

# CURIOSITY AT HOME

## MAKE YOUR OWN THERMOMETER

### MATERIALS

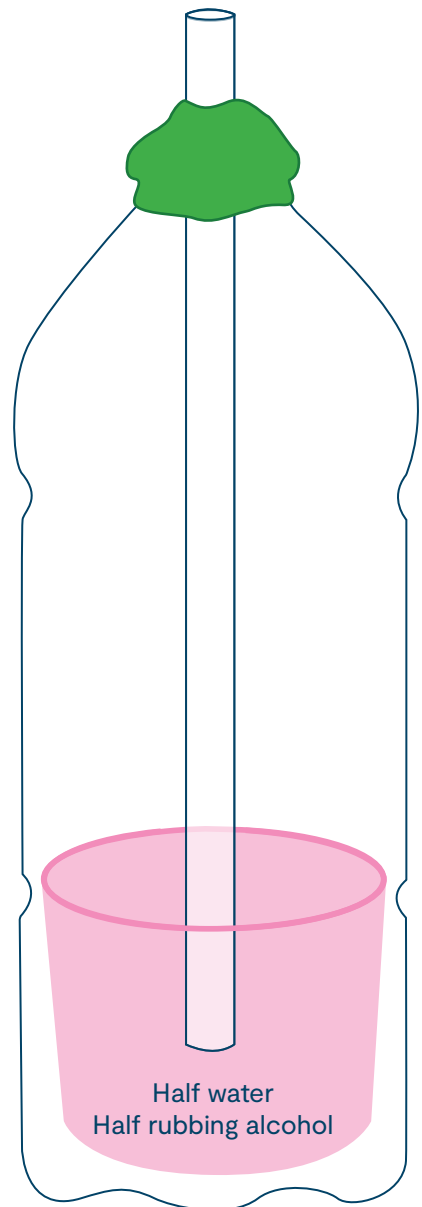
- Modeling Clay
- Food Coloring
- Water
- Clear Straw
- Isopropyl Alcohol
- Plastic Water Bottle

### PROCEDURE

- Pour equal amounts of tap water and rubbing alcohol into the bottle until it's a quarter full.
- Add a few drops of food coloring and shake the bottle to mix it.
- Insert the straw into the bottle, not letting it sink to the bottom.
- Wrap modeling clay around part of the straw and the opening of the bottle to make it stay. Let part of the straw stick out of the bottle. The clay should be tight around the straw and cover the bottle mouth, but make sure to leave the top opening of the straw uncovered.
- Test the thermometer! Have each child put their hands around the bottle. What happens to the mixture when warm hands are on it? Optionally, you can put it in cold water.
- Optional: Make a scale for the thermometer using a real thermometer as a reference.

### DID YOU KNOW?

When the alcohol and water absorb heat, the solution expands, sending the water up the straw. Traditional thermometers work in a similar fashion. As the heat rises, the liquid (usually alcohol or mercury) will expand. These are based on a standard pressure so store-bought thermometers are fully sealed so that the external pressure won't affect the internal pressure. With the thermometers children make, the rising liquid level is dependent on different pressures inside and outside of the bottle. As the closed system inside the bottle gets warmer, the gasses and liquids will try to expand by creating more volume. If the clay is sealing the bottle, the only opening will be through the straw so the solution will be pushed up the straw slightly.



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