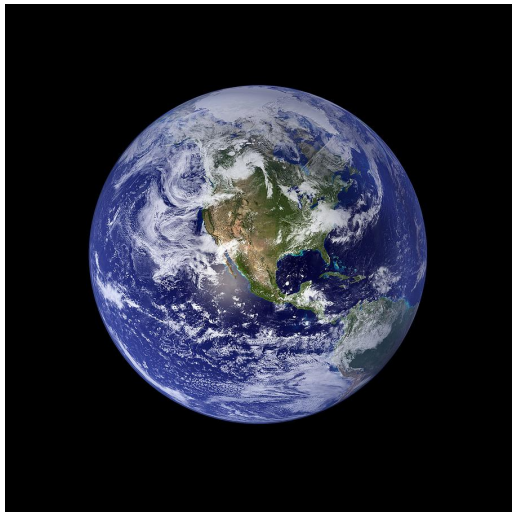
6. Trees provide some of the necessary oxygen that animals need to survive. A single tree can produce 260 pounds of oxygen each year. How much oxygen can be produced by 1,500 trees in a year? (Note that pounds can be shortened to lb, so 260 pounds can also be written as 260 lb.)

7. Landslides can be very costly natural disasters. If the average landslide causes 23 deaths, then what would the average number of deaths be if 36 landslides occurred?

Reading Science

Name: _____ Date: _____

Earth's Systems



1 Many people have seen a picture of Earth from outer space. Our planet looks like a mix of blue, white, and brown. This serene image is so calm and peaceful that it almost looks like nothing is changing or taking place. Don't let this picture fool you! There are many **systems**, or parts, of Earth that are working together. Each part, or system, is needed for life on our planet!

2 Many students believe that Earth is simply a sphere, and life is happening on the very top of it. This is far from the truth. In fact, Earth has four major systems that work together daily.

3 If you think of these systems as layers, then the geosphere would be the first layer. The geosphere is made of both solid and melted rock, soil, and other sediments. This part of Earth consists of the crust, the mantle, and the core. If this is a bit confusing, then think about a hard-boiled egg. The shell of the egg is like the cold, hard rock that makes up Earth's surface, or crust. This is where we live! Under the shell, the white part of the egg represents the mantle. On Earth, the mantle is made of hot, melted rock. Beneath the mantle is the solid iron core. This would be the center of the boiled egg, the yolk.

4 Above the geosphere is the hydrosphere. The hydrosphere has all of Earth's water. Whether the water is in a solid, liquid, or gas state, it is found in the hydrosphere. Without the hydrosphere, nothing could live! The water in the hydrosphere allows all plants and animals to live.

5 Even if we had both the geosphere and hydrosphere, we would not be alive if it were not for the atmosphere. Our atmosphere is the place that holds the oxygen we breathe.

6 The final system, the biosphere, includes all living things. That means us!

Reading Science

7 If you are still a bit confused about how all of these parts work together, think about a cheetah as an example. The cheetah lives on the geosphere, needs the water from the hydrosphere to survive, and needs the oxygen from the atmosphere to breathe. If one of these elements was gone, then the cheetah could not survive. Because all of these pieces are connected, when one system is hurt, the others will suffer the domino effect and also be damaged. If the cheetah's habitat were to undergo a drought or have a forest fire, then there would be fewer plants and animals in the biosphere. The geosphere would be affected as well because there would be fewer plants to hold the soil in place.

8 As you can see, Earth is made up of several systems. Together, these systems support life. If one system is damaged, then a domino effect will take place. When one system changes, it can impact any or all of the other systems. Together, the geosphere, hydrosphere, atmosphere, and biosphere work to support life on planet Earth.

Reading Science

1 In paragraph 1, the word **systems** means–

A pieces.

B independence.

C isolated.

D alone.

---

2 Which of the following is NOT true about Earth's systems?

A Together, the geosphere, hydrosphere, atmosphere, and biosphere work to support life on planet Earth.

B Our atmosphere is the place that holds our oxygen.

C There are many systems, or parts, that work independently.

D There are many systems, or parts, of Earth that work together.

---

3 The passage is mainly about–

A the structure of the water cycle.

B the role of Earth's systems.

C the way the planet appears from outer space.

D the environment.

Reading Science

4 Which sentence best describes the relationship between Earth's systems?

A Earth is not just a sphere with life on top.

B The cheetah will produce offspring.

C Together, these systems support all plant and animal life.

D Earth's systems are independent from one another.

---

5 The author's purpose in writing this passage is to–

A persuade the reader to become an astronaut.

B inform the reader about the interactions between Earth's systems.

C inform the reader about the independence of Earth's systems.

D entertain the reader with an expository text.

Engineering Connections

Name: _____ Date: _____

Engineering Design Process – Redesign and Share and Critique

Students were given a defined problem. They brainstormed a solution to the problem, made a plan, and built it. The results of those steps of the engineering design process are shown below. After reviewing their initial results, you will redesign their solution, share your plans through a presentation, and critique the plans of everyone else.

The Problem

Your little sister needs help. She was supposed to build a model of an ecosystem in a bottle that would be able to sustain itself. You decide to use what you have learned about interactions in ecosystems to evaluate her design and redesign it, if needed, to fit within the constraints of the project.

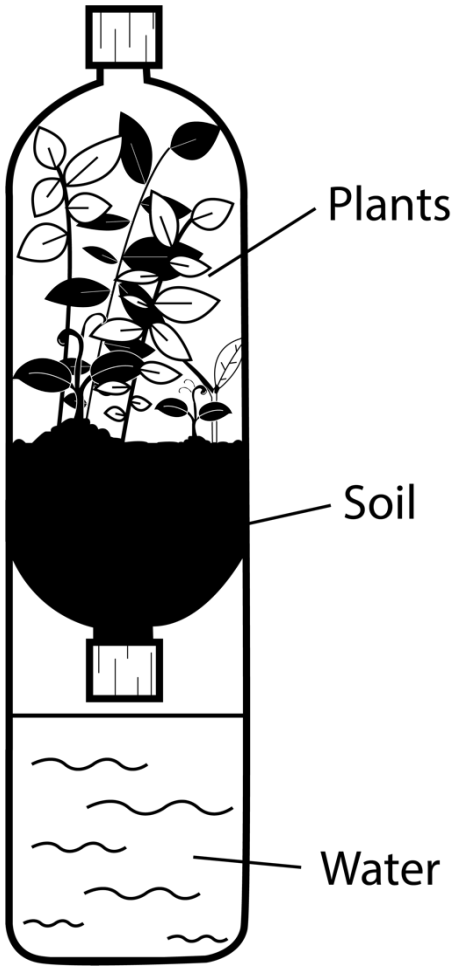
Criteria and Constraints

- The model needs to contain all parts of an ecosystem.
- The model must be able to sustain itself without having to open the bottle.

Plan

Your sister built the following design. She used two water bottles of the same size to create the design. She added plants, soil, and water.

Engineering Connections



Build and Test

Engineering Connections

After a few days, the plants began to die and did not decompose. You notice that the soil is very dry.

Build

Review the results of the tests and record them in the data table below.

	Solution
Does the design meet all the criteria and constraints?	
Does it solve the problem?	

Use the space below to list what problems you need to fix in your redesign.

Engineering Connections

Redesign

How can you fix the problems found during testing? If no problems were found, how can you make the solution even better? Use the space below to draw and label your redesigned solution.

Share

Use the space below to plan how you will present your redesigned solution to the problem. Your presentation should include the scientific ideas used to solve this defined problem.

Engineering Connections

Critique

Note the strengths and weaknesses of all presented solutions in the data table below. Be prepared to discuss them.

Group	Design Strengths	Design Weaknesses

Engineering Connections

Engineering Design Process Student Rubric

Category	3	2	1	0
Quality of Redesigned Solution	The student successfully identified the problem with the original solution and incorporated a fix to the problem in the redesigned solution.	The student successfully identified the problem with the original solution but did not incorporate a fix to the problem in the redesigned solution.	The student did not identify any problem with the original solution or did not attempt a redesigned solution at all.	The student did not identify any problem with the original solution and did not attempt a redesigned solution at all.
Critique	The student identified the strengths and weaknesses of all presented solutions.	The student identified the strengths and weaknesses for multiple presented solutions.	The student identified the strengths and weaknesses of one presented solution.	The student did not identify any strengths or weaknesses of any presented solution.
STEM Skill: Creativity and Innovation	The student used creativity in the design process including the innovative use of resources and alternative solutions, ideas, or redesigns as needed to complete the task.	The student used creativity in the design process including the innovative use of resources to complete the task.	The student used little creativity in completing the task.	The student made no attempt to complete the task.
STEM Skill: Adaptability and Resilience	The student was reflective and demonstrated a willingness to rework the task, ultimately leading to a better product.	The student overcame any frustrations and completed the task.	The student asked for help when needed and completed the task as a result.	The student struggled, did not seek out help, and as a result, did not complete the task.

Content Connection Video

Name: _____ Date: _____

A Change of Scenery

1. What is a landform?

2. What are the top layers of Earth made of? Describe these layers.

3. Describe how plates can move, according to the narrator.

4. What processes change Earth's surface through wind, water, and ice?

Content Connection Video

5. Describe the Old Man of the Mountain and how it changed over time.

Claim-Evidence-Reasoning

Name: _____ Date: _____

Scenario

In 1980, Mount St. Helens volcano in Washington State erupted! A column of ash rose 80,000 feet into the atmosphere and spread to 11 different states. A mix of hot lava and pulverized rock raced toward Spirit Lake miles away. Snow, ice, and entire glaciers melted, causing massive mudslides that spread up to 50 miles away. One of the mudslides buried 14 miles of the North Fork Toutle River under rocks, dirt, and trees. The blast was heard hundreds of miles away in parts of Montana, Idaho, and northern California. However, it was not heard in closer areas such as Portland, Oregon, only 50 miles away. The eruption and fallout reduced hundreds of square miles of forest to wasteland, killed thousands of game animals, and killed 57 people. Areas that received a very thin coat of ash actually showed an increase in crop production the following year. The crusting of ash helps to retain soil moisture. In addition, the ash may provide beneficial chemical nutrients to the soil. The weather was also affected by the volcanic eruption. The ash particles that were thrown into the air were good at attracting water droplets, causing a large amount of rain during the eruption. Some of the gases that were emitted during the volcanic eruption, such as sulfur dioxide, had an immediate cooling effect because they reflected sunlight away from Earth. Estimates of the damage and recovery costs of the Mount St. Helens eruption neared $1 billion dollars.

Claim-Evidence-Reasoning

Prompt
Give a scientific explanation about which of Earth's systems this catastrophic event affected.

Claim:

_____
_____

Evidence:

_____
_____
_____

Reasoning:

_____
_____
_____

Claim-Evidence-Reasoning

Earth's Systems Interactions CER

Rubric for writing a scientific explanation

Points Awarded	2	1	0
Claim	Makes an accurate and complete claim.	Makes a claim that is inaccurate or incomplete.	Does not make a claim.
Evidence	Provides two or more accurate pieces of evidence, uses labels, and addresses variables.	Provides 1–2 accurate pieces of evidence.	Does not provide evidence, or only provides inappropriate or vague evidence.
Reasoning	Evidence is connected to the claim and uses scientific principles and vocabulary.	Cites a reason, but it is inaccurate or does not support the claim. Reasoning does not use scientific terminology or uses it inaccurately.	Does not connect the evidence to the claim.

Open-Ended Response

Name: _____ Date: _____

Interactions of Earth's Systems

Short Answers

1 How does the ocean influence climate?

_____

_____

_____

2 Look at the picture and identify the shown Earth systems.
How are the different systems interacting?

_____

_____

_____

_____

3 Earth's systems can interact quickly or over long periods of time. Give two examples of how Earth can change quickly and two examples of how it changes over long periods of time.

_____

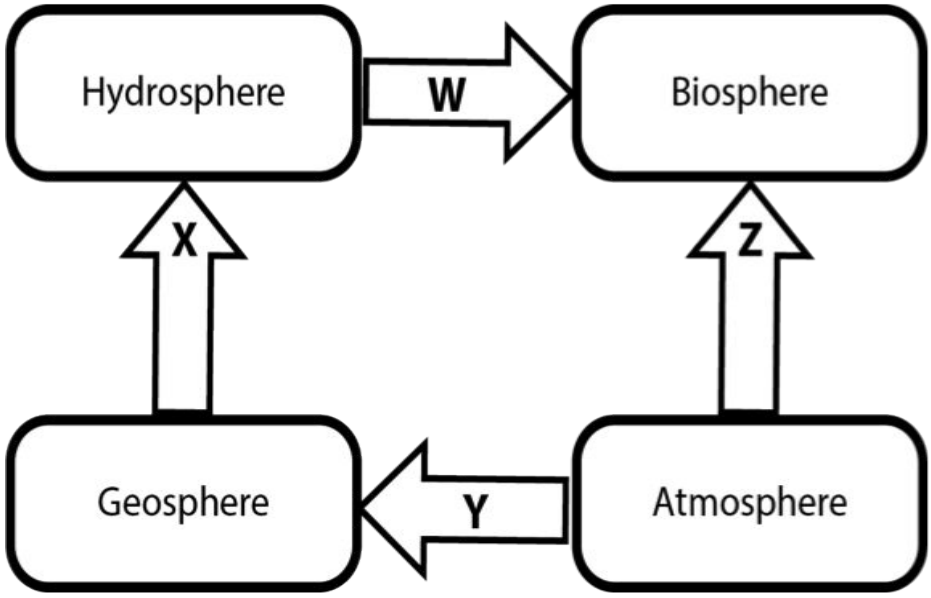
_____

_____

Multiple Choice

Name: _____ Date: _____ Group: _____

1



Which of the following is an accurate label for one of the arrows in the diagram provided here of Earth's system interactions?

A W = Plants release carbon dioxide gas into the air

B X = Heavy rainfall causes a landslide on the side of a mountain

C Y = Strong winds move sand dunes in the desert

D Z = Water vapor in the air cools and forms clouds

Multiple Choice

2 Which of the following provides an example of an interaction between the hydrosphere and geosphere?

A Burrowing animals, like groundhogs, dig holes in the ground to create tunnels.

B A delta is formed at the mouth of a river as sediment is carried downstream.

C Gases are released into the air when a volcano erupts.

D Air masses cool as they are forced upward over mountains.

Multiple Choice

3 The shape of landforms is mostly due to the effects of–

A plants and animals.

B Earth's magnetic field.

C the pull of the Moon's gravity.

D the oceans and the atmosphere.

Multiple Choice

4 Evidence for how the geosphere can affect the biosphere could be found in which of the following observations?

A Making observations over time of the diversity of plant species as the climate becomes warmer and drier

B Observing the rate of sediment formation over time by looking at layers of rock made from sediments

C Gathering data on the different species of fish that live in different zones of the ocean with different temperatures

D Comparing a map of land elevation to a map of the range of trees and observing that trees do not grow above a certain altitude

Multiple Choice

5 Mountain ranges can have an effect on climate because–

A as air masses are forced upwards, they generally cool down.

B there are fewer plants growing near mountains to produce oxygen.

C the tops of mountains are closer to the sun, so they are warmer.

D mountains are continually being worn down by wind and water.

Interactions of Earth's Systems

Guided Practice

Note: Due to the nature of this element, not all sections of the activity can be completed and submitted online by students.

Description

Students will identify the major spheres of our world and their importance to supporting various life forms.

Materials

Set of pre-cut Spheres and Descriptions Cards (per group)
Set of pre-cut Scenario and Result Cards (per group)
Guided Practice Chart Page
Glue or tape

Procedure

Part I

1. Students will start with the Spheres and Descriptions Cards. Students will match the sphere card with the corresponding description card. This will tell you if they understand the different spheres and their roles. If students struggle to match the cards, then ask them basic questions about the picture. Also, have them describe it to you and try to match their description of the picture to one of the description cards.
2. Once they match up correctly, have students glue the pictures to the Student Chart.

Part II

1. Students now need the Scenario and Result Cards. For this activity, students will decide which sphere the scenario card goes with. Once the scenarios have been matched with the spheres, students can glue them inside the boxes. If students struggle with matching the scenarios to the spheres, then ask questions about the detailed descriptive words in the scenario to guide them to the correct sphere.
2. Then, have students match the results cards to the corresponding scenarios. Once these have been matched, have students write down their reasoning in the last box of the row. They must cite evidence from the chart in their reasoning. For students that struggle to do these steps, ask guiding questions from information in the chart to help them understand the relationship between living things and the spheres of the world.

Guiding Points

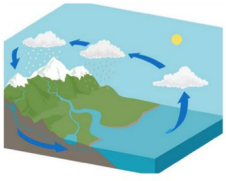
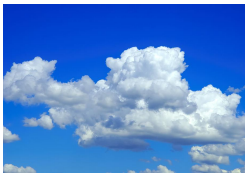
- During this intervention, be sure to label students' observations with appropriate vocabulary terms.

Guided Practice

Sphere	Description	Scenario	Result	Reasoning

Guided Practice

PLEASE MAKE SURE TO PRE-CUT THE CARDS. These are NOT in the correct order. The last column is left intentionally blank. These are designed to fit in the boxes on the Student Chart.

Spheres	Description Cards	Scenario Cards	Results	Reasoning (students write on chart)
	Atmosphere— The gases that make up the air on Earth	Animals disappear	There will be more oxygen and less carbon dioxide in the atmosphere.	
	Geosphere— The inside parts and surface of Earth, including rocks and landforms	Mountains disappear	Less rock on the surface of Earth would break down and move to new locations.	
	Hydrosphere— All of the water on Earth, found in the air, rivers, lakes, oceans, icecaps, rocks, soil, and organisms	Water disappears	There would be no rivers on Earth.	
	Biosphere— All of the living matter on Earth	Air disappears	Plants and animals would perish.	

Guided Practice

Name: _____ Date: _____

Check Understanding

Complete each statement using the word bank.

Word Bank					
plants	survive	air	water	rocks	animals
		spheres			

1. Earth has several _____ that work together to help living things _____.
2. The biosphere is made up of _____ and _____. It is affected mostly by the hydrosphere, which is made up of _____, and the atmosphere, which is made up of _____.
3. The inner parts, landforms, and _____ on Earth make up the geosphere.

Answer the question below. Use additional paper if needed.

4. Some students investigate how landforms are shaped by specific forces on Earth. To model this, one student poured a bottle of water at the base of a mountain of sand. After five minutes, the students observed that the shape of the base of the sand mountain had changed. Explain why this model is a good representation of how some landforms are shaped (make sure to mention the different “spheres” represented in the model).

_____
_____
_____
_____
_____