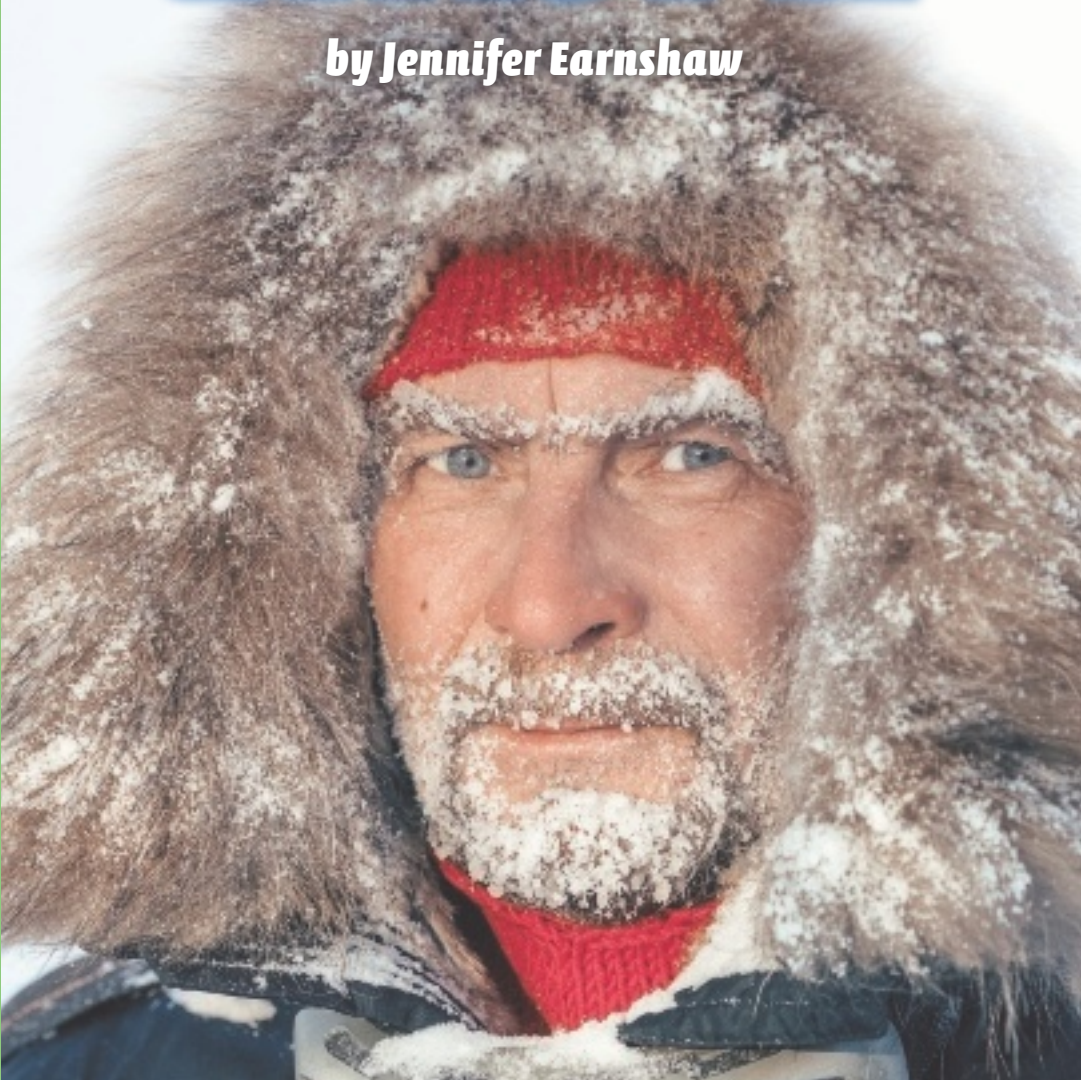


Science

Water on EARTH

by Jennifer Earnshaw





Before Reading

Make a KWL Chart

Before you read this book, make a KWL chart.



Write what you know about water on Earth in the **K** column.

Write what you want to know about water on Earth in the **W** column.

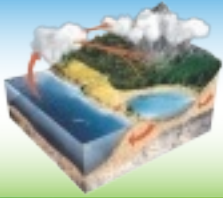
| K | W | L |
|---|---|---|
| | | |

After you read this book, fill in the **L** column of the chart. **Write** what you learned.



During Reading

water cycle



ciclo del agua

precipitation



precipitación

evaporation



evaporación

hydrosphere



hidrosfera

condensation



condensación

reservoir



depósito



During Reading

Do you understand?





Write the missing word that completes each sentence.

Choose from these words.

condensation **precipitation** **evaporation**

1. Water in a  moves into the air because of _____.

2. Water vapor in the air forms a  because of _____.

3. When water  in a  fall to Earth, it is called _____.

4. **Write** About Science
Copy the chart.

Write what state of water each example is.

| | | | |
|-----------------------|--------------------|---------|-------|
| Example | water vapor in air | glacier | ocean |
| State of Water | | | |



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by Jennifer Earnshaw

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Water, Water Everywhere

There are few things better than a tall glass of fresh water on a hot day. Yet in many places this is not an easy thing to get. Much of Earth is covered in water. But the water in the oceans is not safe to drink. It is salt water.

In places that do not have much fresh water, people can use water from the sea. But first they must take the salt out of it. Desalination is the process that removes salt from seawater to get fresh water. Seawater is heated to change it to a gas. The salt is left behind. When the gas is cooled, it changes back to liquid water. But the water is now fresh water.



Desalination can make ocean water safe to drink.



Water vapor in the lion's breath cools and becomes liquid drops that look like fog.

Water in the Air

Look around you. Can you see any water? Even if you do not see it, water is around you. This water is not in liquid form, as in a river. It is not in solid form, as in an ice cube. This water is an invisible gas called water vapor.

Air always has some water vapor in it, even in dry deserts. The water vapor was liquid water at some time. A water drop on a plant or in a river could become water vapor.

In time the water vapor may turn back to liquid form. It may fall to Earth as rain. Water vapor makes up a small part of all the gases in air.

The Water Cycle

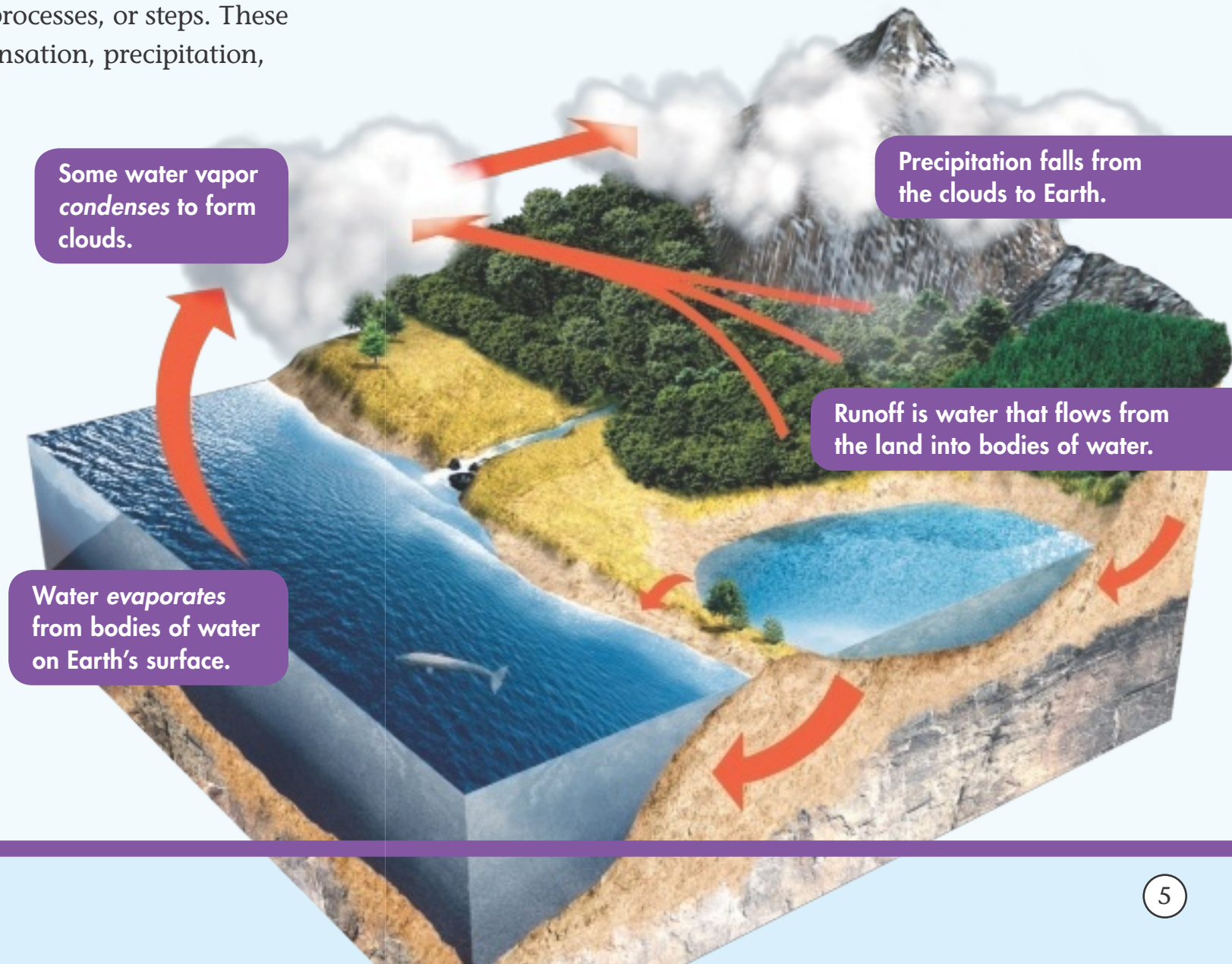
Water is always moving on and above Earth. As it moves, it changes form in the water cycle. The **water cycle** is the repeated movement of water through the environment in different forms. The water cycle never stops. It continues in a series of processes, or steps. These steps include evaporation, condensation, precipitation, and runoff.

The water cycle can be affected by temperature and air pressure. It can also be affected by wind and how high the land is.

Refer to the diagram as you read. Water evaporates from bodies of water as water vapor. The change in form of a liquid to a gas is called **evaporation**. Some water vapor rises into the air.

Clouds form when water vapor in air condenses into tiny drops. The change in form of a gas, such as water vapor, to a liquid is called **condensation**.

Water that falls from clouds as rain, snow, sleet, or hail is called **precipitation**. Most of it falls on the oceans.



Other Paths of the Water Cycle

The water cycle can follow different paths. For example, you have read that clouds can form when water vapor in air condenses. But water vapor in air can also form dew. Dew is water vapor in air that condenses on cold surfaces. You are more likely to see dew on grass in the early morning. This happens because air usually cools overnight.

When the temperature goes below freezing, water vapor in air can change directly from a gas to a solid. When water vapor changes to a solid, frost may form. Frost is tiny ice crystals that are left on cold surfaces like plants or windows.



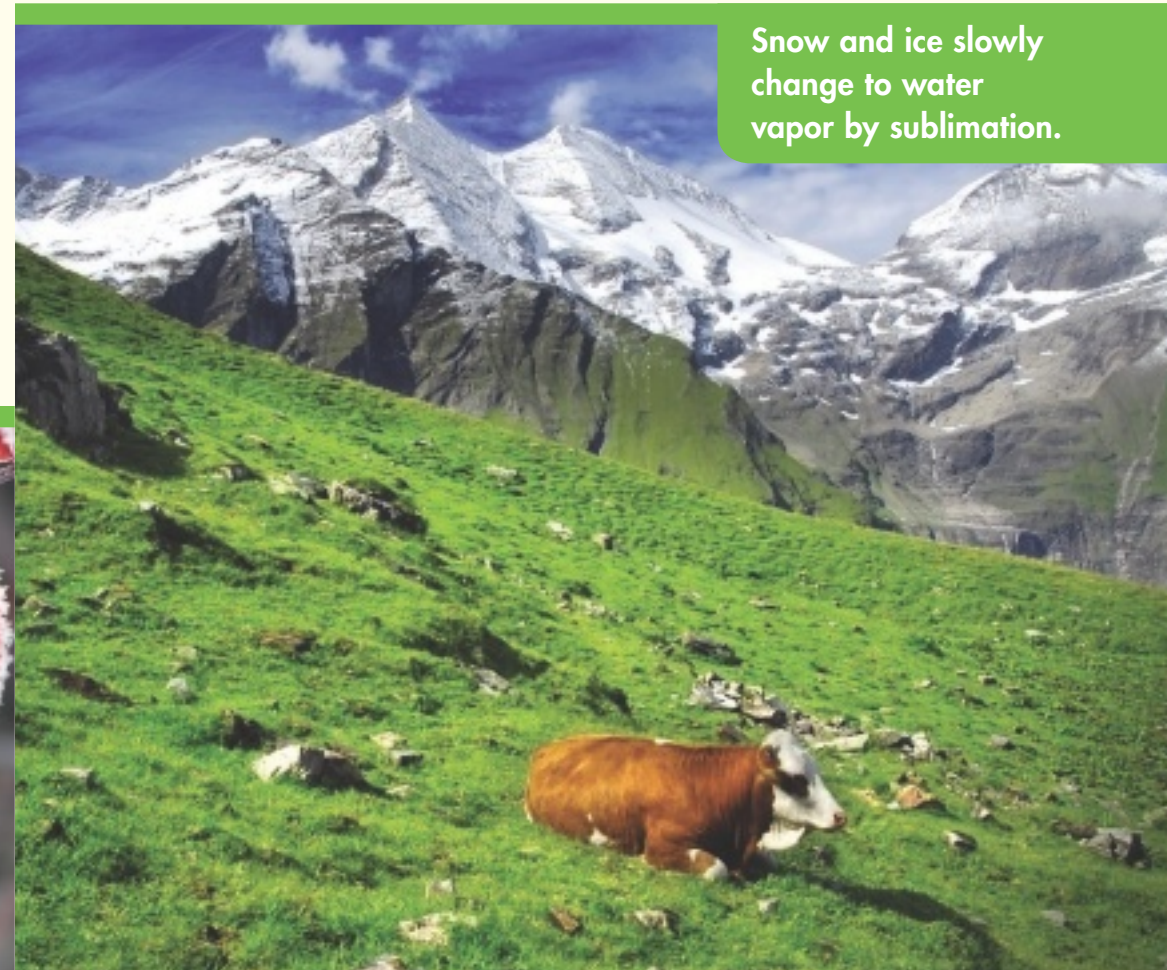
dew



frost

Sublimation is another possible step in the water cycle. This process is the opposite of the way frost forms. Sublimation occurs when snow or ice changes into water vapor without first melting. Both processes skip the liquid phase as water changes form.

Sublimation happens often on tall mountains. It is cold there. Strong, dry winds help change snow and ice directly to water vapor.

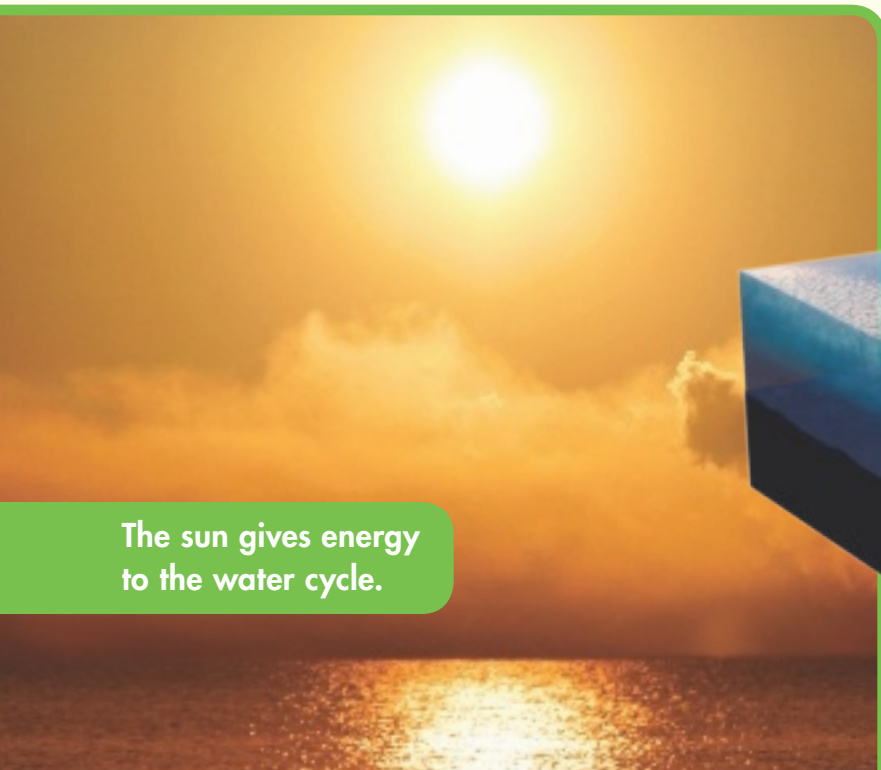


Snow and ice slowly change to water vapor by sublimation.

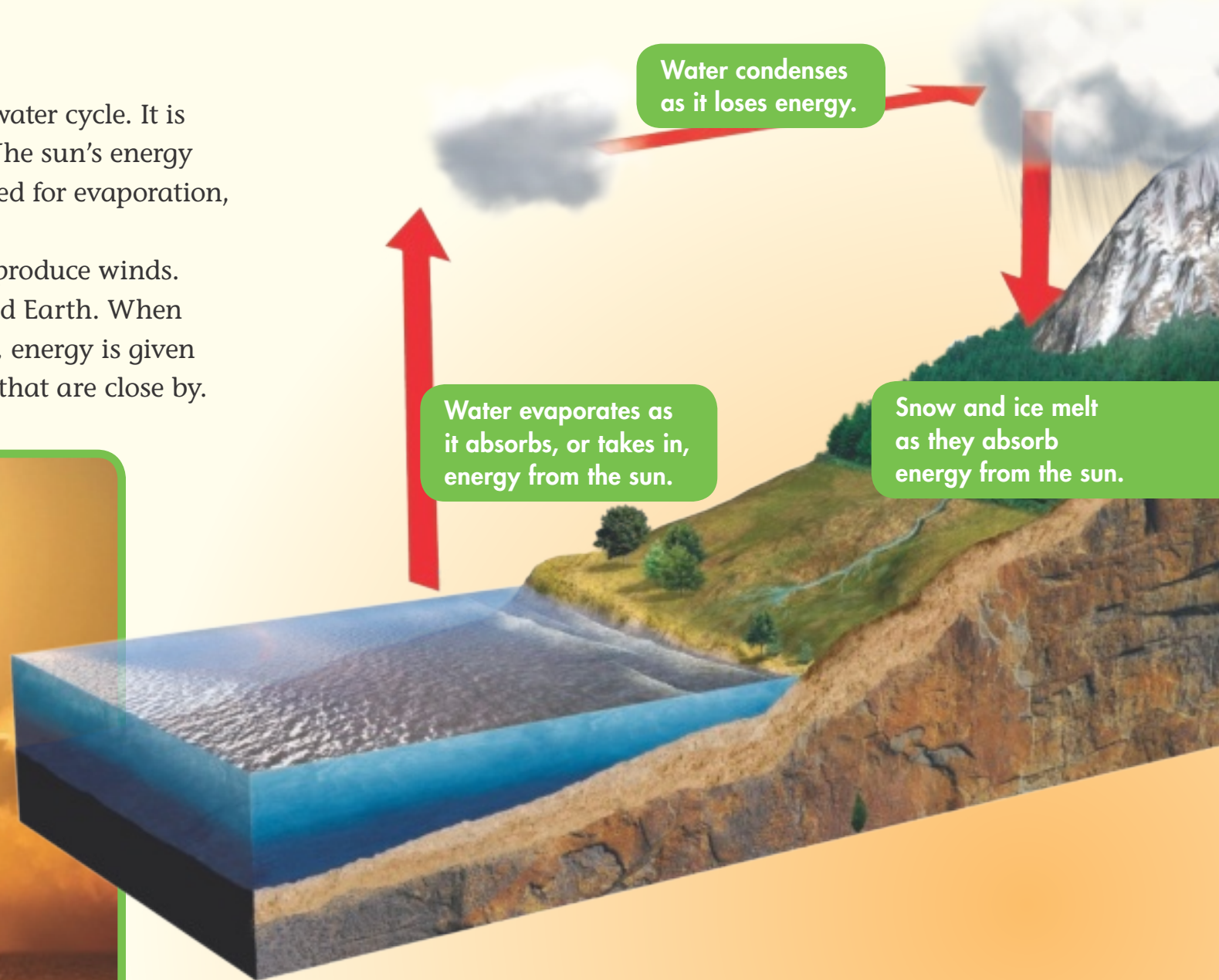
Energy and the Water Cycle

The sun has a major effect on the water cycle. It is the main source of energy on Earth. The sun's energy keeps the water cycle going. It is needed for evaporation, sublimation, and melting.

The sun's energy is also needed to produce winds. Winds move water vapor in air around Earth. When water vapor condenses to liquid water, energy is given off. This energy warms air and water that are close by.



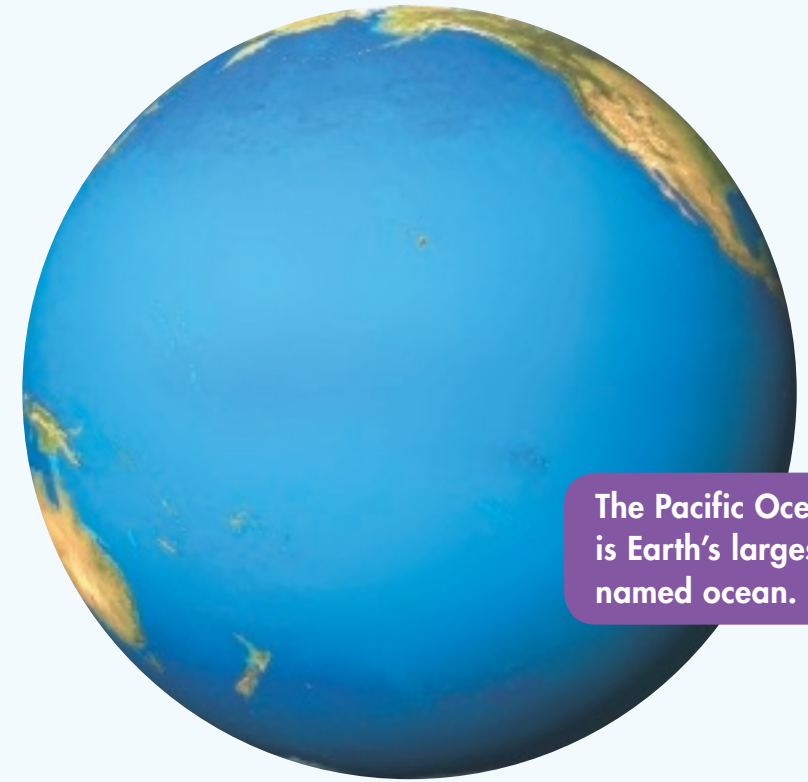
The sun gives energy to the water cycle.



The Hydrosphere

All the waters of Earth make up the **hydrosphere**. Waters of the ocean make up almost all of the hydrosphere. The ocean covers a little less than $\frac{3}{4}$ of Earth's surface. Only a very little part of the hydrosphere is in other places. These places include lakes, rivers, in air, and under Earth's surface.

The ocean is very large. It is divided into five areas. The Pacific Ocean is the largest. It is followed by the Atlantic Ocean, the Indian Ocean, the Southern Ocean, and the Arctic Ocean.



The Pacific Ocean is Earth's largest named ocean.



Earth's oceans are all connected and form one very large ocean.

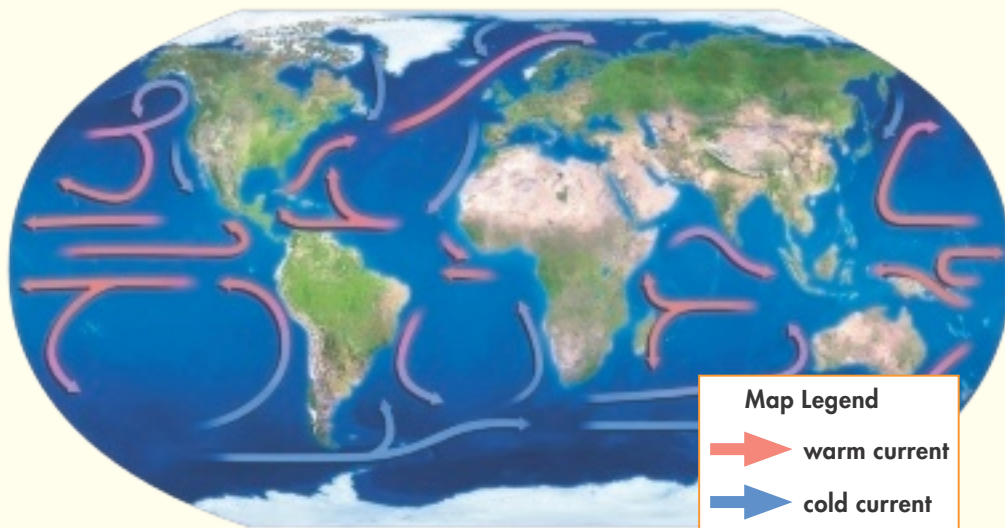
The ocean is the major reservoir for water on Earth. A **reservoir** is a storage area, usually for water. Evaporation, condensation, and precipitation connect oceans with all other bodies of water on Earth.

Ocean water has more salt in some places than in others. Rivers bring fresh water to parts of the ocean. These areas of the ocean have low salinity, or less salt in the water. Salinity is a measure of how salty the water is. In warm areas, ocean water evaporates quickly. Salt is left behind. This means that these areas have high salinity.

Ocean Temperature and Circulation

The temperature of ocean water is different from place to place. Ocean water near the equator is about 30°C. Near the poles, ocean water can be as cold as -2°C.

Ocean water is not always colder just because it is farther from the equator. Currents affect how warm or cold ocean water is. An ocean current is water that flows through the ocean like a river. Some ocean currents carry warm water from places near the equator toward the poles. The Gulf Stream is this kind of current. It moves warm water from the Caribbean Sea to the North Atlantic Ocean. Other currents carry cold water toward the equator.



This map shows currents on the surface of ocean water.

Ocean Resources

The ocean is an important source of food for people and other living things. Many things we use every day come from the ocean. For example, some salt that we eat comes from the ocean. Other useful things are minerals, like magnesium, and drinking water.

You read earlier that salt water can be made into fresh water by removing salt through evaporation. Useful minerals can be collected in the same way.



salt collected from ocean water

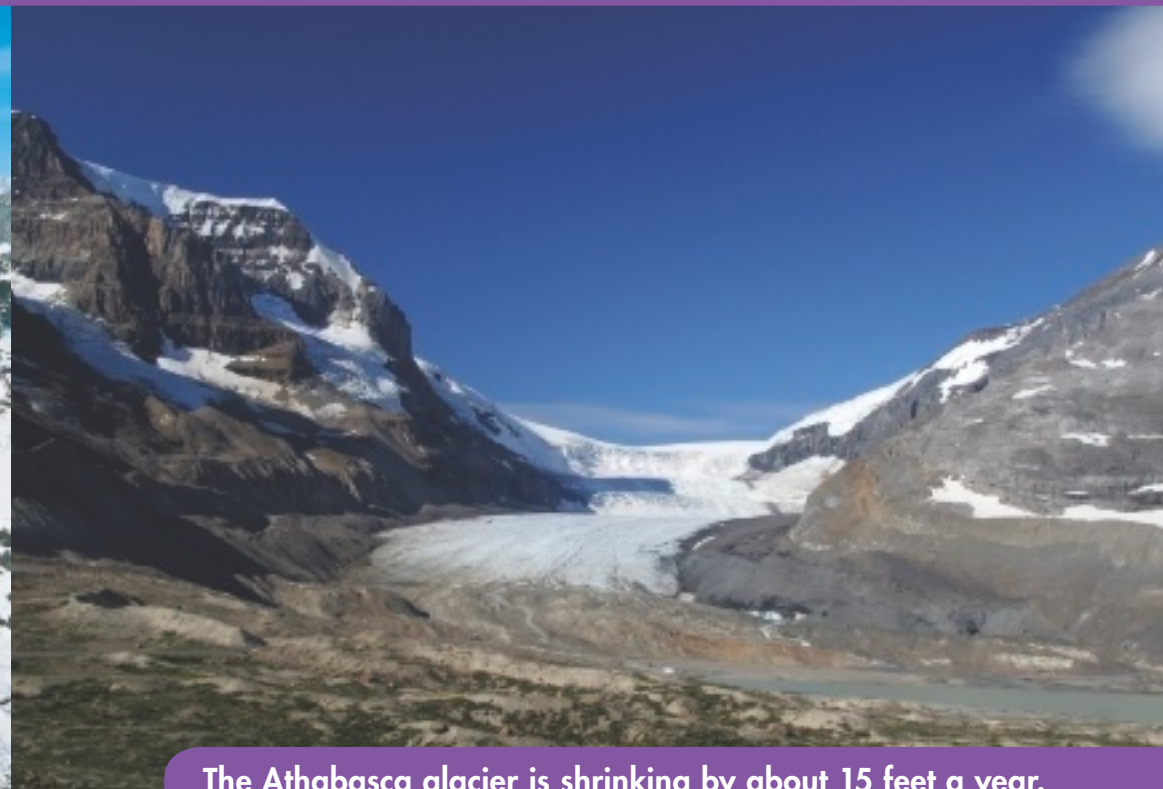
Glaciers

Some of Earth's water is frozen. A glacier is a large mass of ice that moves very slowly. Glaciers form in Antarctica and in other cold places near the poles. They may also form on high mountaintops.

Many glaciers lose some ice in spring and summer. The warmer weather melts the ice. The water that forms flows downhill. The melted water creates streams, rivers, and lakes. The ice that melts in warm weather is usually replaced in winter with snow.

Sometimes a glacier's ice melts faster than snow can replace it. When this happens, the glacier gets smaller. Over time this shrinking has been happening in many parts of the world. Now we can see land that had been covered by ice for thousands of years.

Objects from the past have been found in places where glaciers have melted. Tree stumps and tools that are thousands of years old have been found. The remains of a prehistoric man were also found.



The Athabasca glacier is shrinking by about 15 feet a year.

Glossary

| | |
|----------------------|---|
| condensation | the change in form of a gas to a liquid |
| evaporation | the change in form of a liquid to a gas |
| hydrosphere | all the waters of Earth |
| precipitation | water that falls from clouds as rain, snow, sleet, or hail |
| reservoir | a storage area, usually for water |
| water cycle | the repeated movement of water through the environment in different forms |



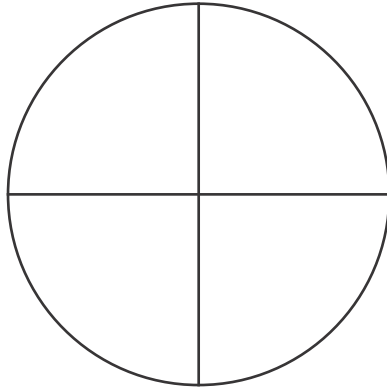
After Reading

Did you understand?



Write or  **draw** your answers.

1. What is the source of energy for the water cycle?
2. **Name** three bodies of water that are part of the hydrosphere.
3. **Draw** a circle like the one shown. Shade in your circle to show how much of Earth is covered with water.



4. **Draw** the major source of energy for the water cycle.



After Reading

Did you understand?

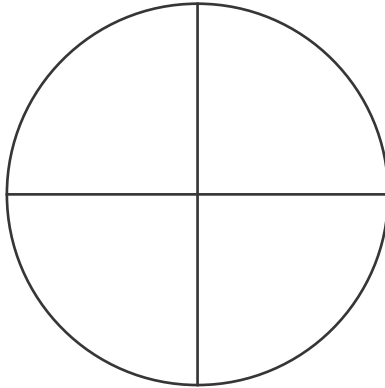


Write or



draw your answers.

1. What is the source of energy for the water cycle?
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3. **Draw** a circle like the one shown. Shade in your circle to show how much of Earth is covered with water.

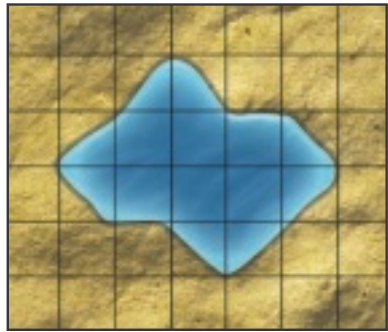


4. **Draw** the major source of energy for the water cycle.

Estimating Area

One way to estimate the area of a shape is to use a grid. The grid divides the shape into squares.

Look at the grid for Lake A. Each grid square equals 1 square kilometer. Lake A fully covers 6 squares.



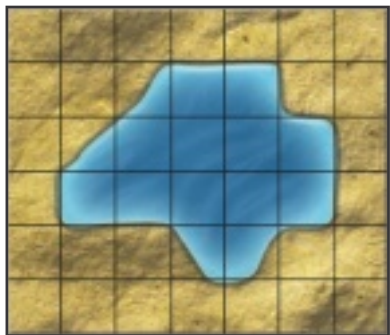
Lake A

Another 8 squares are about half covered by Lake A. The 8 half squares equal 4 full squares.

So, a good estimate of the area of Lake A is $6 + 4 = 10$ square kilometers.

Look at the grid for Lake B. Each grid square is 1 square kilometer.

Estimate the area of Lake B.



Lake B



Write your estimate.

| Genre | Comprehension Skill | Text Features | Science Content |
|------------|-----------------------|--|-----------------|
| Nonfiction | Main Idea and Details | <ul style="list-style-type: none"> • Captions • Labels • Diagrams • Callouts • Glossary | Water on Earth |

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