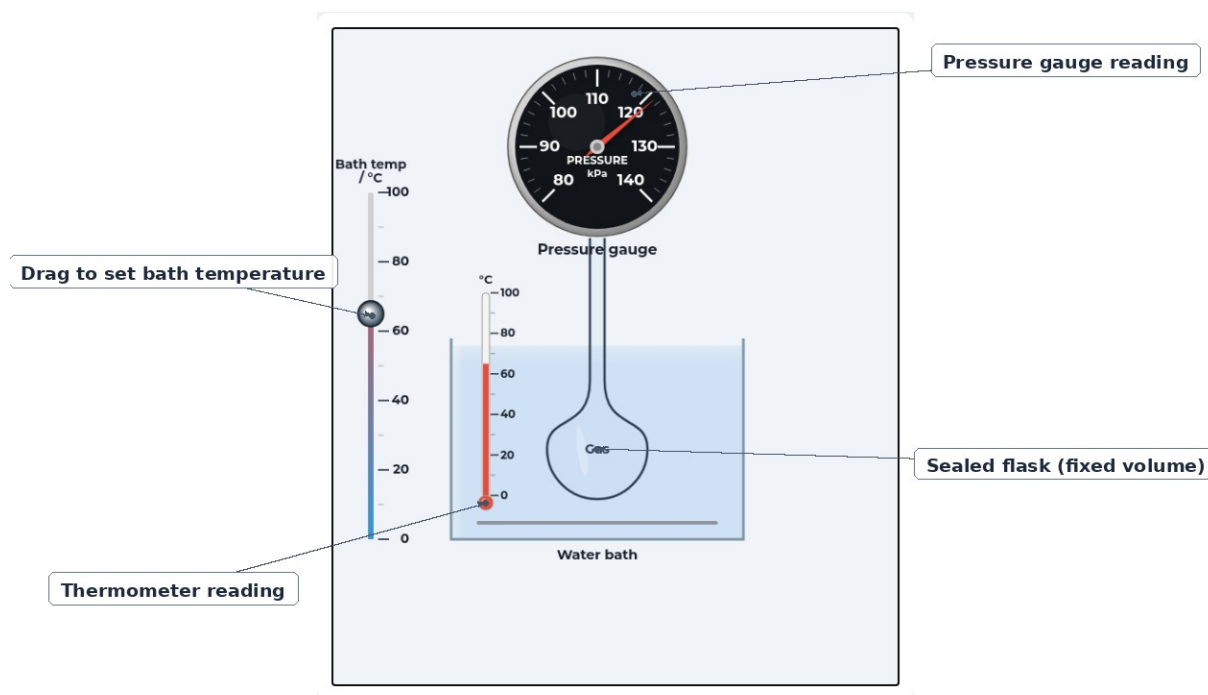


Investigating Pressure and Temperature

Temperature and Pressure at Constant Volume

Aim:

You are investigating how the temperature of a fixed mass of gas affects its pressure, at constant volume.



Method:

1. Set the Bath temperature slider to 20 °C and wait for the pressure gauge needle to stop moving.
2. Read the thermometer and the pressure gauge. Record the temperature and pressure in your results table.
3. Increase the bath temperature in steps of about 10 °C, waiting each time for the needle to stop moving before you record the new pressure.
4. Repeat until you have at least eight pairs of readings spread across the full range of the bath, from close to 0 °C up to close to 100 °C.

Prediction:

The pressure gauge starts at around 107 kPa when the bath is at 20 °C. What do you predict will happen to the pressure reading as you heat the bath towards 100 °C?

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Test your prediction in the simulation.

Results:

Temperature / °C	Pressure / kPa

Analysis:

What do you notice about your temperature and pressure readings as the bath gets hotter?

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Plot a graph of pressure (y-axis) against temperature in °C (x-axis). Draw a line of best fit. Does your line pass through the origin (0 °C, 0 kPa)?

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Extension:

$$T \text{ (kelvin)} = T \text{ (°C)} + 273$$

Convert each of your temperatures to kelvin and plot a new graph of pressure (y-axis) against temperature in kelvin (x-axis). Does this new graph pass through the origin? What does this suggest about the relationship between pressure and absolute temperature?

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