Water-Energy Nexus

Lesson Description

Explore the relationship between water and energy (**water-energy nexus**) and build a model to demonstrate the way water travels from **sources** to homes and businesses.

Lesson Objective

Create a model to demonstrate how water travels from source to homes and businesses using energy and resources. You will learn why the **water-energy nexus** is so essential in many of our ecosystems.

Vocabulary

- gravity
- pipeline
- source
- water-energy nexus

Materials

- ½ cup of water
- two bowls, aluminum tins, a baking sheet, or a box (shoe or pizza box)
- straws, or plastic tubing
    - Don't have it? Make your own *Aluminum straw:*
        - Cut a 6-inch piece of foil and find a pencil or pen
        - Roll the foil around the pencil or pen until it is wrapping it tightly
        - Cut both tips of the foil off and guide the pencil or pen out of the foil!
- blocks, paper houses, boardgame pieces, legos
- molding clay or play dough
- tape
- one small bowl
- one turkey baster, eyedropper, or any cup that can easily pour a liquid (measuring cup, teapot, an empty ketchup container, or anything else you can find!)

Watch it!

- For more information for students, teachers, and parents, visit PEAKstudents.org!
- Please check out our website: 1millionenergyactions, for interactive and informational challenges, polls, and pledges!
- Follow us on our social media:
    - Instagram
    - Facebook

Introduce

Humans, plants, and animals need water to drink and grow. Humans use water in lots of other ways as well: baths, car washing, watering plants. Water is used in the electrical generation process to generate electricity. Humans depend on water for energy and energy for water use. Energy is used to power homes, to move 20% of the water we use every day, to move the state's electricity across power lines, and billions of gallons of diesel fuel every year. The more water we use, the more energy we use and vise versa. Using less saves both water and energy resources.

Investigate

Your Challenge: Move water from the source to the homes and businesses. This model demonstrates how water moves from Northern California to Southern California.

1. Hunt around your house for the materials (or similar items) listed. Once you have them, you are ready to begin.
2. Use a tray/pizza box/shoebox as a base to build your model.
3. Make one side of your base Southern California with a town using the materials you chose for building. Make the other side Northern California with mountains and a water source.
4. Place a small bowl in the center of your neighborhood.
5. Connect the water source to the neighborhood (the bowl) using a **pipeline** (straws or similar material) or be creative with the materials on-hand.
6. Slowly pour the water into the water source and watch **gravity** take over!
7. Pay attention to water traveling. Fix any leaks, observe how fast or slow your water travels, and how much water makes it into the bowl.
8. Now that you've mastered this infrastructure, challenge yourself to keep your pipeline going through a longer path, add mountains, valleys, or twists and turns. See how the time it takes to travel, how many leaks you have, and the number of materials used in your pipeline all change!

Wrap-up

Challenge Questions:

1. How is the land on your model different than the land in California?
2. How do the mountains and valleys change the way water travels? Why?

What can you do to save water and energy at home?
One easy way to save water and energy is to take shorter showers. Each minute in the shower uses 2.2 gallons of water (epa.gov). Think about it, shortening your shower by 5 minutes can save about 11 gallons of water (epa.gov), which in turn saves energy! Start a Shower Log to help you and your family keep track of how long you spend in the shower. See if you can lower your water and energy usage throughout the month!

Glossary

Word	Part of Speech	Definition
gravity	noun	The force that attracts a body toward the center of the Earth, or toward any other physical body having mass.
pipeline	noun	A long pipe, often underground, used to move a liquid such as water over long distances.
source	noun	A place, person, or thing from which something comes or can be obtained.
water-energy nexus	noun	The interconnected relationship between water and energy. Water is used to make energy; energy is needed to transport clean water.