Uplands Science Curriculum

Our science curriculum follows a two-year rolling programme and it fully covers the National Curriculum.

Our science curriculum has our five Big Ideas weaved throughout (diversity, the environment, similarities and differences, relationships and changes).

Within our science curriculum, we give children the opportunity to undertake many different investigations. These range from using materials, testing circuits, how to increase the speed of melting, growing plants and how exercise effects heart rate.

The curriculum will develop children's scientific knowledge and conceptual understanding through biology, chemistry and physics. They will have an understanding of nature, process and methods of science through scientific enquiries that will help them answer scientific questions. Children will then be equipped to use scientific knowledge to understand the uses and implications of science in the future and today.

Our science curriculum makes links to prior learning and is sequenced from reception to year 6.

We have planned an end of unit outcome for each of our science units and picked the key learning points that will enable our children to reach that end point. The key learning is the information we want our children to retain from that unit.

Science Key Learning Points and End of Unit Outcomes

Year A

	Autumn Term	Spring Term	Summer Term
Links	**Prior learning:** Development matters - Talk about what they see, using a wide vocabulary. **Future learning:** Owls – seasonal changes **Big ideas:** Changes and environment	**Prior learning:** Development matters - Talk about the differences between materials and changes they notice **Future learning:** Kestrels – states of matter (liquid, gas and solid) **Big ideas:** Changes and environment	**Prior learning:** Development matters - Talk about what they see, using a wide vocabulary. **Future learning:** Kestrels – how light helps us see, Eagles – how light travels **Big ideas:** Changes
Merlins	**Understanding the world** To understand the changes in Autumn and Winter • In Autumn, the leaves start to change colour and fall off. • In Winter, there are no leaves on the trees and it get colder ***End of unit enquiry question: What happens to the weather in Winter?***	**Understanding the world** To understand the changes that can happen to water • Water freezes when it is very cold • Ice melts when it gets warmer ***End of unit enquiry question: What happens to water when it is very cold?***	**Understanding the world** To know that we have day and night and there are 8 planets • It is day when the sun shines on our side of the world and it does not shine on the other side. • We live on planet Earth and there are 7 other planets. ***End of unit enquiry question: What happens when the sun is not shining on your side of the Earth?***
Vocab	**Autumn, winter, changes**	**Ice, water, freezing, melting**	**Day, night, planets**

Science Key Learning Points and End of Unit Outcomes

Year A

	Autumn Term	Spring Term	Summer Term
Links	**Future learning:** Eagles – how properties can change and be reversible and irreversible **Big ideas:** Similarities and differences	**Previous learning:** Merlins - Seasonal changes **Future learning:** Kestrels –plants **Big ideas:** Environment and changes	**Future learning:** Eagles – lifecycles and reproduction **Big ideas:** Environment, similarities and differences and changes
Owls	**Everyday materials** To understand what material an object is made from and to group everyday materials based on their physical properties • Objects are made from specific materials such as wood, plastic, rock, glass, cardboard and metal. • Materials have properties: such as hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. ***End of unit enquiry question: What material is waterproof?***	**Plants** To understand what a plants needs to grow, the different parts of a plant and to identify deciduous and evergreen trees • A plant needs water, sunlight, earth, air and space. • A plant has a stem, root, bulb, leaves and petals. • Evergreen trees keep their leaves all year round and deciduous trees lose their leaves in Autumn. ***End of unit enquiry question: How do seeds grow in different conditions?***	**Living things and their habitats** To identify and name a variety of plants and animals in their habitats, including micro-habitats • A habitat is a natural environment where an animal or plant can live. • A microhabitat is the smallest part of an environment where a plant or animal can live. • A savannah is a grassy plain with few trees in a hot country. • A desert is a barren landscape with very little rain. • A forest is a larger area covered with trees and plants • An ocean is a large area of water between continents ***End of unit enquiry question: Why is a habitat so important to animals and plants?***
Vocab	**Rock, plastic, glass, cardboard, metal, absorbent, waterproof, transparent, opaque**	**Stem, root, bulb, leaves, petals, evergreen and deciduous**	**Habitat, microhabitat, Savannah, Desert, Forest, Ocean**

Science Key Learning Points and End of Unit Outcomes

Year A

	Autumn Term	Spring Term	Summer Term
Links	**Future learning:** Eagles – how volts effect circuits **Big ideas:** Changes	**Future learning:** Eagles – gravity's effects on objects falling on earth **Big ideas:** Changes and environment	**Future learning:** Eagles – evolution and inheritance (fossils). **Big ideas:** Environment, change and similarities and differences
Kestrels	**Sound and electricity** To understand where electricity comes from, how an electrical circuit works and how sound is created and how it travels • Electricity is a secondary source that is created at power stations. • An electrical circuit will only work when it is complete. • A conductor allows things to pass through and an insulator does not allow things to pass through. • Sound is made through tiny vibrations that travel through your ear canal and send messages to the brain. • As sound travels the vibrations spread so sound becomes smaller the further it travels. • Sound can change pitch through longer or shorter vibrations ***End of unit enquiry question: What materials are electrical conductors?***	**Forces and magnets** To understand that some forces need contact between two objects and magnetic forces can act at distance. • Some forces need contact between two objects • Forces can make objects stop and start moving. • Air resistance is a force that slows something down as it moves through the air. • Friction is the resistance of one surface or object encounters when moving over another • Gravity is a force that pulls two objects towards each other. • Magnets have two poles and the opposite poles attract and the two same poles will push away from each other ***End of unit enquiry question: Which materials are magnetic and non-magnetic?***	**Rocks** To recognise how life changed in the UK from the Stone Age period to the Iron Age. • Metamorphic rocks are made from other rocks, when they are changed from hear or pressure. • Igneous rocks are formed from cooled melted magma and are very hard and have lots of crystals. • Sedimentary rocks are made up of lots of players of sediment that fall on top and they are formed under water. • Fossils are formed when animals or plants die and are covered in sediment that is then washed away and an imprint is left which is then dug up • Soil is a mixture of organic matter, minerals, gases, liquids, and organisms that together support the life of plants ***End of unit enquiry question: What type of rock is best to use to build a house in the Stone Age?***
Vocab	**Circuit, conductor, insulator, vibrations, pitch**	**Gravity, air resistance, friction, magnets, poles, attract, repel**	**Metamorphic, igneous, sedimentary, lava, magma**

Science Key Learning Points and End of Unit Outcomes

Year A

	Autumn Term	Spring Term	Summer Term
Links	**Previous learning:** Owls – basic needs of humans/Kestrels – digestive system. **Future learning:** KS3 - Structure and function of living organisms/ Genetics and evolution. **Big ideas:** Similarities and differences, changes and relationships	**Previous learning:** Owls – habitats/Kestrels – plants. **Future learning:** KS3 - Structure and function of living organisms/Material cycles and energy. **Big ideas:** Changes and similarities and differences	**Previous learning:** Kestrels – conductors, insulators and complete circuits **Future learning:** KS3 - Electricity and electromagnetism. **Big ideas:** Changes
Eagles	**Animals, including humans and evolution and inheritance** To name the parts of the circulatory system, functions of the heart, recognise how living things and humans change over time and understand the process of adaptation. • The heart pumps blood from the veins into the arteries throughout the body. • The circulatory system delivers nutrients and oxygen to all cells in the body. • The gestation period is the time to develop from conception to birth. • Adaptation means the process of change by which an animal or plant becomes better suited to its environment. • Evolution is the way living things have changed over time. • Inheritance means that animals pass on specific traits to their offspring, but there will be some variation. ***End of unit enquiry question: What happens to the heart when you exercise?***	**Living things and their habitats** To describe different lifecycles and reproduction of plants and animals and describe how living things are classified into broad groups. • The life cycle is the series of changes in the life of an organism including reproduction. • Fertilisation can happen externally (outside of the body) or internally (inside the body). • Some plants use the process of sexual reproduction and some use asexual reproduction • A classification key is a set of questions that are used to identify a group something belongs to. ***End of unit enquiry question: What is a lifecycle and how do they differ in plants and animals?***	**Electricity** To understand how the amount of volts being used can effect a circuit and compare how and give reasons for variations in how components function • Electricity is man-made and natural. • A circuit is a complete path around which electricity can flow. • A current is the steady flow of electrons and voltage is the force that makes the electrical current flow. • A variable it something that varies, changes or can be changed. • A fair test is a rest that controls all but one variable when attempting to answer a scientific question. ***End of unit enquiry question: Does wire length affect how components work in a circuit?***
Vocab	**Veins, arteries, circulation, gestation, adaptation, evolution**	**Organism, reproduction, lifecycle, fertilisation,**	**Volt, electrons, variable, component**

Science Key Learning Points and End of Unit Outcomes

Year B

	Autumn Term	Spring Term	Summer Term
Links	**Prior learning:** Development matters - Talk about what they see, using a wide vocabulary. **Future learning:** Owls – seasonal changes **Big ideas:** Changes and environment	**Prior learning:** Development matters - Talk about the differences between materials and changes they notice **Future learning:** Kestrels – states of matter (liquid, gas and solid) **Big ideas:** Changes and environment	**Prior learning:** Development matters - Talk about what they see, using a wide vocabulary. **Future learning:** Kestrels – how light helps us see, Eagles – how light travels **Big ideas:** Changes
Merlins	**Understanding the world** To understand the changes in Autumn and Winter • In Autumn, the leaves start to change colour and fall off. • In Winter, there are no leaves on the trees and it get colder ***End of unit enquiry question: What happens to the weather in Winter?***	**Understanding the world** To understand the changes that can happen to water • Water freezes when it is very cold • Ice melts when it gets warmer ***End of unit enquiry question: What happens to water when it is very cold?***	**Understanding the world** To know that we have day and night and there are 8 planets • It is day when the sun shines on our side of the world and it does not shine on the other side. • We live on planet Earth and there are 7 other planets. ***End of unit enquiry question: What happens when the sun is not shining on your side of the Earth?***
Vocab	**Autumn, winter, changes**	**Ice, water, freezing, melting**	**Day, night, planets**

Science Key Learning Points and End of Unit Outcomes

Year B

	Autumn Term	Spring Term	Summer Term
Links	**Prior learning:** Owls – living things and their habitats. **Future learning:** Kestrels – digestive system, Eagles – functions of the heart and adaptation **Big ideas:** Environment, changes and relationships	**Prior learning:** Owls – animals including humans Autumn term. **Future learning:** Kestrels – bones, muscles and tendons **Big ideas:** Changes and similarities and differences	**Previous learning:** Merlins – daylight and night time **Future learning:** Eagles – rotation of the Earth causing day and night **Big ideas:** Changes, environment and similarities and differences
Owls	**Animals including humans** To understand how to identify and name animals and know the basic needs of humans and animals. • A food cycle is the energy transferred from between organisms in an ecosystem. • A vertebrate is an animal with a backbone and invertebrate is an animal that does not have a backbone. • An herbivore is an animal that eats just plants, a carnivore is animal that eats meat and an omnivore is an animal that eats meat and plants. • An animal is suited to the habitat that it lives in ***End of unit enquiry question: How do scientist group animals by what they eat?***	**Animals including humans and everyday materials** To be able to label the parts of a human and to find out how solid materials can change. • Human bones are important because it keeps us stable and protects our organs. • Humans have five senses that are smell, sight, touch, taste and hearing. • Humans need to have a balanced diet and to exercise to stay healthy • Different objects are made from different materials. • Different materials have different properties. ***End of unit enquiry question: How can you keep your body healthy?***	**Seasonal change** To understand the change across the four seasons and how that effects day and night • The summer has long and hot days usually; in Autumn the days are shorter and the leaves change colour; in Winter the days are shortest and it is usually cold; in Spring, the days become longer and flowers and plant start to grow. • The weather is different across all four seasons. • The length of day changes in all of the seasons. ***End of unit enquiry question: What are seasons and how do they differ?***
Vocab	**Energy transfer, ecosystem, herbivore, carnivore, omnivore, vertebrate, invertebrate**	**Senses, smell, sight, touch, taste, hearing, balanced diet**	**Autumn, winter, summer, spring, seasons**

Science Key Learning Points and End of Unit Outcomes

Year B

	Autumn Term	Spring Term	Summer Term
Links	**Previous learning:** Merlins – ice and water **Future learning:** Eagles – changes in properties when dissolving **Big ideas:** Changes and environment	**Previous learning:** Owls – food cycle, what plants need/Owls – human skeleton **Future learning:** Eagles – heart and circulatory system **Big ideas:** Changes and environment	**Previous learning:** Merlins – day and night, Kestrels – daylight length changing according to season **Future learning:** Eagles – how light travels **Big ideas:** Environment, changes and relationships
Kestrels	**States of matter** To understand that some materials change state when they are cooled or heated. • A solid is a matter made up of molecules that are tightly packed together and cannot move very much. • A liquid is a matter made up of small molecules that are packed quite close together that can move around. • A gas is a matter made up of small molecules that are really spread out. • Condensation is the process of a gas changing to liquid, water vapour condenses and becomes a liquid. • Evaporation is the process of liquid water changing into water vapour. ***End of unit enquiry question: Which materials change state when they are heated or cooled?***	**Animals, including humans, plants and living things and their habitats** To describe the simple functions of the basic parts of the digestive system and understand the impact of environmental change. • Humans get nutrients through food and drink and plants do it through photosynthesis. • The digestive system breaks down food for nutrients and get rid of what is not needed. • The skeleton is a framework for our muscles and protect our organs. • There are 638 muscles in the human body and tendons attach muscle to bone. • Environmental changes can have a negative and positive impact on habitats. • Roots absorb water and then this travels through the plant to the stem and to the tip of the plant • Insects pollinate plants by carrying pollen from one flower to another. ***End of unit enquiry question: How can environmental change impact animals' habitats?***	**Light** To recognise that we need light to see and a shadow forms when the light from a light source is blocked by a solid object. • Light can come from a variety of sources: sunlight, electric light and light caused by reactions. • Light reflects off different surfaces differently. • UV rays come from the sun • Dark is the absence of light. • A shadow is formed when a light travelling from a source is blocked. • A shadow can change size or shape depending on how big or small the object is or where the light source is blocked. ***End of unit enquiry question: What is a shadow and how can it change?***
Vocab	**Liquid, gas, solid, condensation , evaporation**	**Digestion, tendons, nutrients, pollination**	**UV light, reflection, shadow**

Science Key Learning Points and End of Unit Outcomes

Year B

	Autumn Term	Spring Term	Summer Term
Links	**Previous learning:** Kestrels – gravity, air resistance and friction **Future learning:** KS3 - Space physics **Big ideas:** Environment, changes and similarities and differences	**Previous learning:** Kestrels – gravity, air resistance and friction, needing light to see **Future learning:** KS3 - Motion and forces/Waves. **Big ideas:** Environment	**Previous learning:** Kestrels – states of matter, Owls – everyday objects **Future learning:** KS3 – Matter. **Big ideas:** Changes, similarities and differences and environment
Eagles	**Earth and space and forces** To describe the movement of the planets in the solar system and explain how gravity effects unsupported objects falling. • A planet is a celestial body that rotates around a star. • The Earth and moon rotate in an anti-clockwise direction. • As the Earth orbits the sun, the moon orbits the Earth. • The Earth takes 365 days to orbit the sun. • As the Earth rotates and parts of the Earth rotate away from the sun this causes day and night. • The moon has eight different phases which changes how it looks from Earth. ***End of unit enquiry question: Why does the moon look like it changes shape?***	**Forces and light** To explain that gravity acts on objects falling to Earth and light travels in a straight line. • Gravity is the name for a force that pulls everything down toward the centre of the Earth. • Air resistance is force that is caused by air, the air particles hit the object and make it harder to move through the air. • Water resistance is a type of force that uses friction to slow things down that are moving through water. • Levers, gears and pulleys are all mechanisms that make jobs easier to do. • Light travels from light sources to our eyes or from light sources to objects and then to our eyes. • Light is an energy that travels in waves in a straight line. ***End of unit enquiry question: What changes can be made to a shadow?***	**Properties and changes of materials** To know that materials will dissolve in liquid to form a solution and to understand that some changes of materials are reversible and irreversible. • Materials can be grouped by their conductivity, transparency, solubility and magnetism. • A solution is a mixture of two or more substances and to dissolve is a substance that is combined together in a liquid. • **Filtering** - The process of separating a mixture of an insoluble solid and a liquid. **Sieving** - the process of separating a mixture of two different sized solids **Evaporation** – the process of separating a mixture where the solid has dissolved in the liquid. **Reversible** - capable of being reversed so that the previous state or material is restored **Irreversible** - incapable of being reversed so that the previous state or material is restored ***End of unit enquiry question: What materials dissolve? Do they dissolve any quicker if we change the temperature of the water?***
Vocab	**Celestial, orbit, rotate, axis, lunar, solar, meteoroid**	**Newton, gravity, force, incident ray, reflected ray, transparent, translucent, opaque, spectrum, refraction**	**Conductivity, magnetic, transparency, solubility, dissolve, solution, filtering, sieving, evaporation, reversible, irreversible**