Lesson IV: The Water We Drink

Outcome: Students will understand the relationship of water cycles on Earth as compared to that on the Space Station.

Objectives:
After completion of this module, students will be able to:

1. Identify the major uses of water.
2. Describe the components of the water cycle.
3. Identify ways in which water gets contaminated.
4. Explain methods used by agriculturists and astronauts to conserve and keep water clean.

Science Competencies/Standards:
NSES Content Standard A, B, C, D, E, F

Objective 1: Identify the major uses of water

Suggested Assessment:

Have each student name (orally or written) one to two uses for water for each category: General People, Astronauts, and Farmers/Agriculturists

Key:

General Population: drinking, shower, brushing teeth, washing hands, growing plants, washing cars, etc.
Astronauts: drinking, shower, brushing teeth, washing hands, etc.
Farmers/Agriculturists: Irrigation, plant growth & production, processing of agricultural products, etc.

Objective 2: Describe the components of the water cycle.

Suggested Assessment:

To demonstrate understanding of the water cycle, have students do any or all of the following:

A) Have students list the five major parts of the water cycle and draw arrows between them to indicate the cycle.
B) Use uncooked pasta, pipe cleaners, and other craft items to represent a water cycle – have students label the parts.
C) Create a three-dimensional paper maché diorama with labels.
D) Make a water cycle mobile with paper plates, crayons, string, etc.

Objective 3: Identify ways in which water gets contaminated

Suggested Assessment:

Using the attached Activity Sheet ("What's in My Water?"), have students construct a model & predict a path of artificial contamination to lakes, rivers, and oceans. Have students include an oral or written explanation of their prediction and results.

This assessment can be modified by having the students work in groups, or by having the teacher create the model while the students make predictions, observations, and then draw inferences from the data observed.

Objective 4: Explain methods used by agriculturists and astronauts to conserve and keep water clean.

Suggested Assessment:

Have students use the Venn diagram on the attached worksheet ("Waste Not, Want Not") to compare and contrast how astronauts and agriculturists can conserve/recycle water from human/animal waste.

Name: _____
Date: _____

What's in My Water?

Water moves from the tops of mountains and hills where rain and snow fall. When that water runs off, it flows downhill to valleys and rivers. When all of that water comes to a stop, it is collected in natural basins called watersheds.

The problem: anything that was on the earth's surface when that water travels downhill is now in the water and, subsequently, the water supply that we drink, eat, bathe, and use to water our crops.

Construct a model and predict the path that the water will flow. Record your predictions and observations in the table, and then explain how that effects what happens in real life.

Materials:

- Large rectangular aluminum pan
- 5-6 paper drinking cups
- Scissors
- Extra-wide, heavy aluminum foil
- A small bottle of water
- A sharp knife or punch
- Flavored drink powder (grape or cherry is best)

Procedure:

1) Cut the paper cups to different heights and then turn them upside down in the aluminum pan (these will eventually be the "mountains").

2) Stretch the aluminum foil over the cups. Press it down so that it fits tightly over the high and low "mountains" you've created. The edges of the pan should also be tightly covered so that water cannot get into where the cups are sitting under the foil.

3) Using the sharp knife or punch, create three or four small holes toward the top of the water container (the water level should be BELOW where the holes are located!).

4) In the table on your Observation Sheet, record what you think will happen when you cause it to "rain" on the mountains.

5) Hold the container over the top of your model so that it sprinkles "rain" on the mountains and valleys. Record your observations in the table on your Observation Sheet.

6) Sprinkle the colorful drink powder in some areas of your model. Record your predictions about what will happen.

7) Make it rain again. Observe and record where the powder goes.

8) Suppose that the drink powder was actually pollution on real mountains. Use those thoughts to complete the questions on your Observation Sheet.

Name: _____
Date: _____

What's in My Water?
Observation Sheet

Question:	Trial 1 (without powdered drink mix)	Trial 2 (with powdered drink mix)
What **will happen** when it "rains" in the mountains?		
What **happened** when it rained?		

Questions/Conclusions:

1) Were your predictions correct? Yes No If not, why? _____

_____

2) What does this tell you about the soil we use and the water we drink on earth? _____

_____

_____

3) What is the most important concept you learned from this experience? _____

_____

Name: _____
Date: _____

Waste Not, Want Not!

Agriculturists and astronauts use wastes effectively to conserve precious natural resources like water!

Using the Venn Diagram below, compare and contrast how these two types of people can conserve water from waste.