Science Skills, Knowledge and Vocabulary Progression - Key Stage 2

Lower Key Stage 2 – Year 3 and 4 Disciplinary Knowledge	Upper Key Stage 2 – Year 5 and 6 Disciplinary Knowledge
I can ask relevant questions and use different types of scientific enquiries to answer them • consider their prior knowledge when asking questions; answer questions posed by the teacher; decide for themselves how to gather evidence to answer the question; recognise when secondary sources can be used to answer questions that cannot be answered through practical work; identify the type of enquiry that they have chosen to answer their question. **I can make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers** • make systematic and careful observations. • use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. **I can set up simple practical enquiries, comparative and fair tests** • select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.•follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking. **I can gather, record, classify and present data in a variety of ways to help in answering questions I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables** • sometimes decide how to record and present evidence; record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing; record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings); record classifications e.g. using tables, Venn diagrams, Carroll diagrams. • supported to present the same data in different ways in order to help with answering the question **I can use straightforward scientific evidence to answer questions or to support findings** • answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence. **I can identify differences, similarities or changes related to simple scientific ideas and processes** • interpret their data to generate simple comparative statements based on their evidence • begin to identify naturally occurring patterns and causal relationships. **I can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** • draw conclusions based on their evidence and current subject knowledge. • identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry. • use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface • ask further questions which can be answered by extending the same enquiry **I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions** • communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.	**I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** • ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry • decide for themselves how to gather evidence to answer a scientific question; choose a type of enquiry to carry out and justify their choice; recognise how secondary sources can be used to answer questions that cannot be answered through practical work. **I can take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate** • select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. • 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). **I can plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary** • The children select from a range of practical resources to gather evidence to answer their questions; carry out fair tests, recognising and controlling variables; decide what observations or measurements to make over time and for how long; look for patterns and relationships using a suitable sample. **I can record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs** • decide how to record and present evidence; record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing; record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs; record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. • present the same data in different ways in order to help with answering the question. **I can identify scientific evidence that has been used to support or refute ideas or arguments** • answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer • talk about how their scientific ideas change due to new evidence that they have gathered; talk about how new discoveries change scientific understanding. **I can report and present 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** • identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge; the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used • identify any limitations that reduce the trust they have in their data. •communicate their findings to an audience using relevant scientific language and illustrations • use test results to make predictions to set up further comparative and fair tests • use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests.

Year 3 and Year 4 Disciplinary Knowledge – Vocabulary	Year 5 and Year 6 Disciplinary Knowledge - Vocabulary
practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve	variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter

Year 3 Plants Substantive Knowledge	Year 4 Living things and their habitat Substantive Knowledge	Year 5 Living things and their habitat Substantive Knowledge	Year 6 Livings things and their habitat Substantive Knowledge
• I can identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. • I can 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. • I can investigate the way in which water is transported within plants. • I can explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	• I can recognise that living things can be grouped in a variety of ways • I can explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • Recognise that environments can change and that this can sometimes pose dangers and have an impact on living things	• I can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. • I can describe the life process of reproduction in some plants and animals. (See RSE Policy)	• I can describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • I can give reasons for classifying plants and animals based on specific characteristics. • I can describe the life process of reproduction in some plants and animals. (From Year 5 RSE Policy)
Year 3 Plants Vocabulary	**Year 4 Living things and their habitat Vocabulary**	**Year 5 Living things and their habitat Vocabulary**	**Year 6 Livings things and their habitat Vocabulary**
photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport	classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate herbivore, carnivore, omnivore, producer, predator, prey (Y4 - Animals, including humans)	life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, cuttings	vertebrates, fish, amphibians, reptiles, birds, mammals, warm-blooded, cold-blooded, invertebrates, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers

Year 3 **Animals including Humans** **Substantive Knowledge**	**Year 4** **Animals including Humans** **Substantive Knowledge**	**Year 5** **Animals including Humans** **Substantive Knowledge**	**Year 6** **Animals including Humans** **Substantive Knowledge**
• I can 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. • I can identify that humans and some other animals have skeletons and muscles for support, protection and movement.	• I can describe the simple functions of the basic parts of the digestive system in humans. • I can identify the different types of teeth in humans and their simple functions. • I can construct and interpret a variety of food chains, identifying producers, predators and prey.	• I can describe the changes as humans develop to old age.	• I can identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • I can recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. • I can describe the ways in which nutrients and water are transported within animals, including humans.
Year 3 **Animals including Humans** **Vocabulary**	**Year 4** **Animals including Humans** **Vocabulary**	**Year 5** **Animals including Humans** **Vocabulary**	**Year 6** **Animals including Humans** **Vocabulary**
nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine	digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, incisor, canine, molar, premolar, herbivore, carnivore, omnivore, producer, predator, prey	puberty, *the vocabulary to describe sexual characteristics in line with the school's RSE policy*	heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, cycle, circulatory system, diet, drugs, lifestyle

Year 3	Year 4	Year 5 Earth and Space Substantive Knowledge	Year 6 Evolution and Inheritance Substantive Knowledge
		Earth and Space • I can describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • I can describe the movement of the Moon relative to the Earth. • I can describe the Sun, Earth and Moon as approximately spherical bodies. • I can use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	**Evolution and Inheritance** • I can recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • I can recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • I can identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
Year 3	**Year 4**	**Year 5 Earth and Space Vocabulary**	**Year 6 Evolution and Inheritance Vocabulary**
		Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit	offspring, sexual reproduction, vary, characteristics, adapted, inherited, species, evolve, evolution

Year 3 Rocks Substantive Knowledge	Year 4 Materials Substantive Knowledge	Year 5 Materials Substantive Knowledge	Year 6
Rocks • I can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • I can describe in simple terms how fossils are formed when things that have lived are trapped within rock. • I can recognise that soils are made from rocks and organic matter.	**Materials** • I can compare and group materials together, according to whether they are solids, liquids or gases. • I can observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). • I can identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Materials** • I can compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • I can name some materials that will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • I can use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • I can give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • I can demonstrate that dissolving, mixing and changes of state are reversible changes. • I can explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	

Year 3 Rocks Vocabulary	Year 4 Materials Vocabulary	Year 5 Materials Vocabulary	Year 6
rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorbs water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, types of soil (e.g. peaty, sandy, chalky, clay)	solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle	thermal insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material	

Year 3 **Light** **Substantive Knowledge**	**Year 4** **Sound** **Substantive Knowledge**	**Year 5**	**Year 6** **Light** **Substantive Knowledge**
• I can recognise that they need light in order to see things and that dark is the absence of light. • I can notice that light is reflected from surfaces. • I can recognise that light from the sun can be dangerous and that there are ways to protect their eyes. • I can recognise that shadows are formed when the light from a light source is blocked by a solid object. • I can find patterns in the way that the size of shadows change.	• I can identify how sounds are made, associating some of them with something vibrating. • I can recognise that vibrations from sounds travel through a medium to the ear. • I can find patterns between the pitch of a sound and features of the object that produced it. • I can find patterns between the volume of a sound and the strength of the vibrations that produced it. • I can recognise that sounds get fainter as the distance from the sound source increases.		• I can recognise that light appears to travel in straight lines. • I can use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. • I can explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • I can use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
Year 3 **Light** **Vocabulary**	**Year 4** **Sound** **Vocabulary**	**Year 5**	**Year 6** **Light** **Vocabulary**
light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous	sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, quiet, loud, insulation		straight lines, light rays

Year 3 Forces Substantive Knowledge	Year 4 Electricity Substantive Knowledge	Year 5 Forces and Magnets Substantive Knowledge	Year 6 Electricity Substantive Knowledge
• I can compare how things move on different surfaces. • I can notice that some forces need contact between two objects, but magnetic forces can act at a distance. • I can observe how magnets attract or repel each other and attract some materials and not others. • I can 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. • I can describe magnets as having two poles. • I can predict whether two magnets will attract or repel each other, depending on which poles are facing.	• I can identify common appliances that run on electricity. • I can construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • I can identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. • I can recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • I can recognise some common conductors and insulators, and associate metals with being good conductors.	• I can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces. • I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	• I can associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • I can compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • I can use recognised symbols when representing a simple circuit in a diagram.
Year 3 Forces Vocabulary	**Year 4 Electricity Vocabulary**	**Year 5 Forces and Magnets Vocabulary**	**Year 6 Electricity Vocabulary**
force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol	force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	circuit diagram, circuit symbol, voltage