

Key Stage 2 Science Knowledge progression.



	Concept	Year 3	Year 4	Year 5	Year 6
Biology	Working scientifically	- Decide on the most appropriate type of scientific enquiry they might use to answer questions. - Understand and recognise when a simple fair test is necessary. - Help to set up a fair test. - Identify criteria for grouping, classifying and sorting. - Use simple keys. - Look for naturally occurring patterns and relationships. - Decide what data to collect. - Decide what observation to make, including duration and equipment needed. - Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. - Think of a question to investigate. - Make a simple predict about what will happen in an investigation. - Plan what to do to set up an investigation. - Set up an investigation carefully. - Describe what they have observed. - Explain whether my prediction was correct. - Explain my results using scientific language.	- Ask relevant questions - Report on findings from enquiries - Record findings using simple scientific language & tables - Set up simple practical enquiries, comparative and fair tests - Make accurate measurements using a range of equipment, for example data loggers - Record findings using simple scientific language and drawings - Use results to draw simple conclusions and suggest improvements and predictions for setting up further tests - Set up simple practical enquiries, comparative and fair tests - Record findings using labelled diagrams - Report on findings - Use results to draw simple conclusions and suggest improvements and predictions for setting up further tests - Sort and describe materials into solids, liquids and gases. - To make systematic, careful and accurate observations and measurements and report on findings from enquiries	- Observe and compare within a variety of units. - Identifying scientific evidence that has been used to support or refute ideas or arguments - Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary - Take measurements, using a range of scientific equipment, with increasing accuracy and precision - Record results using scientific diagrams and labels, tables, bar and line graphs. - Reporting and presenting findings - Report findings from enquiries. - Use results to make predictions and set up further enquiries - Use Force meters. - To plan and carry out a fair test - Present findings in a bar graph. - Set up further comparative and fair tests	- Raising own questions. - Select an appropriate scientific enquiry. - Plan an investigation in detail. - Decide which variables to control. - Explain variations in component function. - Use my plan to conduct an investigation. - Adjust my plan if necessary. - Decide how to record my findings as data. - Decide how to report my findings appropriately. - Use my results to make new predictions. - Plan and conduct a further investigation. - Use classification systems and keys to identify some animals and plants. - Exploring the work of scientist and research about the relationship between diet, exercise, drugs, lifestyle and health. - Comparing living and non-living things against a criteria or developing their own criteria. - Write an hypotheses. - Identify independent, dependent and controlled variables. - Record results on a line graph. - Create own tables to record results. - Draw scientific diagrams.

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	Understand Plants	Taken from flip charts and lesson plans. • Name and label the following parts of plants: flower, stem, roots, leaves. • To understand the role of flowers, stem, roots and leaves. • Think about what plants need to grow well. • Understand and explanation pollination. • In order for plants to produce more flowers the plant needs to be pollinated. • Petals attract insects to the plant. • Plants have female and male parts. • Stigma is the female part of the flower and receives pollen from insect. • The style and ovary are also female parts of the flower. • Ovary is located at the base of the flower. • The female parts of the flower make the seeds. • The filament is the male part of the flower. • The anther and stamen are also male parts of the flower. • The anther and filament make pollen. • Sepal protects the bud • Pollination happens when pollen, produced by the stamen reaches the stigma • Understand what cross pollination is. • Insect help with cross pollination. • Seeds can be dispersed by: wind, bursting, shaking, water, via animal and dropping or falling from the plant.			
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	Understand animals and humans	- Name the 5 major food groups. - Explain how animals, including humans, obtain food. - Understand the difference between how plants and animals obtain food. - Explain the difference between food groups and types of nutrients. - Explain what types of nutrients humans need. - Understand that movable joints connect bones. - Many animals have skeletons to support their bodies and protect vital organs. - Identify that humans and some other animals have skeletons and muscles for support, protection and movement	- Digestion – the act of softening & changing food so that the body can absorb it to use for energy & growth. - To identify and label the parts of the digestive system: mouth, esophagus, pancreas, liver, large intestine, stomach, anus, small intestine. - Adults have 32 teeth and children have 20 - Identify, name and know the function of: incisors, canines, molars and wisdom teeth. - To know the meaning of omnivores, herbivores and carnivores and identify animals which can be grouped in this way. - Identify parts of the tooth: crown, enamel, root, gums, pulp, nerve and dentine. - Know how to maintain good oral hygiene. - Interpret a variety of food chains. - Understand the terms: predator, prey, primary consumer and secondary consumer and how this within a food chain.	- Understand the terms: babyhood, childhood, adolescence (teenager) and adulthood. - Identify various age milestones. - Identify the stages of the human life cycle. - Know the physical changes that happen during puberty. - Understand the need for good personal hygiene. - Describe some special ceremonies held in some cultures to mark puberty. - Understand the ‘feelings’ associated with puberty. - Know where to get help with problems.	- Identify and label: brain, heart, lungs, stomach, spleen, kidneys, large and small intestine, bladder, appendix, pancreas, gallbladder, liver and esophagus. - Identify and know the purpose of the skeleton, muscular and circulatory system. - Location of the human heart. - Know that the heart pumps oxygenated blood around the body and deoxygenated blood to the lungs. - Label the following parts of the human heart: pulmonic valve, pulmonary artery (left and right), pulmonary veins (left and right), left and right atrium, left and right ventricle, inferior and superior vena cava, aortic valve. - To know that blood travels through the body in arteries, capillaries and veins. - To know that blood contains plasma and this made up of water and protein. - To know the function of: red and white blood cells, plasma and platelets. - To know that blood: carries nutrients, gives oxygen to the body, fights infections and helps the body to heal. - Understand the meaning of the double circulatory system. - Identify and label the: diaphragm, trachea, bronchiole, air sacs (alveoli), bronchus, intercostal muscles and ribs. - Know the purpose of the lungs is to: breath in oxygen, breath out carbon dioxide and to oxygenate blood. - To know the function of the alveoli. - To explain what happens when we breath in and out. - Explain how the digestive system breaks down nutrients. - Identify foods from the five main food groups.
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					• Know the function of the 5 main food groups. • To know what happens to: carbohydrates, proteins, fats, minerals, vitamins, fibre and water when we eat foods. • To understand how the body absorbs nutrients. • To understand how the body excretes waste products. Non statutory • To know what parts of the body can be affected by drugs, alcohol and smoking. • To know the effect legal drugs and prescribed drugs can have on the body. • Cigarettes contain nicotine and this can be a harmful and addictive substance. • To understand how smoking can affect the heart and lungs.
Investigate living things		• Explain the characteristics of living things (Mrs Nerg) • Understand what a habitat is. • Identify local habitats. • Describe different local habitats. • Group and classify a variety of animals. • Understand, use and write branching databases/dichotomous keys. • Understand the term and impact of Urbanisation. • Understand what extinction and endangered means.	• Identify, label and understand the function of stem, leaf, root, petal, stigma, style, ovary, ovule, receptacle, sepal, filament, anther and pollen. • Understand and identify mammals, amphibians, insects, birds and plants. • Understand the life cycle of a plant including: germination, pollination, fertilisation and seed dispersal. • Identify the difference in the life cycles of: mammals, amphibians, insects, birds and plants. • Understand the role of naturalists and behaviourists.	Taken from flip charts and lesson plans. • Sort and group animals based on their features. • Give reasons for the way they have classified animals. •	

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	Understand evolution and inheritance			• Understand the term inheritance and inherited characteristics. • Identify inherited characteristic that are passed on from parent to offspring. • Explain how inherited characteristics can lead to variation. • Understand the term adaptation. • Understand that adaptations are mutations. • Identify adaptive traits. • Understand the term evolution. • Demonstrate understanding of how ideas about evolution developed over time. • Explain the terms adaptation, evolution and natural selection. • Examine fossil evidence. • Explain how a living thing has evolved over time. • Identify adaptive traits in humans as a species. • Describe the known stages of human evolution. • Compare modern humans with members of the same genus and family.
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Chemistry	Investigate materials	• Name the three different types of rocks. • Explain the difference between natural and man-made rocks. • Use the appearance of rocks to group and compare them. • Name the different types of rocks. • Identify features of different rocks. • Group rocks by specific criteria. • Handle and examine rocks carefully. • Explain the difference between a bone and a fossil. • Order the steps of how a fossil is formed. • Explain that soil is composed of different things. • Describe the 4 processes of soil formation.	• Sort materials into solids, liquids or gases. • Describe the properties of solids, liquids and gases. • Show the difference between the particles in solids, liquids and gases. • Identify solids, liquids and gases. • Explain some uses of gases. • Investigate the weight of a gas. • Understand how heat can cause solids to change to liquids and vice versa. • Identify materials that melt at different temperatures. • Investigate the melting and freezing temperature of a material. • Identify the different states water can be in. • Identify the temperatures at which water changes state. • Identify and observe the processes that cause water to change state.	• Sort given materials into solids, liquids and gases – recap. • Know the properties of solids, liquids and gases – recap. • Understand that the properties of a gas can change in different conditions. • Understand that air is matter and is everywhere. • Understand that air fills spaces between and within solids. • Understand that the effects of moving air show that air is matter. • Understand that many gases have uses in everyday life. • Understand that gases can have useful or damaging effects.	
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Physics	Understand movement, forces and magnets	• Notice that some forces need contact between two objects by identify the different types of forces acting on objects. • Compare and explain how things move on different surfaces. • Notice and sort that magnetic forces can act at a distance and attract some materials and not others. • Compare and group materials according to whether they are magnetic. • Observe how magnets attract or repel each other and attract some materials and not others. • Describe magnets as having two poles and to predict whether two magnets will attract or repel each other depending on which poles are facing. • To observe how magnets attract or repel each other and attract some materials and not others.		• Understand that when objects move through air and water they have to push it out of the way. • Water and air push back with forces called water resistance and air resistance. • The harder it is to push the material out of the way the greater the resistance. • Gases weigh less than liquids and so water resistance is greater than air resistance. • Friction is a force against motion caused by two surfaces rubbing against each other. • Friction occurs because no surfaces are perfectly smooth; they have bumps and undulations that can interlock when placed on top of each other. • To move one interlocking surface over another one of three things must happen: The surfaces must rise slightly The bumps on the surface must bend The bumps on the surface must break All of these actions requires a force, this is what causes friction • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move.	
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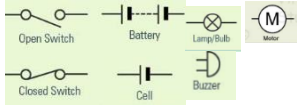
	Understand light and seeing	• Light travels in straight lines. • Identify sources of light. • Explain how light is needed to see things. • Darkness is the absence of light. • Know that the Earth turns to create day and night. • Light is reflected off of objects which is how we see them. • Reflective materials reflect the light that lands on them, but there has to be a source of light shining on them for them to be seen. • Fluorescent materials reflect UV light (which we can't see) as visible light that we can see when it enters our eyes. • Understand that a mirror reflects light. • Looking directly at the sun is dangerous and will hurt their eyes. • A shadow is a dark area or shape caused by a solid object blocking the rays of light from a light source. • Shadows change due to the Earth spinning. • Understand the terms: translucent, opaque and transparent.			• Demonstrate that light travels in a straight line. • Create a model to show how light travels from a light source to our eyes, or to an object and then our eyes. • Explain how we see things. • Understand how light is refracted. • Understand the way refraction alters the direction of light. • Measure the angles of incidence and reflection. • Use understanding of reflection to create a working periscope. • Explain how the periscope allows me to see objects I would not usually be able to see. • Explain what Isaac Newton discovered about colour. • Investigate and understand how light enables us to see colours. • Understand how a prism affects a ray of light. • Explain what this tells us about the visible spectrum. • Make my own colour wheel and explain what it shows about light. • Explain how a shadow is formed. • Explain why shadows are the same shape as the object that casts them.
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	Investigate sound and hearing		• Recognise how sounds are made, associating some of them with something vibrating • Recognise that sounds get fainter as the distance from the sound source increases • Explain how some musical instruments make sounds • Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Explain that sounds travel through gases, liquids and solids. • Understand that we hear because sound waves (vibrations) enter our ears. • Explain why we see lightning before we hear thunder. • Suggest ways to help deaf people communicate. • Find patterns between the pitch of a sound and features of the object that produced it • Find patterns between the volume of a sound and the strength of the vibrations that produced it		
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	Understand electrical circuits		- Identify hazards and dangers associated with electricity. - Identify items which use electricity as a source of power. - Know that a circuit is a path that allows electricity to pass through it. - For electricity to pass through, the circuit must be a complete loop. - Understand that electricity flow from the negative terminal of the battery. - Recognise and use the following symbols:  - Understand and use the terms conductor and insulator. - Understand that a switch can be used to complete or break a circuit.		- Identify how our understanding of electricity has changed over time. - Explain how major discoveries affected our understanding and use of electricity. - Know the scientific symbols for the main parts of a circuit. - Create circuit diagrams using scientific symbols. - Understand the term voltage - Draw circuit diagrams indicating the voltage. - Explain the effect of increasing or decreasing the voltage on different parts of a circuit.
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	Understand the Earth's movement in space			• Describing the Sun, Earth and Moon as approximately spherical bodies by understanding how this knowledge has been attained. • Explain why we know the Sun, Earth and Moon are spherical. • Identifying scientific evidence that has been used to support or refute ideas or arguments in the context of how ideas changed from a flat earth view. • Identify scientific evidence which does or does not provide evidence for an idea or argument. • Name the planets in the solar system. • Describe some features of the planets. • Place the planets in the solar system in the correct order. • Explain how the planets orbit the Sun. • Distinguish between heliocentric and geocentric ideas of planetary movement. • Explain theories of planetary movement in the solar system using evidence. • Explain that day and night is due to rotation of the Earth. • Explain that the Moon orbits the Earth not the Sun. • Explain how the Moon moves relative to the Earth. • Explain how the Earth and Moon move relative to the Sun.	
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