

Earth's Water Lesson 2 & 3

156 & 157 How is Freshwater Distributed Across Earth?

- Read this section as a class
 - After reading, answer the questions.
1. Discuss: Which types of surface water would be best for drinking?

Lakes or rivers because they would require the least filtration for drinking.

2. What are the four largest sources of freshwater on Earth?

glaciers and ice caps

groundwater

ground ice and permafrost

lakes

3. Using the information on this page, how can you convince someone that most of the evaporation of Earth's water occurs from the oceans?

The oceans make up 96.5% of all water on Earth, so a lot of evaporation must happen here.

4. Discuss: Do you think ice found in the oceans, such as icebergs, is frozen saltwater or frozen freshwater? Why?

Nearly all ice on Earth is frozen freshwater. Even though ocean water can freeze, saltwater freezes at a much lower temperature than freshwater. When ocean water does freeze, there is very little salt in the ice because only the water portion of saltwater freezes.

5. Discuss: Do you think water can move from one section of these charts to another? For example, can water move from soil moisture to lakes or from freshwater to ocean water?

Yes, the water cycle connects all water on our planet.

158 & 159 Freshwater Shortages

- Read this section in partners
- After reading, answer the questions.

7. Worldwide, about 1 billion people do not have access to clean water. Another 2.7 billion people do not have freshwater for one month a year.


8. What is the difference between an aquifer and a reservoir?

An aquifer is a natural underground water supply. A reservoir is a human-made place to collect and store water.

9. Why are wetlands important?

They naturally remove pollutants from water

10. **Discuss the Reflect on page 158.

 **Reflect** Why might someone who lives where freshwater is plentiful worry about water shortages elsewhere?

The water cycle connects all water on the planet, so a shortage in one place will eventually affect all places.

11. **Complete the Quest Connection on page 158

Quest Connection



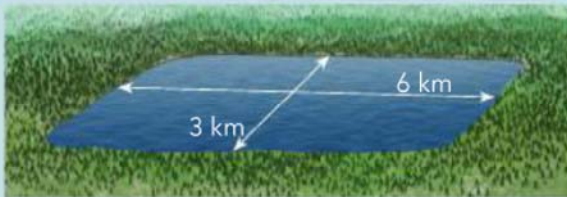
Why is it important to find ways to make dirty, or polluted, water or saltwater drinkable in the future?

Sample answer: The population is growing,
and freshwater is becoming more scarce.

12. **Complete the Model It and the Lesson 2 Check on page 159.

Model It!

You can use math to compare the volume of a lake to the volume of a glacier.



- Calculate** Find the surface area of the lake and the glacier using the formula.
 $B \text{ (surface area)} = l \times w$
 lake: $3 \text{ km} \times 6 \text{ km} = 18 \text{ km}^2$
 glacier: $8 \text{ km} \times 11 \text{ km} = 88 \text{ km}^2$
- Calculate** The depth of the lake is 0.1 km. The depth of the glacier is 0.2 km. Calculate the volume of each freshwater source using the formula. $V \text{ (volume)} = l \times w \times h$
 lake: $3 \text{ km} \times 6 \text{ km} \times 0.1 \text{ km} = 1.8 \text{ km}^3$
 glacier: $8 \text{ km} \times 11 \text{ km} \times 0.2 \text{ km} = 17.6 \text{ km}^3$
- Round the volume of each up to the nearest round number. Estimate how many times more volume the glacier has compared to the lake.
 lake volume rounded up = 2 km^3
 glacier volume rounded up = 18 km^3
 The glacier has about 9 times more volume than the lake.

✓ Lesson 2 Check

- Explain** If more than half of Earth is covered with water, why is freshwater so limited?

Most of the freshwater is tied up in glaciers and ice caps.

- Explain** Surface water is found in lakes, rivers, swamps, marshes, the atmosphere, and ice- and snow-covered land. Why are people not always able to use water from all these sources?

Sample answer: The water may be polluted, or it may be difficult to get to.

164 & 165 *Where is Water? And Ocean Temperatures*

- Read this section in partners
- After reading, answer the questions.

14. What is the hydrosphere?

The hydrosphere is the system that contains all of Earth's water.

15. Discuss: Describe two different roles the ocean plays in the water cycle.

The ocean is Earth's main water storage location, and most evaporation occurs from the ocean in the water cycle.

16. How are different sections of the ocean connected?

Circulation moves ocean water around the globe.

17. **Complete the Graph Data & Quest Connection on page 164.



Graph Data Fill in the bar chart with labels and the correct percentages of saltwater and freshwater.

Quest Connection



If Earth has so much water, why do people in some areas have none to drink? Explain.

Sample answer: Some people get water from rivers, lakes, or wells, but it is not always clean. Some people live far from water and have no way to get it.

18. Why is water temperature at the poles so much lower than water at the equator?

Sunlight at Earth's poles is spread out more than at the equator.

19. What is the difference between currents and tides?

Currents move water along the surface and beneath it. Tides are rising and falling patterns caused by the pull of gravity.

20. ** Complete the Reading Check on page 165



READING CHECK Draw Conclusions Using a ruler, make a dark line along the equator in the picture. Compare the temperature of the water north and south of the equator.

The water temperatures are about the same in the north and the south.

During which season in the north do you think this map was drawn? Why?

In spring or fall because temperatures are about the same in the north and the south.

166 & 167 What is the Motion of the Ocean?

- Read this section as a class
- After reading, answer the questions.

21. What are 3 names of the currents?

California

Peru

Norwegian

22. How do the circular patterns of ocean currents in the northern hemisphere compare to those in the southern hemisphere?

Northern hemisphere - move in clockwise motion

Southern hemisphere - move in counterclockwise motion

23. What factors may affect the direction and movement of ocean currents?

Wind, temperature, location of land masses, and the rotation of the Earth.

24. Discuss: Are ocean currents responsible for the movement of tides?

No, tides are caused by the gravity of the moon and sun pulling water in the ocean. This pull causes ocean water to rise in some areas and lower in others. As the Earth rotates, most coastal regions experience two high tides and two low tides per day.

168 & 169 Salinity & Threats to the Shoreline

- Read this section as a class
- After reading, answer the questions.

26. What is salinity?

A measure of the amount of salt dissolved in water

27. Where in the ocean would you find relatively high salinity?

Locations in the middle of the ocean are far away from any input of freshwater from rivers, so these areas would have higher salinity

28. Why are the surface waters of the Arctic Ocean lower in salinity than the surface waters of the Caribbean Sea?

Surface waters in the Arctic Ocean likely mix more with freshwater sources, such as glaciers and ice caps, than the waters of the Caribbean Sea.

29. **Complete the Identify on page 168

Salinity	
Body of water	Salinity (parts per thousand)
<u>Indian Ocean</u>	32–37 ppt
Caribbean Sea	35 ppt
Arctic Ocean	30 ppt
Antarctic Ocean	34 ppt

Identify Circle the body of water with the lowest salinity. Underline the body of water that most likely has the highest salinity.

30. List two causes and effects mentioned in the text on page 169

Cause: Erosion and rising sea levels

Effect: Shrinking Beaches

Cause: Accidents from Ocean Oil Drilling Spill oil

Effect: Birds, fish, marine mammals, & sea plants suffer

31. **Complete the Reading Check & Lesson 3 Check on page 169

☒ **READING CHECK Draw Conclusions** Can oil spilled on land pollute the ocean? Explain your answer.

Sample answer: Yes, a river can carry oil spilled on land to the ocean.



☒ **Lesson 3 Check**

1. **Explain** Through which processes in the water cycle is the ocean connected to all of Earth's water?

evaporation and precipitation

2. **Explain** On Tuesday, the water temperature at Emerald Beach is 27°C. On Thursday, the water temperature at the same beach is 30°C. What factors might have caused the temperature change?

Sample answer: tides, currents, or the sun's energy