Due: 1/23/18 or 1/24/18

7.1.1 Task Card: Properties of Water

Guiding Question: What properties of water support life in a pond?

* Use Google Docs - Type your Essay below your Data table.

Task: You and your group members will visit four stations to explore and make sense of specific water properties. Once you have completed all four stations, clean up your area, compete the Collaboration Rubric to assess your group work, and respond to the Discussion Questions in your notebook.

What to write down for each station:

1. Record the number of the station, **the property being tested, the property's definition,** and the data collected from the station exploration (i.e. what you observe or record)
2. Leave enough space on your Data Table to record information / observations

Station #	Property Being Tested & Possible Definition	Data (Qualitative observations and quantitative)	
1		observations stated in words	observations collected as data (Numbers)
2			
3			
4			

STATION 1: Solubility

Task Steps:

1. Record the property being tested (solubility) in your Data Table.
2. Pour 100mL of water into the **empty** beaker.
3. Put **1 tsp** of salt in the beaker with water.
4. Using the spoon labeled "water," stir vigorously for 1 minute. Try not to spill!
5. *Record your observations in the Data Table in your science notebook.*
6. Observe the beaker with oil (100 ml). This beaker already has 1 tsp of salt poured inside.
7. Using the spoon labeled "oil," stir the beaker with salt and oil vigorously for 1 minute.
8. *Record your observations in the Data Table in your science notebook.*
9. Clean up the station / station materials.
    - Leave the oil and salt as you found it. Pour the beaker of salty water into the container labeled "saltwater." Reset the station as you found it…beakers, spoons, salt, etc…
10. As a group, respond to the **Discussion Questions** (below) in your science notebook.

Discussion Questions:

- 1A. Which liquid is better at dissolving the salt (water or oil)?
- 1B. Why might this be?
- 1C. Using this exploration, construct a definition for the term "solubility."

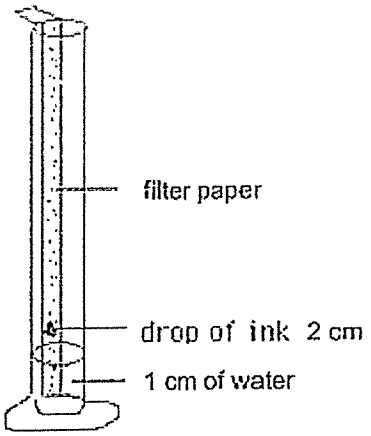
STATION 4: Capillary Action

READ ME! How does water move against gravity from the roots of a tree to the top branches? Well, did you know water can climb? Trees have special tubes to help water climb. Water can also climb up paper! As water travels, it often carries other non water molecules with it.

Part A: Climbing Filter Paper

Task Steps:

1. Record the property of water being explored at this station (capillary action).
2. Observe the strip of paper at this station.
3. Predict how many minutes it will take water to climb up this strip of paper.
    a. Write your prediction in your notebook as *"one centimeter per __ minutes."*
4. Set up the investigation as shown in the image on the right.
    a. Pour water 1 cm deep in the graduated cylinder.
    b. Mark one strip of paper with a light dot of marker 2 cm from the bottom of the paper.
    c. Let it dry completely.
    d. DO NOT PUT THE PAPER IN THE WATER DURING THIS STEP! Tape the paper over the top of the graduated cylinder. The bottom of the paper should nearly touch the bottom of the graduated cylinder. The marker dot should be right above the water.



Set up of filter paper and cylinder

5. Now, place the paper in the beaker with its tip in the water (the marker dot should not be in the water), and **start the timer.**
5. Wait 7 minutes.
6. After 7 minutes, measure and record how far the ink traveled up the paper (in centimeters).
7. Calculate the rate of water flow up the paper in centimeters per minute (__cm per minute).
8. Respond to the **Discussion Questions** below in your science notebook.

Discussion Questions:

- 4A. How does the ink change?
- 4B. Explain why you think the water traveled up the filter paper.

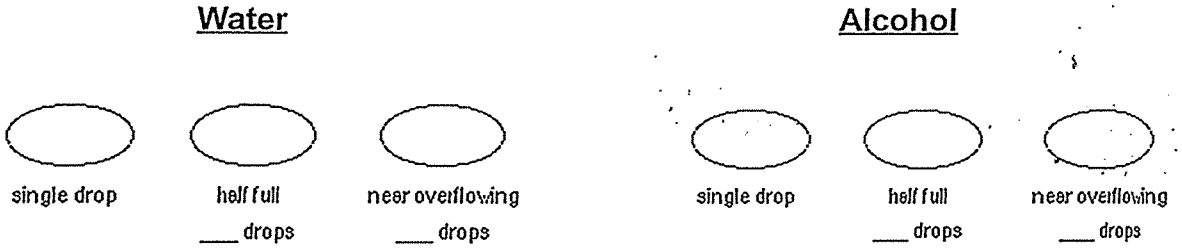
STATION 2: Surface Tension and Cohesion

Part A - Surface Tension and Cohesion:

Guiding Question: Will the penny hold more drops of water or alcohol before it overflows?

Task Steps:

1. Label the properties of water being explored (surface tension and cohesion) on your Data Table.
2. In your notebook, under your data table, predict whether a penny will hold more drops of **water** or **alcohol.**
    a. Have each member **share out** and **explain** their predictions to the group.
    b. Record each group member's prediction in your science notebook.
3. Under your prediction, set up a diagram (like the one below). You will add to this diagram throughout the exploration.



4. Fill the dropper labeled "water" with water.
5. Place a penny on the table.
6. SLOWLY and carefully drop water onto the penny ONE DROP AT A TIME.
    a. Keep count of how many drops fit onto the penny before the water overflows.
    b. Add to your penny diagrams: single drop, ½ full, and near overflowing
    c. *Record how many drops of water you were able to place on the penny before it overflowed.*
7. Complete steps 4-6 using a new penny and the dropper labeled "alcohol."
    a. *Make sure you complete the diagrams for alcohol and record the number of drops before overflowing.*
8. Respond to the **PART A Discussion Questions** (below) in your science notebook.

Discussion Questions:

- 2A. Which liquid held more drops on the penny? Why do you think this liquid held more drops on the penny?
- 2B. Which liquid do you think holds its molecules together the strongest? What did you observe that could be considered evidence for your explanation?
- 2C. Using this exploration, construct a definition for the terms "surface tension" and/or "cohesion."

Part B - Surface Tension and Cohesion

Task:

1. Using a steady hand and a plastic spoon, rest the paper clip on the surface of the water. It should NOT sink!
2. *Record your observations in your Data Table.*
3. Clean up your station / station area: Wash and dry off all materials and return them to the condition in which you found them or cleaner.
4. Respond to the **Part B Discussion Questions** in your science notebook.

Discussion Questions:

- 2D. What kept the paperclip floating?
- 2E. If the paper clip breaks the surface of the water, what happens? Why do you think the paperclip behaves this way?
- 2F. The paper clip demonstrates the surface tension and cohesion of water. What do you think these two terms mean?