

Name: _____ Class: _____ Date: _____

CALIBRATING A THERMOMETER



Learner Outcomes:

- Explain the operation of technological devices and systems that respond to temperature change (i.e. thermometers)

Key Terms:

Thermometer

Temperature

Accuracy

Calibrate

Increments

Precision

Background Information: Today, thermometers and other scientific instruments are mass produced in factories. Early scientists, however, had to build their own measuring devices.

Problem: How can we create and calibrate a homemade thermometer?

Materials:

250 mL flask

Glass tubing

Pen

2 holed rubber stopper

Food coloring

Thermometer

Masking tape

Procedure:

1. Fill the flask completely with water. (Work over a sink.) Do not run the water before filling the flask for this step.
2. Have your teacher add a few drops of food coloring.
3. Insert the stopper with the thermometer and glass tubing into the flask. Do not push too hard.

This investigation / activity has been adapted from:

Bullard J, Krupa G, Krupa M, et al. *Science Focus 7*. Toronto, ON: McGraw-Hill Ryerson.

4. Use a piece of masking tape and your pen to mark the initial temperature on the glass tubing.
5. Do not push or pull on the rubber stopper.
6. Fill your sink with cold water. Put your thermometer in the sink. Mark one "colder" temperature on your glass tubing with masking tape. (Be sure one of your group members holds their finger on the position of the water in the glass tubing, as another writes the temperature on the piece of masking tape.
7. Drain your sink, and refill it with hot water. Use the same method as in step 6 to calibrate a temperature warmer than the initial temperature.
8. Show your 3 calibrations to your teacher, then cleanup you equipment. Be sure to drain the sink.

Analysis:

1. When you first filled the flask with water, why were you asked to not let the water run ahead of time?
2. When you were marking the cold or hot temperatures, why was one person supposed to hold their finger on the water level which you were going to mark with the tape?
3. How was your thermometer different than a real one?

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Extension:

1. Investigate different types of thermometers used throughout history and design an experiment to build and calibrate one other historical model.

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