

## Study Guide for Unit 19: Water Resources

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Read from the beginning of Unit 19 (Water Resources) until *Water in California*.

### Where water is

1. All living things need water for their bodies to function properly. About how much of a human body is water?
2. About how much of the Earth's water is fresh water (not salty water)?
3. How much of the Earth is covered by the ocean (salt water)?
4. Is most of the Earth's FRESH water in a liquid form (in rivers, lakes, in the ground) or in a solid form (snow and ice)?
5. Is most of the Earth's LIQUID FRESH water found in lakes and rivers or underground (in soil or aquifers)?
6. True or false? "Most of the water vapor in the atmosphere is water which evaporated from the ocean. Thus, most of our drinking water comes from the ocean."

### Water in California

7. About how much of California's water comes from snow that falls up in the mountains and then melts slowly in the spring and summer?
  8. Where is most of the fresh water in California, in northern California or southern?
  9. Where are most of the people in California, in northern California or southern?
  10. How do people in southern California get the water that they need?
  11. True or false? "In Orange County, treated wastewater is pumped into their aquifers (groundwater), and then they pump the water out again to use for drinking water."
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Read Unit 19 (Water Resources) from *The Water Cycle* until *Water and Plants*.

### Water Cycle Vocabulary

12. What is evaporation?
  13. What is condensation?
  14. What is infiltration?
  15. What is an aquifer?
  16. What is groundwater?
  17. What is runoff?
  18. What is transpiration?
  19. True or false? “The word *precipitation* can refer to BOTH rain and snow.”
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Read Unit 19 (Water Resources) from *The Water Cycle* until *Water and Plants*.

### Water Cycle: Where does it go?

Water can exist in several different “places” called reservoirs or sinks. For example:

- the atmosphere
- as groundwater (water in soil and aquifers)
- the ocean
- plants on land as well as other living things
- rivers and lakes on land

20. If water evaporates from the ocean, where does it go?
21. If water vapor in the atmosphere condenses and falls as rain, where does it go?  
(Note: It goes directly into several sinks.)
22. Where do plants on land get their water from?
23. When water transpires from plants, where does the water go?
24. True or false? “Most of the water that falls over land eventually flows back into the ocean.”
25. Where does most rain fall, over the land or over the ocean?
26. True or false? “Most of the water that soaks into the Earth (becomes groundwater) flows through the Earth back into the ocean.”

27. True or false? “Water is filtered as it flows through soil and rocks as groundwater (bacteria and contaminants get trapped), making it cleaner.”

28. True or false? “If too much water is pumped out of an aquifer along the coast, ocean water will flow into the aquifer, poisoning it with salt water.”

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Read Unit 19 (Water Resources) from *What we use water for* until *Access to Clean Water*.

### What we use water for

29. In addition to using water in our homes, we need water to grow our food, make products for us (e.g., clothes), and help us generate electricity. Which of these uses is the one that uses the greatest amount of water: homes, agriculture, products, or electricity generation?

30. About what percentage of the water we use goes towards agriculture (farming)?

31. How does the amount of water that we use in our homes compare to the amount of water that is used to make the products we buy and to generate the electricity we use each day?

32. In the United States, we use both surface water in lakes and rivers as well groundwater in aquifers to grow food. Which provides more water?

33. If all the people taking water from an aquifer take MORE water out each year than soaks into the Earth (infiltrates) when it rains each year, what will happen to the water table (water level) in the aquifer)?

34. If the water table goes DOWN and goes BELOW the depth of your well, can you draw water from the aquifer?

35. True or false? “The Ogalla aquifer is the largest groundwater system in the United States, extending from Nebraska to Texas. Agriculture is a big part of the economy in this part of the country, and groundwater is a large part of the water that they use for irrigation. The amount of water in the aquifer has been going down for decades.”

36. True or false? “It is unsustainable for people to take MORE water out of an aquifer each year than soaks into the Earth (infiltrates) when it rains each year, because eventually there will be no water left in the aquifer.”

### Water Scarcity

37. People in some countries use more water in their homes and small businesses than people in other countries. On average, who uses more such water, people in developed countries (wealthier ones) or people in developing countries?
38. Which country has the greatest use of water per person?
39. What is water scarcity?
40. True or false? "In some places, there is plenty of clean water but it is too expensive for many people to buy."
41. According to the United Nations, about how many people do not have access to enough clean water?
42. How can one country affect how much water another country has?
43. What is the primary (main) contaminant in our drinking water supplies?
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Read Unit 19 (Water Resources) from *Sewage and Sewage Treatment* until *Harm caused by untreated sewage*.

### Water Treatment

44. What do we call the treated wastewater that we release into rivers, lakes, and the ocean?
45. In rural areas, homes are not always connected to a wastewater treatment plant. Where does the wastewater from their homes go?
46. What are the TWO primary things that we remove from wastewater (sewage) to clean it before releasing it into the environment? In other words, identify the things that would cause the most harm if they remained in the water.
47. How will the bacteria in wastewater cause harm if they are not removed before the wastewater is released into the environment?
48. How can the nutrients in wastewater cause harm if they are not removed before the wastewater is released into the environment?
49. What organisms do we use in wastewater (sewage) treatment plants to help degrade (break down) the wastes?
50. Which natural ecosystem is the most effective at naturally cleaning wastewater, much like a wastewater treatment plant?

51. How do wetland plants and the shallowness of wetlands physically help clean water? In other words, how do they affect the water and why does this help the water become cleaner?

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Read Unit 19 (Water Resources) from *Drinking Water in the United States* until *Increasing our water supplies: Remove Salt from Ocean Water*.

### Increasing our water supplies: Recycling Wastewater & Desalinization

52. What extra steps are used to make treated wastewater potable (drinkable)?

53. True or false? “Most people drink and use treated water that was previously used by someone else (used, treated, and released into the environment). In other words, we are all drinking toilet-to-tap water already.”

54. What are some of the pros and cons of using recycled wastewater (purified wastewater) as a major component of our fresh water supply?

### Increasing our water supplies: Desalinization

55. What is desalinization?

56. What are some of the pros and cons of using desalinization as a major component of our fresh water supply?

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Read Unit 19 (Water Resources) from *Increasing our water supplies: catch and store more water* until the end of the Unit.

### Increasing our water supplies: Dams and Reducing Waste

57. How do dams and reservoirs lose (waste) a LOT of fresh water?

58. Worldwide, about how much of the water stored by dams and reservoirs evaporates away and is lost from our fresh water supplies?

59. Aside from storing fresh water for future use, what are other effects of building dams (both good and bad)?

60. Which strategy for increasing our fresh water supplies keeps us dependent on climate for our water? In other words, we would have more water in years with lots of

rain and/or snow, and less water in years with smaller amounts of rain and snow if we followed this strategy.

### California's future

61. As the world gets warmer, what do we expect to happen to the amount of water that we store in dams and reservoirs in California?

62. As the world gets warmer, what do we expect to happen to our water supply in California?

63. What is the easiest and least expensive way to increase our fresh water supplies?

64. Which two items use the most water in an average United States home? In other words, if we want to reduce our water use, which two items should we make sure are water efficient/low-flow when it is time to replace them?

65. How can you save water in your home?

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