Temperature and Solar Stills

Estimated Time: 60 minutes

SUMMARY

In this activity, students will learn to track weather and outdoor temperatures. They'll use this knowledge to learn about precipitation, condensation, and build a passive water purification system.

WHAT YOU'LL LEARN

- Weather data tracking
- How precipitation like rain is formed
- How different colors absorb light
- How to purify water using sunlight

Materials Used	Resources
• 1 thermometer (indoor or outdoor) • 1 notebook • Several gallon plastic bags • Paper (colored or colored pencils to color paper) • Several cups or small bowls • Salt • Water • Clear plastic wrap	• Another solar still project: https://teachbesideme.com/simple-science-making-solar-still/ • An example of an emergency solar still: https://www.instructables.com/id/Make-a-solar-still-to-survive/

WHAT TO DO

Tracking Temperatures

1. Get used to reading the thermometer. Note that there are measurements in both Fahrenheit and Celsius.
2. Change the temperature on the thermometer to demonstrate what is being measured. A medical thermometer can be placed in glasses of water of different temperatures. An air thermometer can be put somewhere in sunlight and then placed into a refrigerator to measure varying temperatures.
3. Weather tracking can be useful for a variety of reasons, including: forecasting future weather; understanding long-term trends; and understanding how temperature affects things like how far/fast you can run; and tracking body temperature can be helpful for a variety of health reasons. Try adding a table in the notebook like this one:

Date	Time	Temperature	Location Measured

Making a Solar Still

1. Warm air can hold more water than cold air, which we call humidity. When warm air (with water in it) hits something cold, water slows down and collects on the surface. We call this "condensation." When warm air with water in it hits cold air in the atmosphere, this water can collect to form "precipitation" like rain.

2. You can create a water purifier by using the concept of the water cycle. Add water and enough salt to make the water taste bad to a cup or bowl and mix it until the salt dissolves. Place the cup or bowl in a plastic bag, seal it, and leave it in sunlight. As the water in the bag heats up, it will evaporate into the air in the bag, condense on the inside of the bag, and run down the sides of the bag.
3. After several hours, remove the cup or bag and collect the water in the bag. Taste the water. Water molecules evaporate out of the cup and leave the salt behind, giving you purified water.
4. To test how different colors absorb light to create more heat, repeat the water purification experiment and vary the color of the cup or bowl. For example, place pieces of different colored paper wrapped in plastic wrap in each bowl, add salt water, place the bowls in separate bags, wait for a few hours, and measure the water made by each purifier. Larger amounts of water means that that color absorbed more sunlight!

TIPS

- Younger students may prefer to spend extra time making the thermometer measure hotter or colder temperatures. Practice critical thinking by asking “what do you think the temperature will be?” before measuring, or simply “do you think this will be hotter or colder than _____?”
- The water purifier works best when the bag is much bigger than the cup or bowl to allow the water to drip down the sides of the bag.
- Older students can use the water purification testing in Step 7 as an opportunity to practice engineering skills. Using a variety of materials (trash bags and dark plastic work great), drawing out a design beforehand, and trying several variations on designs provides an opportunity to learn by investigating.
- Any design and materials should work for the purifier as long as:
    - Sunlight can reach the water
    - The space above the water is covered by something that isn’t absorbent
    - Salt water is separated from where condensed water will run down the edges