Experiment: Water Filtration and Conservation with Indigenous Storytelling

Objective:

Students will learn about water filtration methods and the importance of conserving clean water by conducting an experiment to create their own water filter. They will also connect the experiment to indigenous storytelling to understand cultural perspectives on water conservation.

Materials Needed:

- Plastic bottles (cut in half)
- Sand
- Gravel
- Activated charcoal (can be found at garden stores or online)
- Coffee filters or cheesecloth
- Contaminated water samples (this can be made with soil, small pieces of leaves, and food coloring)
- Clean water collection container (e.g., cup or beaker)
- Measuring cups
- Markers for labeling
- Storybooks or resources featuring indigenous stories about water (e.g. “We Are Water Protectors” by Carole Lindstrom, “Autumn Peltier, Water Warrior” by Carole Linstrom, “The Water Walker” by Joanne Robertson)
- Optional: natural materials (like small pebbles or clay) to discuss indigenous practices

Safety Considerations:

- Ensure students do not consume the contaminated water.
- Use gloves if necessary when handling materials.

Procedure:

Opening:

1. **Discussion:** Start with a discussion on the importance of clean water and its conservation. Ask students why water is vital to life and how different cultures view water.
2. **Storytelling Introduction:** Introduce the concept of indigenous storytelling and how it has been used to convey important messages about nature, including water conservation. Share a short indigenous story that highlights the significance of water, such as a tale from a local tribe or a story from the provided resources.

Experiment Steps:

1. **Preparation of Filter:**
    - Give each student or group a plastic bottle that has been cut in half.
    - Instruct students to place a coffee filter or cheesecloth over the neck of the bottle (the part that will be on top) to prevent the filtration materials from falling through.
    - Layer the materials in the following order from top to bottom: activated charcoal, sand, and gravel. Explain the purpose of each layer:
        - **Activated Charcoal:** Removes impurities and contaminants.
        - **Sand:** Traps smaller particles.
        - **Gravel:** Supports the layers above it and prevents clogging.
2. **Contaminated Water Preparation:**
    - Prepare a "contaminated" water sample by mixing water with soil, small pieces of leaves, and a few drops of food coloring.
3. **Filtration Process:**
    - Pour approximately 1 cup of the contaminated water into the filter and observe what happens.
    - Collect the filtered water in a clean container and observe its clarity and color.

Observations:

- Have students record their observations about the filtration process and the appearance of the filtered water.
- Discuss what they notice about the effectiveness of the filter. Did it remove all contaminants? Why or why not?
- Encourage students to reflect on how indigenous practices might inform their methods of conserving and purifying water.

Incorporating Storytelling:

1. **Group Discussion:** After the filtration process, gather students and ask them to share and discuss the indigenous story they heard earlier. What lessons about water conservation were conveyed in the story?
2. **Connection to Experiment:** Ask students to connect the story with the experiment. For example:
    - How does the story illustrate the relationship between people and water?
    - What are some traditional practices mentioned in the story that relate to water conservation?
    - How can the lessons from the story inform their understanding of their own filtration experiment?

Data Collection:

- Ask students to measure the amount of water collected after filtration and compare it to the amount of contaminated water poured into the filter.
- Have them create a simple data table to track their observations and results.

Closing:

- Discuss the outcomes of the experiment and the storytelling. What worked well? What challenges did they face? How did the story enhance their understanding of water conservation?
- Highlight the importance of both scientific practices and cultural stories in promoting water conservation.

Extension Activity:

- Have students research indigenous methods of water conservation and purification, then create a visual presentation or storybook that illustrates their findings.
- Students can also write their own short story with a water conservation message that is inspired by the storytelling session.

Assessment:

- Evaluate students based on their participation in the experiment, their ability to follow directions, their observation notes, and their understanding of the relationship between the experiment, storytelling, and water conservation.

Standards Addressed:

- NGSS 5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- NGSS 5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
- CCSS.ELA-LITERACY.W.5.7: Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
- CCSS.ELA-LITERACY.RL.5.7: Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text.

This lesson plan not only teaches students about water filtration and conservation but also emphasizes the importance of indigenous storytelling in conveying cultural values and lessons related to the environment.