

Make your own thermometer

How does temperature vary around the school?



INTRODUCTION

There are many different types of thermometer, and many will be familiar to children: digital, data loggers, temperature 'guns' and liquid crystal thermometers, in addition to those made more traditionally with glass.

In this activity, children will learn how a glass thermometer works by constructing their own. The thermometer will show changes in temperature, and although it may not be very accurate, it will certainly promote discussion.

LEARNING INTENTIONS



- ☑ To understand how a glass thermometer works
- ☑ To investigate what happens to the liquid and air inside
- ☑ To make careful observations and explanations

KEY QUESTIONS

1. Why have we chosen these resources?
Could we use any alternative ones?
2. Why is it useful to add colouring to the liquid?
3. What happens when the homemade thermometer is moved to different locations?
4. Can you explain why the level of the liquid changes?

KEY VOCABULARY



| | |
|-------------|---------------------|
| Liquid | Thermometer |
| Solid | Expand/ contract |
| Glass | |
| Transparent | |
| Temperature | |



RESOURCES (PER GROUP)



- Transparent glass bottle
 - Straw/tube
 - Water
 - Food colouring
 - Multipurpose reusable adhesive (e.g. Blu Tack / Play-Doh)
 - Large bowl
 - *Warm water
 - Ice cubes
 - Commercial glass thermometer (one for the class will suffice)
- *Alternatives to this are hot water bottles/hand warmers/microwave wheat pack.

WHAT TO DO:

Today we are going to be physicists

1. Encourage children to explore the resources and compare these to a commercial glass thermometer. Ask them to discuss similarities of individual resources to the parts of the thermometer.
 - Place the glass straw into the bottle, making sure it does not touch the bottom of the bottle and is under the surface of the liquid.
 - Wrap pliable, reusable adhesive around the straw and opening of the bottle to suspend it in position, ensuring that no air can escape from or enter the bottle (without this, the thermometer will not work).
2. Assist the children in creating a bottle thermometer:
 - Half fill a bottle with water and add some food colouring (so the liquid can be seen).
3. Place the bottle thermometer in warm water or on a hot water bottle or hand warmer and observe what happens.
4. Children could move the thermometer to different locations and observe changes in the liquid level.

On a hot sunny day, it may be possible for the liquid to rise out of the top of the thermometer!

EXTENSION / FOLLOW UP ACTIVITIES

Using a thermometer or data logger alongside your homemade thermometer, add a scale onto your glass straw.

Observe temperature changes over a day or a week.

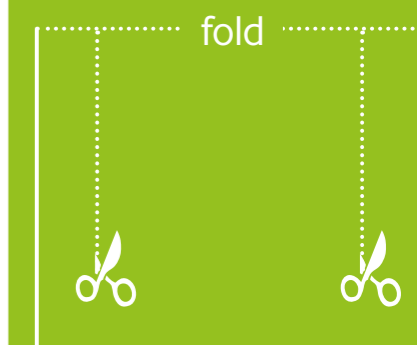
Investigate whether other liquids could be used in your thermometer (e.g. baby oil).

Find out about the Celsius scale, or other scientists who have had temperature scales names after them (e.g. Daniel Gabriel Fahrenheit).



ADDITIONAL RESOURCES (IF REQUIRED):

- Thin card
- Fold in half and cut along top and bottom, then slide onto straw



ANTICIPATED ACTIVITY TIME: **15 – 60 MINS** depending on the time to explore and develop the investigation.