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

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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

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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.

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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.

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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?