

Lesson 1

ANSWER KEYS

Figure 2



Atmosphere

Earth's outermost layer receives energy in the form of sunlight that passes through it and from heat that rises from Earth's surface, including the ocean. Heat rising from Earth's surface creates wind, which distributes heat as well as water through the atmosphere.

The biosphere (birds), hydrosphere (clouds), and atmosphere are interacting in the photo.



Geosphere

Earth's rock and metal contain an enormous amount of energy. Exposed rock absorbs sunlight and radiates heat into the atmosphere. In some locations, energy and new material make up the rocky outer layer of the geosphere in the form of lava. Major eruptions can affect the atmosphere, which in turn affects the hydrosphere and biosphere.

The biosphere (trees), geosphere (volcano), and atmosphere are interacting in the photo.

Hydrosphere

Liquid water, which absorbs energy from sunlight, moderates the climate. When the atmosphere is cold, heat from the ocean can keep the temperature above freezing. When the atmosphere is warm, the ocean absorbs some heat, making coastal communities cooler. Snow and ice reflect sunlight, which otherwise would be absorbed by water, soil, trees, and rock. Without water in all of its forms, Earth would have extreme changes in temperature.

The biosphere (polar bear) and hydrosphere (ice and water) are interacting in the photo.



Biosphere

Life has been found in virtually every part of Earth, from deep below the continental ice shelf of Antarctica to high up in the Himalayan Mountains.


The biosphere (frog) and atmosphere are interacting in the photo.




Figure 3

Sea Ice and Climate

Figure 3 Liquid and solid water are important factors in controlling climate. A large body of water can absorb energy from the sun, while snow or ice reflects solar energy back into space. In recent years, the amount of sea ice—frozen water—in the Arctic Circle has been dwindling because the air and water have been warmer than usual. As more of the Arctic Ocean is exposed due to loss of ice, it absorbs more sunlight and gets warmer. This makes it less likely for sea ice to form even when the air is well below freezing.

CCC Energy and Matter  On the image provided, draw and label a cycle diagram for the feedback that is occurring in the Arctic among ice, liquid seawater, atmosphere, and solar energy.


As the ice melts, more heat enters the atmosphere, making it warmer.


Warmer temps keep the ice from forming.




The sun warms the exposed water, melting the ice.

Reading Checks

 **READING CHECK** **Compare and Contrast** How are the rock and water cycles similar? How are they different?

Both cycles involve the flow of matter and energy through different components. The water cycle describes the movement and changes that water undergoes; the rock cycle follows the changes and movements of rocks.

 **READING CHECK** **Use Information** Which part of each sphere do you interact with in your daily life? Give one example for each of the main spheres.

I breathe the air from the atmosphere, walk on rock from the geosphere, drink water from the hydrosphere, and eat food from the biosphere.

 **READING CHECK** **Cite Textual Evidence** Name a reason why melting glaciers are considered positive feedback.

As a glacier melts, the surrounding land and air get warmer. That causes the glacier to melt even faster.