Key Stage 1

Working scientifically – the knowledge of how to gather and analyse evidence		
Key Stage 1 National Curriculum statements	**In *Snap* Year 1 lessons children…**	**In *Snap* Year 2 lessons children continue to use and develop skills learnt in Year 1 and…**
Asking simple questions and recognising that they can be answered in different ways	• ask questions about what they notice and **observe** in the world around them • show curiosity about **similarities** and **differences** between living things and materials • use what they have noticed or observed to answer questions	• ask questions about how things are similar and different, materials' suitability and how things change • begin to recognise that there are different ways to answer scientific questions, including naming things, sorting them and comparing them
Observing closely, using simple equipment	• make **observations** using all their senses, using context-specific vocabulary to describe them • use **magnifiers** to look more closely • make **comparisons**	• make more systematic observations of features and changes • take **measurements** using non- standard units (string, blocks), and then cm • learn that a **thermometer** is used to measure **temperature**
Performing simple tests	• follow simple instructions to carry out simple comparative **tests** • use practical resources provided, including water droppers	• learn to only change one thing in a **comparative test** to make sure it is **fair** • begin to plan simple tests independently • learn how to set up an **observation over time** enquiry • predict a **result** using prior experience and knowledge
Identifying and classifying	• use sorting hoops to **group** materials and objects using their own and given criteria • use simple ID sheets to **identify** living things	• select their own sorting criteria • use observable features to classify living things using ID cards
Gathering and recording data to help in answering questions	• gather first-hand data from a variety of sources • record their observations in words and labelled pictures (drawn and photos); simple prepared tables and pictograms; block and paper strip **bar charts**	• use prepared tables to classify living things and materials • construct simple bar charts using templates • add labels to **diagrams**

Key Stage 1

Using their observations and ideas to suggest answers to questions	• use simple scientific language to describe their observations and answer questions • use their data to recognise and **rank** differences	• identify **patterns** in their data • use data collected in **enquiries** to inform their answers to questions • begin to develop **explanations** based on evidence collected and previous experience and knowledge

Working scientifically – knowledge about science

In Key Stage 1, children learn that scientists are curious. They make observations of the world around them to build scientific knowledge, looking for similarities and differences between materials and living things to understand more about them and to be able to identify them. Scientists share this knowledge. Children experience at first hand how scientists set up enquiries to test ideas and find out what things are like and how they change. They learn that science enquiries don't always work. They learn that everyone can do science and that science is part of all their lives now and will be in the future.

Blue text indicates key working scientifically vocabulary taught and used in Year 1 and Year 2.

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 1**	**Year 2**
Observing over time	Module 1: Seasonal changes • This module is taught over the year, compiling a diary of how a local environment changes with the seasons – effectively an extended 'observing over time' enquiry.	Module 3: Growing seeds and bulbs • 1: How do plants grow and change over time? • 5: What have we learnt about how a seed germinates? Module 4: Growing up (animals and humans) • 1: How do animals change as they grow?

Key Stage 1

Identifying and classifying	Module 1: Seasonal changes • 1: Are all leaves the same? • 2: Which animals share our space? • 3: Do all trees shed their leaves? • 4: Are all flowers the same? • 5: Which birds visit our bird feeders? • 6: How has our space changed over the year? Module 2: Human body and senses • 3: What can we hear? Module 3: Naming and describing materials • 1 and 2: What material is this? • 4: Is all fabric the same? • 5: How can we group objects made of different materials? Module 4: Properties and uses of materials • 1: Can the same object be made from different materials? • 2: What properties do materials have? Module 5: Animals (vertebrates) • 1: Who's who in the animal (vertebrate) world? • 2: What's so special about birds? Module 6: Identifying plants and their parts • 1: What wild and garden plants can we find around our school?	Module 1: Local habitats • 2: What lives in my tree? • 3: What animals live in this woody habitat? • 4: What animals live in this grassy habitat? • 6: What do the animals that live in the pond eat? Module 3: Growing seeds and bulbs • 2: How are seeds and bulbs different? Module 4: Growing up (animals and humans) • 3: How can we sort food into groups? Module 5: Changing materials • 1: How can I change the shape of an object? • 2: What properties allow a material to be changed? • 3: Which material is fit for purpose?
Pattern seeking	Pattern seeking enquiries require children to collect two sets of data and identify any pattern between them. In Year 1, the focus is on children noticing possible relationships – for example, where most daisies grow, that thinner fabrics are used for summer clothes – not collecting two data sets.	Module 3: Growing seeds and bulbs • 4: How tall will they grow? Module 6: Growing healthy plants • 3: Does temperature affect the growth of mature plants?

Key Stage 1

Comparative testing	Module 3: Naming and describing materials • 3: Is all paper the same? • 4: Is all fabric the same? • 5: How can we group objects made of different materials? Module 4: Using materials • 3: Does it bend or stretch? • 4: Do all materials get wet?	Module 2: Choosing materials • 2: Which ball bounces highest? • 3: Which materials are good for a toddler's play dungarees? Module 3: Growing seeds and bulbs • 3: What do seeds need to germinate? Module 6: Growing healthy plants • 2: Do mature plants need light? • 4: Do mature plants need water?
Research	In Years 1 and 2, the focus is on children gathering data to answer questions 'at first hand', i.e. handling materials and observing real plants and animals. They also use a wide range of sources to gather information, including talking to 'experts', reading non-fiction books and hearing and reading stories. In Year 1 Module 5: Animals (vertebrates) children use high-quality photographs of a wide range of animals to make observations.	

Lower Key Stage 2

Working scientifically – the knowledge of how to gather and analyse evidence		
Lower Key Stage 2 National Curriculum statements	**In *Snap* Year 3 lessons children…**	**In *Snap* Year 4 lessons children continue to use and develop skills learnt in Year 3 and…**
Asking relevant questions and using different types of scientific enquiries to answer them	• suggest questions they could investigate • learn the names of different types of **enquiry** • state what science they did to answer the question	• decide how to gather evidence to answer a scientific question • use a range of question stems • answer questions posed by the teacher identifying the type of enquiry they have used to answer the question
Setting up simple practical enquiries, comparative [and fair] tests (It is a comparative test when a qualitative or categoric variable is changed, for example, the surface a top spins on. This leads to a ranked outcome. It is a fair test when a qualitative or continuous variable is changed, for example, the temperature at which an ice cube melts, leading to identification of a causal relationship. In both only one variable is changed.)	• plan **observing over time enquiries**, making some decisions about what **observations** and/or **measurements** they will need to make and when • plan simple **comparative tests**, making some decisions about what to change and what to measure • make some decisions about which practical resources to use	• use the terms **variable** and **control variable** • use a **fair test** planner to identify variables to change, measure and keep the same to answer a question • plan and carry out a fair test • plan and carry out a comparative test • follow instructions to carry out a **pattern seeking** enquiry

Lower Key Stage 2

Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	• learn to use a **data logger** or **light meter app**, **stopwatch**, weighing scales (digital), rulers • make observations using a **digital microscope** • use standard units for measurements • make systematic and careful observations	• learn to use a thermometer • **use standard units for measurements** • use senses to make detailed observations
Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	• gather **evidence** from a range of sources including first hand observation and experimental **data**, and secondary sources of information, to answer scientific questions • use tally charts	• become more systematic and **accurate** in data collection
Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables	• construct tables • draw labelled **diagrams** with keys • construct simple food chains • use scientific language in writing and orally • make some decisions about how to record observations	• learn to use **branching keys** • learn to draw a **bar chart**, labelling axes and choosing a scale with suitable intervals • use (non-standard) symbols to represent an electrical circuit • **sequence** flow charts • learn to use **Venn and Carroll diagrams** • make detailed observational drawing
Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	• use different ways to report enquiry findings: posters, writing explanatory sentences, labelled diagrams, oral presentation, drama	• begin to make choices about how to report enquiry findings • use appropriate scientific vocabulary consistently and accurately

Lower Key Stage 2

Using results to draw simple conclusions, make predictions for new values, suggest improvements [and raise further questions]	• use prior knowledge or **data** collected in lessons to **predict** outcomes of tests, • use evidence collect in a range of methods and their current knowledge to formulate simple **conclusions**, • begin to **evaluate** effectiveness of tests	• identify a simple **pattern** between two data sets • use test results to propose solutions to problems
Identifying differences, similarities [or changes] related to simple scientific ideas and processes	• identify **differences and similarities** they have observed in data they have collected at first hand or from secondary sources, and relate them to simple scientific ideas and processes they have learned about	• use evidence to generate comparative statements • begin to identify causal relationships • use simple **models** to represent scientific processes
Using straightforward scientific evidence to answer questions or to support their findings	• refer to own data when answering questions	• use data they have collected to answer questions • use scientific knowledge from secondary sources to answer questions

Working scientifically – knowledge about science

In lower Key Stage 2 children learn more about the ways that scientists work to build and communicate knowledge using a range of enquiry types. They learn that scientists make observations; ask questions; and collect, analyse and interpret data to test their ideas. Children experience at first hand the importance of being systematic and accurate when collecting data. They learn that scientists identify links, patterns and relationships between data and that they scientists present and explain their ideas and evidence in different ways, including using models. Children learn that scientific knowledge enables them to make good decisions about how they live and how we can look after our planet.

Blue text indicates key working scientifically vocabulary taught and used in Year 3 and Year 4.

Lower Key Stage 2

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 3**	**Year 4**
Observing over time	Module 5: Flowering plants and plant growth • 2: What do roots and stems do?	Module 1: Changes of state • 2: How is temperature measured? • 4: What are melting and freezing? Module 3: Human impact on the environment • 2: How do materials change over time?
Pattern seeking	Module 3: Forces, friction and magnets • 6: How strong are the magnets?	Pattern seeking enquiries require children to collect two sets of data and identify any pattern between them. They are usually most appropriate to biology contexts where variables cannot be changed, or contexts where data is collected through surveys. In Year 4 children will identify patterns between type of teeth and animals' diet in Module 4; but learning about the digestive system is not an appropriate context for enquiry. Module 3 provides opportunities for follow up survey activities.

Lower Key Stage 2

Comparative anf fair testing	Module 1: Rock, soils and fossils • 2: What are rocks used for? (comparative test) • 4: Which soils hold water? (comparative test) Module 2: Light and shadows • 2: Which object is the most reflective? • 3: How are shadows made? • 5: How can we change the size of a shadow? Module 3: Forces, friction and magnets • 2 How long does a top spin on different surfaces? • 3: How well can an object slide on different surfaces? Module 5: Flowering plants and plant growth • 1: What do leaves do? (comparative test) • 3: What are the functions of the parts of a flowering plant? (comparative test) • 4: What happens if plants do not have enough space? (comparative test)	Module 1: Changes of state • 3: What difference does temperature make to how quickly the ice block melts? (fair test) • 6: What is evaporation and how does it help to get things dry? (fair test) Module 3: Human impact on the environment • 4: How can we prevent micro-plastics from getting into our seas and oceans? (comparative test) • 5: How can we clean up birds affected by an oil spill? (comparative test) Module 5: Sound • 2: How do sounds reach our ears? (comparative test) • 3: How can we change the volume of a sound? (comparative test) • 4: How does the volume of a sound change as we move away from the source? (fair test) • 5: How can we change the pitch of a sound? (comparative test)
Research	Module 1: Rocks, soils and fossils • 5: What is this fossil? Module 5: Flowering plants and plant growth • 5: How are plants different?	Module 4: Movement and nutrition • 6: What do animal teeth tell us? Module 6: Classification of plants and animals • 2: How are vertebrates classified?

Upper Key Stage 2

Working scientifically – the knowledge of how to gather and analyse evidence		
Upper Key Stage 2 National Curriculum statements	**In *Snap* Year 5 lessons children…**	**In *Snap* Year 6 lessons children continue to use and develop skills learnt in Year 5 and…**
Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary	• 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	• 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
Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	• learn to use a force meter • measure liquids **accurately** using measuring cylinders • make decisions about whether **repeat readings** are required to get **accurate data**	• 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
Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	• 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	• 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**

Upper Key Stage 2

Using test results to make predictions to set up further comparative and fair tests	• use test results gathered or knowledge acquired to make **predictions** • pose further questions	• recognise when further tests and observations are needed to answer questions
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	• 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	• 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
Identifying scientific evidence that has been used to support or refute ideas or arguments.	• draw upon test data to construct an **explanation** • use observations and test data to provide **evidence** to **support** or **refute** ideas or arguments	• 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.

Upper Key Stage 2

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 • 3: How does the position of the Sun in the sky change? Module 4: Plant and animal life cycles • 7: Do all insects go through the same life cycle?	Module 1: Classification of living things • 4: What else is living besides animals and plants?
Identifying and classifying	Module 2: Properties and uses of materials • 2: Which materials did the builders use when constructing our school and why? Module 4: Life cycles • 2: Do all plants have the same number of stamen? Module 5: Separating mixtures and changing materials • 2: What happens when we mix liquids and solids?	Module 1: Classification of living things • 6: Who lives here?
Pattern seeking	Module 3: Earth and space • 6: What patterns can we find in data about the planets? Module 4: Life cycles • 5: Do all mammals have the same gestation period?	Module 2: Evolution and inheritance • 1: How are living things different? Module 6: Body health • 3: How does physical activity affect heart rate?

Upper Key Stage 2

Comparative anf fair testing	Module 1: Forces and mechanisms • 6: How does the length of the lever affect the force needed to lift a load? (fair test) Module 2: Properties and uses of materials • 3: Which liquid is the thickest? (comparative test) Module 5: Separating mixtures and changing materials • 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)	Module 3: What light does • 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) Module 5: Electricity: changing circuits • 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)
Research	Module 3: Earth and space • 1: What's in space? Module 5: Separating mixtures and changing materials • 4: How can we clean up contaminated water? Module 6: Human growth • 1: How do newborn babies change into teenagers?	Module 2: Evolution and inheritance • 2: How is an organism adapted to live in its habitat? Module 4: Human circulation • 1: What is blood made of? • 4 What are blood vessels and what do they do? Module 6: Body health • 1: How can we make healthy food choices • 2: What can happen if you don't eat a balanced diet?