**PBL: Save Water! 3rd- 5th Grade**

**I.** **Title and Grade Level: Let’s Save Water! 3rd- 5th grade**

**II.** ***BIG IDEA: How can we save water?***

***Why do we have to make an effort to save water?***

***Where can we save water in our everyday life?***

***Let's investigate the solutions for water conservation!***

***Let's be engineers, scientists, activists, and water-savers!***

**III.** **TASKS: We will research ways to conserve water**

1.Tell students that you would like them to think about the answer to this question: What percentage of Earth's water is available for human consumption? Ask students to write down their answers in a KWL chart. You may want to remind students to consider what they know about oceans and about the type of water that is considered usable by people. Ask students to fill out the first two sections of the KWL chart. Ask students what they want to know by the end of the lesson.

2.Ask a volunteer to demonstrate his or her answer to the question. Give the student a 2-liter bottle filled with colored water and a clear, empty container. Tell the class that the bottle represents all of the water on Earth. Ask the volunteer to pour into the empty container the amount of water that he or she thinks represents the percentage of Earth's water available for human use. Then ask the class to make suggestions about whether more or less water needs to be in the container. Have the volunteer adjust the amount until there is a general consensus among the students. Put the class estimate aside.

3.Tell students that you will now demonstrate the amount of water on Earth that is available for human consumption.

4. Show students the second 2-liter bottle filled with colored water. Tell them that this bottle again represents all of the water on Earth. Measure out 1,950 ml of the water and pour it into a clear, empty container. Label the container “Salt water”. Tell students that this represents how much of our planet's water is found in oceans — 97%.

5. Pour the remaining 50 ml from the bottle into another container and tell the students that this represents the amount of freshwater on Earth — 3%. Label this container “Fresh water”. Ask students to guess what percentage of freshwater is available for human use

6. Divide the class into small groups and ask them to discuss what they had just witnessed in your demonstration and in the interactive activity. Have students answer the following questions during their small-group discussions

· Where is usable water located?

·Is this water a renewable resource?

7. Bring the class back together and ask student groups to share some of their ideas. Conclude by reminding students that water is necessary for life and thus important to conserve and maintain so that it stays available for human consumption, as well as for consumption by plants and animals, which people use for food.

**IV.** **JUSTIFICATION**: This lesson will follow the 5E framework to help students understand and explore the significance of water conservation through real-life solutions.

**V.**  **STANDARDS:**

**SOCIAL STUDIES:**

4.4 Students explain how California became an agricultural and industrial power, tracing the transformation of the California economy and its political and cultural development since the 1850s.

7. Trace the evolution of California’s water system into a network of dams, aqueducts, and reservoirs.

**ELA/Literacy:**

W.3.2 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. b. Develop the topic with facts, definitions, and details. c. Use linking words and phrases (e.g., also, another, and, more, but) to connect ideas within categories of information. d. Provide a concluding statement or section.

W.4.1.a–d-Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)

[W.5.2](http://www.corestandards.org/ELA-Literacy/W/5/2/) Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

**CCSS MATHEMATICS:**

3.NBT. Use place value understanding and properties of operations to perform multi-digit arithmetic.  4

1. Use place value understanding to round whole numbers to the nearest 10 or 100.

5. NBT.A.4 Use place value understanding to round decimals to any place.

**NGSS (Next Generation Science Standards):**

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.\* [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.

***ESS3.A: Natural Resources***

  *Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)*

**A.**     Disciplinary Core Ideas

[ETS: Engineering, Technology and the Application of Science](https://ngss.nsta.org/DisciplinaryCoreIdeasMid.aspx?id=6)

ETS1: Engineering Design

**B.**     Science and Engineering Practices

**C.**     Crosscutting Concepts

|  |  |
| --- | --- |
| 1. Launch Project:Entry Event & Driving Question (DQ) | 2. Build KnowledgeUnderstanding & Skill to answer DQ |
| 3 Present Productsthat Answer DQ | 4. Develop andRevise Productsand Answers to DQ |

**VI . ENGAGING CONTEXT: Hook- Launch activity**

Explain to the students that we will be following and referring to the 5E framework throughout our lesson. Challenge students to identify which phase we are at during the different sections of the lesson. Provide an energizer if a student correctly identifies the phase. Have this poster displayed throughout the entire lesson for teacher and student reference.

·**VII.MEASURABLE OBJECTIVES**

At the conclusion of this lesson, students will be able to:

* Identify sources of fresh water available for consumption
* Understand the need for water conservation due to the limited fresh water supply
* Explore strategies for conserving water at home
* Compare the benefits and drawbacks of using different water management techniques, particularly dams

**VIII   TOTAL TIME:**

**Launch event-One:** 1 day a period of 15 minutes

**EXPLORE**

**Building Knowledge**:

1 day a period of 30 minutes

**Showing and Sharing Knowledge**

EXPLAIN

(Claims and Evidence) 10 minutes

EXTEND/ELABORATE

 1 day a period 15 minutes

(Students develop and revise products and or performances)

**IX.   Social** [**Skills**](http://www.csun.edu/~sb4310/PBL%20Handouts%20and%20Assessments_files/Social%20Skills%20and%20or%20Habits%20of%20Mind%20to%20Engage.docx) **and or Habits of Mind to Engage/Assess to Promote Student Motivation and Success**

Attentive Listening;

Disagree with Idea- Not the Person;

Flexibility in Thinking;

Perseverance;

Team Work,

Compromise

**IX. Level of Voice Appropriate for Each Day/Period of the PBL:**

**When completing activity: (Classroom Level 2 – Normal  Voice Table Talk)**

The level of the voices in the classroom, as the learners are collaborating in a group, should be moderate to high. This activity requires the learners to move around the classroom to gather materials, which they may need. Likewise, the learners will need to discuss with each other in their group as they complete the project.

**A.** DIRECT INSTRUCTION: forming groups, assigning roles, describing roles and tasks

**Materials Manager/ Spy Tasks:** Make sure your team receives and uses the materials without spilling; If the team has a question following Three Before ME- go to another team to answer your question [or see what they have learned]

**Checker's Tasks -** Make sure the time limits are observed.  Help others complete their tasks. Let your instructor know when your team has completed the lab

**Recorder's Tasks**:  Carefully observes and records the benefits and drawbacks of using different water management techniques, particularly dams so that each team member has access to the data.

**Encourager/Observer' s Task** - Coach the team to persevere and stay together while sharing and turn-taking. Notice identify and record occurrence of team members' social skills and habits of mind.

**Checklists and Rubrics** provided for student goal setting and self-assessment; Peer Assessment (Team Performance Rubric) [Rate Your Mates] Content Assessment (poster)

**Peer Assessment** (Rate Your Mates)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Group Member Name** | **Encouraging** | **Attentive Listening** | **Working Toward Consensus** | **Staying on task and with the group** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Scoring Key: Never=N  Sometimes=S Frequently=F

**Explore:** We will use our inquiry skills of predicting (hypothesis testing) comparing and analyzing to:

**\_\_\_\_groups of\_\_\_ students** )  Modified for class composition.

**Explain:** As students complete the launch, inquiry, culminating activity they share…their prior knowledge, observations and questions about water conservation and the limited amounts of water we have.

**Extend/Elaborate:**  In small groups and in the final performance students have opportunities to extend their knowledge and to elaborate on their ideas.  The teacher provides mini-lessons as needed to scaffold student thinking and understanding.

**XI. Materials List**

1.   Two 2-liter bottles full of water

2.   Food coloring (dark color preferable)

3.   Measuring cups (for measuring amounts ranging from 50 ml to 14.5 ml)

4.   Five clear containers (to hold water ranging in volume from 1,950 ml to 0.5 ml)

5.   Markers and tape for making labels

6.   Water Use Worksheet

7.   Notebooks for student’s work

**Evaluate:  (Assess):**

Scoring Rubric for Team Performance of The Water Conservation Project

|  |  |  |
| --- | --- | --- |
| Criterion | Met | Unmet |
| Answer the questions· Where is usable water located?· Is this water a renewable resource?  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Formative Assessment of Non-Cognitive Factors**: Self-Assessment Using the Habits of Mind Check Sheet and Write-up Form (Google Docs).

Children's Literature that Supports the PBL:

* [Why Should I Save Water?](https://amzn.to/2PWKYcK) by Jen Green
* [The Water Princess](https://amzn.to/2O1of24) by Susan Verde
* [Trade](https://amzn.to/2xsFi3q) by Alma Fullerton
* [A Cool Drink of Water](https://amzn.to/2DaTfbm) by Barbara Kerley