

Lab: The Hydrologic ("Water") Cycle

Background information: As the sun heats the oceans, the water evaporates, then condenses in clouds and falls as precipitation. Precipitation percolates into the groundwater or runs over the land into lakes, rivers, and oceans. As it flows towards the oceans the water collects minerals and salts from the Earth's crust. When the water evaporates again the salts and minerals are left behind. This process is known as the hydrologic cycle.

Specific objectives: When you complete this lab you should be able to demonstrate your knowledge of the following skills and concepts:

1. Set up an apparatus that simulates the hydrologic cycle.
2. Accurately measure the mass and volume of a liquid.
3. Accurately measure the mass of salts added and compare to the mass recovered.
4. Monitor and record observations during the hydrologic cycle.
5. Explain how salts are involved in the hydrologic cycle.
6. Use a rubric to self-evaluate your lab.

Problem: What happens to the "salts", and the water, contained in salt water as the salt water is heated?

Hypothesis: If salt water is heated then the salts will _____
 and the water will _____
 because _____

Procedure:

1. Set up equipment as shown in the diagram. FOLLOW ALL SAFETY GUIDELINES.
2. Determine the *mass* of the empty flask and record. Flask = _____ grams.
3. Measure out *20 ml of water* and place it into the flask. Water = 20 ml.
4. Measure out *5 grams of "salts"* and place it into the flask. Salts = 5 grams.
5. Determine *total mass* of flask and contents. Starting flask + contents = _____ grams.
6. Insert rubber stopper and tubing into flask and place on the hotplate.
7. Turn on the hot plate to setting of _____.
8. Begin recording observations until there is no liquid left in the flask.
9. Turn off hotplate.
10. Measure the *volume* of water collected in the test tube and record. Water = _____ ml.
11. Calculate the *mass* of the remaining "salts" and record. Salts = _____ grams.
12. Pour water from test tube back into the flask and record final observations and determine ending *total mass*. Ending Flask + contents = _____ grams
13. Complete and analyze your data by comparing starting and ending measurements and your observations; and then form your conclusion.
14. Clean up all equipment.

Diagram of distillation apparatus: Draw and label a diagram of your distillation apparatus.

Data: Each minute from start to finish, record your observations of the salt water flask, glass bends and tubing, and collection test tube. Be sure to note any changes observed.

<u>Time</u> (in minutes)	<u>Observations</u>		
	<u>Flask</u>	<u>Tubing</u>	<u>Collection Test Tube</u>
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
Final Observations			

<u>Item</u>	<u>Starting Mass</u>	<u>Ending Mass</u>	<u>Change in Mass</u>
Flask	grams		
Salt	grams	grams	grams
Water	ml	ml	ml
Total	grams	grams	grams

Lab questions: Use complete sentences to answer all questions.

1. Why does the liquid in the flask become a gas? What is this process called and what part of the water cycle does this represent? _____

2. Where did the liquid in the test tube come from? What is this process called? _____

3. Would the liquid in the test tube be safe to drink? Explain your answer. _____

4. Explain the difference between evaporation and condensation. _____

5. Compare the starting mass of "salts" with the ending mass of "salts". Was there a difference? Explain why the "salts" do not evaporate with the water? _____

6. Explain why the ending mass was different from the starting mass. Would this "loss" happen in the natural water cycle? _____

Conclusion: State if your hypothesis was supported or negated by the data in this lab and what you found out to be the true results. _____
