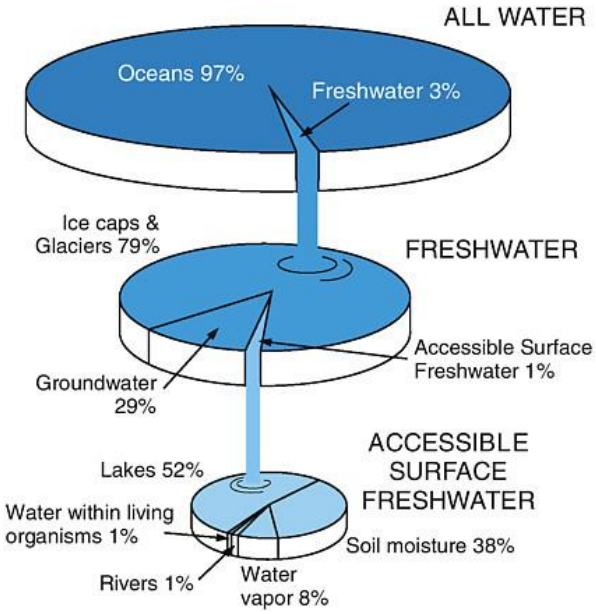
Duration: 50 min. **Date: August 30, 2019**

Practical Test 2: Water on the Earth system

This figure shows the distribution of water on the Earth. 97% of the total water is oceans, and the rest is fresh water. 79% of freshwater exists in the form of ice caps and glaciers, and 29% is groundwater. Therefore, the fresh water that humans can use immediately is only 1% of the total water on the Earth. This 1% fresh water also has varying degrees of pollution. This depends on the environmental conditions of ecosystems (river, stream, wetland, pond, farmland, etc.).



In this test, we will evaluate the ability to investigate the properties of various water samples by using simple experimental instruments. Students will identify the source of each water sample based on their own observations.

[Materials] Water sample #1, Water sample #2, Water sample #3, Water sample #4 (Temperature of water samples are all the same), Clay, Marker pen, Scale, Styrofoam rod, Beakers, pH test strips, Nitrate /Nitrite test strips

Caution! Do not taste or smell the water samples because they can be dangerous.

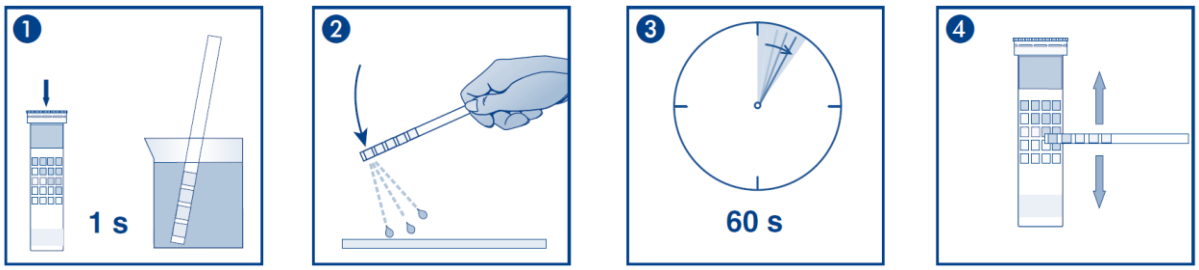
[Step 1] Check the number of each sample.

[Step 2] Measure the pH of each sample.

[Step 3] Measure the Nitrate /Nitrite of each sample.

[Step 4] Design and create a simple hydrometer using clay and scaled Styrofoam rod. Compare the density of each sample.

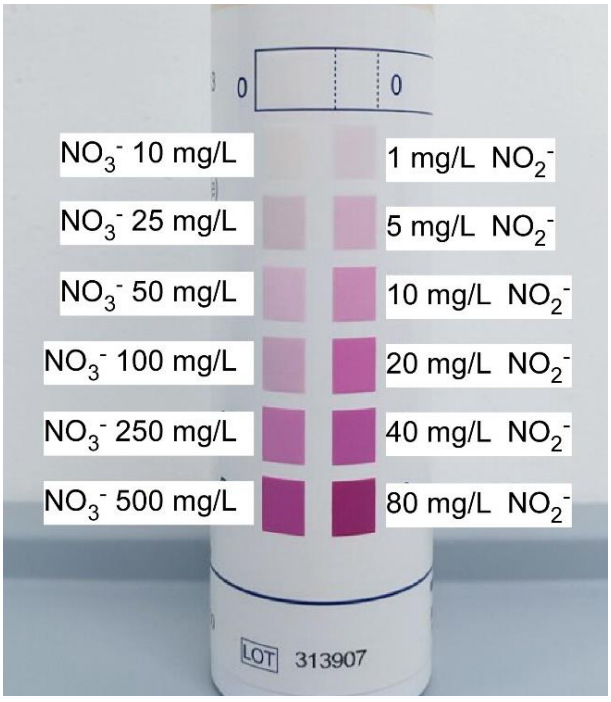
♣ How to use the test strips



(1) Dip the test strip with both fields into the test solution for 1 second.
(2) Shake off excess liquid.
(3) Wait 60 seconds.
(4) Compare with the color scale. In case of Nitrate/Nitrite test strip, the lower test field (at the end of the strip) will turn red-violet. The upper test field will show the nitrite concentration.

♣ Example of pH test strips

♣ Example of Nitrate / Nitrite test strips

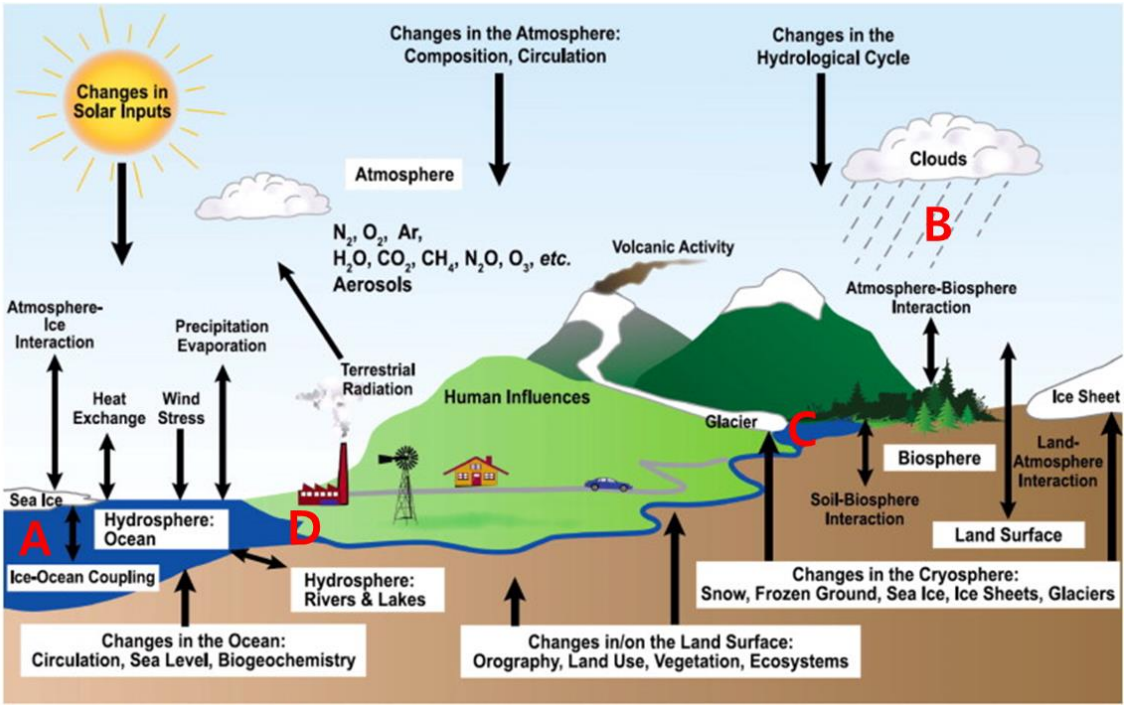


[Step 5] Complete below worksheet.

	Sample 1	Sample 2	Sample 3	Sample 4
pH				
Nitrate [NO_3^-] (mg/L)				
Nitrite [NO_2^-] (mg/L)				

[Step 6] Among the 4 samples, choose the sample with the highest density.

[Step 7] The figure below shows various interactions between Earth systems. Determine the most appropriate location for sample #1, #2, #3, #4 based on your worksheet of step 5.



- Sample #1: (A, B, C, D)
- Sample #2: (A, B, C, D)
- Sample #3: (A, B, C, D)
- Sample #4: (A, B, C, D)