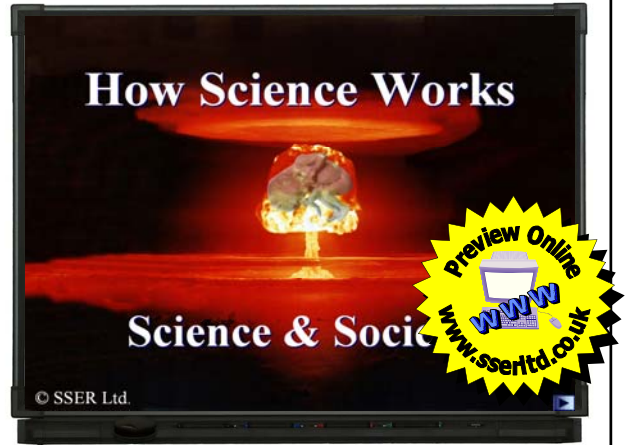




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12 PRESENTATIONS

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14 PRESENTATIONS

Laboratory Safety
KS3
How Science Works

Safety in the Laboratory

Look carefully at this picture of a very unsafe science laboratory. Identify any dangers...



Types of Graph
KS4
How Science Works

Choosing Which Type of Graph to Draw

For each of these tables of data, select the most appropriate graph to use...

Volume of HCl (cm ³)	pH
0	14
5	13.8
10	13.6
15	13.4
20	13.2
25	13.1
30	3.2
35	2.8
40	2.6
45	2.4
50	2.2

How does the pH of drain cleaner change as HCl is added?

- A. Bar Chart
- B. Histogram
- C. Line Graph
- D. Pie Chart
- E. Scatter Graph

Check Answer Reset

Back



KS3 PACK

12 PRESENTATIONS

PROVIDING PLENTY OF INTERACTIVITY AND FEEDBACK WHICH ACTIVELY ENGAGES STUDENTS IN THEIR OWN LEARNING

Presentations in KS3 'How Science Works'	Number of Slides
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KS3 Glossary (MS Word) - Colour & BW Versions supplied.



Making a Prediction
KS3
How Science Works

Decreasing Errors & Increasing Reliability
KS3
How Science Works

Anomalous Results

"An anomalous result is one which appears to be inconsistent with the rest of the data – it stands out."

Anomalous results can occur for a number of reasons such as equipment malfunction or human error.

Consider the set of readings:

5 7 4 4 13 6 5

The 13 stands out as very different from the rest of the readings.

This reading should be ignored in any average calculation, as it is clearly an anomaly.

Using a Measuring Cylinder

Before using a measuring cylinder it is important you know how to use one properly.

- Stand it on a flat surface.

read to the bottom of the meniscus i.e. 46.0

Using a Measuring Cylinder

Complete the volume readings in the spaces below...

What is the volume shown on this measuring cylinder?

cm³

Check Answer Reset

Interactive Diagrams

Selecting & Using Apparatus
KS3
How Science Works

Presenting Data in Tables
KS3
How Science Works

Calculating Means

Calculate the two missing values in the table below, then type in your answers...

Mass of Hydrogen Carbonate Added (g)	Volume of Oxygen Produced (mm ³)			
	Reading 1	Reading 2	Reading 3	Average
0	0.0	0.0	0.0	0.0
1	1.9	2.1	2.0	<input type="text"/>
2	2.0	2.4	2.2	2.2
3	2.6	2.5	2.4	<input type="text"/>
4	2.5	2.6	2.4	2.5

Check Answer Reset

Safety in the Laboratory

Science laboratories also contain many hazards which are clearly identified by hazard symbols.

Drag and drop the hazard symbol to match its meaning...

Interactive Diagrams

Laboratory Safety
KS3
How Science Works

Conducting a Fair Test
KS3
How Science Works

Identifying a Fair Test

For these investigations, identify the experiment which would give a fair test...

An investigation to see if water is needed for seeds to grow, this experiment was set up.

10 seeds Dry cotton wool

Which of the following experiments would make a fair test for this investigation?

	10 seeds on compost	<input type="checkbox"/>
	6 seeds on damp cotton wool	<input type="checkbox"/>
	10 seeds on damp cotton wool	<input checked="" type="checkbox"/>
	10 seeds on dry cotton wool	<input type="checkbox"/>

Correct! Click 'Next' to move on.

Check Answer Reset Next

Reflective Properties - Experiment

Bar Chart to Show the Distance at which Colours Become Visible in a Darkened Room

Colour of Material	Distance (m)
Yellow	4.0
Orange	3.5
Green	3.0
Blue	2.2
Brown	2.0
Black	1.8

Animated Graphs & Charts

Practical Investigations - An Overview
KS3
How Science Works

KS4 PACK

14 PRESENTATIONS

PROVIDING CLEAR EXPLANATIONS OF THE PRINCIPLES OF DESIGNING AND CONDUCTING SCIENTIFIC INVESTIGATIONS

Presentations in KS4 'How Science Works'	Number of Slides
1. Opinions & Evidence	11
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3. Types of Variable	20
4. Conducting a Fair Test	16
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KS4 Glossary (MS Word) - Colour & BW Versions supplied.

The Difference Between Accuracy & Precision

In this animation, the Bull's eye represents the true value of the variable, and the darts represent the measured values. Throw the darts, then drag the labels to the correct place...

Accuracy:

Precision:

Accuracy, Precision & Sensitivity
KS4
How Science Works

Interactive Diagrams

Types of Graph
KS4
How Science Works

Pie Chart

A pie chart is drawn to show how the total frequency is divided between the possible values of categorical, or grouped data. It shows the relative proportions of each value of the variable.

Pie Chart to Show the Heat Loss from a Typical UK House

Walls 25%
Roof 20%
Draughts 15%
Windows 25%

Bar Chart to Show Deaths in Europe Caused by Seven Leading Risk Factors

There is often no natural order for the columns, so it can be helpful to arrange them in order of descending frequency.

Types of Variable

There are many different types of variable. In an experiment, variables can be:

- Independent
- Dependent
- Control

These variables can be further described as:

- Categorical
- Discrete
- Ordered
- Continuous

What's Wrong with These Graphs?

Following graphs. Select the error that has been made in each graph. Answers provided.

Graph 2 - What is wrong with this graph?

- A. No title
- B. Axes not labelled
- C. No scale shown
- D. Independent variable on the y-axis
- E. Wrong scale

Correct - Well Done!

Principles of Graph Drawing
KS4
How Science Works

Animated Graphs & Charts

Interpreting Data & Drawing Conclusions
KS4
How Science Works

Patterns and Relationships

The graph supports the prediction that the growth rate of tomatoes increases as the temperature increases.

A Line Graph to Show How Temperature Affects Tomato Growth

However, it would not be correct to extend the conclusion to higher temperatures, since the plant would die at extreme temperatures.

Scientific Knowledge

Point the cursor to show the scientists' discoveries, then drag the images to the correct place on the timeline...

Newton explained the motion of falling objects by proposing the theory of gravity.

Testable Opinions

Classify statements as testable or not...

Statement	Testable	Untestable
"Jazz music is more enjoyable than jazz music."	<input type="checkbox"/>	<input checked="" type="checkbox"/>
"The weather was last year than it did this year."	<input checked="" type="checkbox"/>	<input type="checkbox"/>
"Today is a nicer day than yesterday."	<input type="checkbox"/>	<input checked="" type="checkbox"/>
"Apples taste better than pears."	<input type="checkbox"/>	<input checked="" type="checkbox"/>
"This torch is better than that one, as it is a nicer colour."	<input type="checkbox"/>	<input checked="" type="checkbox"/>
"The sun is brighter than that one."	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Correct - Well Done!

Opinions & Evidence
KS4
How Science Works

Science & Society
KS4
How Science Works

Issues for Discussion

Click to select a topic then point the cursor to reveal some information.

Destruction of Rainforests

The rainforests are being destroyed by local people, who need the land to grow crops. If you stop the destruction, how are people going to make a living?

Click to select a topic

Presenting Data

Having carried out your investigation, you will need to give thought to how you are going to present the data.

There are a variety of ways to present data and you must select the most appropriate way for the data you have collected.

Identifying Control Variables

The apparatus is used to investigate the effect of glucose concentration on the rate of yeast respiration.

Glucose concentration is the **independent variable**, and the volume of gas produced is the **dependent variable**. Identify the **control variables** that you would need to keep constant during the experiment, to ensure a fair test.

Controls:

Conducting a Fair Test
KS4
How Science Works

Interactive Diagrams

Observation
People notice what is going on in the world around them.
They use their senses of:

- Sight
- Hearing
- Smell

Systematic Error
"Systematic error results from a consistent misapplication of a technique."
Examples of systematic errors:

- A balance was not calibrated properly at the start of an investigation
- Readings on an electronic balance were repeatedly misread
- Using a ruler from the one centimetre line not the zero line

Experimental Safety
What should the students be wearing when they are working with chemicals and a Bunsen flame?
Aprons and lab coats protect you and your school clothes from chemical burns and stains.

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