






**Year 3 Progression & Coverage Science**

**Working Scientifically in KS2 - Years 3 - 6**

	<b>What pupils should know and be able to do Lower KS2</b>	<b>Key vocabulary Lower KS2</b>	<b>What pupils should know and be able to do Upper KS2</b>	<b>Key vocabulary Upper KS2</b>
	<p>Identifying means to recognise something. Pupils learn that living and non-living things can be sorted according to their differences (classifying) They can then group things according to similarities and differences. These are called criteria. Pupils record classifications using Venn and Carroll diagrams and tables.</p>	<p>differences, similarities, classify, diagram, chart, key, Carroll Diagram, Venn Diagram, behaviour, properties, criteria,</p>	<p>Identifying means to recognise something. Pupils learn that living and non-living things can be sorted according to their differences (classifying) They can then group things according to similarities and differences. These are called criteria. Pupils record classifications using Venn and Carroll diagrams and tables. Pupils use classification keys to group according to criteria.</p>	<p>differences, similarities, classify, diagram, chart, key, Carroll Diagram, Venn Diagram, behaviour, properties, criteria, classification key</p>
	<p>A systematic observation is a way scientists observe repeatedly with a clear purpose. Pupils need to know that they can use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements, using a range of equipment, including thermometers and data loggers. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings)</p>	<p>systematic, notice, patterns, observations, careful, accurate, evidence, increase, decrease, predict, conclude, relationships, appearance, unit measurements</p>	<p>Pupils must know how to select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value)</p>	<p>systematic, notice, patterns, observations, careful, accurate, evidence, increase, decrease, predict, conclude, relationships, appearance, unit measurements (force, mm, cm, mins, seconds)</p>
	<p>In a scientific test, scientists make predictions and hypotheses. A prediction is what they think the outcomes might be, and a hypothesis is an explanation of phenomena. In simple comparative tests children compare one event with another and identify different outcomes. A variable is something that can change. In order to demonstrate a causal relationship between two variables children carry out a fair test. For a fair test, they identify a variable that can be changed and measured while keeping the other variables the same.</p> <p>In investigations, <b>conclusions</b> summarize how your results support or contradict your original prediction and help to form a hypothesis.</p> <p>Pupils learn to recognise when a simple fair test is necessary and help to decide how to set it up. They learn to think of more than one variable factor. They recognise when a simple comparative test is necessary and help to decide how to set it up.</p>	<p>cause, effect, enquiry, fair test, comparative test, variable factor, record, measure, prediction, conclusion, evidence, hypothesis, phenomena.</p>	<p>The children show they know how to select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. During an enquiry, they assimilate other scientific processes into their learning. They make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value). They evaluate their findings, suggest improvements to their methods and form hypotheses.</p>	<p>Control, relationships, reliability, accuracy, interpret, justify, prove, Question/Enquiry, Method, Variables, Prediction, Results, Conclusion, Evaluation</p>

	<p>Children begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.</p> <p>With help, children can look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. Children can say what they found out, linking cause and effect.</p>	<p>patterns, relationships, cause, effect, data, changes, similarities, differences, predict, question, observations, conclude,</p>	<p>Pupils learn how to identify causal relationships and patterns in the natural world from their evidence; make simple conclusions, make predictions for new values, suggest improvements and raise further questions. They draw conclusions based on their evidence and current subject knowledge. They identify results that do not fit the overall pattern; and explain their findings using their subject knowledge (anomalies)</p>	<p>causal, interpret, data, graphs and charts, anomaly, atypical, typical, impact</p>
	<p>Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations</p>	<p>secondary source, reliability, fact, interpretation</p>	<p>Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations</p>	<p>secondary source, reliability, fact, interpretation</p>

### Scientific Knowledge Year 3

Topic Title (Threshold Concept)	Forces & Magnets (Forces and Magnets)	Animals Including Humans (Animals and Humans)	Rocks (Substances and Properties)	Plants (Plant Life)	Light (Light and Seeing)
NC Reference	Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing.	Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food - they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Recognise that they need light in order to see things, and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change
Prior knowledge	The shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (y2)	Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. ( Y2)	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses ( y2)	Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy ( y2)	Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. Describe the simple physical properties of a variety of everyday materials, transparent and opaque.
Sticky knowledge	A force is a <b>push or a pull</b> . When an object moves on a surface, the texture of the surface and the object affect how it moves. Forces act in <b>opposite directions</b> to each other. When an object moves across a surface, <b>friction</b> acts as an <b>opposite force</b> . A magnet	Animals, unlike plants which can make their own food, need to eat in order to get the <b>nutrients</b> they need. Food contains a range of different nutrients - <b>carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water - and fibre</b> that are needed by the body to stay healthy. A	There are three types of rocks that are formed naturally. <b>Igneous: Sedimentary and Metamorphic:</b> Some rocks can absorb water. Some rocks contain fossils. <b>Fossils</b> were formed millions of	Many plants, but not all, have <b>roots, stems/trunks, leaves and flowers/blossom</b> . The roots absorb water and <b>nutrients</b> from the soil and <b>anchor</b> the plant in place. The stem transports water and <b>nutrients/minerals</b> around	We see objects because our eyes can sense <b>light</b> . <b>Dark</b> is the <b>absence of light</b> . We cannot see anything in complete darkness. Some objects are sources of light. Objects are easier to see if there is more light. Some surfaces <b>reflect</b>

	<p>attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are <b>magnetic</b>. The strongest parts of a magnet are the <b>poles</b>. Magnets have two poles - a <b>north pole and a south pole</b>. If two like poles, e.g. two north poles, are brought together they will push away from each other - <b>repel</b>. If two unlike poles, e.g. a north and south, are brought together they will pull together - <b>attract</b>. The distance around a magnet which attracts magnetic materials is called its <b>magnetic field</b>.</p>	<p>piece of food will often provide a range of nutrients. Humans, and some other animals, have <b>skeletons and muscles</b> which help them move and provide protection and support. There are 5 types of <b>vertebrate</b> ( animals with backbone: <b>mammals ,fish, reptiles, amphibians, birds</b>)</p>	<p>years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. <b>Soils</b> are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter).</p>	<p>the plant and holds the leaves and flowers up in the air to enhance <b>photosynthesis, pollination and seed dispersal</b>. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to <b>reproduce</b>. Pollen is transferred to the <b>female</b> part of other flowers (<b>pollination</b>). This forms seeds, sometimes contained in <b>berries or fruits</b> which are then dispersed in different ways.</p>	<p>light. Objects are easier to see when there is less light if they are <b>reflective</b>. The light from the sun can damage our eyes and therefore we should not look directly at the sun. <b>Shadows</b> are formed on a surface when an <b>opaque</b> or <b>translucent</b> object is between a <b>light source</b> and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface. Define: <b>transparent, translucent and opaque</b></p>
<p><b>Working scientifically</b>  (These are suggested WS areas that complement unit - also refer to and highlight WS milestones as cover and ensure all covered over year/phase)</p>	<p><b><u>Identify, classify and group</u></b>  Identify magnetic and non-magnetic materials</p> <p><b><u>Pattern Seeking</u></b>  Explore the way that magnets behave in relation to each other.</p> <p><b><u>Comparative and fair testing</u></b>  Carry out investigations to explore how objects move on different surfaces e.g., rolling balls/cars.</p> <p>Devise an investigation to test the size of a magnetic field.</p>	<p><b><u>Identify, classify and group</u></b>  Compare, contrast and classify skeletons of different animals.</p> <p>Classify food according to food group and nutrients.</p> <p>Identify the impact of a lack of nutrients on human health</p> <p>Identify which bones are used for support, protection and movement. Identify how muscles expand and contract for movement.</p>	<p><b><u>Identify, classify and group</u></b>  Classify rocks according to simple physical properties , create a key</p> <p>Identify types of fossils</p> <p><b><u>Observing change over time</u></b>  Observe and describe the effects of weathering on different rocks</p> <p><b><u>Comparative and fair testing</u></b>  Devise a test to find out if all rocks are waterproof</p> <p>Investigate and test different kinds of soils to see how quickly water drains through</p>	<p><b><u>Identify, classify and group</u></b>  Identify common features of flowers, name and label them</p> <p>Identify pollen in flowers observe pollination by insects in flowers in school grounds</p> <p><b><u>Observing change over time</u></b>  Observe the effect of putting cut white carnations or celery in coloured water.</p> <p><b><u>Comparative and fair testing</u></b>  Investigate how removal of leaves/ light/ soil/ roots affects a growing plant. Devise a fair test.</p> <p><b><u>Secondary sources</u></b>  Research different types of seed dispersal</p>	<p><b><u>Identify, classify and group</u></b>  Classify materials according to how reflective they are</p> <p><b><u>Pattern Seeking</u></b>  Explore how shadows vary as the distance between a light source and an object or surface is changed.</p> <p>Explore shadows in the playground at different times of day- explain why they are different</p> <p><b><u>Comparative and fair testing</u></b>  Investigate best materials to make shadow puppets</p> <p><b><u>Secondary sources</u></b>  Research how sunglasses filter UV light from the sun</p>
<p>End of unit task</p>	<p><b>Investigate movement, forces and magnets</b> Is a bigger magnet stronger? Investigate and conclude.</p>	<p><b>Animals and humans</b> Identify and describe the main nutritional benefits of carbohydrates, fibres, fats, proteins Explain the impact of diet on human health and some of the effects of a poor diet and malnutrition</p>	<p><b>Investigate fossils</b> Explain how a given fossil was formed -storyboard and explain the journey</p>	<p><b>Investigate important changes in our environment</b> Research why bees are important and what we need to do to save them. Write an explanation of pollination and its importance.</p>	<p><b>Understand light and seeing</b> Explain investigation findings about how and why the size of shadows changes.</p>