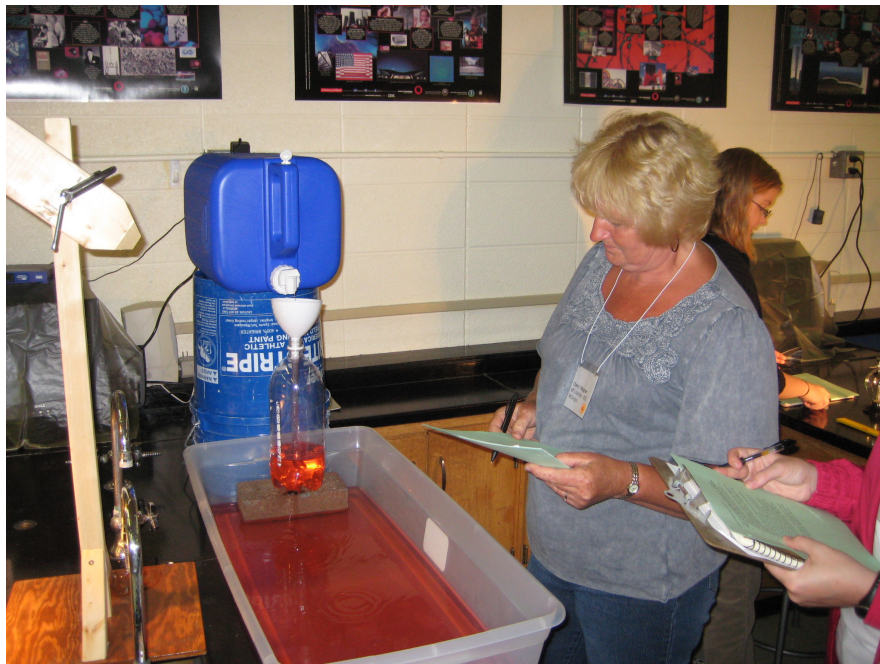


Leaky container and water jug

Work with one other person on this activity. **PLEASE READ ALL INSTRUCTIONS BEFORE YOU BEGIN!**

1. Fully open the spigot on the water jug until the container on the wooden stand is about half full. Close the spigot.
2. Describe the change of water level in the container after you've stopped adding water.
3. Now add water very slowly so that it just drips into the container.
4. Describe the change of water level you observe as the water drips into the container.
5. Slowly increase the rate at which water comes out of the spigot until you're adding water at a rate that is equal to the rate at which it's leaking out.
6. Describe the change of water level you observe when you're adding water at the same rate it's leaking out.
7. Now slowly increase the rate at which water comes out of the blue jug but stop opening the spigot before you've reached its fully open position. Describe what you observe.
8. Now fully open the spigot. Describe what you observe.
9. Now add water more slowly and decrease the rate until it is a slow drip. Describe the changes you observe.



Daily Cycle of Temperature (Leaky container and water jug)

Summary – This activity investigates the relation between the rate at which solar energy is added to the earth-atmosphere system, the rate at which heat energy leaves the earth-atmosphere system, and the timing of the warmest and coldest temperatures during a summer day.

Materials Needed

- A camping-style water jug (one that has a spigot that allows water to drain out at a variable rate) filled with water and to which you've added red food coloring
- A container (about 2 quarts in size) that has a pencil-sized hole near the bottom
- A funnel placed over the top of the leaking container; this will smooth out the turbulent flow of water from the jug to the container
- A stand or brick on which to place the leaking container to elevate it somewhat
- A plastic storage tub in which to place the leaking container

Scientific Questions

How does the rate at which energy is added affect the timing of the warmest and coldest temperatures?

Possible Hypothesis

- Temperature will be warmest when you're adding energy most quickly
- Temperature will be warmest just after you've stopped adding energy
- Temperature will be warmest shortly after you've added energy most quickly and when the input and output rates are equal

Set up

- Leaky container will work best if elevated above the bottom of the plastic storage container.

Notes

- In this activity, water level represents temperature: the higher the water level, the warmer the temperature.
- Students will likely predict that the water level will be highest when the rate of addition is greatest
- This activity takes practice!