**Earth and Space Labs**

**1. Ocean Circulation and Temperature**

**Sketch** and label the set up at the front bench:

**Procedure:**

* fill basin 2/3 full of water with RT water
* put boiling water into 2 styrofoam cups
* put ice water into 2 styrofoam cups
* place basin on top of the cups with hot at one end and cold at other
* drop blue food colouring into basin above cold cups
* drop red food colouring into basin above hot cups

**Observe:** and draw on above sketch

**Why did this happen?**

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**2. Ocean Circulation and Salinity**

What is salinity? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is tap water considered salty? Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is an ocean current? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Procedure:**

* fill a basin 2/3 full of RT water
* plug the hole in the bottom of the styrofoam cup with your finger
* fill the cup with food-coloured salt water
* hold the cup in one corner of the basin with the bottom in the water
* remove your finger
* observe the flow of salt water for 1 minute

**Observations:**

1. Sketch of set up
2. Observation of flow of salt water

1. Explanation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Questions:**

i) Which has a higher density, fresh or salt water? Explain.

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ii) What can you predict about ocean currents?

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**3. Watershed Lab**

**4. Buffering capacity of soil**

**Purpose:**

* To visualize the phenomenon of buffering capacity.
* To discover what type of soil condition will be the most resistant to pH change.
* To test one of the most important characteristics of soil in the lithosphere.
* To determine pH by using colour pH indicator paper.

**Materials and Procedure:**

1. Mass 35 g of soil in one beaker.
2. Mass 35 g of sand in one beaker.
3. Measure 35 mL of water and add to one beaker.
4. Add 50 mL of distilled water to each beaker.
5. Stir the beakers, starting with water, then sand, then soil.
6. Take the pH of each and record.

* for the soil, make a puddle in the soil with the stirring rod, and spread the liquid onto the pH paper. Look on the opposite side of the pH paper for the result.

1. Add 10 drops of HCl to each beaker.
2. Stir the beakers, starting with the water, then the sand and then the soil. Do NOT cross-contaminate!
3. Take the pH again using the same technique.

**Results:**

**Title:**

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| **Substance** | **Initial pH** | **Final pH** | **Variation in pH** |
| **Distilled water** |  |  |  |
| **Sand** |  |  |  |
| **Garden soil** |  |  |  |

**Discussion questions:**

1. Why did you use the same mass of soil, sand or water in each of your beakers?

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1. Which substance showed the least variation in pH? Which substance showed the most?
2. Fertilizers used for common house plants are often slightly acidic. What effect may this have on the plants growing in the soil?

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1. Given the result obtained for the sand, what conclusion can you make about plants and other living things that live in sandy conditions as compared to soil?

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1. Given the concentration of HCl is 1 M, what result would you expect if a 10 M solution was used?

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