



Science – Key Skills and Knowledge

Working scientifically

LKS2	To ask scientific questions	To plan an enquiry	To observe closely	To take measurements	To gather/record results	To present results	To interpret results	To draw conclusions	To make a prediction	To evaluate an enquiry
Classifying	Be able to ask a range of Yes/No questions to aid sorting.	Be able to put appropriate headings onto intersecting Venn and Carroll diagrams.	Be able to compare objects based on more sophisticated, observable features. Present observations in labelled diagrams.			Sort objects and living things into groups using intersecting Venn and Carroll diagrams.	Spot patterns in the data particularly two criteria with no examples e.g. there are no living things with wings and no legs.	Draw simple conclusions, when appropriate, for patterns e.g. a flying insect with no legs might always crash land.		Suggest improvement e.g. a wider range of objects – only looked at British trees. Suggest new questions arising from the investigation.
Researching	Ask a range of questions linked to a topic.	Choose a source from a range provided.				Present what they learnt verbally or using labelled diagrams.	Be able to answer their questions using simple scientific language.			Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.
Comparative/fair testing		Decide what to change and what to measure or observe.	As for KS1- Make observations linked to answering the question.	Measure using standard units where not all the numbers are marked on the scale, and take repeat readings where necessary.	Prepare own tables to record data.	Present data in bar charts.	Refer directly to their evidence when answering their question.	Where appropriate provide oral or written explanations for their findings.	Use results from an investigation to make a prediction about a further result.	Suggest improvements e.g. to method of taking measurements. Suggest new questions arising from the investigation.
Observing over time		Decide what to measure or observe. Decide how often to take a measurement.	Make a range of relevant observations.	Measure using standard units where not all the numbers are marked on the scale. Use dataloggers to measure over time.		Present data in time graphs.				
Pattern seeking		Decide what to measure or observe.	As for KS1- Make observations linked to answering the question.	Measure using standard units where not all the numbers are marked on the scale.		Use ICT package to present data as a scattergram.				

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Classifying	Be able to ask a range of Yes/No questions to aid sorting and decide which ways of sorting will give useful information.	Identify specific clear questions that will help to sort without ambiguity.	Be able to compare not only based on physical properties but also on knowledge gained through previous enquiry.			Create branching databases (tree diagrams) and keys to enable others to name living things and objects.	Be able to talk about the features that objects and living things share and do not share based on the information in the key etc.	Be able to use data to show that living things and materials that are grouped together have more things in common than with things in other groups.		Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for.



Researching	Ask a range of questions recognising that some can be answered through research and others may not.	Choose suitable sources to use.				Present what they learnt in a range of ways e.g. different graphic organisers.	Be able to answer their questions using scientific evidence gained from a range of sources.			Be able to talk about their degree of trust in the sources they used.	
Comparative /fair testing	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results.	Recognise and control variables where necessary.	As for KS1- Make observations linked to answering the question.	Measure using standard units using equipment that has scales involving decimals.	Prepare own tables to record data, including columns for taking repeat readings.	Choose an appropriate form of presentation, including line graphs.	Be able to answer their question, describing causal relationships.	Provide oral or written explanations for their findings.	Use test results to make predictions for further investigations.	Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled, and accuracy of results.	
Observing over time							As for LKS2- Prepare own tables to record data.				Be able to answer their questions, describing the change over time.
Pattern seeking							Choose an appropriate form of presentation, including scatter graphs.				Be able to answer their questions identifying patterns.



	Year 3	Year 4	Year 5	Year 6
Animals including humans	<ul style="list-style-type: none"> To identify and know 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 and know that humans and some animals have skeletons and muscles for support, protection and movement. 	<ul style="list-style-type: none"> Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey. 	<ul style="list-style-type: none"> To describe the changes as humans develop to old age 	<ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans.
Plants	<ul style="list-style-type: none"> Identify, know and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore and know 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 and understand 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. 			
Living things and their habitats		<ul style="list-style-type: none"> Identify and name a variety of living things (plants and animals) in the local and wider area. Give reasons for classifying plants and animals based on specific characteristics. Recognise that environments are constantly changing and that this can sometimes pose dangers to specific habitats. 	<ul style="list-style-type: none"> To know and describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. 	<ul style="list-style-type: none"> Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.
Materials	<p>Rocks</p> <ul style="list-style-type: none"> 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 soil are made from rocks and organic matter. 	<p>State of matter</p> <ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	<p>Properties and changes of material</p> <ul style="list-style-type: none"> 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. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible. 	



<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Forces</p>	<ul style="list-style-type: none"> • Compare how things move on different surfaces. • Notice that some forces need contact between 2 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 2 poles. • Predict whether 2 magnets will attract or repel each other, depending on which poles are facing. 		<ul style="list-style-type: none"> • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • Identify the effects of air resistance, water resistance and friction, that act between moving surfaces recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect. 	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Electricity</p>		<ul style="list-style-type: none"> • Identify common appliances that run on electricity. • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • 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. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. • Recognise some common conductors and insulators and associate metals with being good conductors. 		<ul style="list-style-type: none"> • Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. • 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. • Use recognised symbols when representing a simple circuit in a diagram.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Light</p>	<ul style="list-style-type: none"> • Recognise that they need light in order to see things and that dark is 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 the eyes. • Recognise that shadows are formed when light from a light source is blocked by a solid object. • Find patterns in the way that the size of shadows change. 			<ul style="list-style-type: none"> • Recognise that light appears to travel in straight lines. • 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. • 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. • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Evolution and inheritance</p>				<ul style="list-style-type: none"> • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.



Sound		<ul style="list-style-type: none">• How sounds are made, associating some of them with something vibrating.• Recognise that vibrations from sounds travel through a medium to the ear.• Find patterns between 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. Recognise that sounds get fainter as the distance from the sound's source increases.		
Earth and space			<ul style="list-style-type: none">• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.• Describe the movement of the Moon relative to the Earth.• Describe the Sun, Earth and Moon as approximately spherical bodies.• Use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky.	