

DIY Thermometer



FUN FACT

Before there were thermometers there was an instrument called a thermoscope. Thermoscopes are devices that show changes in temperatures.

Unlike a modern thermometer, thermoscopes don't have standard scales for measuring temperature.

THERMAL ENERGY

Thermal energy is the energy contained within a system that is responsible for its temperature.

Heat is the flow of thermal energy. The total kinetic energy of moving particles of matter is called thermal energy. All matter has thermal energy, even matter that feels cold. That's because the particles that make up matter are always in motion and have kinetic energy.

MATERIALS

- Ice
- Water
- Small bowl
- Food coloring
- Modeling clay
- Bottle with small neck
- Clear plastic drinking straw

DIFFICULTY



Why are thermometers so smart?

*Answer on the next page

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ALABAMA PUBLIC TELEVISION

*Joke Answer -
They have lots of degrees!

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EXPERIMENT

Step 1: Gather materials.

Step 2: Fill your bottle about half way up with water and add a few drops of food coloring.

Step 3: Shape the modeling clay into a sphere larger than the opening of the bottle. Carefully poke your straw through the clay (make sure the straw doesn't get blocked).

Step 4: Place the clay sphere and straw on top of the bottle, allowing the straw to reach near the bottom of the bottle (don't allow the straw to touch the bottom of the container). Seal the bottle with the clay, making sure there are no gaps to allow air to enter.

Step 5: Note the level of the water, this is room temperature.

Step 6: Try placing your thermometer in ice water and observe what happens to the liquid in the straw.



WHY IT WORKS

When the temperature of the liquid in the bottle increases, it has gained energy, causing its molecules to expand and rise into the narrow straw. When the liquid cools, its molecules lose energy causing them to contract, allowing the liquid in the tube to fall to a lower level. Therefore, high levels of liquid in the tube indicate a higher temperature and low levels indicate a lower temperature.

EXTEND YOUR LEARNING

- What happens if you put your thermometer into warm water?
- Would using a liquid other than water change the way your thermometer behaves?
- Could you add lines to your thermometer to get a better, more accurate reading?

WORKFORCE CONNECTION

Solar photovoltaic (PV) installers, also known as PV installers, assemble, set up, and maintain rooftops or other systems that convert sunlight into energy. Solar photovoltaic installers usually work as part of a team. They must understand how solar energy is converted into electric energy by the solar panels they install. They must also set up systems to safely store this collected solar energy for use in homes and businesses.