

Unit 3 - The Hydrosphere and the Biosphere

Key concept - Systems - How do different environmental systems interact with each other on Earth?

Related concepts - Models and environment - How can we use scientific models to explain changes in our environment?

Global concept - Orientations in time and space - Why is the position of Earth in the solar system essential for our survival?

Unit 3 KEYWORDS

- H₂O
- Hydrosphere
- The Water Cycle
- Evaporation
- Transpiration
- Condensation
- Precipitation
- Melting
- Run-off
- Glaciers
- Pollution
- Fertilisers
- Livestock
- Reservoirs
- Irrigation
- Purification
- Sewage

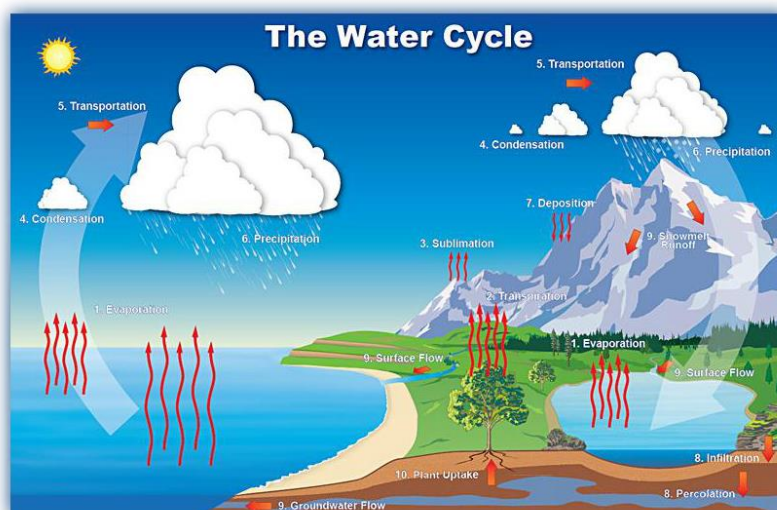
The hydrosphere

Definition: The hydrosphere is the **system** containing all of the water on Earth.

Water is **essential** for life on Earth as it is required by ALL living organisms. The chemical formula for water is **H₂O**. This means that it contains 2 **hydrogen** atoms and 1 **oxygen** atom.



(Theawkwadyeti.com, 2015)



Task 3a: Setup a free account with "storyboardthat.com" and create a cartoon strip called "A Day in the Life of a Water Molecule". Include at least 4 processes and captions to explain what is happening.

The importance of water

Although 75% of the Earth is covered in water, only about 3% is freshwater. Freshwater is essential for humans as we need it for agricultural, domestic and industrial purposes.

Nearly 80% of the fresh water on our planet is found as ice in **glaciers** (Image - (Mail Online, 2010)). Water in this form is not useful for humans so we can only use the water from lakes, rivers and ground water.

Explain why is it difficult and expensive to use seawater?



Uses:

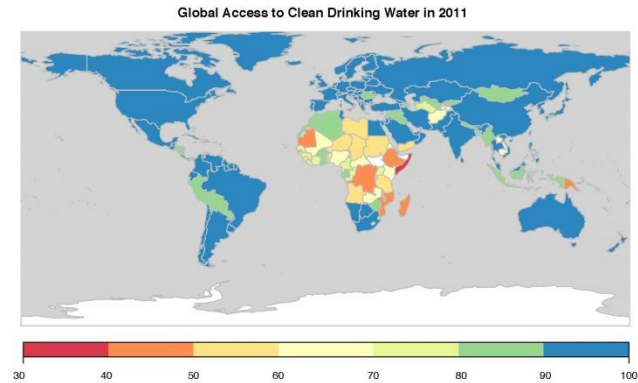
- **Agricultural** - Watering crops, feeding livestock (animals).
- **Domestic** - Drinking water, washing and cleaning.
- **Industrial** - Used to make many chemical products, producing electricity.

Good quality water is essential for human health. Unfortunately, however, there are still nearly 800 million people around the world who do not have access to clean drinking water.

Which **areas of the world** have the most people without access to clean drinking water?



(Water.org, 2015)



<http://archive.epi.yale.edu/our-methods/water-and-sanitation>

Water pollution

As the amount of fresh water on our planet is limited it is important to keep it clean and usable. Many human activities are now resulting in **water pollution**.

- **Domestic** water pollution - Water used for washing, cleaning and toilet system contain many harmful chemicals. Waste such as plastic. (*Image* - Cbunga.wordpress.com, 2015)
- **Agricultural** water pollution - Chemicals from fertilisers enter groundwater and rivers/lakes. (*Image* - Greentyne.org.uk, 2015)
- **Industrial** water pollution - Some of the most harmful chemicals are released by important industrial processes. (*Image* - Editor, 2015)



industrial



agricultural



Domestic



industrial

agricultural



Domestic



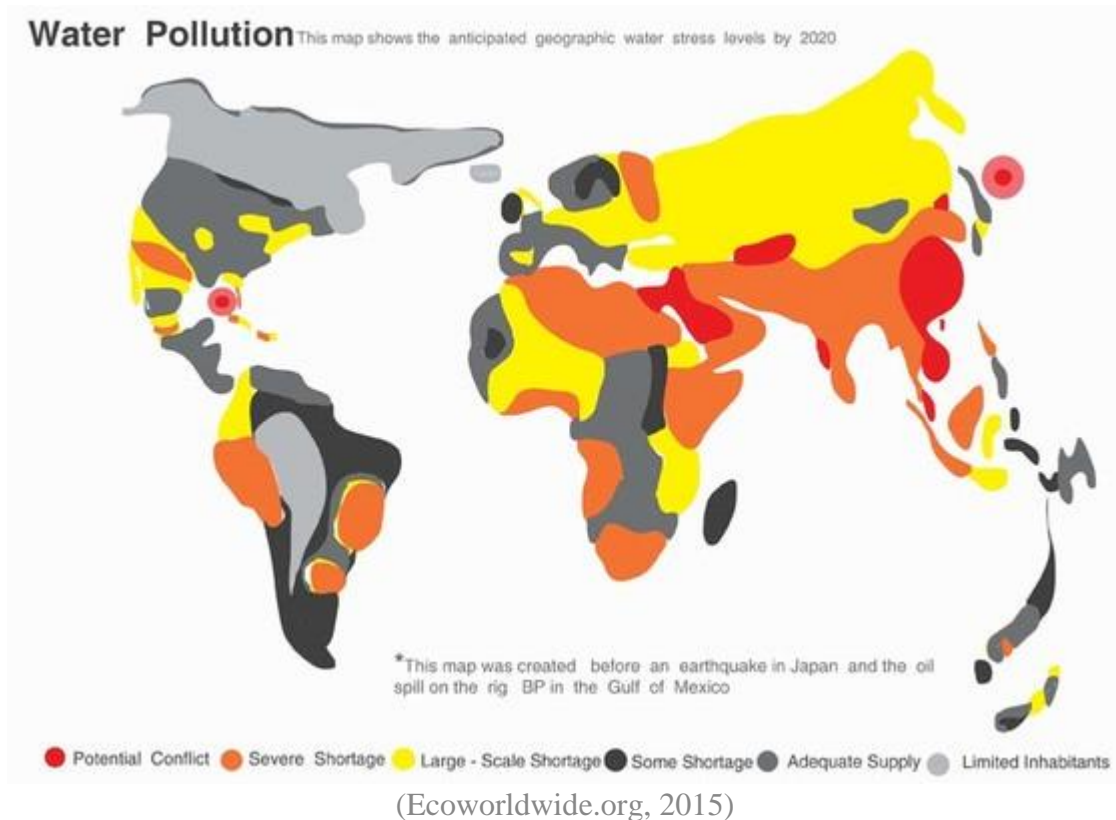
Task 3b:

1. **Match** the photos above to the type of water pollution - **Domestic, agricultural and industrial.**
2. **Make** an informative poster about ways that we can prevent or reduce water pollution.

Main Points that your poster shows:

- Domestic: Use less soap/detergent/bleach/anti-bacterial products/micro-beads as these go into the water supply
- Agricultural: Buy less intensively farmed products/more organic products as fewer chemicals needed to produce the food. Eat less meat as cattle farming produces a lot of waste that goes into the water.
- Industrial: Reduce consumption of products that require a lot of packaging/use rare Earth metals to produce as the waste products from manufacturing these can go into the water supply.

The following infographic shows the areas of the world that will have the greatest difficulty in obtaining water by the year 2020. **State** which areas of the world will have the greatest difficulty and **explain** why you think it is these countries.



The places that are predicted to have the greatest difficulty obtaining water by 2020 are mostly along the equator, for example the Middle East like Saudi Arabia and Kuwait, and on the East coast of China.

This may be because of the climate in these areas. The sun's rays hit the Earth more directly on the equator and so they heat the Earth more, causing the water to evaporate. Therefore these countries may have little rainfall throughout the year.

The Biosphere

Definition: The system of all living things on our planet and the internal systems that are required to maintain it.

In Units 4, 5 and 6 you will learn about life on Earth and the **systems** in which it functions. The biosphere also includes the systems that we have looked at in Units 2 and 3 - The

atmosphere, lithosphere and the hydrosphere. All of these are essential in maintaining life on our planet.



References:

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