



## Science Knowledge overview

Cycle 1 Summer 2	<b>Materials</b> Identify and name an increasing variety of everyday materials. Begin to identify common uses of different materials. Describe physical properties of a range of materials.	<b>Materials</b> Identify and name everyday materials. Begin to describe some properties of familiar materials.	<b>Materials</b> Explore an increasing range of materials (begin to explore materials in different ways).										
Cycle 2 Autumn 1				<b>Materials</b> Know the suitability of a variety of everyday materials for their particular uses. Know solid objects can be changed by squashing, bending, twisting and stretching.	<b>Materials</b> Describe the simple physical properties of everyday materials. Explore and describe how the shape of malleable materials can be changed.	<b>Materials</b> Explore and manipulate malleable materials (begin to respond to options).					Identify and classify.  Use observations and ideas to suggest answers to questions.  Gather and record data to help in answering questions.	Sort objects into groups.  Make generalisations and connections to answer simple questions.  Begin to collect and make simple records of their findings.	Begin to match objects in terms of single features.  Request events or activities.  Participate in shared activities and sustain concentration.
Cycle 2 Autumn 2	<b>Living Things and their Habitats</b> Know the differences between living things, dead and non-living things. Know what a habitat is. Know what a food chain is and how animals depend on each other.	<b>Living Things and their Habitats</b> Group things into living and non-living. Match some familiar animals with their habitat. Know the diet of familiar animals.	<b>Animals and Humans</b> Explore pictures and objects related to animals and their habitats (begin to match or group objects).								Identify and classify.  Use observations and ideas to suggest answers to questions.  Gather and record data to help in answering questions.	Sort objects into groups.  Make generalisations and connections to answer simple questions.  Begin to collect and make simple records of their findings.	Begin to match objects in terms of single features.  Request events or activities.  Participate in shared activities and sustain concentration.
Cycle 2 Spring 1	<b>Plants</b> Know seeds and bulbs grow into plants. Describe what plants need to be healthy.	<b>Plants</b> Observe and describe how a plant grows. Name something a plant needs to grow.	<b>Plants</b> Observe how a plant grows (begin to describe / explore objects).										
Cycle 2 Spring 2				<b>Materials</b> Know the uses of an expanding variety of materials for particular uses. Explore how a range of materials and objects respond to squashing, bending, twisting and stretching and how material are selected for their properties.	<b>Materials</b> Know the suitability of a variety of everyday materials for their particular uses. Know solid objects can be changed by squashing, bending, twisting and stretching.	<b>Materials</b> Explore and manipulate a range of different materials (begin to respond to options). Begin to name some common materials.							

## Science Knowledge overview

Cycle 2 Summer 1							<b>Seasonal Changes</b> Explore the temperature changes across the seasons and the appropriate clothing needed for each season. Explore a range of different weather we experience across the year (gales, thunder storms, hail, heatwaves, and snow storms).	<b>Seasonal Changes</b> Name the seasons and know the changes across them.	<b>Season Changes</b> Explore day and night and how the temperature changes over the day through sensory based activities (participate in shared activities).			
Cycle 2 Summer 2	<b>Animals and Humans</b> Know the basic needs of animals and how their offspring turn into adults. Know the importance for humans of exercise, eating healthy, and hygiene.	<b>Animals and Humans</b> Name some of the basic needs of a familiar animal. Group some examples of lifestyle choices into healthy and unhealthy.	<b>Animals and Humans</b> Explore and participate in healthy lifestyle routines (join in with shared activities).									
Cycle 3 Autumn 1							<b>Light</b> Know light is reflected from surfaces for us to be able to see them and how shadows are formed. Know the dangers of the sun (sunburn / eye damage).	<b>Light</b> Identify some sources of light and objects that reflect light. Name how to keep safe in the sun.	<b>Light</b> Explore reflective objects (begin to observe and respond to materials and objects).	Ask relevant questions and begin to try to answer them. Set up simple practical enquiries. Make careful observations and Measurements. Gather and record data in a variety of ways. Use simple scientific language and	Ask simple questions and recognising that they can be answered in different ways. Use simple equipment to make observations. Gather data to help in answering questions. Begin to use some simple scientific	Explore objects and materials in a variety of ways. Observe the results of their own actions. Respond to options or choices. Begin to match objects in terms of single features. Request events or activities. Participate in
Cycle 3 Autumn 2							<b>Forces and Magnetism</b> Understand friction as a force and how this changes over different surfaces. Understand magnetism (know force acts at a distance, magnets attract and repel each other, they are attracted to certain metals, they have poles and which poles attract/repel).	<b>Forces and Magnetism</b> Explore how friction is a force and how things move over different surfaces (fast/slow). Understand magnetism (explore how magnets can attract and repel each other).	<b>Forces and Magnetism</b> Engage with activities and objects which explore friction and magnetism (observe / observe the results of their actions).	drawings to communicate ideas. Share findings including oral and written explanations and displays. Draw simple conclusions and make predictions. Identify differences, similarities or changes.	language. Begin to answer simple scientific questions.	shared activities and sustain concentration. Begin to recognise change. Begin to respond to scientific questions.

## Science Knowledge overview

Cycle 3 Spring 1				<b>Rock and Soil</b> Know the composition of soil. Know why soil is important and the different types of soil.	<b>Rocks and Soil</b> Explore different types of soil and the animals that live in soil. Explore why soil is important for plants to grow.	<b>Rocks and Soil</b> Explore soil in the classroom and outside (explore objects in a variety of ways).						
Cycle 3 Spring 2				<b>Rocks</b> Know the different types of rock. Know how fossils are formed.	<b>Rocks</b> Explore rocks and begin to sort into given groups based on their properties. Know fossils are a record of a prehistoric plant or animal found in some rocks.	<b>Rocks</b> Explore rocks and stones in the classroom and outside (explore objects in a variety of ways).						
Cycle 3 Summer 1	<b>Animals and Humans</b> Know living things need nutrition and how they get this. Know skeletons are needed for support, protection and movement in animals.	<b>Animals and Humans</b> Know some of things needed to keep living healthy. Know skeletons are needed for support in humans.	<b>Animals and Humans</b> Know some of things needed to keep them healthy. Know skeletons are needed for support, protection and movement in animals.									
Cycle 3 Summer 2	<b>Plants</b> Know the function of the parts of flowering plants including their lifecycle (pollination, seed formation and seed distribution). Know how water is transported within plants.	<b>Plants</b> Know the how a flowering plant is pollinated by insects. Know plants need water to be healthy and this is taken in by the roots.	<b>Plants</b> Explore the things a plant needs to be healthy (participate in shared activities).									
Cycle 4 Autumn 1				<b>Materials</b> Know names of solids, liquids and gases. Know how materials change state with temperature changes.	<b>Materials</b> Be able to group familiar materials into solids, liquids or gases. Know how water can be both solid, liquid and gas.	<b>Materials</b> Explore sensory activities related to water within its different states (begin to respond or options or choices).				Ask relevant questions and begin to try to answer Them.  Set up simple practical enquiries.	Ask simple questions and recognising that they can be answered in different ways.  Use simple equipment to make observations.	Explore objects and materials in a variety of ways.  Observe the results of their own actions.
Cycle 4 Autumn 2	<b>Living Things and their Habitats</b> Recognise that living things can be	<b>Living Things and their Habitats</b> Be able to group animals with a given criteria.	<b>Living Things and their Habitats</b> Explore living organisms and their characteristics /						Make careful observations and Measurements.		Respond to options or choices.	

## Science Knowledge overview

	grouped in a variety of ways Use classification keys to help group, identify and name a variety of living things.	Use simple keys to help identify an organism.	differences (begin to match objects).								Gather and record data in a variety of ways.	Gather data to help in answering questions.	Begin to match objects in terms of single features.
Cycle 4 Spring 1							<b>Electricity</b> Know common appliances which use electricity. Know how to construct a simple series circuit and name the parts (cell, wire, bulb, switch, buzzer). Name materials which are conductors and insulators.	<b>Electricity</b> Name some familiar appliances which use electricity. Construct a simple circuit and name the parts (cell, wire, bulb). Sort familiar materials into conductors and insulators.	<b>Electricity</b> Explore sensory activities related to objects which use electricity to make light and movement (begin to respond or options or choices).		Use simple scientific language and drawings to communicate ideas.	Begin to use some simple scientific language.	Request events or activities.
Cycle 4 Spring 2				<b>Materials</b> To know the process where water can evaporate and condense in the home.  To understand the role of evaporation and condensation within the water cycle.	<b>Materials</b> Be able to name materials which are solids, liquids or gases.  To explore practical examples of the evaporation and condensation of water.	<b>Materials</b> Explore sensory activities related to materials within its different states and change of state (begin to respond or options or choices).					Share findings including oral and written explanations and displays.	Begin to answer simple scientific questions.	Participate in shared activities and sustain concentration.
Cycle 4 Summer 1							<b>Sound</b> Know how sounds are made and how they travel. Know how pitch and loudness of sounds can change.	<b>Sound</b> Name objects that make sound and how the sound is produced. Know how sounds in these objects can be changed.	<b>Sound</b> Explore sensory activities related to objects which use make sounds (observe the results of their actions).		Draw simple conclusions and make predictions.		Begin to recognise change.
Cycle 4 Summer 2	<b>Animals and Humans</b> Know the function and organs of the digestive system, including the name and function of different teeth. Interpret and food chains and Identify producers, predators and prey.	<b>Animals and Humans</b> Know the organs of the digestive system, including the function of teeth. Create a simple food chain within a given habitat.	<b>Animals and Humans</b> Explore routines we need to keep healthy (hydration, toilet, diet, cleaning teeth). (Participate in shared activities and sustain concentration.)								Identify differences, similarities or changes.		Begin to respond to scientific questions.
												Begin to make connections or generalisations.	Begin to make simple recordings of their findings.

## Science Knowledge overview

Cycle 5 Autumn 1	<b>Living Things and their Habitats</b> Know the lifecycles of a mammal, amphibian, insect and bird. Know how plants and animals reproduce.	<b>Living Things and their Habitats</b> Know the lifecycles of a mammal and insect. Know how animals reproduce.	<b>Living Things and their Habitats</b> Explore the lifecycles animals or insects (begin to match objects).							Plan different types of scientific enquiries to answer questions.  Take measurements, using scientific equipment, with increasing accuracy.  Record data and results of using scientific diagrams, labels and simple graphs.	Ask relevant questions and begin to try to answer them.  Use simple equipment to take measurements.  Gather and record data in a variety of ways.  Use an increasing level of scientific language.  Share findings in a number of simple ways.  Identify differences, similarities or changes.  Draw simple conclusions and make predictions.	Explore objects and materials in a variety of ways.  Observe the results of their own actions.  Respond to options or choices.  Begin to match objects in terms of single features.  Request events or activities.  Participate in shared activities and sustain concentration.  Begin to recognise change.  Begin to respond to scientific questions.  Begin to make connections or generalisations.  Begin to make simple recordings of their findings.  Begin to contribute to experiments or practical activities.
Cycle 5 Autumn 2							<b>Forces</b> Understand the forces of gravity, air resistance, water resistance and friction. Understand how levers, pulleys and gears allow forces to have a greater effect.	<b>Forces</b> Understand the forces and friction. Understand how levers allow forces to have a greater effect.	<b>Forces</b> Explore how forces act on objects – push / pull (Observe the results of their own actions).	Use test results to make predictions. Report and presenting findings from enquiries, including conclusions.  Identify scientific evidence that has been used to support or refute ideas or arguments.		
Cycle 5 Spring 1				<b>Materials</b> Know how to group materials on the properties of hardness solubility, transparency, electrical and thermal conductivity, and response to magnets.	<b>Materials</b> Be able to group materials on the properties of transparency, opacity.	<b>Materials</b> Take part in activities to explore grouping or separating materials (explore objects in a variety of ways).						
Cycle 5 Spring 2							<b>Earth and Space</b> Know the movement of the Earth and planets in the Solar System relative to the sun. Describe these as spherical objects. Know the movement of the Moon relative to the Earth. Know day and night is related to the rotation of the Earth.	<b>Earth and Space</b> Identify some of the planets in the solar system. Name the sun and moon in the solar system. Know the Earth rotates on its axis.	<b>Earth and Space</b> Participate in sensory activities related with space and the planets (Request events or activities).			
Cycle 5 Summer 1	<b>Animals and Humans</b> Know the changes as humans develop to old age.	<b>Animals and Humans</b> Describe the changes as humans grow and age.	<b>Animals and Humans</b> Explore how we and familiar people have changed over time									
Cycle 5 Summer 2				<b>Materials</b> Know what dissolving is and how to separate mixtures using sieving, filtering and evaporation.	<b>Materials</b> Know what dissolving is and how to separate mixtures using sieving.	<b>Materials</b> Take part in activities to explore grouping or separating materials (explore objects in a variety of ways).						



## Science Knowledge overview

	Know variation occurs within offspring. Know how organisms adapt to their environment and adaption can lead to evolution.		shared activities and sustain concentration).										
Cycle 6 Summer 2							<b>Electricity</b> Know the effect of voltage within a circuit (buzzer or lamp). Know the symbols for components of a circuit.	<b>Electricity</b> Know how to construct a simple series circuit and name the parts (cell, wire, bulb, switch, and buzzer). Name materials which are conductors and insulators.	<b>Electricity</b> Explore sensory activities related to objects which use electricity to make sound and actions (begin to respond or options or choices).				
Cycle 7 Autumn 1	<b>Organisms Cells / Movement</b> Know the function of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts. Identify similarities and differences between plant and animal cells. Understand the organisation living things from cells to tissues to organs to systems to organisms. <i>[Understand the role of diffusion in the movement of materials in and between cells.]</i> Understand the structure and functions of the human skeleton, to include support, protection, movement and making blood cells. <i>[Understand the interaction between skeleton and muscles.]</i>	<b>Organisms and Movement</b> Know plants and animals are made from smaller building blocks. Name some of the key organs within animals. Name some of the key organ systems in plants. Understand the role of the skeleton has in support and protection.	<b>Animals and Plants</b> Participate in practical activities to explore key functions of our bodies (eating, digestion, breathing, heart rate).							Ask questions, based on observations of the real world. Make predictions using scientific understanding and knowledge. Plan and carry out scientific enquiries. Use a range of appropriate apparatus and techniques. Make and record observations and measurements with increasing accuracy and precision. Evaluate the reliability of their investigations and results. Share reasoned explanations. Use mathematical concepts to calculate and present results.	Ask simple questions, based on observations. Begin to make simple predictions. Help to plan and carry out scientific experiments. Use scientific apparatus. Make and record observations. Begin to evaluate their work. Use mathematical concepts to calculate results. Begin to share their findings.	Explore objects and materials in a variety of ways and begin to make simple observations.  Observe the results of their own actions and begin to recognise change.  Respond to options or choices and request events or activities.  Participate in shared activities and sustain concentration and begin to contribute to experiments or practical activities.  Begin to make simple recordings of their findings.  Begin to respond to scientific questions.	
Cycle 7 Autumn 2				<b>Particulate Nature of Matter, Atoms and Elements</b> Know the properties of the different states of matter (solid, liquid and	<b>Elements, Mixtures and Compounds</b> Name and describe the properties of a range of materials.	<b>Materials</b> Take part in activities to explore contrasting materials.							Begin to match objects in terms of single features.



### Science Knowledge overview

				<p>gas) in terms of the particle model, including gas pressure.</p> <p>Know changes of state in terms of the particle model.</p> <p>Describe the differences between atoms, elements and compounds</p> <p>Understand chemical symbols and formulae for elements and compounds.</p> <p><i>[Understand conservation of mass changes of state and chemical reactions.]</i></p> <p>Know energy changes on changes of state.</p> <p><i>[Understand exothermic and endothermic chemical reactions (qualitative)]</i></p>	<p>Group materials based on their state.</p> <p>Know materials are made of smaller building blocks.</p> <p>Describe the differences between pure and impure.</p> <p>Be able to describe and name a range of elements.</p> <p>Be able to name and describe a range of compounds.</p> <p>Know energy is needed to melt ice and boil water.</p>	(Begin to make connections or generalisations).					<p>Begin to make connections or generalisations.</p>
<p>Cycle 7 Spring 1</p>							<p><b>Space Physics</b></p> <p>Understand gravity as a force on Earth and other planets.</p> <p>Understand the force of gravity between planets and the sun.</p> <p><i>[Understand gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun.]</i></p> <p>Understand our Sun as a star, other stars in our galaxy, other galaxies.</p> <p>Understand the seasons and the Earth's tilt.</p> <p><i>[Understand day length at different times of year, in different hemispheres.]</i></p>	<p><b>Space</b></p> <p>Know the effect of gravity.</p> <p>Know the movement of the Earth and planets in the Solar System relative to the sun. Describe these as spherical objects.</p> <p>Know the movement of the Moon relative to the Earth.</p> <p>Know day and night is related to the rotation of the Earth.</p>	<p><b>Space</b></p> <p>Participate in sensory activities related to gravity (Respond to options or choices and request events or activities.)</p>		



## Science Knowledge overview

				<p>Describe the concept of a pure substance. Understand mixtures, including dissolving. Understand diffusion in terms of the particle model. Name simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography. <i>[Be able to describe the identification of pure substances.]</i></p>	<p>Be able to describe a mixture. Be able to understand substances can be soluble or insoluble dissolving is a reversible change. Understand we can separate mixtures by filtration. Be able to name some soluble and insoluble substances. Understand we can separate mixtures by distillation.</p>	<p>materials are separated in a number of ways. (Explore objects and materials in a variety of ways and begin to make simple observations).</p>							
<p>Cycle 7 Summer 2</p>							<p><b>Sound</b> Understand how waves on water behave. <i>[Understand these waves can be reflected, and add or cancel – superposition.]</i> Understand echoes, reflection and absorption of sound. <i>[Understand frequencies of sound waves are measured in hertz (Hz)]</i> Understand sound needs a medium to travel. <i>[Compare the speed of sound in air, in water, in solids.]</i> Understand sound is produced by vibrations of objects. <i>[Understand the difference between longitudinal and transverse waves.]</i> Understand the auditory range of humans and animals. <i>[Understand how pressure waves transfer energy.]</i></p>	<p><b>Sound</b> Know how sounds are made by vibrating objects. Describe how sound travels. Know how pitch and loudness of sounds can change. Understand sounds can be reflected or absorbed. Describe how we are unable to hear certain sounds. Describe how the ear helps us hear sounds.</p>	<p><b>Sound</b> Explore sensory activities related to making sounds and altering sounds (observe the results of their actions).</p>				

## Science Knowledge overview

<p>Cycle 8 Autumn 1</p>	<p><b>Reproduction and Health</b> Understand reproduction in humans, including the structure and function of the male and female reproductive systems. Understand the menstrual cycle fertilisation, gestation and birth. Understand the effect of maternal lifestyle on the foetus through the placenta. Understand the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.</p>	<p><b>Reproduction and Health.</b> Name and locate the key parts of the male and female reproductive systems. Understand the key concepts of reproduction in humans. Understand the key concepts within the menstrual cycle. Understand the dangers of alcohol on the foetus. Understand the dangers to health on taking recreational drugs.</p>	<p><b>Health</b> Explore health and hygiene routines (being active, varied diet, mental health, cleaning bodies). (Respond to options or choices and request events or activities.)</p>							<p>Ask questions, based on observations of the real world. Make predictions using scientific understanding and knowledge. Plan and carry out scientific enquiries. Use a range of appropriate apparatus and techniques. Make and record observations and measurements with increasing accuracy and precision. Evaluate the reliability of their investigations and results. Share reasoned explanations. Use mathematical concepts to calculate and present results.</p>	<p>Ask simple questions, based on observations. Begin to make simple predictions. Help to plan and carry out scientific experiments. Use scientific apparatus. Make and record observations. Begin to evaluate their work. Use mathematical concepts to calculate results. Begin to share their findings.</p>	<p>Explore objects and materials in a variety of ways and begin to make simple observations. Observe the results of their own actions and begin to recognise change. Respond to options or choices and request events or activities. Participate in shared activities and sustain concentration and begin to contribute to experiments or practical activities. Begin to make simple recordings of their findings. Begin to respond to scientific questions. Begin to match objects in terms of single features. Begin to make connections or generalisations.</p>
<p>Cycle 8 Autumn 2</p>				<p><b>Chemical Reactions</b> <i>[Understand chemical reactions as the rearrangement of atoms.]</i> Be able to represent chemical reactions using formulae and using equations. Understand combustion as a displacement reaction. <i>[Understand thermal decomposition, and oxidation and displacement reactions.]</i> Know the order of metals and carbon in the reactivity series. <i>[Know the use of carbon in obtaining metals from metal oxides.]</i> Describe the properties of ceramics, polymers and composites.</p>	<p><b>Chemical Reactions</b> Be able to describe a range of chemical reactions. Understand chemical reactions like combustion are irreversible changes. Be able to write simple explanations about chemical reactions. To know some chemicals are more reactive than others.</p>	<p><b>Reactions</b> Explore a range of experiments and activities involving reactions or change. (Observe the results of their own actions and begin to recognise change.)</p>						

## Science Knowledge overview

<p>Cycle 8 Spring 1</p>							<p><b>Light</b> Understand that light can travelling through a vacuum. <i>[Understand the similarities and differences between light and sound waves.]</i> Understand the transmission of light through materials and reflection from a surface. <i>[Understand absorption, diffuse scattering of light.]</i> Understand the use of ray model to explain the path of light. <i>[Describe the role of the convex lens in focusing the human eye.]</i> Understand how light transfers energy from source to absorber. <i>[Understand this leads to chemical and electrical effects; photo-sensitive material in the retina and in cameras.]</i> Understand how light is reflected or absorbed and how this is related to the perception of colour.</p>	<p><b>Light</b> Know light is reflected from surfaces for us to be able to see them. Know the dangers of the sun (sunburn / eye damage). Understand light travels in straight line and this is how shadows are formed. Describe how the eye helps us see. Describe how light being reflected / absorbed helps us see colours.</p>	<p><b>Light</b> Explore light and dark and exploring shadows (Observe the results of their own actions and begin to recognise change.)</p>			
<p>Cycle 8 Spring 2</p>	<p><b>Breathing and Digestion</b> Know the structure and functions of gas exchange system in humans. <i>[Understand the adaptations to gas exchange.]</i> Understand the mechanism of breathing to move air in and out of the lungs. <i>[Understand a pressure model to explain the movement of gases, including simple</i></p>	<p><b>Digestion</b> Name and locate some of the key organs within the digestive system. Name and describe the function of different teeth. Describe the path of food through the digestive system.  Describe some of the ways how to follow a healthy lifestyle.  Describe some of the dangers of</p>	<p><b>Digestion</b> Explore food, diet and our digestive system (teeth, stomach, and using the toilet). (Begin to respond to scientific questions.)</p>									

### Science Knowledge overview

	<p><i>measurements of lung volume.</i>] Understand the impact of exercise, asthma and smoking on the human gas exchange system. Understand the contents of a healthy human diet. <i>[Understand the role of carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water in a healthy diet and why each is needed.]</i> Understand the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. Name the tissues and organs of the human digestive system. Describe the role of the organs within the digestive system and the path of food. <i>[Understand the adaptations the digestive system and how the digestive system digests food (enzymes simply as biological catalysts)].</i></p>	<p>following an unhealthy lifestyle.</p> <p>Describe a healthy and balanced diet.</p>										
<p>Cycle 8 Summer 1</p>				<p><b>Periodic Table</b> Understand the varying physical and chemical properties of different elements. Understand principles underpinning the Mendeleev Periodic Table. Understand the Periodic Table: periods and groups;</p>	<p><b>Periodic Table</b> Know the name of a range of elements. Be able to describe the properties of a range of materials. Be able to groups elements based on their properties. Be able to describe and identify metals and non-metals. Be able to observe and describe the</p>	<p><b>Solids, Liquids and Gases</b> Explore sensory activities related to solids, liquids and gases.</p>						

### Science Knowledge overview

				<p>metals and non-metals.  <i>[Know how patterns in reactions can be predicted with reference to the Periodic Table.]</i>                      Describe the properties of metals and non-metals.  <i>[Understand the chemical properties of metal and non-metal oxides with respect to acidity.]</i></p>	<p>reactions of elements.</p>									
<p>Cycle 8                      Summer                      2</p>							<p><b>Electricity and Electromagnetism</b>                      Understand electric current is measured in amperes.                      Identify series and parallel circuits are currents.  <i>[Understand potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current.]</i>                      Understand conducting and insulating materials.                      Understand the effects of static electricity.  <i>[Understand separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects.]</i>                      Understand magnetic poles, attraction and repulsion.                      Be able to plot magnetic fields lines.  <i>[Understand Earth's magnetism, compass and navigation.]</i>  <i>[Understand the magnetic effect of a current, electromagnets, D.C. motors.]</i></p>	<p><b>Electricity and Electromagnetism</b>                      Understand the dangers of electricity and how to keep safe around electricity.                      Know how to construct a simple series circuit and name the parts (cell, wire, bulb, switch, buzzer).                      Name materials which are conductors and insulators.                      Describe the effect of static electricity.                      Understand magnetism (know force acts at a distance, magnets attract and repel each other, they are attracted to certain metals, they have poles and which poles attract/repel).</p>	<p><b>Electricity and Electromagnetism</b>                      Engage with activities and which explore magnetism and operating simple electrical circuits (Respond to options or choices and request events or activities.)</p>					

## Science Knowledge overview

<p>Cycle 9 Autumn 1</p>	<p><b>Respiration</b> Understand aerobic and anaerobic respiration in living organisms. <i>[Understand the breakdown of organic molecules to enable all the other chemical processes necessary for life.]</i> Be able to write a word summary for aerobic respiration. Understand the process of anaerobic respiration in humans. <i>[Understand and micro-organisms, including fermentation, and a word summary for anaerobic respiration.]</i> Understand the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.</p>	<p><b>The Respiratory system</b> Name and locate the organs within respiratory system. Understand how we breathe air in and out of the lungs. Understand the dangers of smoking on the lungs. Understand how asthma effects breathing. Understand how the circulatory system transports blood around the body.</p>	<p><b>The Respiratory system</b> Explore breathing and the respiratory system. Explore changes in breathing. (Observe the results of their own actions and begin to recognise change.)</p>								<p>Ask questions, based on observations of the real world. Make predictions using scientific understanding and knowledge. Plan and carry out scientific enquiries. Use a range of appropriate apparatus and techniques. Make and record observations and measurements with increasing accuracy and precision. Evaluate the reliability of their investigations and results. Share reasoned explanations. Use mathematical concepts to calculate and present results.</p>	<p>Ask simple questions, based on observations. Begin to make simple predictions. Help to plan and carry out scientific experiments. Use scientific apparatus. Make and record observations. Begin to evaluate their work. Use mathematical concepts to calculate results. Begin to share their findings.</p>	<p>Explore objects and materials in a variety of ways and begin to make simple observations. Observe the results of their own actions and begin to recognise change. Respond to options or choices and request events or activities. Participate in shared activities and sustain concentration and begin to contribute to experiments or practical activities. Begin to make simple recordings of their findings. Begin to respond to scientific questions. Begin to match objects in terms of single features. Begin to make connections or generalisations.</p>
<p>Cycle 9 Autumn 2</p>				<p><b>Acids and Alkalis</b> Be able to define acids and alkalis in terms of neutralisation reactions. Know the pH scale for measuring acidity/alkalinity; and indicators <i>[Understand reactions of acids with metals to produce a salt plus hydrogen.]</i> Know reactions of acids with alkalis to produce a salt plus water. <i>[Know what catalysts do.]</i></p>	<p><b>Acids and Alkalis</b> Be able to name some products in the home which are acids and alkalis. Be able to use universal indicator to identify if a solution is an acid or alkali. To know how to handle acids and alkalis in the home safely. To know how to identify hazard and warning labels and what they mean.</p>	<p><b>Safety</b> Take part in following safety routines related to safety in the home and in school. (Participate in shared activities and sustain concentration and begin to contribute to experiments or practical activities.)</p>							



## Science Knowledge overview

Cycle 9 Spring 1							<p><b>Motion and Forces</b> Understand speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time). <i>[Understand the representation of a journey on a distance-time graph.]</i> Understand forces as pushes or pulls, arising from the interaction between two objects. Use force arrows to label and describe balanced and unbalanced forces. Understand forces are needed to move, stop or change objects directions. Understand contact forces: stretching and squashing – springs; friction between surfaces, with pushing things out of the way; resistance to motion of air and water. <i>[Understand forces measured in Newton's.]</i> Understand non-contact forces: gravity, forces between magnets and forces due to static electricity. <i>[Understand atmospheric pressure.]</i> Understand upthrust effects, floating and sinking in water. <i>[Understand pressure measured by ratio of force over area – acting normal to any surface.]</i></p>	<p><b>Motion and Forces</b> Understand friction as a force and how this changes over different surfaces. Understand the forces of gravity, air resistance, water resistance and friction. Understand how levers, pulleys and gears allow forces to have a greater effect. Be able to use force arrows in diagrams to show forces.</p>	<p><b>Forces</b> Use toys and games to explore how forces act on objects – gears, levers and pulleys (Observe the results of their own actions and begin to recognise change.)</p>
Cycle 9 Spring 2	<p><b>Evolution and Inheritance</b> Know heredity as the process by which genetic information is</p>	<p><b>Evolution and Inheritance</b> Understand how genetic information is passed from one</p>	<p><b>Inheritance</b> Explore how offspring of animals are similar to their parents. Explore</p>						

## Science Knowledge overview

	<p>transmitted from one generation to the next. Know a simple model of chromosomes, genes and DNA in heredity. <i>[Understand the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model.]</i> Describe variation between species. Understand the variation between individuals within a species. Understand the role of inheritance in driving natural selection. Understand the role of inheritance in driving natural selection which in turn may lead to extinction. <i>[Know the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.]</i></p>	<p>generation to the next. Explore how genetic traits can be passed on in animals and humans. Describe variation within a species like dogs. Understand how selective breeding in animals can drive variation. Understand how variation can have a positive or negative impact.</p>	<p>similarity and variation. (Begin to make simple recordings of their findings.)</p>									
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## Science Knowledge overview

Cycle 9 Summer 1				<p><b>Earth and Atmosphere</b>            Know the composition of the Earth's structure. Know the rock cycle and the formation of igneous, sedimentary and metamorphic rocks. Know the Earth as a source of limited resources and the efficacy of recycling [Describe the carbon cycle.] Describe the composition of the atmosphere. Know production of carbon dioxide by human activity and the impact on climate.</p>	<p><b>The Earth</b>            Know the simple composition of the Earth's structure. Know the simple composition of the Earth's atmosphere. Know the different types of rock and composition of soil. Know how fossils are formed. Know how and why we recycle. Understand pollution and its impact on the Earth. Understand the impact of climate change.</p>	<p><b>Earth</b>            Participate in activities related to recycling. (Participate in shared activities and sustain concentration and begin to contribute to experiments or practical activities.)</p>			
Cycle 9 Summer 2							<p><b>Energy</b>            To be able to compare energy values of different foods (from labels) (kJ)            Be able to compare power ratings of appliances in watts (W, kW)  <i>[Be able to compare amounts of energy transferred (J, kJ, kW hour)]</i>  <i>[Understand domestic fuel bills, fuel use and costs.]</i>            Understand fuels and energy resources. Understand how temperature difference between two objects leads to energy transfer from the hotter to the cooler one. Understand how energy can be transferred by conduction or radiation and how use of insulators can reduce this transfer. <i>[Understand other processes that involve energy]</i></p>	<p><b>Energy</b>            To be able to identify foods which are high and low in energy.            To be able to compare the power ratings for a range of familiar household appliances. Understand how we use fuels to heat our homes and power machines. Understand heat moves from hot to cold. Understand how different types of heaters can transfer heat by conduction and radiation. Understand how insulators can reduce heat loss.</p>	<p><b>Energy</b>            Explore sensory experiences involving temperature changes. (Respond to options or choices and request events or activities.)</p>

## Science Knowledge overview

							<p><i>transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels.]</i></p> <p>Be able to compare the starting with the final conditions describing increases and decreases in the temperatures.</p>					
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