Name: Date:

Topic: Water Resources Period:

Warm Up: List everything you do each day that requires water and try to estimate your daily usage (in gallons).

Where do you think your water comes from? How does it get cleaned/purified?

1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is water that has few dissolved ions, such as salt.

2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ water released after use by households, industry, or agriculture.

3) \_\_\_\_\_\_\_\_\_\_\_\_ water is any body of water found above ground, such as oceans, rivers, and lakes.

- Water provides many ecosystem services to animals and plants. Humans are 75 \_\_\_\_\_\_ water. - We require \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4) Facing water shortages, a county in California tried an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ approach: treating sewage water to create a source of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ water.

- **Case:** The Orange County Water District (OCWD) in Anaheim, CA has begun a groundbreaking project to turn wastewater into drinking water. They have been purifying HUGE amounts of wastewater and pumping it deep back underground .

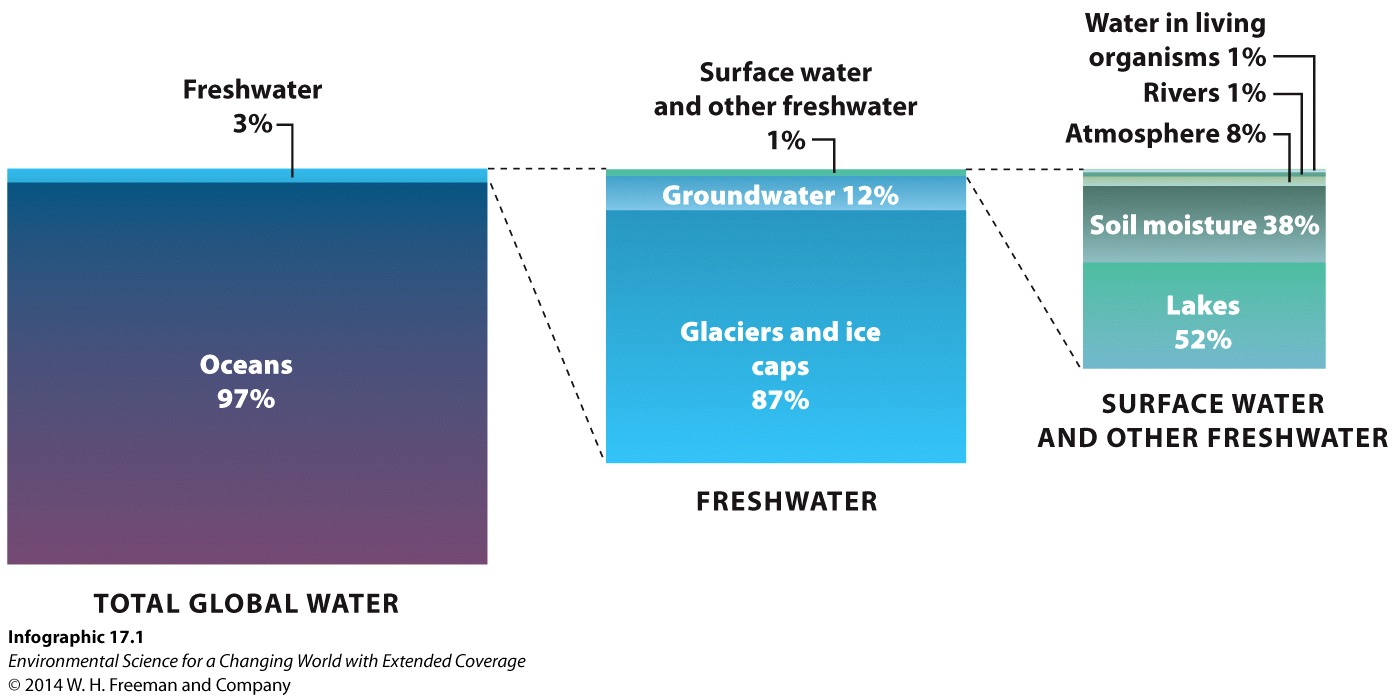
5) Although 75 percent of Earth’s \_\_\_\_\_\_\_\_\_\_\_ is covered by water, only 1/100 of 1 \_\_\_\_\_\_\_\_\_\_\_ of that water is \_\_\_\_\_\_\_\_\_\_\_\_ by humans.

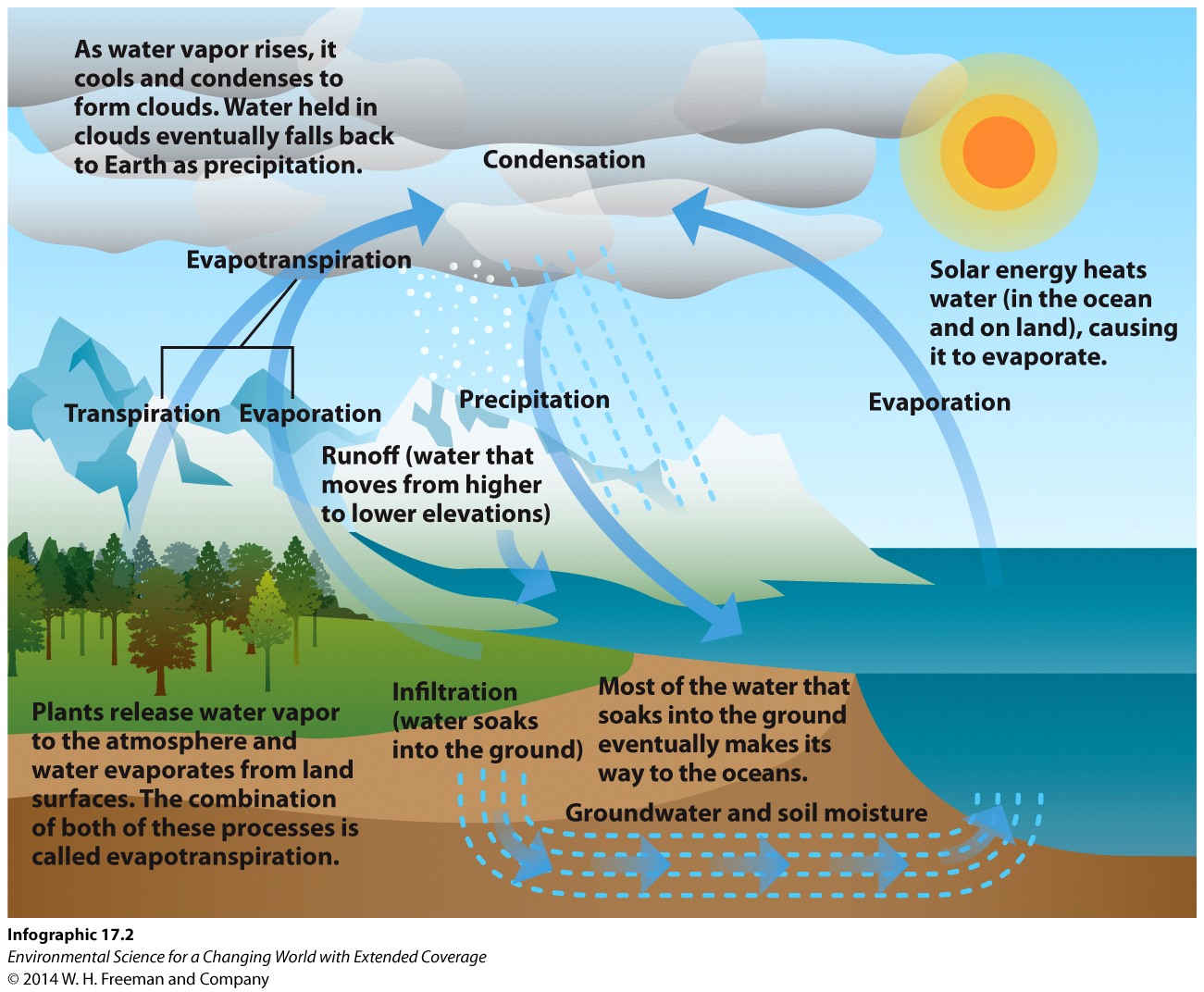
- Nearly \_\_\_\_\_ percent of the freshwater on the planet is trapped in \_\_\_\_ caps and glaciers.

6) Wherever it is, water moves through a water cycle: cycling between \_\_\_\_\_\_\_\_\_\_ and liquid states.

- This process sends 17,000 \_\_\_\_\_\_\_\_\_\_\_ gallons of water vapor into the atmosphere every year.

- Once aloft, that water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (condensation) and may fall back to Earth as precipitation (rain, snow, sleet, etc.). Almost all precipitation falls in the \_\_\_\_\_\_\_\_\_\_\_\_. But a tiny amount falls on land, which is what humans can \_\_\_\_\_\_\_\_\_\_\_\_.





7) Ocean water is too \_\_\_\_\_\_\_\_\_\_\_ for humans to consume, and can be toxic in large doses.

8) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of nearby ocean water is expensive and uses a large amount of \_\_\_\_\_\_\_\_\_.

- This refers to any of several processes that \_\_\_\_\_\_\_\_\_\_\_\_\_\_ some amount of [salt](http://en.wikipedia.org/wiki/Sodium_chloride) and other [minerals](http://en.wikipedia.org/wiki/Mineral) from saline [water](http://en.wikipedia.org/wiki/Water).

9) People don’t always live near \_\_\_\_\_\_\_\_\_\_\_ sources of freshwater, making water scarcity a vital issue.

- The World Health Organization (WHO) estimates that 1 in 3 people – more than 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ – lack sufficient access to clean water.

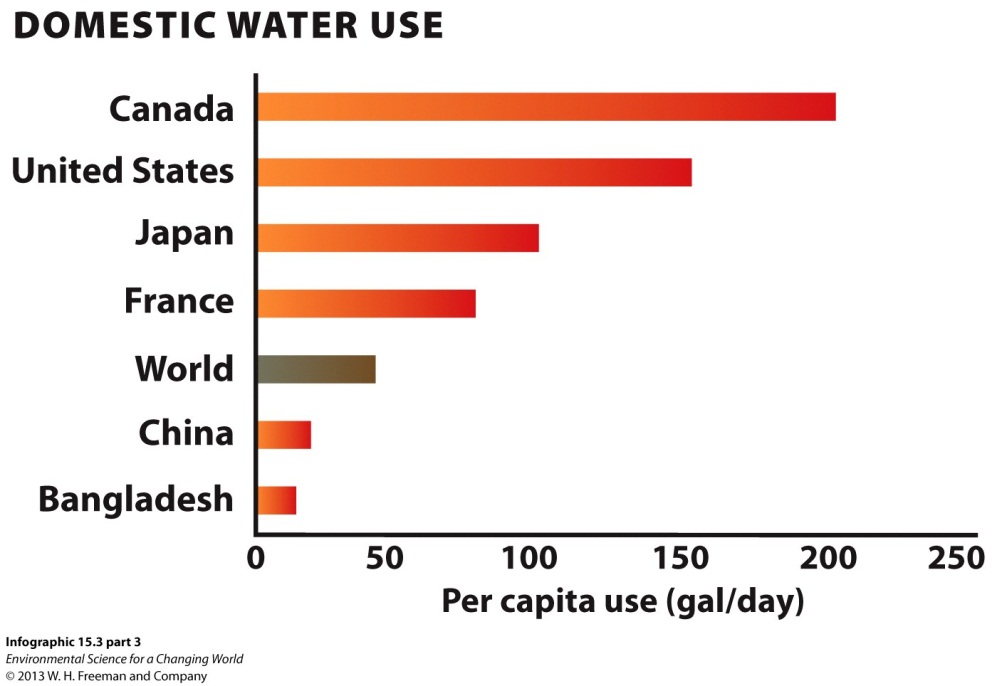
- As populations \_\_\_\_\_\_\_\_\_\_\_\_\_, so will water scarcity: the United Nations estimates 2 out of 3 people will face water \_\_\_\_\_\_\_\_\_\_\_\_\_ by 2025.

- In many \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nations, people use nearby surface waters to meet their basic needs. Without improved sanitation, this water is contaminated with raw \_\_\_\_\_\_\_\_\_\_\_\_ and other forms of contamination.

10) Water Usage: An \_\_\_\_\_\_\_\_\_\_\_\_\_ of water is one-foot of water covering a one-acre surface. This would be about 300,000 gallons and support two families for a year.

- \_\_\_\_\_\_\_\_\_\_\_\_\_\_ can only provide water equal to the replenishment rates.

- \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (City) use is actually dwarfed by agricultural drain.



11) California faces several water challenges:

- Northern California gets freshwater from \_\_\_\_\_\_\_\_\_\_\_\_ Sierra Mountain snowpack – which may \_\_\_\_\_\_\_\_\_\_\_\_ with climate change.

- With climate change, this \_\_\_\_\_\_\_\_ melt is being reduced to critical levels each year.

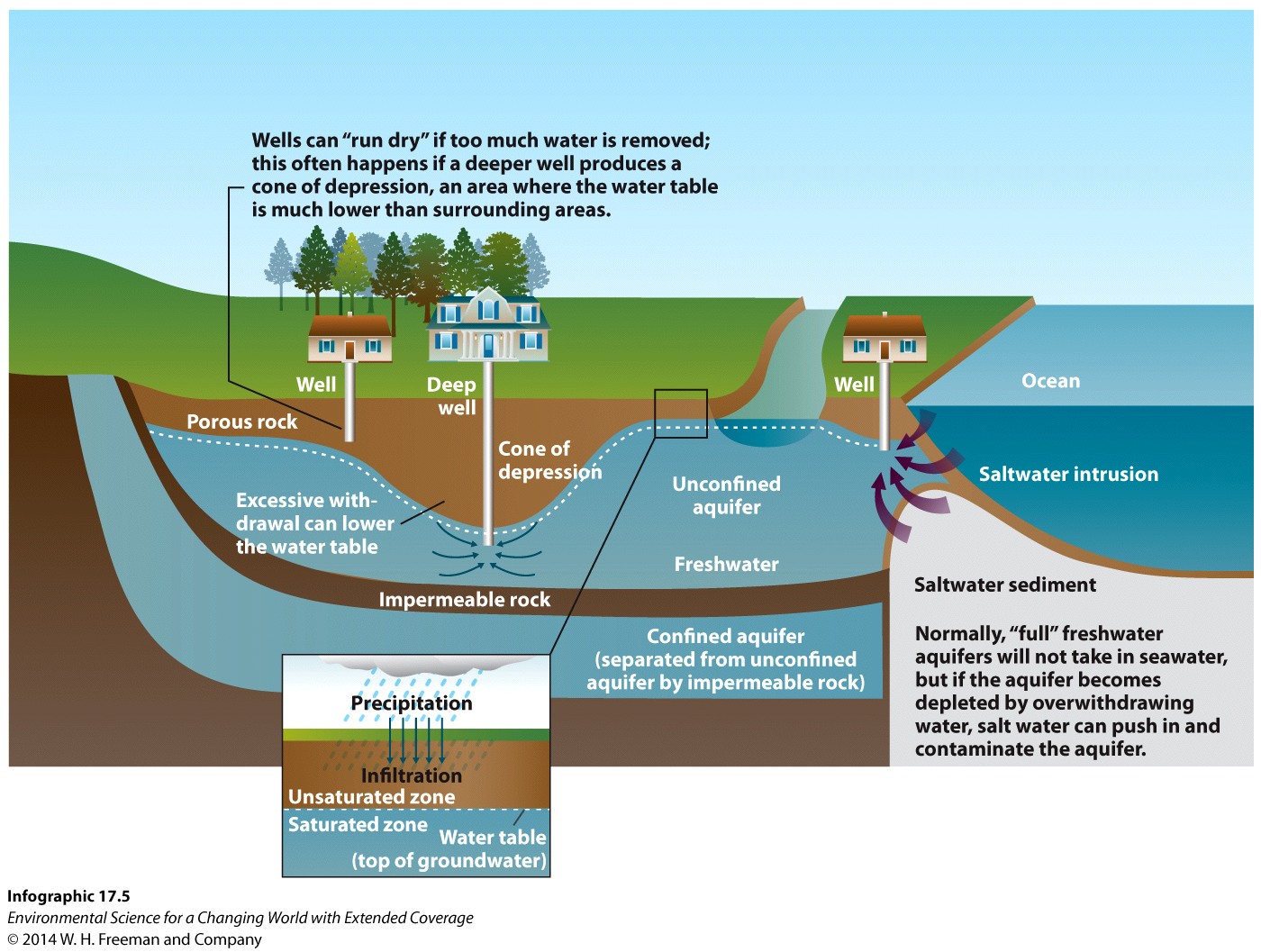
- \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the state’s water is in northern California, but two-thirds of the population is in the south. Shipping water south is costly – and earthquakes could cut off the water supply.

12) Many people – not just in California – rely on aquifers, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ regions of rock or soil permeated with water.

- Water \_\_\_\_\_\_\_\_\_\_\_\_\_ down into the Earth naturally fills cracks and crevices while maintaining the water table and refilling the aquifer.

- In California, proximity to seawater and lower water tables have resulted in saltwater \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into the freshwater sources.

- California discovered saltwater was \_\_\_\_\_\_\_\_\_\_\_\_\_ some aquifers – putting that water supply in jeopardy.



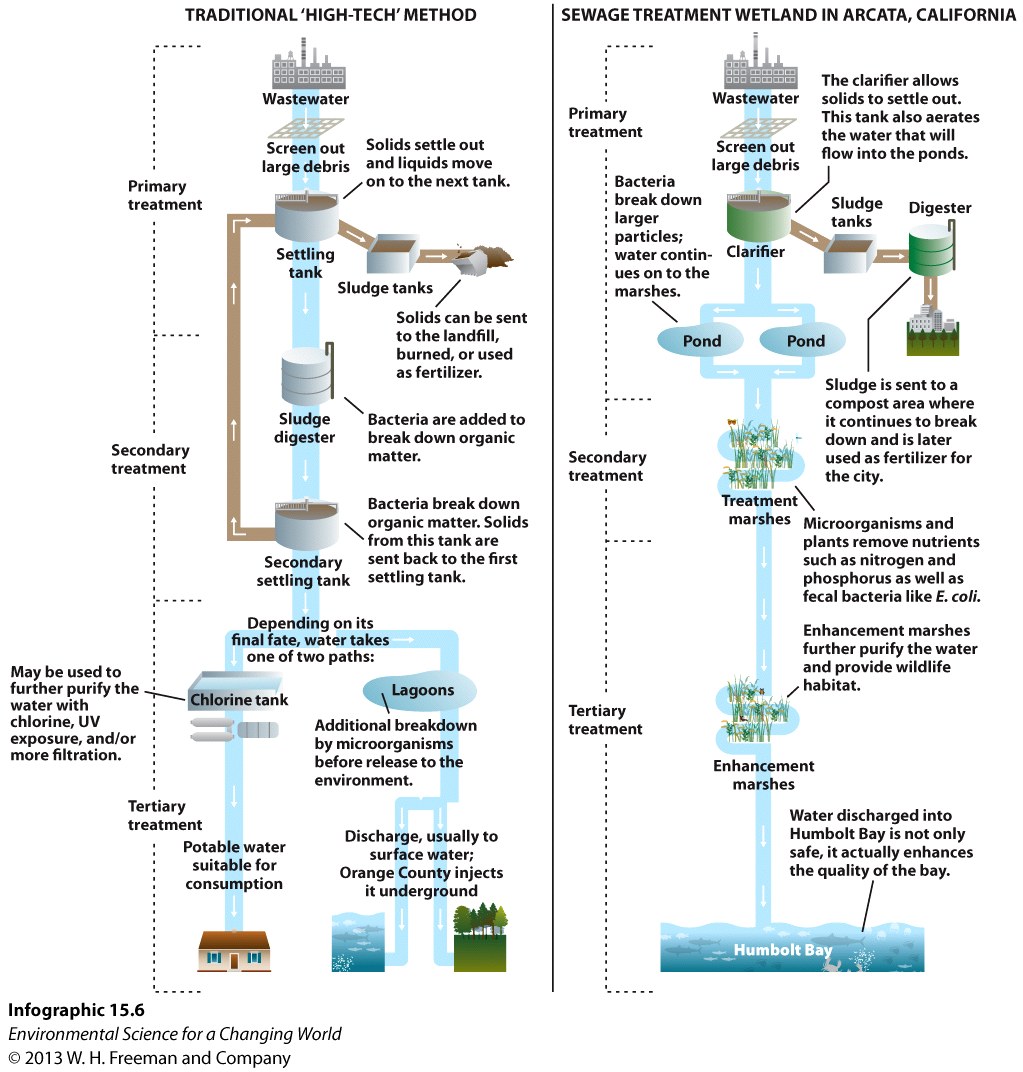
13) Increasing population also led to increases in wastewater: 100 \_\_\_\_\_\_\_\_\_\_ gallons/day of partially treated sewage water was flooding the Santa Ana River.

- When people move into an area, they bring with them additional demand for water and more waste. As Orange County became more populated, it was necessary to adjust to the highs and lows of the water supply. The existing project was expanded and more wastewater was pumped into the Groundwater Replenishment System.

- After much community discussion, the Groundwater Replenishment System went online in 2008: now 70 \_\_\_\_\_\_\_\_\_\_\_ gallons of recycled water are pumped into wells daily.

14) Solving water \_\_\_\_\_\_\_\_\_\_\_ is not easy. Some communities dam up rivers to create \_\_\_\_\_\_\_\_\_\_\_\_\_ – but these lose water every day through evaporation.

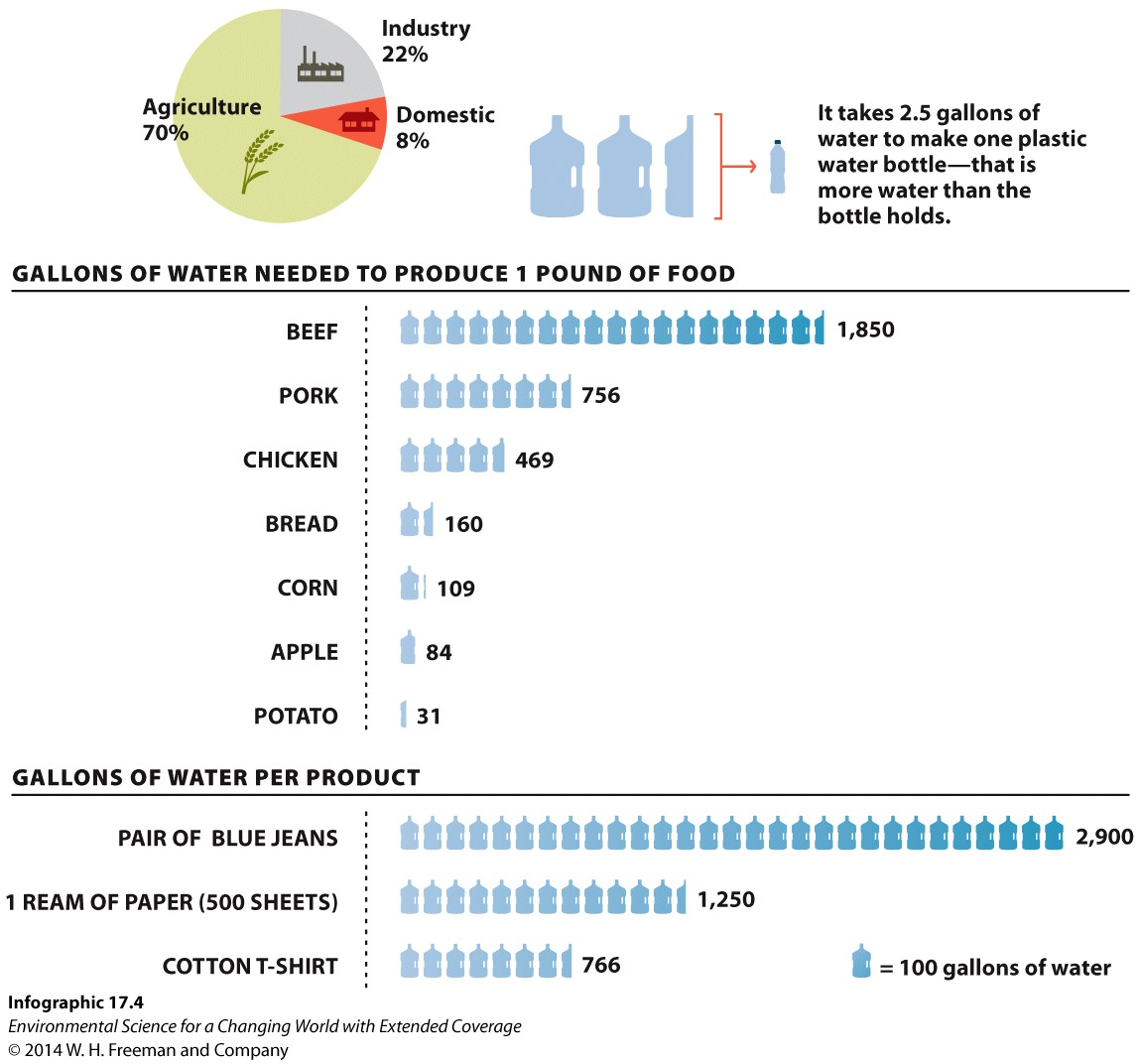
15) Arcata, CA, converted a \_\_\_\_\_\_\_\_\_\_\_ to wetlands and sends sewage water to be consumed by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in order to purify it.



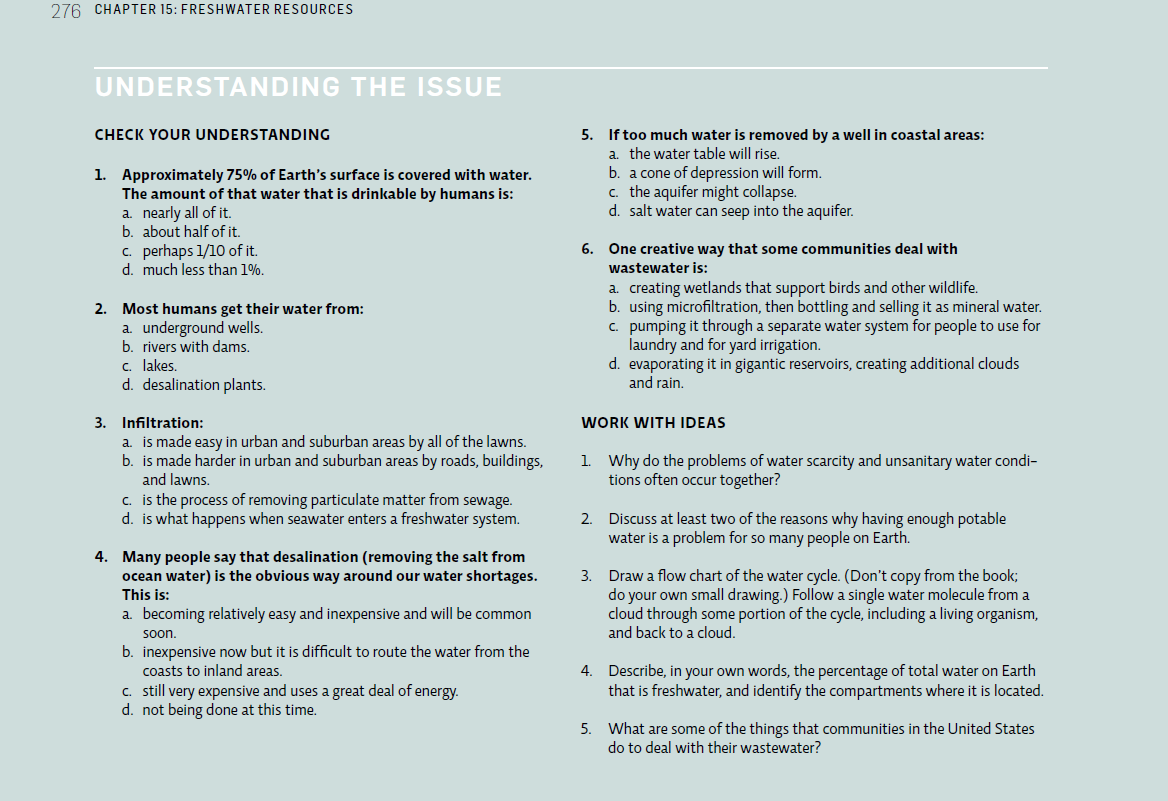
16) The Orange County system was costly: $487 \_\_\_\_\_\_\_\_\_\_\_\_\_. A less expensive approach is water conservation.

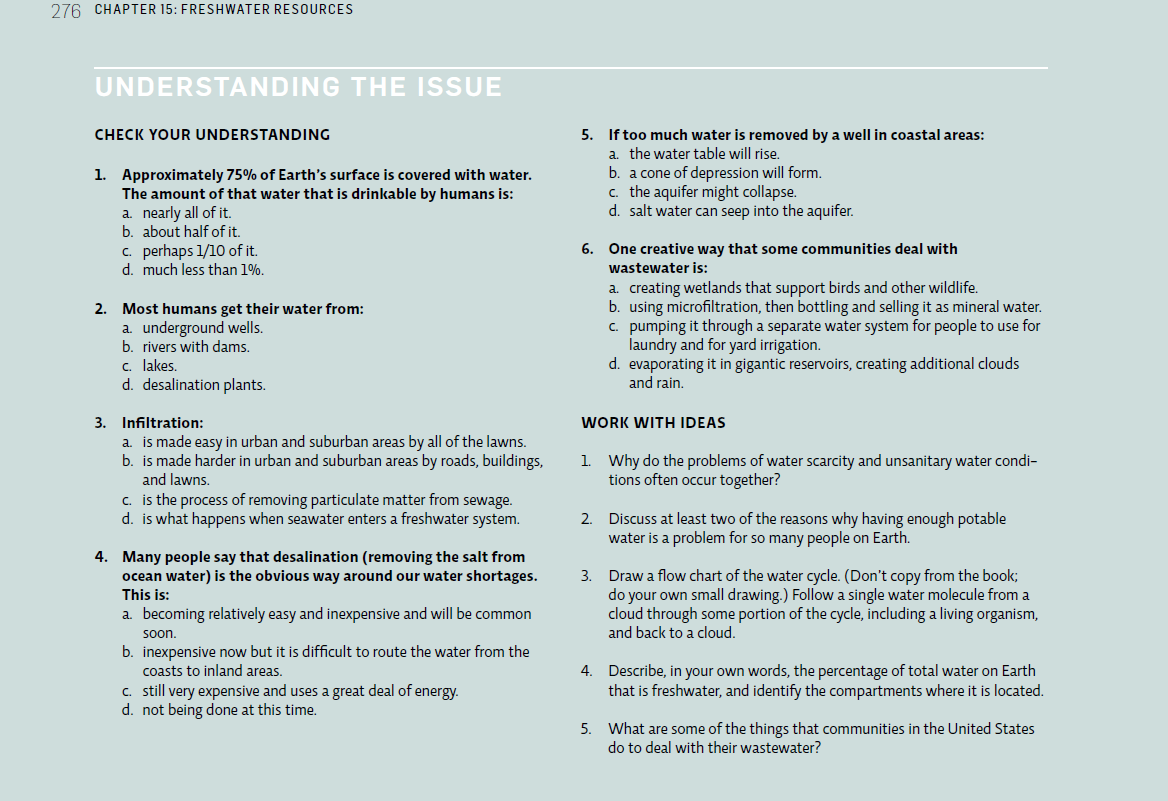
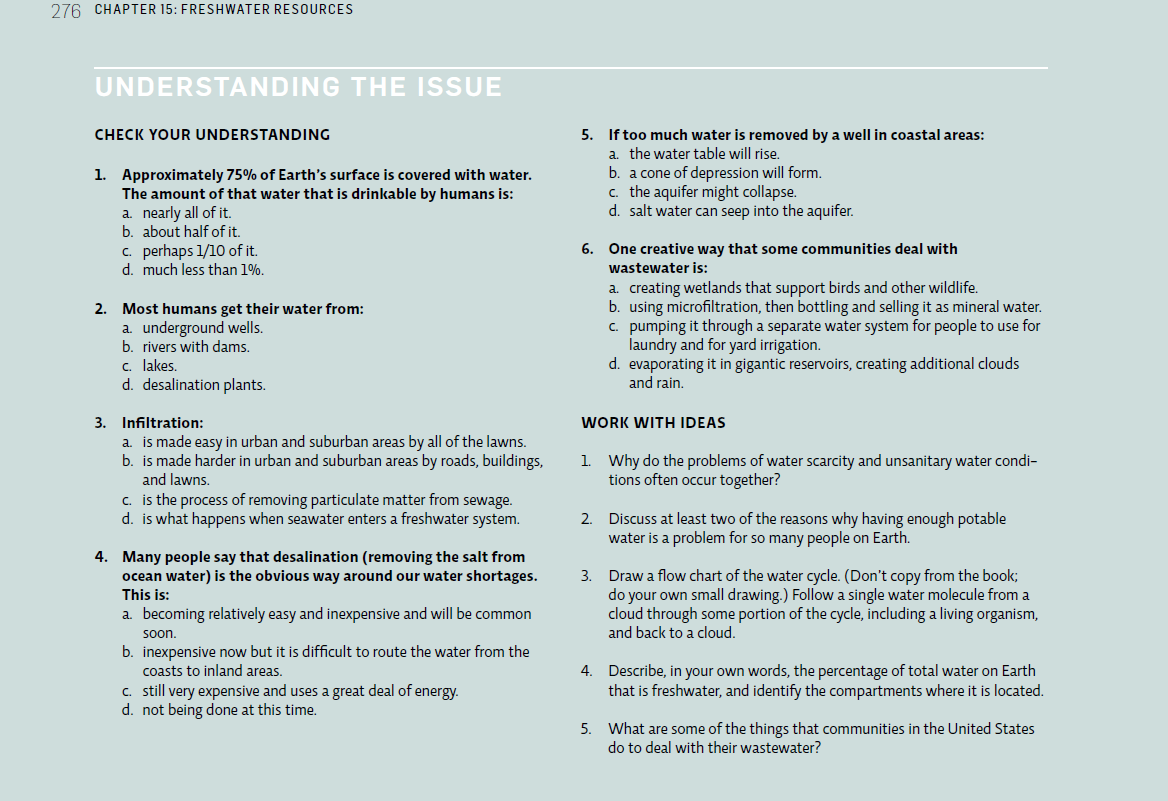
17) ***It might be surprising how much water goes into the products we use on a daily basis.***

- \_\_\_\_\_\_\_\_\_\_\_\_\_ uses the most water and creates the most waste. Water-saving \_\_\_\_\_\_\_\_\_\_\_\_\_\_ methods limit loss to evaporation and runoff, reducing water usage.



18) \_\_\_\_\_\_\_\_ changes in the household – such as low-flow toilets – can also save a lot of water. Buying less stuff and using less energy also \_\_\_\_\_\_\_\_\_ water – because much water is used to produce both.





19 Explain why people in many places in the United States complain of water shortages, while this map indicates they have access to clean water and sanitation.

20) If so much of Africa is grasslands and jungles, why do the inhabitants have so little access to clean water and sanitation?

