Find the Water

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Learning Objectives/Key Messages

- NASA is sending spacecraft to many planets, moons, and asteroids around the solar system searching for, among other things - water!
- Water is fundamental for life, so human explorers will need clean water to survive, and we might find other living things in water around the solar system.
- Many times, we can't see the water we are searching for, because it may be underground or locked into rocks or ice.

Age/Ability:

- School age and up
- Multimodal, accessible for all physical abilities

Materials Needed per Station:

- 1 cup sand
- 1 permanent marker
- 6 opaque containers with lids (to-go coffee cups work, but will not hold up long)
- 21 raised adhesive objects for labeling containers; felt dots, glue dots, sticky notes with pen-tip punched holes or squares of tape can also work)
- soda water (or water and non-medicated seltzer tablets)
- vinegar (strongly scented juice, or essential oils)
- wipes to clean cups between uses
- water
- additional substance such as water ice, dirt, or rocks
- Paper towels (in case of spills)
- Sink or safe large receptacle(s) for liquid disposal after event
    - Also good for hand washing if anything spills on hands
- Hand cleansing wipes
- Trash can
- Test It! page (ideally laminated - use with dry erase markers)
- Optional:
    - *Investigate It!* Page
    - Liquids of different temperatures
    - *Water in the Solar System* page - Visit the PLANETS website and download a larger version: (https://planets-stem.org/water-in-extreme-environments/educator-resources-water-in-extreme-environments/water-in-extreme-environments-all-downloads/)
    - *How Much Water is On Earth* printout Larger version available: (https://spaceplace.nasa.gov/water/en/)

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Setting Up the Cups at Each Station:

- Label lids 1 through 6 with marker

  ♿ Adding felt dots, stickers, tape, or sticky tape with numbered holes to the containers allow blind learners to refer to them by number.

- Fill cup #1 with water. Put on the lid.
- Fill cup #2 with sand. Measure or feel to ensure its weight is roughly the same as the cup with water. Put on the lid.
- Fill cup #3 with water and add roughly a tablespoon of vinegar. Measure or feel to ensure its weight is roughly the same as Cup 1. Put on the lid.
- Leave cup #4 empty. Put on the lid.
- Fill cup #5 with soda water (or water and non-medicated seltzer tablets). Measure or feel to ensure its weight is roughly the same as Cup 1. Put on the lid.
- Fill cup #6 with the non-liquid-water choice most appropriate for your site. Measure or feel to ensure its weight is roughly the same as Cup 1. Put on the lid.
- Notes:
  - Filling a cup with water and freezing it overnight into solid ice can spark conversations around the differences of water in solid form and what it would take to convert it to liquid.
  - Filling the cup with any other materials–such as pencils, rocks, dirt, or marbles–can make a distinct sound or odor distinguishable from water.

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Test It! (Educator Version)

Keep the lid firmly on each cup and gently swish the liquid.

- 🚫 Do not open containers!
- 🚫 Do not drink!
- 👂 Listen! What do you notice about how it sounds?
- 🤚 Shake it! What do you notice about how it moves?
- 👃 Smell! What do you notice about how it smells?

NOTE: Use the wafting technique to gently sniff the contents.

Hold the vial one foot away from your nose.

Gently “waft” the air towards your nose with your other hand.

Reset for the next scientist-in-training ⏪

- ✅ Place all cups back in place and wipe them clean.
- 🧽 Clean up any spills.
- 🧼 Wash hands (or use hand cleansing wipes).
- 🗑️ Throw away any trash.
- ❗ Reset the Alka-Seltzer/soda water as needed!

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