5 Sulfur is a yellow powder that is used in many different common compounds.
The melting point of sulfur is 115°C and the boiling point of sulfur is 444°C.

5.1 Draw a sketch graph of temperature (°C) versus time (s), which shows how the temperature changes over time, as solid sulfur is heated from 25°C to 500°C.
Show the position of the melting and boiling points on the temperature axis.

5.2 In which state is sulfur at 25°C?

_____

5.3 In which state is sulfur at 200°C?

_____

5.4 What happens to the temperature of the sulfur while it melts?

_____

6 Use the table of melting and boiling points on page 53 to complete the following table.

Substance	Temperature (°C)	State
H_2Te	-1	6.1
HF	-81	6.2
HCℓ	4	6.3
$C\ell_2$	-102	6.4
Br_2	-6	6.5
I_2	100	6.6
I_2	150	6.7

Experiment 4 Date:

Aim: To see how the temperature changes over time when ice is heated from -5°C until it boils and evaporates.

Investigative question:

_____

_____

Hypothesis:

_____

_____

Variables:
Fill in the items or quantities that match the headings in the table below.

Independent variable (Which is changed.)	**Dependent variable** (Which is measured.)	**Controlled variable(s)** (Which remain(s) the same.)

Method:
1. Place a sensitive thermometer in a glass beaker of ice.
2. Heat the beaker.
3. Use a stopwatch and take a temperature reading in °C every 2 minutes.

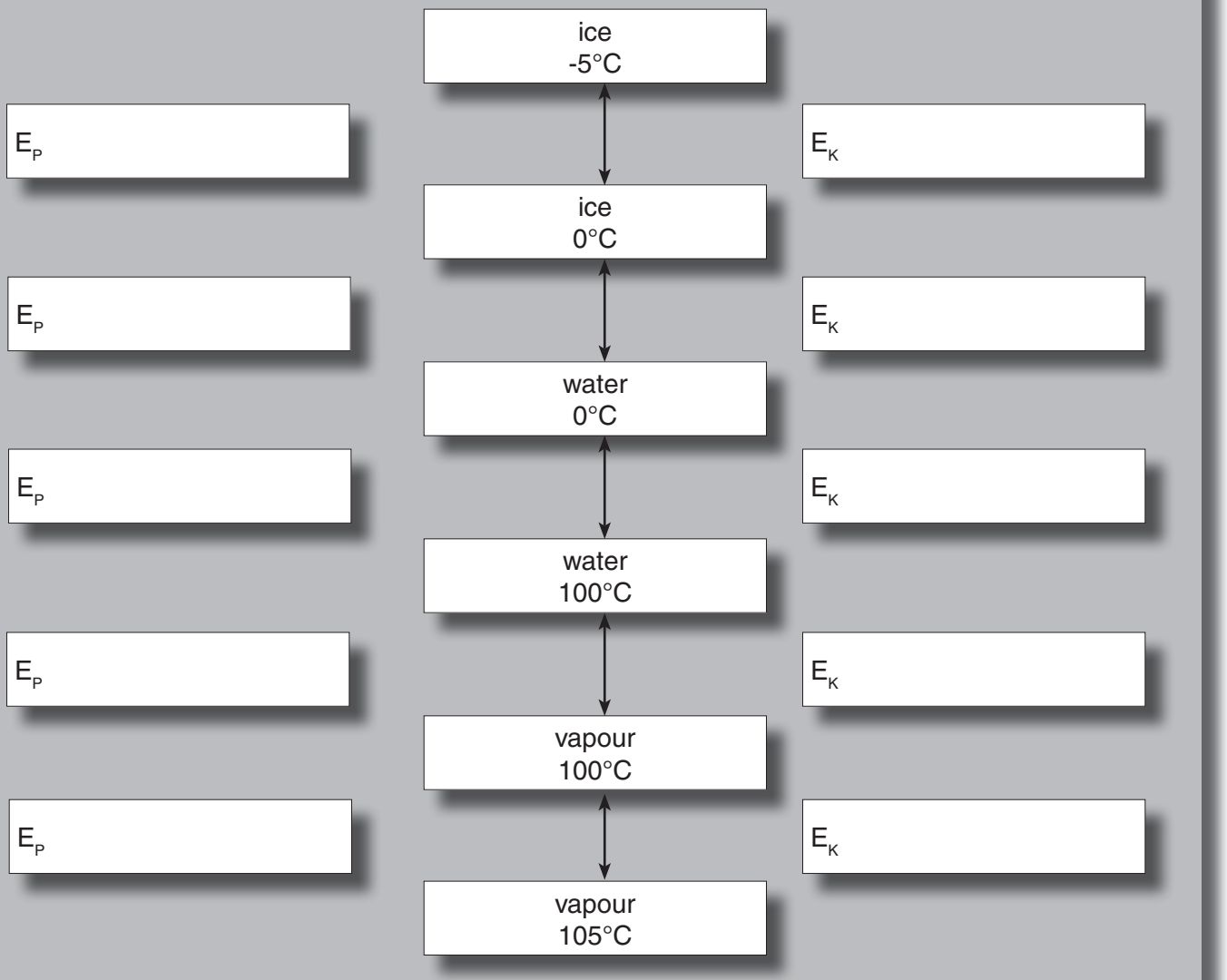
Observations:
Complete the table for the following time intervals. (Adjust time intervals if necessary.)

Time (minutes)	Temperature (°C)	Time (minutes)	Temperature (°C)
0		16	
2		18	
4		20	
6		22	
8		24	
10		26	
12		28	
14		30	

Results:
Draw a graph of temperature (°C) versus time (minutes) to determine the temperature changes over time. The shape of the graph will help you to come to a conclusion.

Conclusions:

Complete the diagram below to summarise the findings of this investigation.



2.2 The kinetic molecular theory

The kinetic molecular theory of matter is used to explain the behaviour of the particles in all three states.

Kinetic molecular model

1. All matter is composed of tiny particles.
2. The particles are in constant motion.
3. There are empty spaces between the particles.
4. There are forces of attraction and repulsion between the particles.
5. The particles are colliding continuously with one another and the sides of the container. These collisions are all elastic (no kinetic energy is lost during the collisions).
6. At any given time, the speed and kinetic energy of the individual particles will differ, but the average kinetic energy of all the particles will remain constant if the temperature remains constant.