

## General

# Boiling point of water

(Ireland)

## Background

Gas syringes are typically used to demonstrate that as pressure is reduced (or volume increased) the boiling point of water changes. However these are expensive and can break easily. This model allows students to experience the pressure-boiling point relationship for themselves, using inexpensive equipment

## You will need:

- ✓ Large rubber stopper
- ✓ A Philips head screwdriver
- ✓ 50 cm<sup>3</sup> plastic syringe
- ✓ Jug of warm water
- ✓ Oven gloves
- ✓ Kettle

## Follow these steps:

1. Use a Philips head screwdriver to make a hole in an inverted large rubber stopper. Make sure the hole is large enough and deep enough to fit the tip of a 50 cm<sup>3</sup> syringe.
2. Heat some water to about 50°C and pour it into the jug.
3. Allow each student or group to fill their syringe one-third full of the warm water.
4. Invert the syringe and eliminate the air above the water level.



## What next?

- This explains why cooking food by boiling at higher altitudes may not be safe
- Also the reverse principle can be used to explain why pressure cookers are so effective at cooking food

5. The syringe tip needs to be securely inserted in the hole in the stopper.
6. Using oven gloves, a student can hold the barrel of the syringe securely and then pull the syringe piston.
7. This can be repeated several time with the same water sample.

## So what happened?

As the volume within the syringe increases, the internal pressure drops. This causes the boiling point of water to decrease also. Not only is steam produced but bubbling can be seen throughout the water.

When the piston is lowered the boiling stops.