



Lesson 1:

The Water Crisis

Student Materials

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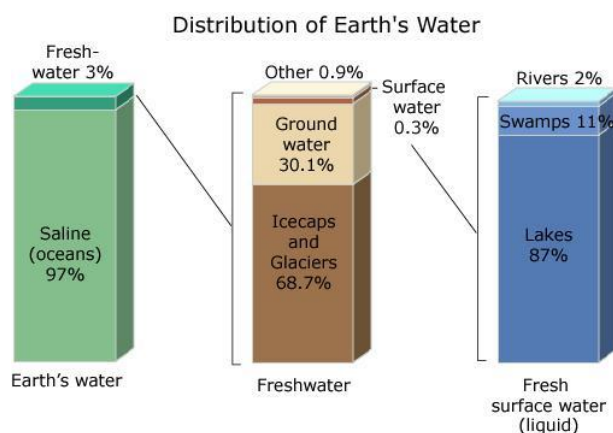


Name _____ Date _____ Period _____

Water Crisis: Student Data Worksheet

Directions

Using the graphs and maps, answer the following questions. This activity will give you the opportunity to interpret some of the graphs and maps that you'll see during the Water Crisis slide presentation during class.



1. According to the bar graphs in Figure 1, **what percentage** of the world's water is **fresh water**?
2. What do these three divided bar graphs tell you about **where** the Earth's fresh water resides?

Figure 1. Distribution of earth's water.

Physical water scarcity refers to the lack of water to meet domestic, industrial, and agricultural needs. Areas of physical water scarcity are shown in red on the map in Figure 2 below. Economic water scarcity means that an area or country has insufficient financial resources to deliver safe, clean water to those areas that need it for drinking or agriculture. Areas of economic water scarcity are shown in orange in Figure 2.

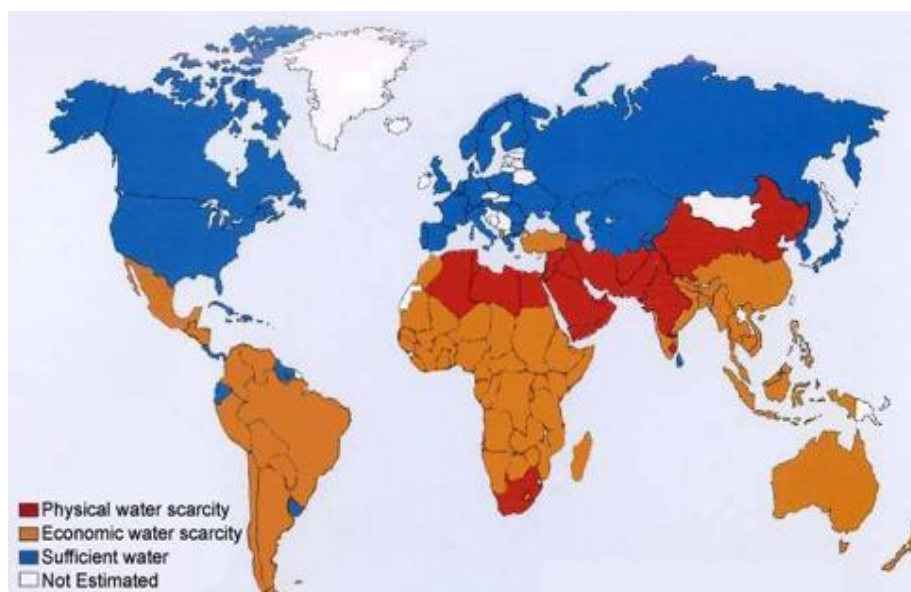
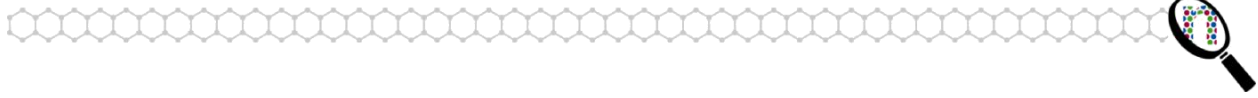
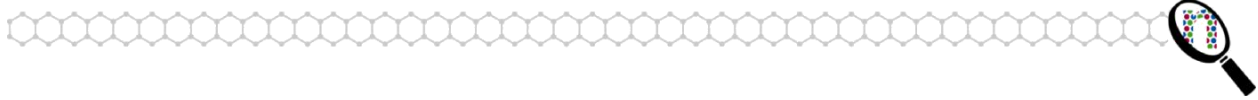


Figure 2. Global map of water scarcity in 2006.



Answer questions 3-8 based on information from the map in Figure 2.

2. Name the countries or global areas that are experiencing **physical water scarcity**.
3. What would you predict the climate to be in these areas and why?
4. Name the countries or global areas that are experiencing **economic water scarcity**.
5. Name the countries or global areas that are **not** experiencing any water scarcity.
6. What do you predict the difference in per capita income (average income per person) would be between regions with plenty of water and regions with economic water scarcity?
7. The southwestern United States is typically characterized as having a dry, arid climate. Why might this region be shown as having plenty of water even if it is dry and arid?



When water is taken from a natural source for human use, it is called “water withdrawal.” However, a country can never withdraw all of the fresh water that is theoretically available within its borders. Much of it is seasonal, or part of flood runoff, or rain that cannot possibly all be captured. Countries that withdraw a high percentage of their available fresh water are said to be under “freshwater stress” and are in danger of becoming considered “water scarce.” In the map in Figure 3, the light orange represents mild freshwater stress and the darker orange represents extreme freshwater stress. Blue areas are considered to be free from freshwater stress.

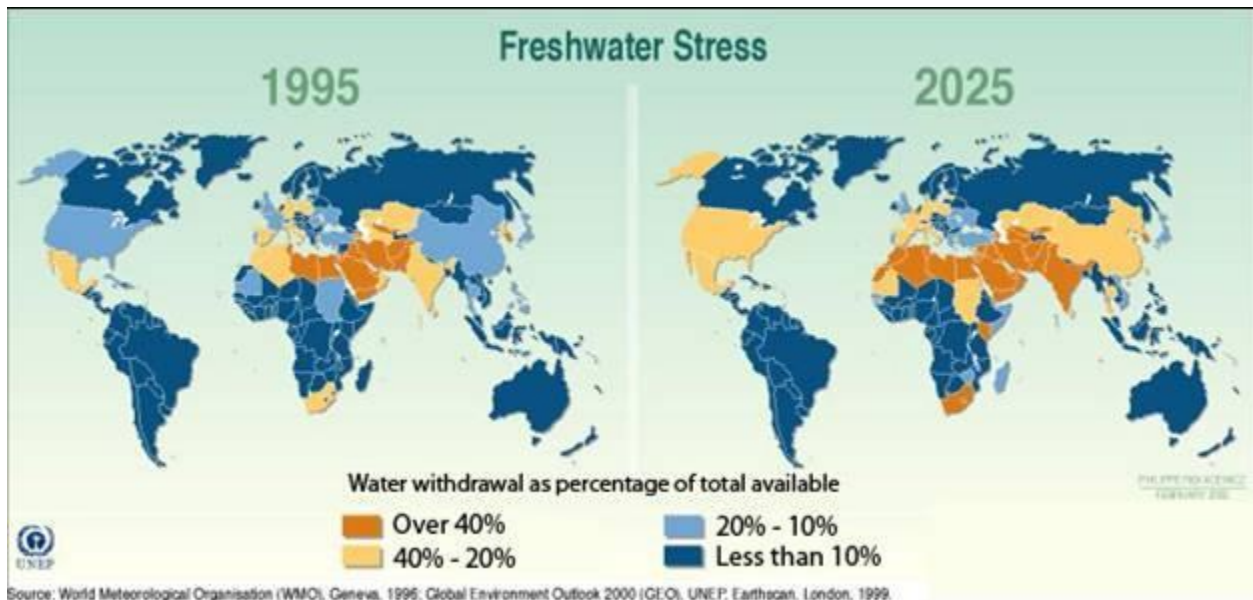


Figure 3. Global map of freshwater stress, 1995 and 2025 (predicted).

8. Compare the two maps above, showing freshwater stress from the year 1995 and projected to the year 2025. What are the changes that you see happening in which areas?

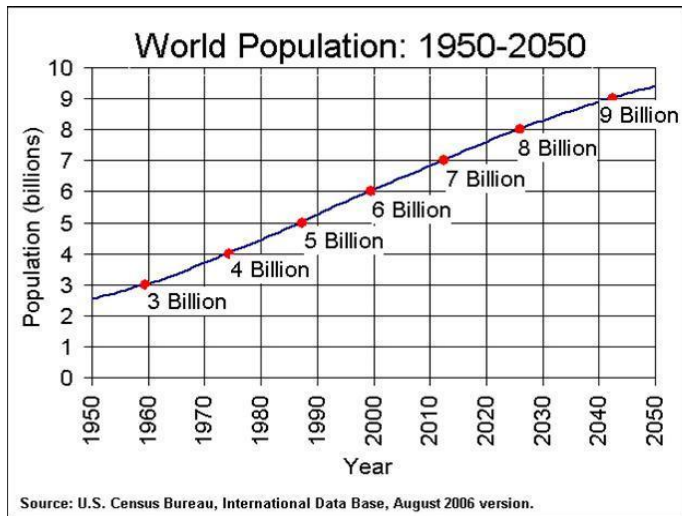
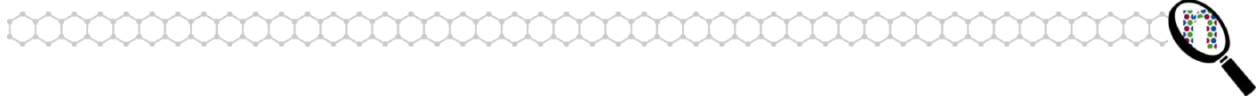


Figure 4. World population from 1950 to 2050 (predicted).

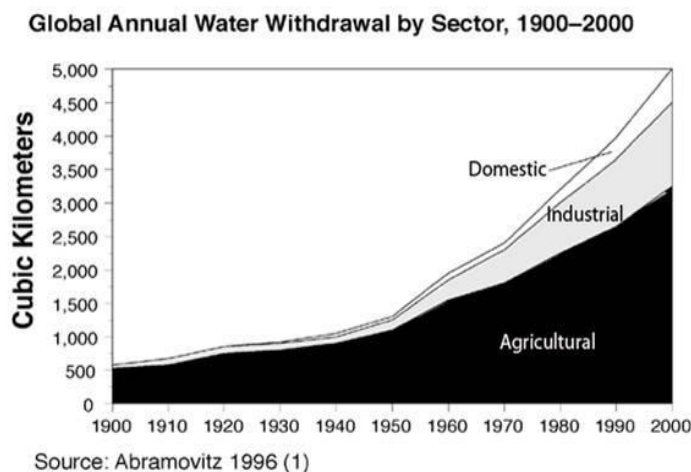


Figure 5. Global annual water withdrawal by sector, 1900-2000.

9. In Figure 4, what trend do you see in for the global population?

10. What would you predict the global population to be in 2060? Justify your prediction.

11. According to the graph in Figure 5, which sector uses the most water?

12. Which sector uses the least amount of water?

13. How does the trend in water consumption (Figure 5) compare to the trend in population (Figure 4) for the time period 1950-2000?

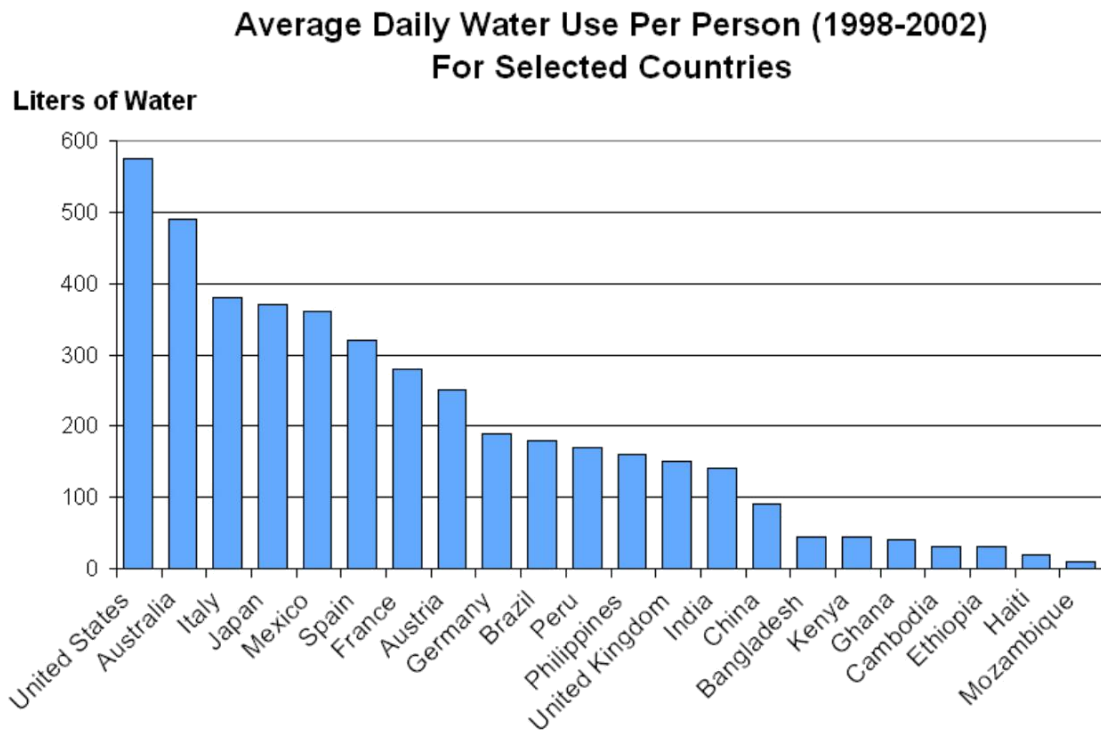
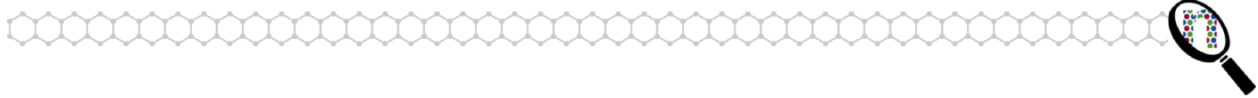


Figure 6. Average daily water use per person for selected countries, from 1998 to 2002.

14. According to Figure 6, which countries consume the most water?

15. Which countries consume the least water?

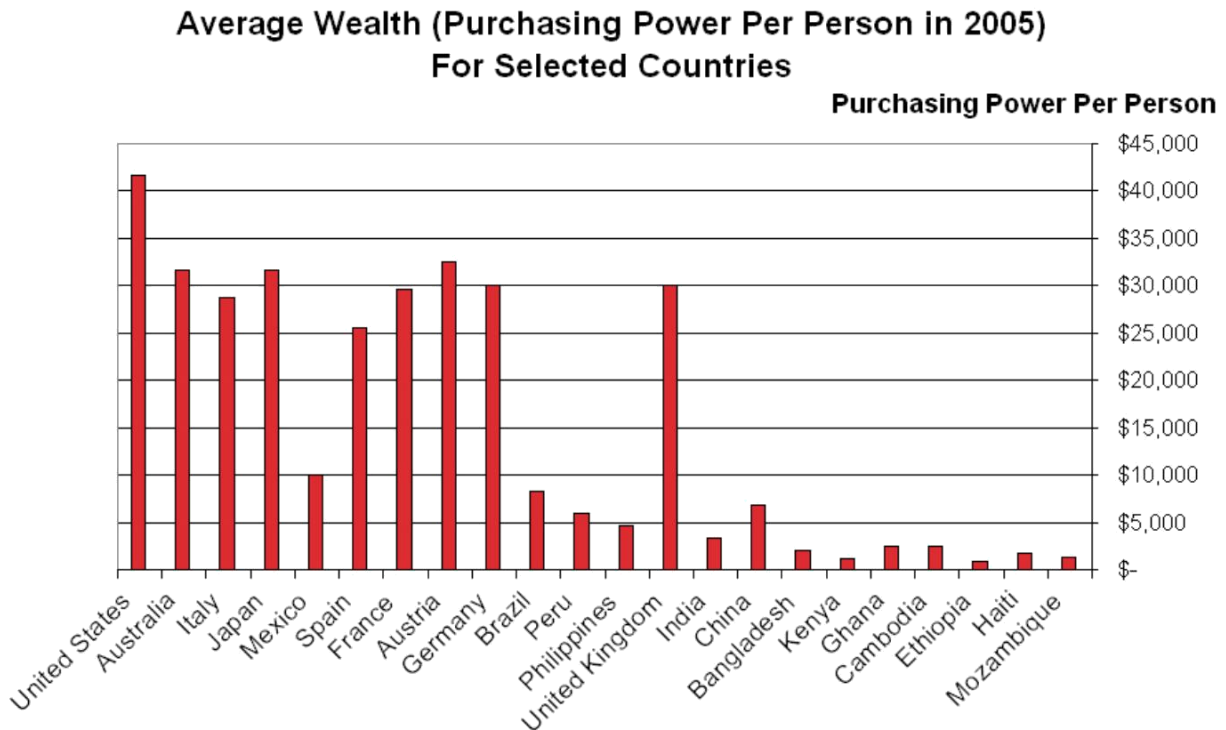


Figure 7. Average wealth for selected countries (purchasing power by person in 2005).

Answer questions 16-19 based on information from the graph in Figure 7.

16. How many countries have an average per person purchasing power of less than \$10,000?
17. How many countries have an average per person purchasing power of more than \$25,000?
18. How many countries have an average per person purchasing power of \$10,000-\$25,000?
19. What is the difference between the average per person purchasing power in the highest wealth country and the lowest wealth country?

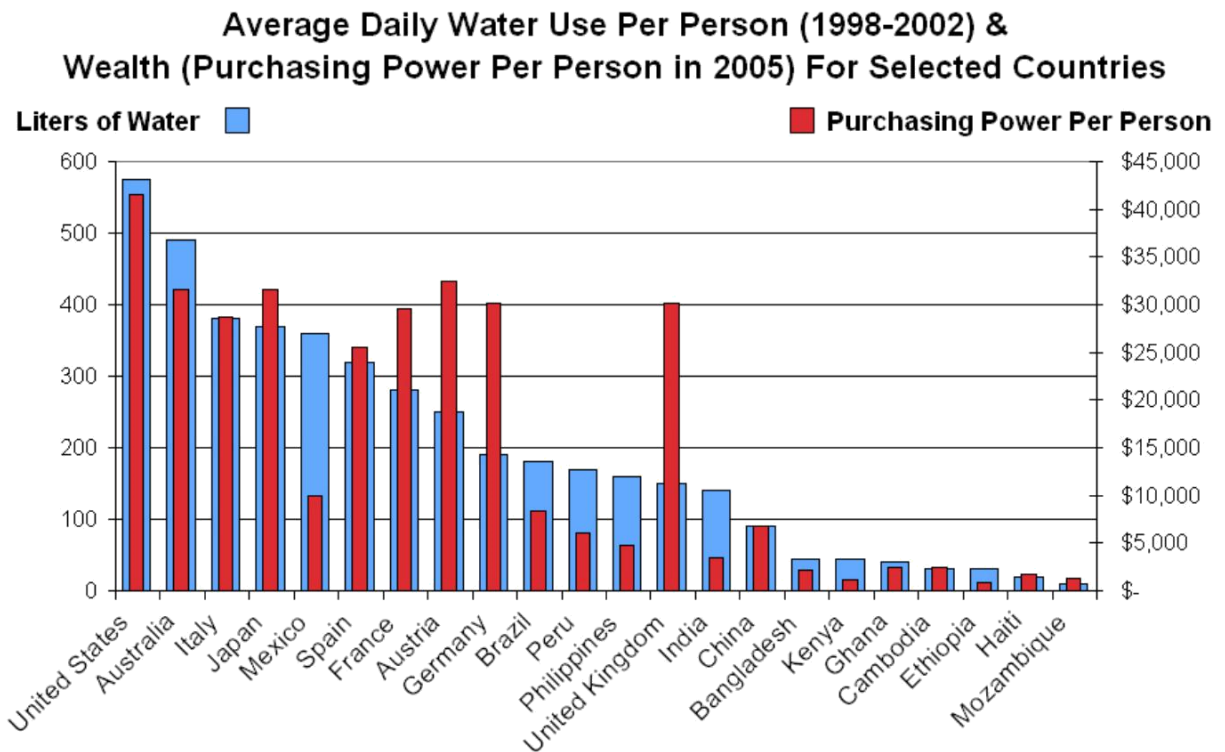


Figure 8. Average daily water use per person and wealth.

20. According to Figure 8, does there seem to be a relationship between a country's wealth and their average daily water consumption? If so, what is the relationship?

Fine Filters Initial Ideas: Student Worksheet

Write down your initial ideas about each question below and then evaluate how confident you feel that each idea is true. At the end of the unit, we'll revisit this sheet and you'll get a chance to see if and how your ideas have changed.

Date

1. Why are water’s unique properties so important for life as we know it?	How sure are you that this is true?			End of Unit Evaluation
	Not Sure	Kind-of Sure	Very Sure	
2. How do we make water safe to drink?	How sure are you that this is true?			End of Unit Evaluation
	Not Sure	Kind-of Sure	Very Sure	
3. How can nanotechnology help provide unique solutions to the water shortage?	How sure are you that this is true?			End of Unit Evaluation
	Not Sure	Kind-of Sure	Very Sure	
4. Can we solve our global water shortage problems? Why or why not?	How sure are you that this is true?			End of Unit Evaluation
	Not Sure	Kind-of Sure	Very Sure	



Name_____ Date_____ Period _____

The Water Crisis: Student Quiz

Write down your ideas about each question below.

1. What does it mean to have “clean fresh drinking water”?

2. Explain the term “water scarcity.”

3. Does water scarcity have an impact on human health? If so, what are some of the consequences?

4. Describe three reasons why some nations are experiencing a scarcity of clean drinking water.

5. Why is the water scarcity problem projected to increase?

6. Which sector—domestic, industrial, or agriculture—consumes the most water?