

Working scientifically – the knowledge of how to gather and analyse evidence

Upper Key Stage 2 National Curriculum statements	In <i>Snap</i> Year 5 lessons children...	In <i>Snap</i> Year 6 lessons children continue to use and develop skills learnt in Year 5 and...
<p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</p>	<ul style="list-style-type: none"> identify independent and dependent variables and use these to generate fair and comparative test questions identify the important variables to control when carrying out a comparative or fair test research secondary sources to find answers to questions justify selection of enquiry type 	<ul style="list-style-type: none"> make planning decisions about where and how to collect information (recognising and controlling variables, deciding what observation or measurements to make over time and for how long, using suitable samples to identify patterns) recognise how secondary sources can be used to answer questions that cannot be answered through practical work ask and write enquiry questions
<p>Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</p>	<ul style="list-style-type: none"> learn to use a force meter measure liquids accurately using measuring cylinders make decisions about whether repeat readings are required to get accurate data 	<ul style="list-style-type: none"> construct data collection tables select measuring equipment to give the most precise results including force meters with a suitable scale, ruler or tape measure, make decisions about whether further research (secondary sources) is required
<p>Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</p>	<ul style="list-style-type: none"> create tables to collect data draw and label line graphs, scatter graphs and bar charts with the variables on the correct axis, choose a suitable scale with equal intervals and plot data correctly draw labelled diagrams of mechanisms and structures 	<ul style="list-style-type: none"> construct and use a range of ways to record and sort data create branching keys with four or more items draw circuit diagrams using recognised symbols

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<p>Using test results to make predictions to set up further comparative and fair tests</p>	<ul style="list-style-type: none"> • use test results gathered or knowledge acquired to make predictions • pose further questions 	<ul style="list-style-type: none"> • recognise when further tests and observations are needed to answer questions
<p>Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations</p>	<ul style="list-style-type: none"> • use data gathered to identify causal relationships • explain how to increase the accuracy and precision of measurements • use key vocabulary accurately and consistently • make decisions about salient and relevant data to present • recognise that there are many different ways to report findings: scales, charts, reports, annotated diagrams, graphs, charts, inventor’s notebooks, multimedia presentations such as website pages and television advertisements • draw valid conclusions from data collected 	<ul style="list-style-type: none"> • analyse scatter graphs • recognise that in a pattern seeking enquiry it is important to have as much data as possible • use scientific language to communicate findings from a range of enquiries in written, oral, dramatic and multimedia presentations • use and evaluate models to represent systems and processes • evaluate methods used, control of variables, precision of measurements, credibility of secondary sources • justify trust in data
<p>Identifying scientific evidence that has been used to support or refute ideas or arguments.</p>	<ul style="list-style-type: none"> • draw upon test data to construct an explanation • use observations and test data to provide evidence to support or refute ideas or arguments 	<ul style="list-style-type: none"> • evaluate limitations of data collected or from secondary sources • explain why scientists do not always agree • differentiate between fact and opinion

Working scientifically – knowledge about science

In upper Key Stage 2 children learn more about the ways that scientists work to build and communicate knowledge. They learn that science is universal and has been carried out throughout history. Children experience at first hand how scientists work through an iterative enquiry process, in which answering one question often leads to another. They learn that scientists design and evaluate enquiries in order to maximise the trustworthiness of their data. Children learn at first hand to use their own growing scientific knowledge to review and question their own ideas and understanding and that of others and to appreciate that over time areas of science can change and develop in response to new evidence.

Blue text indicates key working scientifically vocabulary taught and used in Year 5 and Year 6.

Enquiry types

In *Snap* children use different enquiry types to learn more about the methods scientists use to build scientific knowledge. In all lessons children answer a question to develop their conceptual knowledge and explicitly learn and use working scientifically procedural skills. In some lessons, where appropriate, children complete an enquiry to gather data to answer the question – see list below. The enquiry type is always relevant to the context.

Enquiry types	Year 5	Year 6
Observing over time	Module 3: Earth and space <ul style="list-style-type: none"> 3: How does the position of the Sun in the sky change? Module 4: Plant and animal life cycles <ul style="list-style-type: none"> 7: Do all insects go through the same life cycle? 	Module 1: Classification of living things <ul style="list-style-type: none"> 4: What else is living besides animals and plants?
Identifying and classifying	Module 2: Properties and uses of materials <ul style="list-style-type: none"> 2: Which materials did the builders use when constructing our school and why? Module 4: Life cycles <ul style="list-style-type: none"> 2: Do all plants have the same number of stamen? Module 5: Separating mixtures and changing materials <ul style="list-style-type: none"> 2: What happens when we mix liquids and solids? 	Module 1: Classification of living things <ul style="list-style-type: none"> 6: Who lives here?
Pattern seeking	Module 3: Earth and space <ul style="list-style-type: none"> 6: What patterns can we find in data about the planets? Module 4: Life cycles <ul style="list-style-type: none"> 5: Do all mammals have the same gestation period? 	Module 2: Evolution and inheritance <ul style="list-style-type: none"> 1: How are living things different? Module 6: Body health <ul style="list-style-type: none"> 3: How does physical activity affect heart rate?

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<p>Comparative and fair testing</p>	<p>Module 1: Forces and mechanisms</p> <ul style="list-style-type: none"> 6: How does the length of the lever affect the force needed to lift a load? (fair test) <p>Module 2: Properties and uses of materials</p> <ul style="list-style-type: none"> 3: Which liquid is the thickest? (comparative test) <p>Module 5: Separating mixtures and changing materials</p> <ul style="list-style-type: none"> 3: What makes a difference to how fast sugar or salt dissolves? (comparative test) 6: How much gas can be produced by a non-reversible change? (fair test) 	<p>Module 3: What light does</p> <ul style="list-style-type: none"> 3: What might affect the size of a shadow? (fair test) 4: What affects the size of a shadow? (fair test) 5: How is light reflected? (fair test) <p>Module 5: Electricity: changing circuits</p> <ul style="list-style-type: none"> 2: How can we change a circuit? (comparative test) 3: How can we change the brightness of a lamp? (comparative test) 4: How can we change how other components work? (comparative test)
<p>Research</p>	<p>Module 3: Earth and space</p> <ul style="list-style-type: none"> 1: What's in space? <p>Module 5: Separating mixtures and changing materials</p> <ul style="list-style-type: none"> 4: How can we clean up contaminated water? <p>Module 6: Human growth</p> <ul style="list-style-type: none"> 1: How do newborn babies change into teenagers? 	<p>Module 2: Evolution and inheritance</p> <ul style="list-style-type: none"> 2: How is an organism adapted to live in its habitat? <p>Module 4: Human circulation</p> <ul style="list-style-type: none"> 1: What is blood made of? 4: What are blood vessels and what do they do? <p>Module 6: Body health</p> <ul style="list-style-type: none"> 1: How can we make healthy food choices 2: What can happen if you don't eat a balanced diet?