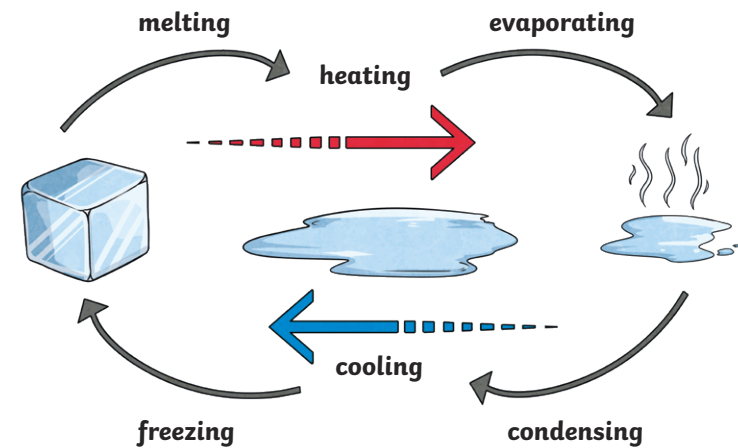


Key Vocabulary Overview	
<b>independent variable</b>	the one thing you change in an investigation
<b>dependent variable</b>	what you measure (or observe) in an investigation
<b>controlled variables</b>	all the things you keep the same in an investigation
<b>states of matter</b>	the states that a material can exist in (solid, liquid or gas)
<b>melting point</b>	the temperature at which a solid substance melts into a liquid
<b>prediction</b>	what you think might happen in an investigation, based on what you already know
<b>method</b>	the specific steps or procedures you will follow to conduct an investigation or experiment
<b>thermal conductor</b>	a material that allows heat to easily travel through it
<b>thermal insulator</b>	a material that does not allow heat to easily travel through it

## States of Matter



## Melting Points

The **melting point** of a solid substance is the temperature at which it melts into a liquid. **Melting points** vary depending on the material that the solid is made of.



## Thermal Conductors and Insulators

Stainless steel will speed up the rate at which food heats, as metals are good **thermal conductors**.

Plastic is a good **thermal insulator**.

A plastic handle can protect hands from burning.



### Generating a Question

Identify the factors that affect the enquiry. Use this knowledge to generate a suitable question for your enquiry.

How does the type of chocolate affect the **melting point**?



How does a chocolate wrapper affect the rate at which chocolate melts?



### Research and Prediction

Conduct research on the topic.

With the evidence gathered from your research and your existing scientific knowledge, **predict** what the outcome of your enquiry might be.

### Type of Enquiry

Since we are looking at the impact of a single factor (variable) on the **melting point** of chocolate or the rate at which chocolate melts, we are conducting a fair test.



### Fair Testing

In order to conduct a fair test, you must:

- consider all of the factors (variables) that may affect the outcome of the investigation and only change one thing based on the chosen enquiry question;
- use scientific equipment correctly to measure the outcome;
- record and present the results of the investigation, taking repeat readings where necessary to identify anomalous results;
- draw conclusions based on the results of the investigation;
- assess the repeatability of our results by evaluating the scientific process.

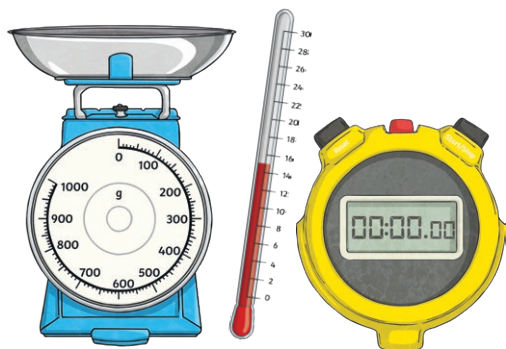
### Variables

In order to conduct a fair test and improve the accuracy of your results, you must identify three things:

independent variable	dependent variable	controlled variables
the factor that you will be changing in the investigation	the factor that you will be measuring or observing in the investigation	the factors that you will be keeping the same in the investigation

### Equipment

Identity what equipment you will need based on your chosen enquiry question. When using scientific measuring equipment, it is important to read the scale correctly.



### Method

Write a set of detailed instructions that explain how you will conduct your investigation. Outline how you will use your equipment to measure the **dependent variable** and how you will control the other variables.

### Repeat Readings

Observe or measure carefully.

Many different variables can affect the results of an investigation and scientists work hard to keep **controlled variables** the same in order to measure correct results.

Scientists often take repeat readings to identify anomalous results.

To take a repeat reading, conduct the investigation multiple times and record the results of each attempt.

I am going to repeat the investigation three times for each type of chocolate.



### Recording Results

You will need to decide how to record your results.

You might choose to record your results in a table or a chart. This may make it easier to analyse your data.

Independent Variable	Dependent Variable: Time Taken to Melt (seconds)			
	Result 1	Result 2	Result 3	Mean Result
white chocolate				
milk chocolate				
dark chocolate				

### Calculating the Mean

Calculating the mean is a way of finding an average within a data set. This can improve reproducibility and lets you see how close your results are to the results you would expect.

### Evaluation

An important part of the enquiry process is the evaluation at the end. This is an opportunity to reflect on the whole process and identify how you could improve your enquiry if it were to be carried out again.

I would use a digital thermometer and digital scales to improve my readings.

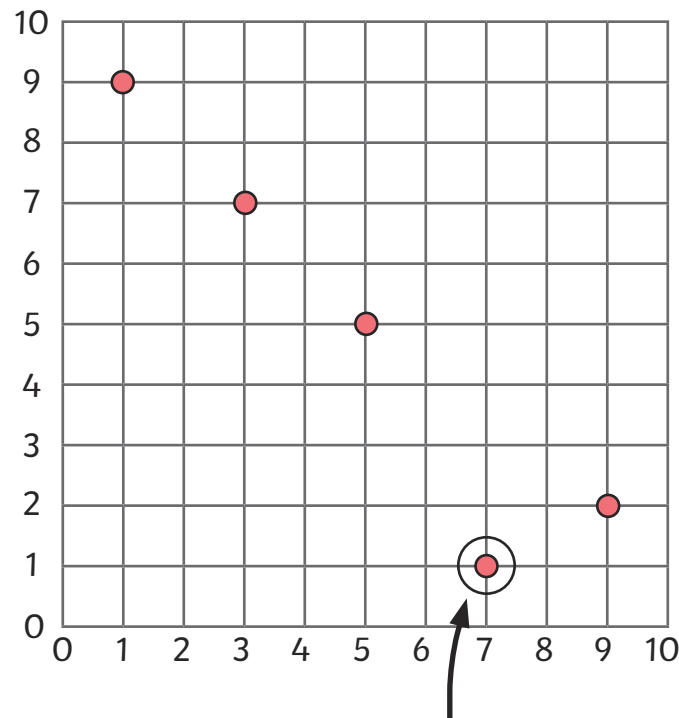


I would carry out more repeat readings to help me to identify anomalous results.



### Anomalous Data

These are results that seem out of the ordinary compared with the rest of your data. When evaluating data, it is important to identify anomalous data and consider what may have caused the result.



This result is anomalous because it does not follow the same pattern as the rest of the data.

### Investigating Further

Now that you have completed your investigation, which factor might you investigate next? What are the variables that would need to be considered?

Could the amount of dairy in different types of chocolate affect the **melting point**?



### Conclusion

An essential part of an investigation is the conclusion. This is where scientists use the analysis of their results to answer their enquiry question.

A strong conclusion will:

- analyse the results;
- use findings to answer the enquiry question;
- use scientific vocabulary correctly.