***Topic V: Water Cycle and Role in the Earth System \*Watch Video* - Sustainability: Water Cycle**

***Earth- I can explain how human activities impact, biosphere, nutrient cycles and the water cycle
Earth - I can describe how biogeochemical cycles (water, nitrogen, carbon, and phosphorous) work and impact the Earth System
Earth- I can explain how solar radiation impacts the biosphere, the water cycle and how it drives wind and ocean currents.***

**Cool Statistics about Water:**

97 % of Earth’s water is found in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_% of all water is fresh water – most of which is locked in \_\_\_\_\_\_\_\_\_\_\_ and groundwater

The atmosphere holds 0.001 % of all the water on Earth as water vapour.

* If all the water in the atmosphere fell at once the earth’s surface would be covered in only
\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm of water.

**Water on Earth spends time in all four spheres.**

On the surface water can be seen in bodies of water such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, frozen as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or snow and as a gas as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_or fog. Water found underground is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*\*****Watch Interactive of Water Cycle:*****List all the places that the water molecule travels.**[**http://serc.carleton.edu/eslabs/weather/2a.html**](http://serc.carleton.edu/eslabs/weather/2a.html)

**Water continuously cycles through ecosystems by three main processes**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_as the sun heats the earth becoming \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: As warm water vapour rises, it cools and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into tiny water droplets and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are formed.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: As the water droplets get larger, eventually the clouds release water as rain, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or hail.

**On the surface water flows** between bodies of water as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, in rivers and streams. It **infiltrates** the ground finding its way to aquifers, underground streams or it may be intercepted by \_\_\_\_\_\_\_\_\_\_\_\_ of plants, absorbed, carried through the plants tissues and then released as water vapour from leaf pores. This process is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Answer the following questions:**

1. What role does sun have in driving the water cycle?
2. How might water flow across the Earth’s surface impact the geosphere and the biosphere?

**Water is extremely important to the Earth System: Why?**

* Water vapor is a very significant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ its effect is stronger than most other greenhouse gases even \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* More moisture in the air means \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ temperatures & more precipitation.
* More rain over shorter period leading to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Higher temperatures melt glaciers and ice caps leading to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Drives weather and climate through the transport of heat energy stored in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Heat energy is created and stored in the atmosphere when water molecules change to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The heat is released into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when molecules condense creating cloud droplets
* **All life on Earth relies on water for survival.** Photosynthesis requires water.
Our bodies are\_\_\_\_\_\_\_\_% water.

**Watch Video on Water Pollution:** Complete the following while viewing the video.

**What is water pollution**? Results from the introduction of harmful substances like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into water.

Some Natural causes of water pollution are: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Some human activities that result in water pollution are: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Some affects of water pollution on humans and other organisms are:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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What can we do to help our ecosystems and prevent water pollution?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Complete the following water cycle by filling in the appropriate terms in the numbered boxes.
*Some terms you may need are* ***transportation,******deposition, sublimation, precipitation, condensation, percolation, evaporation, surface flow, transpiration, plant uptake, infiltration, groundwater flow, snowmelt/run-off, transportation****.*



5.

3.
From ice or snow

9.

1.

2. (from plants)

8. Surface Flow

10. percolation

12.

11. (via roots)

6.

5.

4. (movement)

8.

4. Transportation

7.

7.

1.

6.

**Complete the following by filling in the terms or numbers relevant to the water cycle shown on your labelled diagram of the water cycle.**

*The terms you will need are* ***transportation,******deposition, sublimation, precipitation, condensation, percolation, evaporation, surface flow, transpiration, plant uptake, infiltration, groundwater flow, snowmelt/run-off, transportation****.*

|  |  |  |
| --- | --- | --- |
| #\_\_\_\_\_\_ -\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the change of state of water (a liquid) to water vapor (a gas). On average about 120 cm of water from the ocean’s surface becomes water vapour in the atmosphere each year. | #2-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is another name for evaporation of liquid water from plants and trees into the atmosphere. Nearly all (99%) of all water that enters the roots exits through other parts of the plants such as leaves via this process into the atmosphere. | #3 - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is the process where ice and snow (a solid) changes into water vapor (a gas) without moving through the liquid phase. |
| **#\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the movement of solid, liquid and gaseous water through the atmosphere. Without this movement, the water evaporated over the ocean would not precipitate over land. | #\_\_\_\_\_ -\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is when water falls to the earth as snow, sleet, drizzle or hail. On average, about 980 mm of rain, snow and sleet fall each year around the world. | #5 -\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the process where water vapour (a gas) changes into water droplets (a liquid). This is when we begin to see clouds. |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the reverse of sublimation. Water vapor (a gas) changes into ice (a solid) without going through the liquid phase This is the most often seen on clear, cold nights when frost forms on the ground. | #\_\_\_\_\_ -**Infiltration** is the movement of water into the ground from the surface. #\_\_\_\_\_ -**Percolation** is the movement of water past the soil going deep into the groundwater. | **# \_\_\_\_\_\_ - Surface flow** is the snowmelt runoff, rivers, lakes and streams that transport water to the oceans. #\_\_\_\_\_\_- **Ground water** flow is the flow of water underground in aquifers. The water may return to the surface in springs or eventually seep into the oceans. |
| #\_\_\_\_\_\_\_ -**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is water taken by plant roots from the groundwater flow and soil moisture. Only 1% of water the plant draws up is used by the plant. The remaining 99% is passed back into the atmosphere. |  |  |

Study these terms for your Earth System Quiz!