

1. Describe and evaluate the sustainability of water resources. (3.6.1-2, 3.2.1-2, 3.2.5)

- a.** Be able to **explain and diagram** the earth’s water budget.
 - i.**What percent of the Earth’s water supply is fresh water? Where is that freshwater stored and available?
- b. Determine** if water sources are renewable, replenishable, or non-renewable.
- c. Outline** factors contributing to personal water use and reasons for global water scarcity.
- d. Identify** and **distinguish** between desalination plants, conservation measures, reclaimed water, and groundwater.
- e. Justify** which method above suites a particular location and situation.

2. Evaluate the impacts of water use. Describe past and present state of water quality. (5.1.1-5.1.3)

- a. Define** the term pollution and distinguish between point source and non-point source pollution.
 - i.**Which is becoming a greater threat for urban rivers? Who is responsible for for each type?
- b. Cite examples** and **examine** challenges different forms of water pollution present for management.
 - i.**Common sources include: combustion of fossil fuels, manufacturing, domestic/agricultural/industry waste, and agricultural systems.)
 - ii.**Which form of pollution is more difficult to regulate and harder to attribute responsibility?
- c. Outline** the process of eutrophication and purpose solutions.
- d. Outline** the major steps in the process of treating wastewater.

Warm Ups:

Write the questions or problem (this can be shortened or in your own words) and the answer.

Date:

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Water Resources Vocabulary

Biochemical oxygen demand (BOD): A measure of the amount of dissolved oxygen required to break down the organic material in a given volume of water through aerobic biological activity.

Eutrophication: The natural or artificial enrichment of a body of water, particularly with respect to nitrates and phosphates, that results in depletion of the oxygen content of the water. Eutrophication is accelerated by human activities that add detergents, sewage or agricultural fertilizers to bodies of water.

Pollution: The addition to an environment of a substance or an agent (such as heat) by human activity, at a rate greater than that at which it can be rendered harmless by the environment, and which has an appreciable effect on the organisms within it.

Pollution, non-point source: The release of pollutants from numerous, widely dispersed origins; for example, gases from the exhaust systems of vehicles.

Pollution, point source: The release of pollutants from a single, clearly identifiable site; for example, a factory chimney or the waste disposal pipe of a factory into a river.

General Terms:

Model: A simplified description designed to show the structure or workings of an object, system or concept.

System: An assemblage of parts and the relationships between them, which together constitute an entity or whole.

IB ESS Water Scarcity Lecture Notes

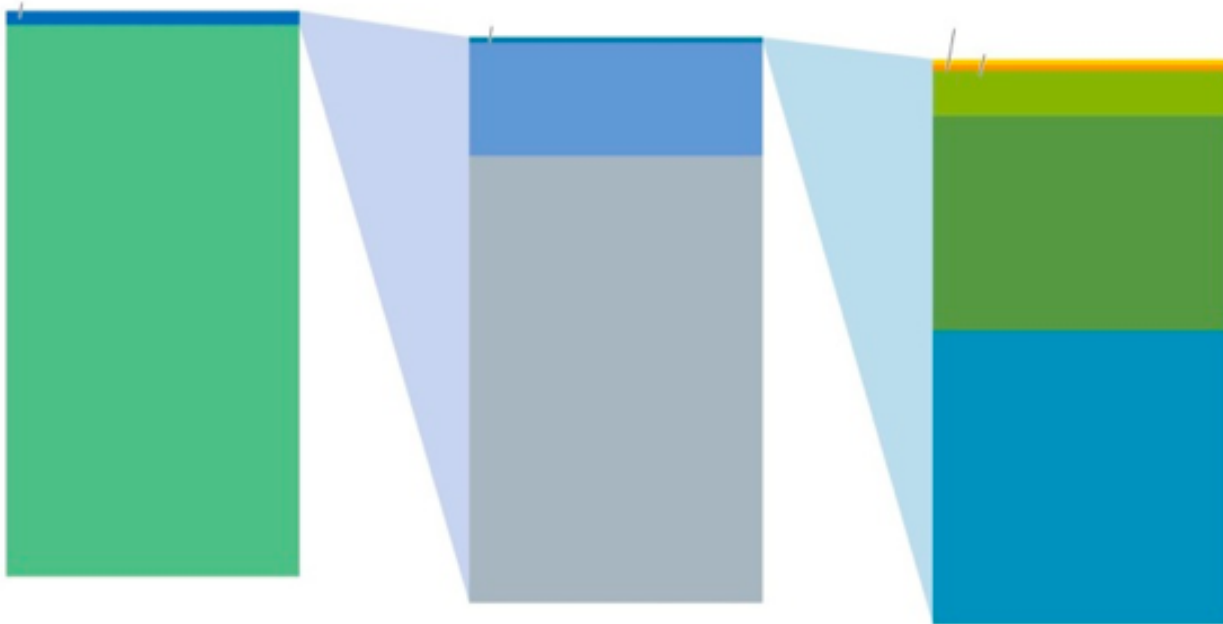
I. Distribution

1. *Global*

- a) Continent with the least available freshwater: _____
- b) Continent with least available freshwater **per capita**: _____

2. *Water Budget*

- a) Total water v. Freshwater v. Usable Freshwater



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- b) Where is most freshwater stored? _____

II. Water Use

1. *Categories*

- a) List ways you use water:

- b) How would your water use differ if you lived in a LEDC?

2. Access & Excess

- a) _____ Billion people live without clean drinking water
- b) 2.6 billion people lack _____
- c) 1.8 million people die every year from diarrheal diseases
- d) 3900 children die everyday from _____
- e) Daily per capita use of water in residential areas:
 1. 350 litres in _____
 2. 200 litres in _____
 3. 20 litres in S_____ (or less)
- f) Over 260 river basins are shared by two or more countries, mostly without adequate legal or institutional arrangements
- g) Quantity of water needed to produce 1 kg of:
 1. wheat: L
 2. rice: L
 3. beef: L

3. How do dietary choices influence water scarcity?

4. Your Use: record your reflections after watching the following video.

5. Conflict: Record causes of water scarcity, impacts on people, and general points.

a. Colorado River

b. Israeli Aquifers

Pacific Northwest Water Videos

PRE-READING BACKGROUND: Record a few details you know about the history of Pacific Northwest waterways, water quality, and conservation measures (including water treatment).

WILLAMETTE WATER QUALITY

1. Outline events that lead to initial water clean-up efforts along the Willamette River.

2. Summarize how non-point source pollution has changed the threat facing water quality along the river?

3. Describe an association between what you observed and what you know from previous units or events.

4. List and categorize as many agencies and groups addressing water quality as you can remember.

1. Governmental:

2. Community:

3. Private:

5. Are clean rivers worth protecting?

PORTLAND SEWERS

1. What occurred in the Willamette River after major rain events?
2. What materials flow into rivers during CSO (combined sewer overflow) events?
3. Should the solution to pollution be dilution?

Invasive Species in the Tualatin River

1. Two species Clean Water Services are working to eradicate:
2. What is the source of these invasive plants?
3. What's the greatest challenge in combating invasive species' pollution?

OCEANIC DEAD ZONE

1. What role did algae play in the dead zone?
2. What triggered the dead zone (use productivity in your answer)?
3. Compare and contrast similarities existing between this dead zone and eutrophic lakes?

Read SBS: Chapter 15 (pg. 400-428)

1. Freshwater makes up _____ of the global water budget and is renewed through _____?
2. What form of freshwater makes up 20% of all freshwater and plays a large role in meeting human demands?
3. Describe benefits (ecological services, economic, biodiversity, etc) of each:
 - a. Rivers and Streams
 - b. Lakes and Ponds
 - c. Wetlands
 - d. Groundwater
4. Describe an example of uneven distribution of water resources.
5. What are the different ways we use water?
6. Which Human activity uses the most water?_____
7. MEDCs use _____ times more water than LEDCs.
8. List positive and negative impacts of dams:
9. Describe proposed solutions to water depletion.

10. Distinguish between Point and Non-Point Pollution:

11. Give descriptive examples of the different forms of water pollution: (if you want also write a definition)

a. Toxic Chemicals:

b. Sediment:

c. Thermal Pollution:

d. Nutrient Pollution:

e. Pathogens and Waterborne Diseases:

12. Explain the different solutions to groundwater pollution.

13. Opinion: Describe what you think is the most promising answer to water depletion? What about water pollution?

Read OX: pages 286-288 on Eutrophication

What is Eutrophication?	What Causes it?	What are the impacts?	Management strategies

Read OX: pages 209, 213-222 in text and answer the following questions on the case studies.

1. List Israel's water sources (stores) and demands (flows) on this system.
2. Outline an environmental and social effect of water scarcity in this region.
3. In your opinion what would be a sustainable solution to water management in this part of the world? Do you or could you live by this standard?
4. What role does silt play in cities along the Yangtze River?
5. Evaluate an advantage and a disadvantage to the Three River's Dam.

6. Why has the Aral Sea shrunk? If the outcome was known when the project started, why did it go ahead?

7. Consider the solutions proposed for the Aral Sea, discuss advantages and disadvantages of each.

8. Describe the two categories of water use from the Colorado River.

9. Who do you think should control the water of the Colorado River? (Consider that it is an international river, and what level of community or government regulation.)

10. Give a point and non-point source for water pollution. (Look hard it's there.)

Read the two BBC articles linked on Ms. Brill’s Website. To help us capture the main points in the two articles on water scarcity, we are going to read for the 3 A’s (see below). Since it is difficult to mark an online copy, divide a sheet of paper in four squares. Label three of the squares with the words below, and keep the fourth square for your notes that don’t fit the other categories.

- *What are the main ARGUMENTS (or ideas) being made in the text?*
- *What can you ANALYZE from the maps in the text?*
- *What ASSOCIATIONS do you make to prior learning or other subjects?*

<p><u>ARGUMENTS:</u></p>	<p><u>ANALYZE:</u></p>
<p><u>ASSOCIATIONS:</u></p>	<p><u>OTHER NOTES:</u></p>