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<p>Rationale</p> <p>The aim of our Science curriculum at Baden-Powell is to support each and every child's understanding of their place in the diverse world in which they live: to learn about the links and direct impact that Science has had and continues to have on their everyday lives. Our school values of Respect, Friendship, Compassion, Aspiration and Resilience are woven into the Science curriculum and are referred to regularly. In particular, we encourage the Aspiration to find out more about the world and the Resilience to problem-solve and answer questions within different real-life scientific contexts.</p> <p>The knowledge and skills that we have chosen to include in our Science curriculum derive directly from the objectives set out in the National Curriculum (2014) and are in line with CLP guidance for Science.</p> <p>The sequencing of our Science curriculum follows the order set out in the National Curriculum in terms of Key Stage and Year Group. Within each Year Group, the areas of study e.g. classification, are placed within a sequence of learning (topic) in which relevant and meaningful links with other curriculum subjects can be made. Where this is not possible, the remaining areas of study are slotted into the most appropriate gaps e.g. Light in Year Six. We have also considered factors such as the weather when planning our sequencing. For example, Year Three study plants in the Summer Term as there is a greater chance of success when growing a plant from seed.</p> <p>Lastly, we aim to highlight three substantive concepts which we consider to be integral to the subject of Science – The Natural World, Innovation and Invention and Change Over Time. We weave these ideas throughout our topics to further increase the relevance and real-world application of the learning the children encounter.</p>							
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	
Year 3	Rocks	Light	Forces & Magnets	The Skeletal System	Plants		
	Substantive concepts:  	Substantive concepts:  	Substantive concepts:  	Substantive concepts:  	Substantive concepts:  		
	Key people:	Key people:	Key people:	Key people:	Key people:		
Year 4	Classification	Habitats & Food Chains	The Digestive System	States Of Matter	Electricity	Sound	
	Substantive concepts:  	Substantive concepts:   	Substantive concepts:  	Substantive concepts:   	Substantive concepts:  	Substantive concepts:   	
	Key people:	Key people:	Key people:	Key people:	Key people:	Key people:	
Year 5	Reversible & Irreversible Changes		The Solar System	Life Cycles	Forces		
	Substantive concepts:   		Substantive concepts:  	Substantive concepts:  	Substantive concepts: 		
	Key people:		Key people:	Key people:	Key people:		
Year 6	The Cardiorespiratory System		Inheritance & Evolution	Classification	Electricity	Light	
	Substantive concepts:  		Substantive concepts:  	Substantive concepts:  	Substantive concepts:  	Substantive concepts:  	
	Key people:	Key people:	Key people: Charles Darwin	Key people:	Key people:	Key people:	

<u>3 substantive concepts</u>	
The Natural World	
Innovation & Invention	
Change	

Science - Progression

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Autumn 1			Autumn 2			Spring 1		
Rocks			Light and Shadow			Forces and Magnets		
Key Knowledge Rock is a hard material made up of one or more minerals. Soils are made from rocks and organic matter. Fossils are formed when things that have lived are trapped within sedimentary rock.			Key Knowledge Light is needed in order to see things and dark is the absence of light Shadows are caused when light is blocked by an opaque object Light from the sun can be dangerous			Key Knowledge A force is a push, a pull or a twist in a particular direction. Objects move differently on different surfaces because of friction. Magnets attract or repel each other		
Other Knowledge There are three types of rock—sedimentary, igneous and metamorphic. Sedimentary rock is easily worn away and often has fossils and layers. Metamorphic rock often has minerals and spots of colour. Igneous rock often has visible crystals. Sedimentary rock is formed from layers of igneous and metamorphic rock which are layered between organic matter over time. Metamorphic rock is formed when igneous rocks are subjected to massive heat and pressure. Igneous rock is formed when molten lava cools. Fossils provide information about living things that inhabited the Earth millions of years ago.			Other Knowledge Eyes should be protected from the Sun—glasses, hats etc. Opaque means no light can be transmitted Translucent means some light can be transmitted Transparent means light can be transmitted, allowing objects behind to be seen The size of shadows depends on how close the light source is to a subject. Light is a form of energy Sun is a light source but the Moon is not (it reflects the light from the Sun).			Other Knowledge Some forces need contact between two objects (contact force) Magnetic force is a non-contact force. Some materials can be magnetic and some are not. Magnets as have two poles - north and south. Opposite poles will attract. Similar poles will repel.		
Key Skills Plan: Ask relevant questions about an observation Do: With support, set up simple practical enquiries, comparative and fair tests Make careful observations Record: Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language and modelled/given drawings, labelled diagrams, keys, bar charts and tables Review: With help, use results to draw simple conclusions, make predictions for new values. Report on findings from enquiries through: oral and written explanations. Use straightforward scientific evidence to answer questions or to support their findings.			Key Skills Do: With support, set up simple practical enquiries, comparative and fair tests Make careful observations Record: Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language and modelled/given drawings, labelled diagrams, keys, bar charts and tables Review: With help, use results to draw simple conclusions, make predictions for new values. Report on findings from enquiries through: oral and written explanations. Use straightforward scientific evidence to answer questions or to support their findings.			Key Skills Plan: Come up with some experimental ideas to answer a given question. Ask relevant questions about an observation Do: With support, set up simple practical enquiries, comparative and fair tests Make careful observations Take accurate measurements using standard units and a range of equipment (use of rulers, scales to the nearest whole unit) Record: Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language and modelled/given drawings, labelled diagrams, keys, bar charts and tables Review: With help, use results to draw simple conclusions, make predictions for new values. Report on findings from enquiries through: oral and written explanations. Use straightforward scientific evidence to answer questions or to support their findings.		
Key Vocabulary Rock - a solid mass made up of minerals Sedimentary - rocks formed by layers of sediment, e.g. chalk Igneous - rocks formed by a volcano or other source of great heat Metamorphic - rocks formed by heat and pressure e.g. marble Eruption - bursting out Molten lava - hot, melted rock that erupts from a volcano Soil - top layer of the Earth's surface Fossil - the remains of a living animal or plant from a long time ago which are embedded in earth or rock Organic matter - substance that has come from a recently living organism and can decay Layers - built up by things being laid down in sheets one after the other Pressure - being pushed with force from multiple directions Minerals - a solid, naturally occurring inorganic substance Fair test - a scientific test where one factor is changed and everything else stays the same			Key Vocabulary Light - something that makes things visible Dark - the absence of light Shadow - a dark image cast on a surface by an object blocking the source of light Light source - where light comes from e.g. the sun, a bulb, a torch, a candle Translucent - lets through some light through Opaque - lets no light pass through Transparent - lets all light through giving a clear view of the other side			Key Vocabulary Fair test - a scientific test where one factor is changed and everything else stays the same Push— when a force moves an object away from something Pull— a force that changes the direction of an object towards you Twist— a combination of a push and a pull. It causes an object to rotate around a fixed point. Friction - is a force between two surfaces sliding across each other Magnet— a material that produces a magnetic field Repel - to force away or apart Attract—drawn together by a force Contact force—is where you need to touch the object to apply the force Non-contact force— a force that pushes or pulls an object without touching it Magnetic—a material a magnet is attracted to Poles—areas of the magnet where the magnetic force is at its strongest. Non-magnetic - a material a magnet is not attracted to.		
cross curricular links								

Science - Progression

Spring 2			Summer 1			Summer 2		
The Skeletal System			Plants					
Key Knowledge Animals cannot make their own food: Many animals have skeletons and muscles for support, protection and movement. A vertebrate is an animal with a back bone e.g. dog, humans and elephants			Key Knowledge Flowering plants have: roots, stem, leaves and flowers. A seed grows into a new plant through pollination, dispersal and germination. Plants need air, light, water, nutrients from soil and room to grow.					
Other Knowledge Animals require the right amount of nutrition from what they eat. Animals get nutrition from what they eat. There are 7 nutrients: protein, fats, carbohydrates, vitamins, minerals and fibre and water An endoskeleton is located on the inside of an animal's body. An exoskeleton is located on the outside of an animal's body. Bones and skeletons enable us to move and give our organs protection.			Other Knowledge Roots give stability and absorb water and nutrients from the soil. Stems give further stability and transport water and nutrients around the plant Leaves have a wide surface area to collect sunlight, to make their own food (photosynthesis) and to breathe. Flowers are brightly coloured and sweetly scented to attract bees and other pollinators for reproduction. Pollination is the fertilization of an egg which creates seeds which are then dispersed (spread). Seeds can be dispersed in different ways. Some plants need more or less of these things depending on the species –ie. Desert plants need less water. Plants adapt to their environment in different ways. Water is transported through the roots, up the stem to the leaves. Some plants of the same species possess the same features.					
Key Skills Record: Record findings using simple scientific language and modelled/given drawings, labelled diagrams, keys, bar charts and tables Review: Use straightforward scientific evidence to answer questions or to support their findings.			Key Skills Plan: Come up with some experimental ideas to answer a given question. Ask relevant questions about an observation Know that you can use different types of enquiries to answer a question (research, comparative/fair testing, pattern seeking, classification, observation over time) Do: With support, set up simple practical enquiries, comparative and fair tests Make careful observations Take accurate measurements using standard units and a range of equipment (use of rulers, scales to the nearest whole unit) Record: Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language and modelled/given drawings, labelled diagrams, keys, bar charts and tables Review: With help, use results to draw simple conclusions, make predictions for new values. Report on findings from enquiries through: oral and written explanations. Use straightforward scientific evidence to answer questions or to support their findings.					
Key Vocabulary Characteristic—a special quality or trait that makes a person or animal different or the same as others Diet—the type of foods which humans or animals usually eat Nutrition—the process of eating healthy food for living and growing Energy—the thing that gives us strength to be able to move and grow Skeleton - the bones inside or outside an animal's body that help support and hold it up: protect vital organs; and allow movement. Muscles—soft tissues in the body that contract and relax to create movement. Vertebrates—animals with backbones Invertebrates—animals without backbones			Key Vocabulary Stability—this allows an object to return to its position if moved slightly Pollen—the substance that allows plants to make new plants (reproduction) Pollination—during plant reproduction, pollen grains need to move from the anther of one plant to the stigma of another. Pollinators—insects that go from flower to flower to feed and as they do they move pollen at the same time. Dispersal—the spreading of seeds. This may be by wind, by insects or by water. Germination—the process by which seeds begin to grow into plants Root - the part of a plant that grows under the ground. Roots take in water and food and they hold the plant in the soil. Stem - the main part of a plant that supports the branches, leaves, and other parts. Leaf - a flat part of a plant or tree that grows from the stem or branch. Flower - the part of a plant that makes fruit or seeds. Flowers often have a pleasant smell and colour. Petal - one of the separate leaves that form the outer part of a flower head. These are usually a different colour from the other leaves. Stigma - part of a plant that receives pollen Stamen - the part of a flower that makes and bears the pollen. Sepal - a part of a plant, shaped like a leaf, that lies at the base of a flower. Sepals hold and protect developing flower buds. Ovary - the part of a flower that contains the seeds and grows into a fruit. Reproduction - the process by which living things create young or offspring.					
cross curricular links								

Science - Progression			
Year 4	<p>The aim of our Science curriculum at Baden-Powell is to support each and every child's understanding of their place in the diverse world in which they live: to learn about the links and direct impact that Science has had and continues to have on their everyday lives. Our school values of Respect, Friendship, Compassion, Aspiration and Resilience are woven into the Science curriculum and are referred to regularly. In particular, we encourage the Aspiration to find out more about the world and the Resilience to problem-solve and answer questions within different real-life scientific contexts. The knowledge and skills that we have chosen to include in our Science curriculum derive directly from the objectives set out in the National Curriculum (2014) and are in line with CLP guidance for Science. The sequencing of our Science curriculum follows the order set out in the National Curriculum in terms of Key Stage and Year Group. Within each Year Group, the areas of study e.g. classification, are placed within a sequence of learning (topic) in which relevant and meaningful links with other curriculum subjects can be made. Where this is not possible, the remaining areas of study are slotted into the most appropriate gaps e.g. Light in Year Six. We have also considered factors such as the weather when planning our sequencing. For example, Year Three study plants in the Summer Term as there is a greater chance of success when growing a plant from seed. Lastly, we aim to highlight three substantive concepts which we consider to be integral to the subject of Science – The Natural World, Innovation and Invention and Change Over Time. We weave these ideas throughout our topics to further increase the relevance and real-world application of the learning the children encounter.</p>		
	Autumn 1	Autumn 2	Spring 1
	Classification	Habitats and Food Chains	The Digestive System
	Key Knowledge	Key Knowledge	Key Knowledge
	A classification key asks questions to group living things. Living things can be identified using the 7 life processes (MRS GREEN) which are: movement, respiration, sensitivity, growth, reproduction, excretion & nutrition. Vertebrates can be classified into five main groups: mammals, fish, birds, amphibians and reptiles.	A food chain consists of producers, consumers, predators and prey. A habitat is a specific location where a living thing resides. Environments are constantly changing and that this can sometimes pose dangers to animals.	The digestive system produces energy from food and excretes waste products. The digestive system includes: mouth, tongue, teeth, oesophagus, stomach and intestines. Humans have 3 different types of teeth each with a specific purpose: canines, incisors and molars.
	Other Knowledge	Other Knowledge	Other Knowledge
	Living things are either plants or animals. The main difference between plants and animals is that plants can make their own food (photosynthesis). Animals are either vertebrates (with a backbone) or invertebrates (without a backbone). Mammals are warm blooded, have hair or fur; have mammary glands and are breast-fed; and give birth to live young. Amphibians are cold blooded, have moist skin, lay their jelly-like eggs in water and can live on both land and in water. Reptiles are cold blooded, have dry scales and lay leathery eggs on land. Fish are cold blooded; have gills, scales and fins; and lay jelly-like eggs in water. Birds are warm blooded; have feathers and wings; and they lay hard-shelled eggs on land.	Energy is produced by the sun, so all food chains begin with the sun. A producer is type of plant. A consumer eats or consumes a plant or animal in the food chain. A predator eats the prey. The prey eats the producer. In a food chain, the arrow represents the transfer of energy, and is labelled 'is food for'. A habitat provides what a living thing needs to survive (MRS GREEN) Organisms need to adapt to their environment to thrive	Within animals, including humans, nutrients and water are transported through the blood. The mouth produces saliva to start breaking down food. The tongue and teeth work together to chew food. The oesophagus transports food to the stomach. Acid in the stomach breaks down food further. Food is transported through the small intestine by peristalsis and nutrients are absorbed into the blood here. Food is transported through the large intestine by peristalsis and further nutrients and water are absorbed into the blood. Canines are pointed and help to tear and pierce food. Incisors are sharp and help cut and chop food. Molars are large and flat teeth and they grind and chew food.
	Key Skills	Key Skills	Key Skills
	Plan: Ask relevant and considered questions about an observation Record: Gather, record, classify and present data in a variety of ways to be able to independently answer questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables and begin to know when which is most appropriate.	Plan: Ask relevant and considered questions about an observation Record: Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables and begin to know when which is most appropriate. Review: Independently use results to draw simple conclusions, make predictions for new values.	Plan: Ask relevant and considered questions about an observation To know which type of enquiry is required to answer a given question. To come up with a verbal method for an enquiry to a given question. Do: Set up simple practical enquiries, comparative and fair tests Make systematic and careful observations Record: Gather, record, classify and present data in a variety of ways to be able to independently answer questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables and begin to know when which is most appropriate. Review: Independently use results to draw simple conclusions, make predictions for new values. With support, suggest improvements and raise further questions Report on findings from enquiries through: more detailed oral and written explanations
	Key Vocabulary	Key Vocabulary	Key Vocabulary
Respiration —the act of breathing Sensitivity —reacting to changes in the surrounding environment Excretion —getting rid of waste products from the body Reproduction - the process by which living things create young or offspring. Nutrition —the process of eating healthy food for living and growing Classification key —a series of questions used to classify a living organism Characteristic —a special quality or trait that makes a person or animal different or the same as others Warm-blooded —blood is kept at a temperature by the body Cold-blooded —the temperature of the blood is dependent on the environment Vertebrates —animals with backbones Invertebrates —animals without backbones	Food chain —a series of organisms which depend upon the next organism as a source of food / energy Producer —produces energy at the very beginning of a food chain Consumer —something which eats something else in a food chain Prey —an animal hunted down by a predator Predator —an animal that hunts other animals Carnivore —an animal that only eats other animals Omnivore —an animal that eats both other animals and plants Herbivore —an animal that only eats plants Habitat —the natural home or environment of an animal or plant Adaptation: the process of change to make a living thing better suited to its environment. Environment —the surroundings in which an animal or plant lives Diet — the type of foods which humans or animals usually eat	Nutrition — the process of eating healthy food for living and growing Digestion — the process of food gradually being broken down into simple soluble substances. Digestive system: the organs which digest food. Molar and premolar: large, flat teeth which chew and grind food at the back of the mouth Incisor: front teeth which chop and cut food. Canine: pointy teeth which rip and tear meat. Oesophagus: the long tube between the mouth and the stomach. Stomach: a sack-like, muscular organ that is attached to the oesophagus. When food enters the stomach, it is churned with lots of acid Small Intestine: the long, thin winding tube that food goes through after it leaves the stomach. Large Intestine: the shorter wider tube that follows the small intestine. Rectum: the lower part of the large intestine, where faeces (poo) is stored before it leaves the body. Anus: the opening at the end of the digestive system from which solid waste leaves the body. Saliva: the liquid in your mouth which helps to aid digestion	
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Science - Progression		
Spring 2	Summer 1	Summer 2
States Of Matter	Electricity	Sound
Key Knowledge	Key Knowledge	Key Knowledge
Materials are made up of particles Materials can have 3 different states - solid, liquid or gas Materials can change state if heated or cooled.	Electricity can only flow around a complete circuit. An electrical conductor will allow electricity to pass through it easily. An electrical insulator does not allow electricity to pass through it.	Sounds are made by vibrations travelling through a medium to the ear. The size of a vibration will affect volume. The speed of a vibration will affect pitch.
Other Knowledge	Other Knowledge	Other Knowledge
A solid is a material in which all particles are so tightly packed they cannot move and so have a fixed volume. A liquid is a substance where the particles are able to move a little and can be poured—the volume is still fixed. A gas is a substance in which the particles freely roam with speed and it will fill the space it is in. Evaporation and condensation occur in the water cycle. Evaporation is when a liquid is heated and changes to a gas. Condensation is when a gas is cooled and turns to a liquid. The rate of evaporation is linked to temperature. Temperature is measured in degrees Celsius (°C).	Common appliances—fridges, kettles, ps4s— run on electricity. A simple circuit must include cells and wires and can also include bulbs, switches and buzzers. 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. A switch opens and closes a circuit. A lamp will not light if the switch is open. The source of electricity can be from a battery or from the mains (plug in a wall) Most metals are good conductors, as is water Plastic, rubber and wood are examples of good insulators.	The size of an instrument or the size of its parts can affect the speed of a vibration. The human ear is divided into 3 parts: the outer ear, the middle ear and the inner ear. The human ear contains the 3 smallest bones in the body.
Key Skills	Key Skills	Key Skills
Plan Ask relevant and considered questions about an observation To know which type of enquiry is required to answer a given question. To come up with a verbal method for an enquiry to a given question. Do Set up simple practical enquiries, comparative and fair tests Make systematic and careful observations Take accurate measurements using standard units and a range of equipment (use of rulers, scales, log meters to the nearest whole or half unit) Record Gather, record, classify and present data in a variety of ways to be able to independently answer questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables and begin to know when which is most appropriate. Review Independently use results to draw simple conclusions, make predictions for new values. With support, suggest improvements and raise further questions Report on findings from enquiries through: more detailed oral and written explanations	Plan Ask relevant and considered questions about an observation To know which type of enquiry is required to answer a given question. To come up with a verbal method for an enquiry to a given question. Do Set up simple practical enquiries, comparative and fair tests Make systematic and careful observations Record: Gather, record, classify and present data in a variety of ways to be able to independently answer questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables and begin to know when which is most appropriate. Review: Independently use results to draw simple conclusions, make predictions for new values. With support, suggest improvements and raise further questions Report on findings from enquiries through: more detailed oral and written explanations	Plan Ask relevant and considered questions about an observation. Do: Set up simple practical enquiries, comparative and fair tests Take accurate measurements using standard units and a range of equipment (use of rulers, scales, log meters to the nearest whole or half unit) Record Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables and begin to know when which is most appropriate. Review Independently use results to draw simple conclusions, make predictions for new values. Report on findings from enquiries through: more detailed oral and written explanations
Key Vocabulary	Key Vocabulary	Key Vocabulary
States of matter - the three different forms which materials can be in. (solids, liquids and gases) Particles - an extremely tiny piece of matter Solids - Objects that hold their shape because particles are arranged close together e.g. bricks or coins. Liquids - substances that flow easily because particles are further apart e.g. water or oil. Gases - air-like substances that don't have a shape because particles are far apart and move around freely. Properties - something about a material that we can measure, see or feel Boiling point - the temperature at which a liquid bubbles and turns from a liquid to a gas (e.g. Water's boiling point is 100 degrees Celsius) Freezing point - the temperature at which a liquid turns into a solid. It occurs when heat is lost from an object. (e.g. Water's freezing point is 0 degrees Celsius) Melting - the process of changing something from a solid into a liquid because heat is applied. (Ice turning into water). Solidifying - to make or become a solid because heat is reduced. Condensation - process in which gas changes into a liquid because heat is reduced. Evaporation - the process of a liquid becoming a gas because heat is applied. Temperature - the degree of hotness or coldness that can be measured using a thermometer Water cycle - the path that all water follows as it moves in different states around our planet. Thermometer —the instrument used to measure temperature Fair test - a scientific test where one factor is changed and everything else stays the same	Electricity - the flow of tiny particles called electrons and protons that flow from place to place. Electrical appliances - items that need electricity to work, such as a kettle, toaster, oven, fridge. Electrical circuit - a complete circle around which electricity can flow. Cells - an electrical power supply that allows energy to flow through a circuit. Component —the individual parts of a circuit e.g. wires, bulbs and buzzers are all components. Wires - carry the electric current to various parts of an electrical system. Bulbs - a device used to convert electricity into light. Buzzers - an electrical device that makes a buzzing noise. Battery - a container that stores energy until it is needed. Electrical Insulator - materials that do not allow electricity to pass through them such as plastic, rubber, wood and glass. Electrical Conductor - materials that allow electricity to flow through easily, such as metal. Switch - something that stops or allows the flow of an electrical circuit. Plug — a device used to allow electricity to flow from an electric supply to an appliance. Mains electric — the electricity that is delivered to homes and businesses through an electric grid. Plugs in your home are often linked to the mains electric which is more powerful than a battery.	Vibrations - a rapid movement back and forth/up and down Sound - a type of energy made by vibrations due to the quick movement of air. Source —the item producing the vibrations. E.g. string instrument, speaker. Pitch - how high or low a sound is. Volume - how loud or quiet a sound is. Decibels - a unit for measuring the volume of a sound. Fair test - a scientific test where one factor is changed and everything else stays the same
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Science - Progression			
Year 5	<p>The aim of our Science curriculum at Baden-Powell is to support each and every child's understanding of their place in the diverse world in which they live: to learn about the links and direct impact that Science has had and continues to have on their everyday lives. Our school values of Respect, Friendship, Compassion, Aspiration and Resilience are woven into the Science curriculum and are referred to regularly. In particular, we encourage the Aspiration to find out more about the world and the Resilience to problem-solve and answer questions within different real-life scientific contexts. The knowledge and skills that we have chosen to include in our Science curriculum derive directly from the objectives set out in the National Curriculum (2014) and are in line with CLP guidance for Science. The sequencing of our Science curriculum follows the order set out in the National Curriculum in terms of Key Stage and Year Group. Within each Year Group, the areas of study e.g. classification, are placed within a sequence of learning (topic) in which relevant and meaningful links with other curriculum subjects can be made. Where this is not possible, the remaining areas of study are slotted into the most appropriate gaps e.g. Light in Year Six. We have also considered factors such as the weather when planning our sequencing. For example, Year Three study plants in the Summer Term as there is a greater chance of success when growing a plant from seed. Lastly, we aim to highlight three substantive concepts which we consider to be integral to the subject of Science – The Natural World, Innovation and Invention and Change Over Time. We weave these ideas throughout our topics to further increase the relevance and real-world application of the learning the children encounter.</p>		
	Autumn	Spring 1	
	What's The Matter	Our Earth and the Solar System	
	Key Knowledge	Key Knowledge	
	<p>A reversible change is one where a material can be returned to its original state. An irreversible change is one where a material cannot be returned to its original state. A solution is a combination of a liquid and a dissolved solid.</p>	<p>Earth is one of the 8 planets of the Solar System; they all orbit the Sun. The moon orbits the Earth (approximately every 28 days) Night and day occur because Earth rotates on its axis once every 24hrs.</p>	
	Other Knowledge	Other Knowledge	
	<p>Comparative and fair tests can be used to group everyday materials by their properties, including their hardness, solubility, conductivity (electrical and thermal), and response to magnets. A conductor is a material or device which is able to transmit a property through it. E.g. An electrical conductor allows electricity to flow through it. An insulator is material or device which is not able to transmit a property through it. E.g. A heat insulator doesn't allow heat through it. A mixture is a combination of two or more different materials. If a solid dissolves in a liquid it is said to be a soluble material. Mixtures can be separated through filtering, sieving or evaporating. A solution can be heated to evaporate the liquid and leave the solid. Everyday materials, such as metals, wood and plastic, are chosen for their uses due to their properties based on evidence from comparative and fair tests. Reversible changes of state include freezing, melting and evaporation, dissolving and mixing. Irreversible changes include burning, rusting and the action of acid on bicarbonate of soda.</p>	<p>The 8 planets of the solar system are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune The solar system we live in is called The Milky Way Galaxy. The sun is a star at the centre of our solar system A moon is a celestial body which orbits a planet. (Earth has 1 moon; Jupiter has 4 large moons and numerous other small ones) Earth takes one year to orbit around the Sun. Pluto was reclassified as a 'dwarf planet' in 2006 - additional knowledge The Sun, Earth and Moon are approximately spherical bodies. The tilt of the Earth's axis and the orbit around the Sun cause the seasons.</p>	
	Key Skills (Master list)	Key Skills (Autumn)	Key Skills
	<p>Plan: With some discussion, plan different types of scientific enquiries to answer their own questions about an observation. With input, identify the variables which will need to be controlled. Become familiar with the terms dependent and independent variables. Do: Take measurements using a range of scientific equipment (inc. previous equipment and thermometers) Increasing accuracy and precision (readings to nearest 1 decimal place where needed) With teacher input, take repeated readings where necessary Record: With guidance, record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Review: With guidance, use test results to make predictions to set up further comparative and fair testing With guidance, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations With prompting, identify scientific evidence that can be used to support or refute ideas or arguments</p>	<p>Plan: With input, identify the variables which will need to be controlled. Become familiar with the terms dependent and independent variables. Do: Take measurements using a range of scientific equipment (inc. previous equipment and thermometers) Record: With guidance, record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Review: With guidance, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations. With prompting, identify scientific evidence that can be used to support or refute ideas or arguments</p>	<p>Record: With guidance, record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Review: With prompting, identify scientific evidence that can be used to support or refute ideas or arguments</p>
	Key Vocabulary	Key Vocabulary	Key Vocabulary
<p>Solids - objects that hold their shape because particles are arranged close together e.g. bricks or coins. Liquids - substances that flow easily because particles are further apart e.g. water or oil. Gases - air-like substances that don't have a shape because particles are far apart and move around freely. Properties - something about a material that we can measure, see or feel Conductor - a material or substance which allows electricity (electrical conductor) or heat (thermal conductor) to pass through it. Insulator - a material or substance which does not allow electricity (electrical conductor) or heat (thermal conductor) to pass through it. Thermal - relating to heat Reversible change - a reversible change is a change that can be undone or reversed. Irreversible change - a change is called irreversible if it cannot be changed back again. In an irreversible change, new materials are always formed. Sometimes these new materials are useful to us. Burning and rusting are examples of irreversible changes. Solution - a combination of a liquid and a dissolved solid. Soluble - a solid which can be dissolved. Insoluble - a solid which cannot be dissolved. Dissolving - when a solid breaks down in a liquid so you can no longer see it. Mixture - a mixture contains two or more materials that are not chemically combined. Filter - to pass a mixture through a device to separate unwanted material. Sieve - a utensil used for separating different sized solids or solids from a liquid. Burning - a high-temperature, irreversible reaction between a fuel and oxygen, that produces smoke. Rusting - an irreversible reaction between iron and oxygen which produces rust. Fair test - a scientific test where one factor is changed and everything else stays the same Independent variable - something that might be changed in an experiment Dependent variable - something that might be measured in an experiment Y3/4: experiment, material, separate; Y5/6: equipment, temperature</p>	<p>Spherical - shaped like a sphere Solar system - the system which is made up of the Sun and all of the smaller objects that move around it. Orbit - movement around a star or planet. Rotate - the action of turning around a centre point. Axis - an imaginary line that an object turns around. This imaginary line runs directly through the object's centre, from the north to the south poles Star - an exploding ball of burning gas held together by gravity Planet - a large natural object that orbits, or travels around, stars. Gravity - the force which holds objects to Earth. The main planets in our solar system (The Milky Way) are called: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune Geocentric - an idea that the Earth is at the centre of the Universe Heliocentric - an idea that the Sun is at the centre of the Universe</p>		
cross-curricular links			

Science - Progression		
Spring 2	Summer 1	Summer 2
Life Cycles of Animals and Plants	Forces	
Key Knowledge	Key Knowledge	Key Knowledge
<p>All animals and plants have a life cycle Changes in the environment can impact the life cycle of animals and or plants There are two types of reproduction: sexual and asexual</p>	<p>Air resistance, water resistance and friction are forces that can affect a moving object Forces can be transferred through mechanical devices (gears, pulleys, levers) allowing a small force to have a greater effect. Objects fall towards the Earth because of the force of gravity.</p>	
Other Knowledge	Other Knowledge	Other Knowledge
<p>Most animals reproduce by sexual reproduction. Sexual reproduction involves two parents where the sperm from the male fertilises the female egg. Most mammals, including humans, give birth to live young (e.g. babies or kittens) whilst others lay offspring as eggs (e.g. snakes and chickens) Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Examples of asexual reproduction are bulbs, tubers, runners and plantlets and this involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.</p>	<p>Air resistance is when air pushes against the direction of the main driving force. Water resistance is when water pushes against the direction of the main driving force. Friction is the resistance that one surface encounters when moving over another - i.e. rubbing. The mass of an object is a measurement of how much matter is in it. It is measured in kilograms (Kg). The weight of an object is the force acting on an object due to gravity. It is measured in newtons (N).</p>	
Key Skills	Key Skills	Key Skills
<p>Record With guidance, record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Review With guidance, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations With prompting, identify scientific evidence that can be used to support or refute ideas or arguments</p>	<p>Plan: With input, identify the variables which will need to be controlled. Become familiar with the terms dependent and independent variables With some discussion, plan different types of scientific enquiries to answer their own questions about an observation. Do: Take measurements using a range of scientific equipment (inc. previous equipment and thermometers) Increasing accuracy and precision (readings to nearest 1 decimal place where needed) Record: With guidance, record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Review: With prompting, identify scientific evidence that can be used to support or refute ideas or arguments With guidance, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations</p>	
Key Vocabulary	Key Vocabulary	Key Vocabulary
<p>Life cycle - the changes in a life of a living organism Reproduction - the process by which living things create young or offspring. Sexual reproduction - reproduction through combining cells from two different living organisms. Asexual reproduction - reproduction which does not require two 'parents' to reproduce. Gestation period - the time it takes for a living thing to develop in the womb before birth. Pollination - the transfer of pollen from one plant to another. Germination - the development of a plant from a seed. Sperm - the human male's sex cell Fertilisation - when two sex cells join together Egg - the human female's sex cell Metamorphosis - a process some animals go through to become adults. It is a series of physical changes. Metamorphosis is common in insects and amphibians. e.g. a caterpillar to pupa to a butterfly. Plantlets - a young plant Embryo - unborn or unhatched offspring Adolescent - a stage of life between being a child and being an adult Adult - a fully grown or developed animal or plant Migration - the movement of animals from one place to another</p>	<p>Gravity - the force which holds objects to Earth. Friction - a force between two surfaces sliding across each other Air resistance - a force that is caused by air. The force acts in the opposite direction to an object moving through the air. Water resistance - a type of force that uses friction to slow things down that are moving through water. It is often called drag. Buoyancy - the ability or tendency of something to float in water or other fluid Mass - a measurement of how much matter is in an object. It is measured in kilograms (Kg). Weight - the force acting on an object due to gravity. It is measured in newtons (N). Mechanism - any tool used to convert or control motion or transmit control or power Machine - a device that makes it easier to do work by increasing the force you can apply Lever - a simple machine which helps us to lift an object Pulley - a simple machine that makes it easier to lift or move a heavy object. It includes at least one wheel and a length of rope Gear - a rotating part in a machine that has teeth cut around its circumference Fair test - a scientific test where one factor is changed and everything else stays the same Independent variable - something that might be changed in an experiment Dependent variable - something that might be measured in an experiment Newton - a unit of measurement for a force, like a push or a pull, named after Sir Isaac Newton Upthrust - any force causing something to be pushed upwards</p>	
cross-curricular links		

Science - Progression			
Year 6	<p>The aim of our Science curriculum at Baden-Powell is to support each and every child's understanding of their place in the diverse world in which they live: to learn about the links and direct impact that Science has had and continues to have on their everyday lives. Our school values of Respect, Friendship, Compassion, Aspiration and Resilience are woven into the Science curriculum and are referred to regularly. In particular, we encourage the Aspiration to find out more about the world and the Resilience to problem-solve and answer questions within different real-life scientific contexts. The knowledge and skills that we have chosen to include in our Science curriculum derive directly from the objectives set out in the National Curriculum (2014) and are in line with CLP guidance for Science.</p> <p>The sequencing of our Science curriculum follows the order set out in the National Curriculum in terms of Key Stage and Year Group. Within each Year Group, the areas of study e.g. classification, are placed within a sequence of learning (topic) in which relevant and meaningful links with other curriculum subjects can be made. Where this is not possible, the remaining areas of study are slotted into the most appropriate gaps e.g. Light in Year Six. We have also considered factors such as the weather when planning our sequencing. For example, Year Three study plants in the Summer Term as there is a greater chance of success when growing a plant from seed.</p> <p>Lastly, we aim to highlight three substantive concepts which we consider to be integral to the subject of Science – The Natural World, Innovation and Invention and Change Over Time. We weave these ideas throughout our topics to further increase the relevance and real-world application of the learning the children encounter.</p>		
	Autumn 1	Autumn 2	Spring 1
	The Circulatory System		Evolution and Inheritance
	Key Knowledge		Key Knowledge
	<p>The heart pumps blood around the body. Blood carries oxygen and nutrients around the body. Exercise can help keep the heart and lungs healthy.</p>		<p>Features in the offspring are inherited (passed on) from the parents. Adaptation is when a living thing changes to better suit its environment in order to survive. Evolution is the creation of a new species over a very long period of time, due to ongoing adaptation.</p>
	Other Knowledge		Other Knowledge
	<p>There are several types of blood vessels: Capillaries are small vessels where oxygen and carbon dioxide are exchanged. Arteries carry oxygenated blood AWAY from the heart Veins transport deoxygenated blood back TO the heart. Platelets help the blood to clot as a means to heal a wound and to cease blood loss. A pulse (measured by feeling an artery) indicates the heart rate. Exercise will affect your pulse and respiratory rate due to an increased demand of oxygen. The lifestyle choices a person makes will impact how their bodies function.</p>		<p>All living things have offspring of the same kind Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. Over time, these inherited characteristics become more dominant within the population. Fossils give us evidence of what lived on the Earth millions of years ago and provide evidence to support the theory of evolution. Scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.</p>
	Key Skills		Key Skills
	<p>Plan: To independently plan different types of scientific enquiries to answer their own questions about an observation To independently identify the variables which will need to be controlled. Do: Take measurements using a range of scientific equipment (inc. all equipment so far) Increasing accuracy and precision (readings to 1 decimal place where needed) Able to independently spot incorrect readings. Independently know when to take repeated readings. Record: Independently record data and results of increasing complexity using the most appropriate scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using the most appropriate for the data. Review: Independently, use test results to make predictions to set up further comparative and fair testing Independently, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations Independently, identify scientific evidence that can be used to support or refute ideas or arguments</p>		<p>Record: Independently record data and results of increasing complexity using the most appropriate scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using the most appropriate for the data. Review: Independently, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations Independently, identify scientific evidence that can be used to support or refute ideas or arguments</p>
	Key Vocabulary		Key Vocabulary
<p>respiration—the act of breathing that causes the exchange of oxygen and carbon dioxide (added to Y4 definition) Inhalation - breathing in exhalation - breathing out artery - a blood vessel that carried blood AWAY from the heart capillary - tiny blood vessels connecting arteries to veins. These blood vessels carry oxygen and nutrients to individual cells throughout the body vein - a blood vessel that carries blood back TO the heart gas exchange - the delivery of oxygen from the lungs to the bloodstream, and the elimination of carbon dioxide from the bloodstream to the lungs pulse - the beating of your heart that you can feel in the arteries in your neck or wrist lungs - the organ where gas exchange occurs heart - the organ which pumps your blood around your body oxygen - the gas we inhale carbon dioxide - the gas we exhale circulatory system - this includes the heart and all the vessels which pump the blood around the body. fair test - a scientific test where one factor is changed and everything else stays the same diet— the type of foods which humans or animals usually eat nutrition— the process of eating healthy food for living and growing independent variable – something that might be changed in an experiment dependent variable – something that might be measured in an experiment</p>		<p>offspring: an animal's young (children) adaptation: the process of change to make a living thing better suited to its environment. Inheritance: the process by which genetic information is passed on from a parent to a child species: a group of living organisms consisting of similar individuals capable of exchanging genes or breeding with each other. evolution: the process by which different kinds of living organism are believed to have developed from earlier forms during the history of the earth by the long-term process of adaptation. evolve: to develop/change gradually vary: to differ in a characteristic. characteristic— a special quality or trait that makes a person or animal different or the same as others</p>	
cross curricular links			

Science - Progression		
Spring 2	Summer 1	Summer 2
Classification	Electricity	Light
Key Knowledge	Key Knowledge	Key Knowledge
<p>Living things can be grouped by identifying specific characteristics. Some living things cannot be classified as plants or animals. Invertebrates have different sub-groups including insects, arachnids, molluscs and annelids:</p>	<p>There are recognised symbols for cells, wires, bulbs, switches and buzzers which are used when drawing a simple circuit diagram. The brightness of a lamp or the volume of a buzzer depends on the voltage in the circuit. The more bulbs/buzzers in a simple circuit the less bright/loud each will be.</p>	<p>Light appears to travel in straight lines We see things because light from a source travels or is reflected to our eyes Shadows will have the same outline as the shape blocking the light.</p>
Other Knowledge	Other Knowledge	Other Knowledge
<p>Molluscs: have antennae, a radula (tongue-like structure) and a mantle (overhang of the top body wall) Arachnids (spiders): Most have 8 jointed legs and 2 part body. No antennae or wings Insects: 3 part body, may have wings, antennae and compound eyes Annelids: worm like body, bilateral symmetry, segmented bodies with no hard skeleton Micro-organisms and fungi are examples of living things which are neither plants or animals.</p>	<p>A switch works by breaking and making a circuit. A parallel circuit is a circuit in which there is more than one path for the current to follow. There are advantages of using parallel circuits. The term voltage refers to a force. The term current refers to the number of electrons. Voltage can be increased by increasing the number of cells or choosing a cell with a higher voltage.</p>	<p>The parts of the human eye each have a function which allows the eye to see. Refraction is when light passes from one medium to another and it changes direction, e.g. light passing from air to water. White light comprises of all colours in the colour spectrum. A spectrum occurs because the different colours of the white light travel at different speeds</p>
Key Skills	Key Skills	Key Skills
<p>Record: Independently record data and results of increasing complexity using the most appropriate scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using the most appropriate for the data. Review: Independently, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations Independently, identify scientific evidence that can be used to support or refute ideas or arguments</p>	<p>Plan: To independently plan different types of scientific enquiries to answer their own questions about an observation To independently identify the variables which will need to be controlled. Do: Take measurements using a range of scientific equipment (inc. all equipment so far) Able to independently spot incorrect readings. Record: Independently record data and results of increasing complexity using the most appropriate scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using the most appropriate for the data. Review: Independently, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations Independently, identify scientific evidence that can be used to support or refute ideas or arguments</p>	<p>Plan: To independently plan different types of scientific enquiries to answer their own questions about an observation To independently identify the variables which will need to be controlled. Do: Take measurements using a range of scientific equipment (inc. all equipment so far) Record: Independently record data and results of increasing complexity using the most appropriate scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs using the most appropriate for the data. Review: Independently, report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results (spot anomalies), in oral and written forms such as displays and other presentations</p>
Key Vocabulary	Key Vocabulary	Key Vocabulary
<p>Classification—the process of sorting items into groups Classification key—a series of questions used to classify a living organism Micro-organism—a microscopic organism. E.g. bacteria and viruses Characteristic— a special quality or trait that makes a person or animal different or the same as others Vertebrates—animals with backbones Invertebrates—animals without backbones</p>	<p>Electricity - the flow of tiny particles called electrons and protons that flow from place to place. Electrical circuit - a complete path around which electricity can flow. Simple Circuit: a simple circuit is a circuit in which there is only one route for the current to flow through. Voltage: (V)— the 'push' (force) that makes the electrons move through the wire. This comes from the battery. Current: (A)— the number of electrons that are moving around the wires with a certain amount of energy. Electrons: a negatively charged particle. Circuit Diagram: the scientific way of drawing a circuit which uses recognised symbols for the components. Fair test - a scientific test where one factor is changed and everything else stays the same Independent variable – something that might be changed in an experiment Dependent variable – something that might be measured in an experiment</p>	<p>Light rays—a straight line of light coming from a light source. Light source – where light comes from e.g. the sun, a bulb, a torch, a candle Fair test - a scientific test where one factor is changed and everything else stays the same Independent variable – something that might be changed in an experiment Dependent variable – something that might be measured in an experiment Translucent - lets through some light through Opaque – lets no light pass through Transparent - lets all light through giving a clear view of the other side Angle of Reflection—the angle at which light bounces off a surface Refraction—light bending as it travels from one thing to another Spectrum—a band of colours or a range of something, often seen when light is separated into its individual colours Medium—anything that helps energy travel from one place to another White Light— light that is actually made up of all the colors of the rainbow mixed together Prism—a piece of transparent material, like glass or plastic, that bends light as it passes through it</p>
cross curricular links		