

Jamie Burton
SCI 295 – Dr. Mitchell
April 24, 2012
5 E Lesson Plan

Title: **How can the Water Cycle be modeled?**
Indiana Standards: 5.2.4; 5.3.4; 5.3.5

Engage (5-10 minutes)

Begin by having students fill-out the questionnaire attached (entitled “Water Warm-Up”). Once completed, ask students the following question: “Where does rain come from?” Allow for a short discussion to ensue.

Explore (20-25 minutes)

Move students to the laboratory where each table/group has been given the following materials:

1. 50 mL of salt water (10 g of NaCl dissolved in 50 mL water) in a 100 mL Erlenmeyer flask
2. An additional 100 mL Erlenmeyer flask
3. Bunsen burner or hotplate
4. Rubber tubing
5. Coffee filter
6. Ice

Tell students that they have 20 minutes to separate out all the salt from the water (or as much as they can) using only the materials given.

SAFETY – Since students will be dealing with Bunsen burners and/or hotplates, be sure to review proper lab safety, especially as it relates to fire safety (i.e. review locations of fire extinguishers and blankets; remind them never to point a heating test tube or flask at someone; emphasize the need for hot pads, tongs, and heat-proof gloves; etc.). As always, remind them never to eat or drink anything in the lab.

Explain (5-10 minutes)

Once the lab activity is complete, ask students to clean their lab area and return to their desks. In their science journal, have the students write down what they did and the processes they observed. Next, have each table/group share their thoughts with the class and write down processes – along with their appropriate name – on the board. The three main terms that students should come up with are defined below:

Evaporation - the change of state from liquid to gas, as when a water molecule evaporates to form (invisible) water vapor; promoted by the addition of heat which results in breaking of hydrogen bonds between water molecules

Condensation- the change of state from gas to liquid due to cooling, as when water vapor turns into water droplets

Precipitation- water that is a result of condensation in the form of rain, snow, sleet or ice.

Elaborate (5-10 minutes)

Begin by asking students if they can see these sorts of processes in the natural environment, guiding them towards the idea of the water cycle. Project or draw a representation of the water cycle and ask students to tell where the specific processes belong. Continue the discussion, time permitting, with the following discussion questions:

1. In light of this experiment, would you consider water to be a renewable resource?
2. Why do scientist use models such as this one to study natural phenomena?

Evaluate

Formative

As students are performing the various parts of the lesson, the teacher should be walking around, group-to-group, answering questions and posing clarifying questions.

Summative

At the end of the lesson, the teacher should fill out the It's the Cycle of Water Evaluation Sheet. This can be done for either each individual student or each group of students.

Behavioral Objectives

Cognitive

*Students will be able to **identify parallels** between the lab activity and the water cycle.*

Psychomotor

*Students will **demonstrate** their ability to use lab equipment safely and effectively.*

Affective

*Students will **display persistence** with the task of separating the solution.*

References

http://www.ucar.edu/learn/1_1_2_4t.htm

http://drjudysciencesolutions.org/webquestshp/reinhartz.thm/teacher_page.htm

Name: _____ Date: _____ Per: _____

Water Warm-Up

Short Answer

1. What are the three stages of matter? How are they different from one another?

2. What are three things you know about water?

True or False

- _____ 1. Water is created in clouds.
- _____ 2. The water we drink today is the same water as the water people drank by people hundreds of years ago.
- _____ 3. The amount of water on Earth doubles every 3 years.

Name: _____ Date: _____ Per: _____

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Student's Name: _____

It's the Cycle of Water Evaluation Sheet

	1	2	3	4	5
Behavior	Student was rowdy and/or had a negative attitude. Student did not help clean appropriately after lab time.	Student was rarely on task during the course of the lesson. Student did not help clean up appropriately after lab time.	Student was mostly on task during the course of the lesson. Student helps clean up appropriately after lab time.	Student was almost always on task during the course of the lesson. Student helps clean up appropriately after lab time.	Student behaves appropriately during the course of the lesson. Student helps clean up appropriately after lab time.
Participation	Student seems distracted and does not participate fully or meaningfully to class discussions.	Student seems disinterested in the topic and does not meaningfully contribute to class discussions.	Student seems disinterested in the topic and contributes to discussions at a basic level.	Student seems somewhat interested in the topic and contributes meaningfully to classroom discussions.	Student is actively involved in classroom discussions and contributed meaningfully.
Content	Students has no understanding of the three main terms and cannot relate them to the water cycle.	Student has a basic understanding of the three main terms but fails to apply them to the water cycle.	Student has a general understanding of the three main terms and can somewhat relate them to the water cycle.	Student has a general understanding of the three main terms but can comfortably relate them to the water cycle.	Student understands the three main terms and can easily relate them to the water cycle.

TOTAL: _____ / 15