Science Long Term Plan

Journeying together with hope and aspiration

*At Parish, we value each person as they are, seeing every member of our school family as a precious, unique individual and treating them with **dignity**. Seeking first to understand through the building of relationships, we live in a **community** of **hope**. We aspire to enable each person to be a curious learner, inspired to develop the knowledge and **wisdom** to make the world a better place. We strive to encourage all to fulfil their God-given potential, having a confidence in transformation for the better.*

How does our vision impact Science at Parish?

Inspired by our Church school vision, we use our core four values to guide all aspects of our thinking and practice. Below is an explanation of how each of the core four impacts upon the teaching and learning of science at Gainsborough Parish.

 **Dignity** Children of all abilities are encouraged and nurtured to build on their knowledge of science. We support every child to be respectful of each others' own personal scientific predictions and ideas.	 **Community** We strive to provide pupils with the knowledge of science careers, scientists and inventors in our community and the wider world and prepare them to engage with the global scientific community through collaboration with others.
 **Hope** Through a curriculum rich in science capital, we aim to encourage all pupils to think that science is relevant and important to their lives, now and in the future, supporting them to succeed in their life experiences and in becoming confident, responsible citizens of the future.	 **Wisdom** We provide a Science curriculum that equips pupils with the foundations for understanding the world through biology, chemistry and physics which they experience first-hand through challenging and inspiring inquiry based opportunities.

EYFS	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6

Characteristics of effective learning	Children will engage in their learning through the characteristics of effective teaching and learning. The three characteristics of effective teaching and learning are: • **Playing and exploring** – children investigate and experience things and have a go • **Active learning** – children concentrate and keep on trying if they encounter difficulties and enjoy achievements • **Creating and thinking critically** – children have and develop their own ideas, make links between their ideas and develop strategies for doing things
EYFS Statutory Educational Programme: Understanding the World	Understanding the world involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension.
How might Science look within EYFS? Development Matters statements in bold	**Name and describe themselves and people who are familiar to them** *(describe changes to their growing bodies, look at pictures of themselves as babies and notice and describe changes that have taken place)* **Compare and contrast characters from stories** *(Frequently share fictional and non-fictional texts, images and tell oral stories that help children begin to deepen their understanding)* **Explore the natural world around them** *(provide children with frequent opportunities for outdoor play and exploration, encourage interactions with the outdoors, to foster curiosity and give children freedom to touch, smell and hear the natural world around them. Create opportunities to discuss how we care for the natural world, offer opportunities to sing songs and join in with rhymes and poems about the natural world. After close observation draw pictures of the natural world including animals and plants. Observe and interact with natural processes such as ice melting, sound causing a vibration, light travelling through transparent material, an object casting a shadow, a magnet attracting an object and a boat floating on water.)* **Describe what they see, hear and feel whilst outside** *(Encourage focused observation of the natural world. Listen to children describing and commenting on things that have seen whilst outside including plants and animals. Encourage positive interaction with the outdoor world, offering children a chance to take supported risks, appropriate to themselves and the environment in which they are in. Name and describe some plants and animals children are likely to see, encouraging children to recognise familiar plants and animals whilst outside.)* **Recognise some environments that are different to the one in which they live** *(Teach children about a range of contrasting environments within both their local or national region. Model the vocabulary needed to name specific features of the natural world both natural and man-made. Share non-fiction texts that offer an insight into contrasting environments. Listen to how children communicate their own understanding of contrasting environments through conversations and play e.g. role play/small world play.)* **Understand the effects of changing seasons on the natural world around them.** *(Guide children's understanding by drawing children's attention to the weather and seasonal features. Provide opportunities for children to note and record the weather. Select texts to share with the children about the changing seasons. Throughout the year, take children outside to observe the natural world and encourage children to observe how animals behave differently as the seasons change. Look for children incorporating their understanding through play.)*
Vocabulary	Vocabulary – enriching and widening (subject specific relating to overarching topics) Scientific vocabulary children will be exposed to: Question, answer, explore, test, experiment, investigate, observe, compare, describe, predict, sort, group, record, magnets, magnetic, freeze, melt, boil, sink, float, plant, grow, flower, tree, soil, roots, stem, stalk, leaves, petals, trunk, branches, seed, bud, blossom, life cycle, caterpillar, butterfly, chrysalis, transform, frogspawn, tadpole, froglet, frog, body parts, baby, adult, human, wood, metal, plastic, glass, rock, hard, soft, rough, smooth, mix, combine
End of year Expectations: (ELG)	**Understanding the World** **ELG: People, Culture and Communities** *Children at the expected level of development will:* - Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps; - Know some similarities and differences between different religious and cultural communities in this country, drawing on their experiences and what has been read in class; - Explain some similarities and differences between life in this country and life in other countries, drawing on **ELG: The Natural World** *Children at the expected level of development will:* - Explore the natural world around them, making observations and drawing pictures of animals and plants; Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Science Curriculum Cycle A

KS1 Focus	Why this, why now?	Lower KS2 Focus	Why this, why now?	Upper KS2 Focus	Why this, why now?

How does our world change in each season? **(Linked to Snap Science Y1 M1 – Seasons)**	This Biology module is taught across the year in Autumn Term 1, Spring Term 1 and Summer Term 2, so that children can observe the impact of the changing seasons on the world around them. It builds on EYFS exploration and understanding of the effects of changing seasons on the natural world around them and describing what they see, hear and feel whilst outside. It builds on children's experiences of animals and plants and explaining why some things occur. It allows children to experience the changing world, as they observe the effects that changing seasons and weather have on them and on the world around them. It will ensure that young children carry out regular and frequent observations of the world around them to build a rich knowledge of their local natural environment. Children will look closely at one space within the local area and return to it regularly throughout the year in order to see what has changed. On each visit there is a different focus, to help them to identify common natural events that happen across the year. This learning will prepare children for later learning in **'How do I grow plants?'** and ' **How do I grow healthy plants?'** later this year and Year 2 Biology (Living things and their habitats) in Cycle B **'What animals live in our local area?',** alongside **'What do the parts of a plant do?'** in LKS2.	**What different types of rocks are there?** **(Linked to Snap Science Y3 M1 – Rocks, soils and fossils)**	Although this is the first-time rocks, soils and fossils will have been explicitly taught, it will build on children's experiences in their everyday lives and the units already covered related to materials and their properties in KS1. In this unit children will work as 'Rock Detectives' establishing core knowledge and understanding of rocks, their relationship to soils and how fossils have formed over time. The work on fossils will then be further developed in Cycle A UKS2 **'What evidence is there that living things have changed over time?'** when children will learn about how fossils provide information about living things from the past.	**How do we classify living things?** **(Linked to Snap Science Y6 M1 – Classification of living things)**	This module is taught at the start of the autumn term when there are still plenty of living things easily found within and close to the school grounds for first-hand classification and the creation of branching keys. The work created at the end of this module can then also be used by LKS2 children in their classification module at the end of Cycle A '**How are vertebrates and invertebrates classified?'** Children have previously learnt about animal (vertebrate and invertebrate) classification, structure and stages of life and about common wild and garden plants and deciduous and evergreen trees and the differences between seed and bulb plant growth in KS1. In LKS2 they have learnt about classification of rocks, plants and animals and the use of branching keys. In this module, children will learn to describe how living things are classified into broad groups according to common observable characteristics and give reasons for classifying plants and animals based on specific characteristics. This prepares children for later learning about differences between species (Key Stage 3 Biology – Inheritance, chromosomes, DNA and genes).
Why do I need 5 senses? **(Linked to Snap Science Y1 M2 – Human body and senses)**	This develops knowledge and understanding of the human body, building on their early experiences during EYFS. The children identify and name simple parts of the body and are introduced to the concept of five senses that help them to find out about the world around them and how those link to particular parts of their body. This links to Cycle B when KS1 focus on **'What do animals need to be alive and healthy ?** where children learn more about humans; that they grow from tiny babies into adults, need exercise and the right types and amounts of food to help them to be healthy and leads on to **'Where does all the food we eat go?'** and '**How amazing are bodies?'** in LKS2 Cycle A where the children will learn about other human body systems and parts of the human body (skeletal). It will also prepare children for later learning in '**How are shadows made?'** and '**How does sound travel?'** in LKS2 Cycle A.	**How are shadows made?** **(Linked to Snap Science Y3 M2 – Light and shadows)**	Although this is the first-time light will have been explicitly taught, it will build on children's experiences of light in their everyday lives and the key knowledge previously learnt in Cycle A KS1 in **'Why do I need 5 senses?'** related to light being seen by the eyes and in modules about properties of materials (transparent, opaque).The key ideas in this unit of learning are that there needs to be light for us to see, that some things give out light and others reflect it, and that there are factors which affect the size of shadows. The children will return to light and shadows in UKS2 Cycle A **'How do I see?'**, when they will develop their knowledge of how light travels and how we see.	**What evidence is there that living things have changed over time?** **(Linked to Snap Science Y6 M2 – Evolution and inheritance)**	This builds on Cycle A Term 1 learning from LKS2 'What different types of rocks are there?' in which they learnt about how fossils are formed over time. It also builds on their knowledge of living things and how they are adapted to particular environments based on learning in LKS2. They are introduced to the idea that variation in organisms can result in the species becoming better adapted to its environment and that the process of natural selection, over a long period of time, leads to evolution. Although children may have been introduced to the concept of adaptation during their time at school, natural selection and evolution will not have been formally discussed at school prior to this unit. This prepares children for later learning about genetics, differences between species and variation within species (Key Stage 3 Biology – Inheritance, chromosomes, DNA and genes).
How do I grow plants? **(Linked to Snap Science Y2 M3 – Growing seeds and plants)**	Seasonal changes from **'How does our world change in each season?' (Autumn Term 1)** will be revisited again during this project. This Biology module is taught across the year, so that children can observe the impact of the changing seasons on the world around them. It allows children to observe animals in habitats and notice how they change through the year building on **What animals live in our local area?** and **'How do I sort and group animals?'** in Cycle B. This module builds on EYFS exploration of the natural world and is taught now in March/April so that the seeds and bulbs suggested for germinating can be planted outside and have time to grow into mature plants before the start of the summer holidays. It is taught before '**How do I grow healthy plants?' (Summer Term)** to distinguish between the conditions required for seed germination and those needed for healthy mature plant growth. It then leads on to **' What do the parts of a plant do?'** and **'Why are flowers important in the life cycle of a flowering plant?'** in LKS2 Cycle B, where children will learn about the functions of different parts of flowering plants; the requirements of plants for life and growth, and the way in which water is transported within plants.	**How amazing are bodies?** **(Linked to Snap Science Y3 M4 – Movement and nutrition for the human body)**	Movement and nutrition for the human body is a Biology topic which builds on what the children have previously learnt about the basic parts of the human body and their senses; about the basic needs of animals and about the importance for humans of exercise and eating the right amounts of different types of food in KS1. In this module, children will learn that animals need the right types and amount of nutrition and that humans and some other animals have skeletons and muscles for support, protection and movement. This prepares children for the next unit of learning about the functions of the basic parts of the digestive system in humans and the different types of teeth in in Cycle A LKS2 '**Where does all the food we eat go?'** The topic Animals, including humans is revisited in every subsequent year group in the Long Term Plan to ensure that key knowledge is secured.	**What's in space?** **(Linked to Snap Science Y5 M3 – Earth and space)**	This develops knowledge and understanding previously learnt about how day length varies with the seasons in KS1 and that the Sun and stars are light sources and the Moon is not in LKS2. In this module, children will learn to describe the movement of the Earth, and other planets, relative to the Sun in the solar system and explain day and night and the apparent movement of the Sun across the sky. Earth and space is an area of knowledge that is only included once in the Long Term Plan but it links to learning about light and draws on children's everyday experiences of day and night and the night sky. It is taught in this term to allow children to have previously seen the phases of the moon in the winter months and to still experience them. This module prepares children for later learning about stars and galaxies, differences in gravitational force, and the Earth's tilt as the explanation for seasonal variations (Key Stage 3 Physics – Space physics).
What material is this? **(Linked to Snap Science Y1 M3 – Naming and describing materials)**	Materials is a Chemistry topic, building on children's early experiences in Foundation stage where they will have explored materials using a variety of equipment and explored uses and changes to some simple materials. This prepares children for later learning about the observable properties of everyday materials in **'What are objects made from?** in KS1 Cycle B (Year 1 Chemistry – Everyday materials); about the suitability of a variety of everyday materials for particular uses in '**Which material should I choose?'** in KS1 Cycle B (Year 2 Chemistry – Uses of everyday materials); recognising how the shapes of some solid objects can be changed by	**Where does all the food we eat go?** **(Linked to Snap Science Y4 M4 – Digestion and food chains)**	This module on Digestion and food chains is a Biology topic that builds on the previous unit of learning in Cycle A LKS2 '**How amazing are bodies?'** In this module, children will learn the simple functions of basic parts of the digestive system in humans; identify different types of teeth and their simple functions and construct and interpret a variety of food chains. This prepares children for later learning about the circulatory system and how it links to the digestive system in Cycle A UKS2 **'How can I keep my body healthy?'** and Cycle B UKS2 **'What does my circulatory system do?'** and it links to	**How do I see?** **(Linked to Snap Science Y6 M3 – What light does)**	Children have previously learnt that light comes from light sources and we need it to see and how a shadow is formed and can be changed in LKS2 Cycle A '**How are shadows made?'** In this module, children will learn to use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye and to explain why shadows have the same shape as the objects that cast them. This module will prepare children for later learning in KS3 Physics where they will learn about light waves and the speed of light; explanations for images in mirrors, pinhole camera, refraction, lenses focusing light, how the

	squashing, bending, twisting and stretching in **'How many ways are there of changing the shapes of objects?'** KS1 Cycle A next term (Year 2 Chemistry –Uses of everyday materials); about rocks in '**What different types of rocks are there?**'(Year 3 Chemistry – Rocks) LKS2 Cycle A and solids, liquids and gases, and changes of state in '**What are changes of states?'**(Year 4 Chemistry – States of matter) in LKS2 Cycle B.		Cycle A UKS2 '**What evidence is there that living things have changed over time?'** where the children will develop further knowledge about adaptation and evolution.		eye works and colours, different frequencies of light and prisms splitting white light.
How many ways are there of changing the shapes of objects? **(Linked to Snap Science Y2 M5 – Changing materials)**	This Chemistry topic builds on learning and experiences from the previous unit in Cycle A KS1 **'What material is this?'** where the children learnt about distinguishing between objects and the materials from which they are made. In this module, the children will learn to find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. These ideas are then further developed in Cycle B LKS2 **'How do forces make objects move, speed up or change direction?**'	**How does sound travel?** **(Linked to Snap Science Y4 M5 – Sound)**	This builds on KS1 learning from Cycle A '**Why do I need 5 senses?'** when the children learnt about hearing. They will learn that sounds are made by something vibrating and that these vibrations travel through a medium to the ear so that we hear them. They will explore ways to change the pitch and volume of sounds. Sound is included only once in the National Curriculum for Key Stages 1 and 2, but links to work on materials and states of matter in Key Stage 2 and will be discussed in the context of learning about light in Year 3 and Year 5, comparing similarities and differences between light and sound. This module will prepare children for later learning in Key Stage 3 Physics about sound as a wave with speed and frequency.	**How can we compare, group and use materials?** **(Linked to Snap Science Y5 M2 – Properties and uses of materials)**	This Chemistry topic builds on what children have previously learnt about the properties of solids, liquids and gases and evaporation and condensation and the part played in the water cycle and about magnets and which materials are electrical conductors and electrical insulators in LKS2. In this module, children will learn to compare and group together everyday materials on the basis of their properties and give reasons for the particular uses of them. There is a clear link to learning about dissolving, solutions, separating mixtures, filtering, sieving and evaporating, reversible and irreversible changes in Cycle B UKS2 '**How can we mix and change materials?'**
How do I grow healthy plants? **(Linked to Snap Science Y2 M6 – Growing healthy plants)**	Seasonal changes from **'How does our world change in each season?' (Autumn Term 1)** will be revisited again during this project. This Biology module is taught across the year, so that children can observe the impact of the changing seasons on the world around them. This is taught now in the summer months because many flowering plants produce fruits in the summer and it links to the current unit of teaching and learning **'How do I grow healthy plants?'** Growing healthy plants is a Biology topic building on children's learning and experiences from the previous module in Cycle A KS1 **' How do I grow plants?'** where they learnt that seeds and bulbs grow into mature plants, and the conditions required for seeds to germinate. In this module, children will learn to find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. It will prepare them for later learning about the life cycle of flowering plants; about the function of different parts of flowering plants and about other conditions required for mature plant growth such as air and nutrients in LKS2 Cycle B '**What do the parts of a plant do?'** and '**Why are flowers important in the life cycle of a flowering plant?'**	**How are vertebrates and invertebrates classified?** **(Linked to Snap Science Y4 M6 – Classification of plants and animals)**	Classification of plants and animals is a Biology topic that builds on what the children have previously learnt in KS1 about animal classification and structure; wild and garden plants and deciduous and evergreen trees and the differences between seed and bulb plant growth. In this module, children will learn to recognise that living things can be grouped in a variety of ways and explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. This will prepare children for later learning about differences in animal life cycles and life processes in Cycle B UKS2 '**What do we know about plant and animal life cycles?'** and about the classification of living things in Cycle A UKS2 **'How do we classify living things?'**	**How can I keep my body healthy?** **(Linked to Snap Science Y6 M6 – Body health)**	This build on KS1 learning from Cycle B **What do animals need to be alive and healthy?** and LKS2 learning form Cycle A '**Where does all the food we eat go? and How amazing are bodies?'** where the children learnt about the types of food that humans and other animals need in order to stay alive. They will develop a deeper understanding of what constitutes a healthy diet, through exploring food groups and how the body uses them and how to keep their bodies health and how their bodies might be damaged (lifestyle choices, diet, exercise, drug use) and how these are informed by scientific evidence. In addition, this unit draws on children's learning in LKS2 about the functions of the skeleton and muscles as they explore the effects of exercise on the body and pulse rate and develop their understanding of the circulatory and respiratory systems. There is a clear link with work in **PSHE** and this unit is planned with this in mind. This unit also closely links to UKS2 Cycle B **'What does my circulatory system do?'**

Science Curriculum Cycle B

KS1 Focus	Why this, why now?	Lower KS2 Focus	Why this, why now??	Upper KS2 Focus	Why this, why now?
What animals live in our local area? **(Linked to Snap Science Y2 M1 – Local habitats)**	This builds on EYFS exploration and understanding of the effects of changing seasons on the natural world around them and describing what they see, hear and feel whilst outside. It develops knowledge linked to KS1 Cycle A learning **'How does our world change in each season?** This unit should be taught outside in the early autumn, when children are likely to see the most animals and to ensure that young children carry out regular and frequent observations of the world around them to build a rich knowledge of their local natural environment. In this module, children will make observations of animal life in the school grounds and local environment and identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants. Learning is built upon and developed further in subsequent year groups when the children identify, group and classify things in Cycle A – LKS2 **'How are vertebrates and invertebrates classified?'** and when they	**What are changes of states?** **(Linked to Snap Science Y4 M1 – Changes of state)**	Changes of state is a Chemistry topic building on children's experiences in KS1 about suitability of a variety of everyday materials for particular uses, based upon their properties and how temperature can be measured using a thermometer. In this module, children will learn to compare and group materials together, according to whether they are solids, liquids or gases; observe that some materials change state and measure or research the temperature at which this happens in degrees Celsius (°C). They will identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. This prepares children for later learning about dissolving, solutions, separating mixtures, filtering, sieving and evaporating and reversible and irreversible changes in Cycle A UKS2 ' **How can we compare, group and use materials?'** and in Cycle B UKS2 '**How can we mix and change materials?'**	**What different forces are there?** **(Linked to Snap Science Y5 M1 – Forces and Mechanisms)**	This unit builds on LKS2 learning about how things move on different surfaces, magnets and forces that need contact between two objects. In this module, children will learn about the force of gravity, the effects of air resistance, water resistance and friction and about levers, pulleys and gears. As children will learn more about measuring forces in Key Stage 3, they are just introduced to this in this module. This prepares children for later learning in KS3 when drawing force diagrams, learning about the turning effect of forces and measuring forces.

	construct food chains and identify predators and prey in Cycle A – LKS2 '**Where does all the food we eat go?'**				
What are objects made from? **(Linked to Snap Science. Y1 children on this cycle need to start with Y1 M3 Lesson 1 and 2 and then continue to Y1 M4 – Properties and used of materials)**	Properties and uses of materials is a Chemistry topic, building on children's early experiences in Foundation Stage of exploring the natural world and describing what they see and feel. It introduces children to a range of basic materials and their properties many of which will be familiar to them and allows children to learn to distinguish between an object and the material from which it is made; describe the physical properties of a variety of everyday materials and compare and group together a variety of everyday materials on the basis of their simple physical properties. The key knowledge is then further developed in Cycle B in KS1 in **'Which material should I choose?**' when the suitability of a range of materials for particular uses are evaluated. This then leads into learning about liquids, gases and changes of state in Cycle B – LKS2 **'What are changes of states?'** and learning about rocks Cycle A – LKS2 '**What different types of rocks are there?'**	**How do forces make objects move, speed up or change direction?** **(Linked to Snap Science Y3 M3 – Forces, frictions and magnets)**	This builds on KS1 learning from Cycle A **'What material is this?'** and '**How many ways are there of changing the shapes of objects?'** and Cycle B **'What are objects made from?'** and '**Which material should I choose?'** where the children were introduced to how materials can be changed by the actions of squashing, bending, twisting and stretching and how these link to the properties of materials. The children will investigate magnetic forces and also explore how forces can make objects start to move, speed up, slow down or change direction. They will compare how things move on different surfaces. This idea will be developed further in UKS2 Cycle B **'What different forces are there?'** when they will learn about friction, water resistance and air resistance and the forces involved in simple mechanisms and in Cycle B UKS2 '**How can we mix and change materials?'** where children learn how magnetism can be used to separate magnetic materials from a mixture.	**How can we mix and change materials?** **(Linked to Snap Science Y5 M5 – Separating mixtures and changing materials)**	Separating mixtures and changing materials is a Chemistry topic that consolidates knowledge learnt in LKS2 about comparing and grouping materials; the processes of evaporation and condensation in the water cycle and about pollution. This module is linked to Cycle A UKS2 'How can we compare, group and use materials?' and children will learn about dissolving and how to use knowledge of solids, liquids, and gases to decide how mixtures might be separated. They will learn about reversible and irreversible changes This prepares children for later learning about chemical reactions of different types in KS3.
What do animals need to be alive and healthy? **(Linked to Snap Science Y2 M4 – Growing up animals and humans)**	This is a Biology topic building on children's learning and experiences in the Early Years Foundation Stage about exploration of the natural world around them, making observations and drawing pictures of animals. In this module, children will learn that animals, including humans, have offspring which grow into adults; they will find out about and describe the basic needs for survival and the importance of exercise, eating the right amounts of different types of food, and hygiene. This prepares children for later learning about nutrition and about skeletons and muscles in humans and other animals in Cycle A LKS2 **'How amazing are bodies?';** about the human digestive system and teeth in Cycle A LKS2 '**Where does all the food we eat go?'** and about animal classification in Cycle A LKS2 '**How are vertebrates and invertebrates classified?'**	**How does an electrical circuit work?** **(Linked to Snap Science Y4 M2 – Electricity circuits)**	Although this is the first-time electricity will have been explicitly taught, it will build on children's experiences of electricity in their everyday lives and in EYFS and on the key knowledge previously learnt about uses of everyday materials in KS1. They will identify electrical appliances, distinguishing between those which are powered by mains and battery. They will explore the production of light, sound and movement by making simple series circuits with cells, wires, bulbs, buzzers and motors, learning the names of the components and recognising some common conductors and insulators. This is further developed in Cycle B in UKS2 through '**How can we vary the effects of electricity?'** when the children learn about adapting circuits by varying components and recording these circuits using circuit diagrams with standard symbols.	**What does my circulatory system do?** **(Linked to Snap Science Y6 M4 – Human Circulation)**	This module develops knowledge and understanding from LKS2 about the skeletal system and digestive system. In this module, children will learn to about the human circulatory system and ways in which nutrients and water are transported within animals, including humans. This will develop learning about how physical activity keeps our heart healthy as it is a muscle, and how drugs affect our health from Cycle A UKS2 '**How can I keep my body healthy?'**
Which material should I choose? **(Linked to Snap Science Y2 M2 – Choosing Materials)**	Choosing materials is a Chemistry topic, building on children's learning and experiences in EYFS of the Natural World where they have explored the differences they notice between materials and how they can be changed. It further develops earlier KS1 learning in Cycle B from '**What are objects made from?'** In this module, children will learn to identify and compare the suitability of a variety of everyday materials for particular uses. This prepares children for later learning about different kinds of rocks and their properties in Cycle A – LKS2 '**What different types of rocks are there?** and about solids, liquids, gases and changes of state in Cycle B – LKS2 **'What are changes of states?'**	**What impact do humans have on the environment?** **(Linked to Y3 M1 Lesson 3 and Y4 M3 – Human impact on the environment)**	This unit on Human impact on the environment builds on understanding gained in KS1 relating to feeding relationships of animals in a habitat and how to show them in a food chain; how plants gain nutrients from soil which help them grow and that some materials can be recycled. In this module, children will learn to recognise that environments can change and that this can sometimes pose dangers to living things. This prepares children for later learning about animal life cycles in Cycle B UKS2 '**What do we know about plant and animal life cycles?'** and about how materials decompose in Y5 chemistry in Cycle A and B and about adaptation in Cycle A UKS2 '**What evidence is there that living things have changed over time?'**	**What do we know about plant and animal life cycles?** **(Linked to Snap Science Y5 M4 – Plant and animal life cycles)**	In KS1 children have previously learnt that animals have offspring and that flowers play an important part in the life cycle of flowering plants. In this module, children will learn to describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird and describe the life process of reproduction. This module is clearly linked to Cycle A UKS2 '**What evidence is there that living things have changed over time?'** and prepares children for later learning in Cycle B UKS2 about human growth '**What is the human lifecycle?'**
How can I sort and group animals? **(Linked to Snap Science Y1 M5 – Animals – Vertebrates)**	This builds on understanding gained in EYFS and the exploration of the natural world around them and making observations and drawing pictures of animals and plants. This module is best taught towards the end of the year as children may wish to study tadpoles. They module will allow children to learn about a variety of familiar and less familiar animals, including fish, amphibians, reptiles, birds and mammals and their structures. They will begin to learn how the living things are suited to the habitat and the interactions between the living organisms within a habitat. This is further developed in Cycle A LKS2 '**How are vertebrates and invertebrates classified?'**	**What do the parts of a plant do?** **(Linked to Snap Science Y3 M5 – Flowering plants and plant growth)**	This module is taught here in early summer so that the plants suggested for testing have an opportunity to grow. Due to the time needed for the plants to grow, enquiries set up in each lesson carry over into future lessons. This module will build on their experiences of identifying and growing plants in Key Stage 1 (Cycle A – **How do I grow plants?** and '**How do I grow healthy plants?'** and Cycle B – **What are the parts of a plant?).** It will also complement the KS1 Cycle A unit **'How does our world change in each season?'** and the next unit of learning in LKS2 **Why are flowers important in the life cycle of a flowering plant?'** It is taught before the unit '**Why are flowers important in the life cycle of a flowering plant?'** so children learn about the functions of stems, roots and leaves before they learn about the functions of flowers. In this unit, they will learn about the absorption and transport of water and nutrients and the role of	**How can we vary the effects of electricity?** **(Linked to Snap Science Y6 M5 – Electricity: changing circuits)**	This builds on LKS2 learning from Cycle B **'How does an electrical circuit work?'** The children will develop their understanding of electrical circuits and construct circuits with an increasing number of components and contrast the effects this has on the function of the components. They will learn to use the recognised electrical symbols to record circuits, particularly as the circuits become more complex. This prepares children for later learning in KS3 physics about constructing parallel circuits; measuring electric current and voltage in circuits and understanding the differences in resistance with conducting and insulating components.

			the leaf in making food and explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow). This then leads into learning in UKS2 Cycle B '**What do we know about plant and animal life cycles?'**		
What are the parts of a plant? **(Linked to Snap Science Y1 M5 – Identifying plants and their parts)**	n EYFS children will have previously learnt to explore the natural world around them, making observations and drawing pictures of plants. This module is best taught in summer when there are plenty of plants in flower so that children will learn to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees and identify and describe the basic structure of a variety of common flowering plants, including trees. This prepares children for later learning as the topic of plants is revisited in every subsequent year group in the Long Term Plan and the learning from this module is the foundation for this.	**Why are flowers important in the life cycle of a flowering plant?** **(Linked to Snap Science Y3 M6 – Flowering plants life cycle)**	This module is taught in June/July so that the flowers that are being discussed are more likely to have bloomed and are therefore observable to the children. This module is taught after the LKS2 unit '**What do the parts of a plant do?'** so that children learn about the functions of stems, roots and leaves before they learn about the functions of flowers. In this module, children will learn to explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. This prepares children for later learning about reproduction in plants in Cycle B UKS2 '**What do we know about plant and animal life cycles?'**	**What is the human lifecycle?** **(Linked to Snap Science Y5 M6 – Human growth)**	Earlier in Cycle B UKS2 the children will have learnt about life processes in other living things and differences in their life cycles '**What do we know about plant and animal life cycles?'** Lessons in this module focus on the stages of the human life cycle, from birth to death including puberty in girls and boys. There is a clear link with work in **PSHE** about human reproduction and puberty and this unit is planned with this in mind. This unit also closely links to UKS2 Cycle B **'What does my circulatory system do?'**

Note about Working Scientifically Progression

Year 1 and 2

This mixed age plan has been organised to ensure secure progression of conceptual knowledge. However, this reorganisation of the modules in years 1 and 2 means that all the lessons where KS1 Working Scientifically statement 1 (ask questions) is explicitly taught are in cycle A, leaving cycle B without a discreet opportunity for children to ask questions and recognising that they can be answered in different ways. Teachers should therefore develop opportunities for children to do this in cycle B. **Which material should I choose?** is an ideal opportunity for this.

Year 3 and 4

The mixed age plan has been organised to ensure secure progression of conceptual knowledge. However, this reorganisation of the modules in years 3 and 4 means that all the lessons where KS2 Working Scientifically statement 1 is explicitly taught are in cycle B. There are planned enquiries taking place in cycle A, but the children are not asking questions related to which enquiry type in this cycle. Teachers should therefore develop opportunities for children to do this in cycle A. **How does sound travel? and How are shadows made?** are ideal opportunities for this.

Year 5 and 6

The mixed age plan has been organised to ensure secure progression of conceptual knowledge. However, this reorganisation of the modules in years 5 and 6 means that all the lessons where KS2 Working Scientifically statement 4 is explicitly taught are in cycle B, leaving cycle A without a discreet opportunity to use test results to make predictions and set up further tests in their work. There are planned enquiries taking place in cycle A, but the children are not using those results to plan further tests. Teachers should therefore develop opportunities for children to do this in cycle A. **How can we compare, group and use materials?** offers ideal opportunities for this.

Essential Knowledge in the Key Stage One Science Curriculum – Cycle A

*Suggested learning outcomes are not necessarily 1 per lesson, some lessons may cover several outcomes and some outcomes may take several lessons.

Term	National Curriculum Expectations	Suggested Learning Questions	Associated Substantive Knowledge	Key Vocabulary
Autumn Term 1 How does our world change in each season? **(Linked to Snap Science Y1 M1 – Seasons)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type: Identifying and classifying	1) *How do the changing seasons affect me?* 2) *What can we see and hear that shows us that the seasons are changing? (Relate to Summer and Autumn)* 3) *How does the weather change across the seasons?* 4) *What do different kinds of weather look and feel like?* 5) *Are all leaves the same?* 6) *Do all trees shed their leaves?* 7) *Which animals share our space?*	• **Know that the four seasons are Spring, Summer, Autumn and Winter.** • **Know that there are different types of weather (rain, sun, wind, fog, snow, cloud).** • Know that the weather is warmer in summer and spring and colder in autumn and winter. • **Know that in autumn the weather becomes colder, leaves change colour, daylight hours become shorter.** • Know that the days are longer in the spring and summer and shorter in the autumn and winter. • Know that leaves can be used to help identify plants (most deciduous trees have wide, broad, flat leaves). • **Know that some trees are deciduous, and their leaves change colour in the autumn and fall to the ground and that they grow new ones in spring.** • **Know that some trees are evergreen and look the same all through the year because they do not drop their leaves (they continually shed and replace leaves throughout the year).** • Know that oak, horse chestnut, beech, hawthorn and hazel are deciduous trees. • Know that holly, Scots pine and laurel are evergreen trees. • Know that they are more likely to see a woodlouse on the ground, under a log or at the base of a tree or spider webs might be found on the outside of buildings or in shrubs.	• autumn, winter, spring, summer, names of the months of the year, ● berry: a fleshy fruit containing many seeds ● deciduous: plants which shed their leaves once a year ● evergreen: plants which appear to have leaves all year round ● insect: small six-legged animal with body in three parts and often with wings ● leaf (plural leaves): flat part of the plant which are attached to the stem. ● nut: a dry fruit with a hard shell ● plant: a living thing that grows in the ground and usually has leaves, stems, and roots ● seasons: the four periods into which a year can be divided ● tree: a tall plant that has a hard trunk, branches, and leaves

	Y1 Seasonal Changes: Observe changes across the 4 seasons. Observe and describe weather associated with seasons and how the day length varies.			
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit **(Link back to EYFS curriculum or Summer unit from Cycle B)** - BOLD from the unit that feeds into this unit or • - BOLD that has been taught in this unit so far			
Autumn Term 2 Why do I need 5 senses? **(Linked to Snap Science Y1 M2 – Human body and senses)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type: Identifying and classifying Y1 Animals, including humans: Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	1) *Is everyone's body the same?* 2) *How can we explore the world using our sense of touch?* 3) *What can we hear?* 4) *What smells do we like and dislike?* 5) *What differences can our tongues taste?* .	• **Know that humans are mammals and vertebrates.** • **Know and name the main human body parts: head, neck, arms, elbows, torso, legs, knees, feet, hands, face, ears, eyes, hair, mouth, teeth** • **Know the five senses are taste, hearing, touch, smell, seeing and that they help us to make sense of the world around us.** • **Know that we see things with our eyes which send messages to our brain.** • **Know that we feel things with touch and that this is using our skin which covers our whole bodies** • Know that the sense of touch can help to keep us safe from harm such as burning or being squashed. • **Know our ears are the part of our body that hears and this to helps us to make sense of the world around us.** • **Know that we smell things with our noses.** • **Know that the human sense of taste uses the tongue to detect the flavour of what is in our mouths and can help us decide if we like a food or not.** • Know that our tongues, along with noses and eyes, help us to taste things. • Know that sour and sweet are only two things our tongues can taste. Salty, bitter and spicy are examples of others	● classify: to group objects, materials and living things according to similarities in appearance or properties ● diagram: a drawing that shows the parts of something or how the parts work together ● group: to place (verb) objects, materials or living things into sets ● identify: to know and say what something is ● pattern: something that happens or appears in a regular and repeated way ● rank: to put things in an order ● brain: the part of the body which controls thinking and movement ● hearing: the sense which enables us to notice sounds ● mammal: a warm-blooded animal that is covered in hair or fur. The female gives birth to live young and feeds her babies on milk from her own body ● sense: how the body perceives outside changes ● sight: the sense which enables us to see ● smell: the sense which enables us to notice aromas ● taste: the sense which enables us to notice flavours ● torso: the central part core of the human body ● touch: the sense which enable us to notice what something it feels like
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit.			

	Connect should focus on: - BOLD learning of previous unit: • **Know that the four seasons are Spring, Summer, Autumn and Winter.** • **Know that there are different types of weather (rain, sun, wind, fog, snow, cloud).** • **Know that in autumn the weather becomes colder, leaves change colour, daylight hours become shorter.** • **Know that some trees are deciduous, and their leaves change colour in the autumn and fall to the ground and that they grow new ones in spring.** • **Know that some trees are evergreen and look the same all through the year because they do not drop their leaves (they continually shed and replace leaves throughout the year).** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Spring Term 1 How do I grow plants? **(Linked to Snap Science Y2 M3 – Growing seeds and plants)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type: Identifying and classifying Observing over time Comparative testing Pattern seeking Y1 Seasonal Changes: Observe changes across the 4 seasons. Observe and describe weather associated with seasons and how the day length varies. Y2: Plants Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	*Seasonal changes (How does our world change in each season?) should be taught throughout the year and these lessons should be taught at some point in this unit.* 1) *Are all flowers the same? (Lesson 4 from Y1 M1 Seasons)* 2) *Which birds visit our bird feeders? (Lesson 5 from Y1 M1 Seasons)* *How do I grow plants?* 1) *How do plants grow and change over time?* 2) *How are seeds and bulbs different?* 3) *What do seeds need to germinate?* 4) *How tall will they grow?* 5) *What have we learnt about how a seed germinates?*	Seasons • **Know that spring is the season that follows winter.** • Know that flowers that bloom in spring are snowdrops, crocuses, primroses, daffodils and bluebells and they may see blossom on trees. • **Know that days are longer and evenings stay lighter.** • **Know that birdsong may be heard as birds begin to build their nest.** • Know that flowers vary by shape and colour (bluebells are blue, bell-shaped flowers; daffodils are yellow or white, trumpet-shaped flowers; forget-me-nots are small, simple, saucer-shaped flowers). • Know that blue tits, sparrows, robins and chaffinches are all more likely to feed on the bird feeders. • Know that blackbirds, wood pigeons, starlings and magpies are all more likely to feed on the ground. • Know that some of the winter birds are no longer around in the springtime. Plants • **Know that the parts of the plant which grow above the ground are stems, leaves and flowers** • **Know that roots grow below the ground.** • **Know that trees are plants because they also have stems (trunks), leaves and roots, and most have flowers.** • **Know that plants can grow either from seeds or bulbs** • Know that when a seed starts to grow, this is called germination. • Know that when a seed germinates, its seed coat splits and the roots, stems and leaves grow from it. • **Know that seeds need water to germinate but they do not need soil and most do not need light because they are usually found under the soil**	• bulb: a rounded structure which acts as a food store; a new plant will sprout and grow from it • conditions: factors that affect a living thing • germinate/germination: when a seed starts to grow • mature: has completed its development • seedling: a young plant • flower: the part of a plant which is often coloured other than green and grows above the ground • leaf: a flat part of a plant which is attached to the stem • roots: the part of a plant which grows under the ground • seed: a plant part from which a new plant grows • stem: the part of a plant which grows above the ground and which holds the leaves and flowers
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit.			

	Connect should focus on: - BOLD learning of previous unit: • **Know that humans are mammals and vertebrates.** • **Know and name the main human body parts: head, neck, arms, elbows, torso, legs, knees, feet, hands, face, ears, eyes, hair, mouth, teeth** • **Know the five senses are taste, hearing, touch, smell, seeing and that they help us to make sense of the world around us.** • **Know that we see things with our eyes which send messages to our brain.** • **Know that we feel things with touch and that this is using our skin which covers our whole bodies** • **Know our ears are the part of our body that hears and this to helps us to make sense of the world around us.** • **Know that we smell things with our noses.** • **Know that the human sense of taste uses the tongue to detect the flavour of what is in our mouths and can help us decide if we like a food or not.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Spring Term 2 What material is this? **(Linked to Snap Science Y1 M3 – Naming and describing materials)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type Identify and classifying Comparative testing Year 1: Everyday Materials Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties.	1) *What material is this? Part 1* 2) *What material is this? Part 2* 3) *Is all paper the same?* 4) *Is all fabric the same?* 5) *How can we group objects made of different materials?*	• **Know the name of these everyday materials - wood, plastic, glass, metal, water, rock, paper, fabric.** • **Know what material an object is made from.** • **Know that wood, rock and water are natural materials that are found in the environment in their natural state.** • **Know that metal, plastic, glass, brick, paper and fabric are manufactured because they have been made by changing a natural material.** • **Know that a property describes what a material is like (the characteristics of a material – looks and feels like).** • **Know that paper is a manufactured material made from wood, which is a natural material.** • Know that it is important to recycle paper, so that it can be used again, in order to reduce the number of trees chopped down. • Know that kitchen towel is the best at mopping up with as it is absorbent. • **Know and name these fabric: wool, cotton, nylon, silk and PVC.** • Know that fabrics can be made from recycled materials and should be reused or recycled whenever possible by passing it on for use by others.	● absorb/absorbent: to take in fluid ● manufactured: a material that has been made into another material by humans ● material: the substance something is made of ● natural: found in nature; not made by humans ● property: what a material is like ● recycle: to turn waste materials into new materials and objects ● reuse: to use a material or object again ● transparent: a material that you can see through ● classify: to group objects, material and living things according to similarities in appearance or properties ● group: to place objects, materials or living things into sets
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that spring is the season that follows winter.** • **Know that days are longer and evenings stay lighter.** • **Know that birdsong may be heard as birds begin to build their nest.** • **Know that the parts of the plant which grow above the ground are stems, leaves and flowers** • **Know that roots grow below the ground.** • **Know that trees are plants because they also have stems (trunks), leaves and roots, and most have flowers.**			

	• **Know that plants can grow either from seeds or bulbs** • **Know that seeds need water to germinate but they do not need soil and most do not need light because they are usually found under the soil** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.

Summer Term 1 How many ways are there of changing the shapes of objects?? **(Linked to Snap Science Y2 M5 – Changing materials)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type: Identifying and classifying Y2: Uses of Everyday Materials Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	1) *How can I change the shape of an object?* 2) *What properties allow a material to be changed?* 3) *Which material is fit for purpose?* 4) *What can pushes and pulls do?*	• **Know that squashing, bending, stretching and twisting can change the shape of some materials.** • **Know that a property describes what a material is like (the characteristics of a material – looks and feels like).** • **Know that Lycra fabric, a rubber band and a sponge are all squashy, stretchy, flexible and elastic.** • **Know that knitted cotton fabric, modelling clay and blu tack are all squashy, stretchy and flexible but they do not spring back to how they were before.** • **Know that materials that cannot be squashed or stretched at all, such as a metal block, wooden block and a rock are stiff and rigid and that this is the opposite of squashy and stretchy.** • **Know that objects are made from materials with properties that make them fit for purpose** (CT to choose which of the following are most suitable for the children in their class to know) - Know that lycra fabric is the most suitable material for a swimsuit to be made out of because it flexible, elastic, stretchy and water-resistant. - Know that metal or wood are the most suitable materials for a climbing frame to be made out of because they are stiff, rigid, strong and water resistant, - Know that rubber is the most suitable material for scooter tyres to be made out of because they are flexible, elastic and squashy. - Know that modelling clay is the most suitable material for putting into a mould because it is squashy, stretchy and flexible. - Know that metal is the most suitable material for a pan to be made out of because it is stiff and rigid. - Know that rubber is the most suitable material for a ponytail band to be made from because it is elastic, squashy, stretchy and flexible. • **Know that a push or a pull can be used to change the shape of a material and/or an object.** • Know that William Harbutt invented Plasticine because he wanted to solve the problem of his art students struggling to work with clay that dried out too quickly.	● fit for purpose: well suited for its use ● invent/inventor: to create or design something that has not existed before ● pull: (verb) to move toward/(noun) a move toward ● push: (verb) to move away/(noun) a move away ● elastic/elasticity: able to stretch, bend or twist without breaking and then return to original form ● squashy/squash: can be crushed or squeezed, keeping the same volume, so that it becomes flat or out of shape ● stiff: cannot be stretched or squashed ● stretchy/stretch: can be made longer or wider, keeping the same volume, without breaking or tearing ● twist: to move something out of shape with a turning motion ● bend: to move from a straight to a curved shape ● flexible: able to bend easily without breaking ● material: the substance something is made of ● property: what a material is like ● rigid: unable to bend
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know the name of these everyday materials - wood, plastic, glass, metal, water, rock, paper, fabric.** • **Know what material an object is made from.** • **Know that wood, rock and water are natural materials that are found in the environment in their natural state.** • **Know that metal, plastic, glass, brick, paper and fabric are manufactured because they have been made by changing a natural material.**			

	• **Know that a property describes what a material is like (the characteristics of a material – looks and feels like).** • **Know that paper is a manufactured material made from wood, which is a natural material.** • **Know and name these fabric: wool, cotton, nylon, silk and PVC.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Summer Term 2 How do I grow healthy plants? **(Linked to Snap Science Y2 M6 – Growing healthy plants)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type: Comparative testing Pattern seeking Y1 Seasonal Changes: Observe changes across the 4 seasons. Observe and describe weather associated with seasons and how the day length varies. Y2: Plants Observe and describe how seeds and bulbs grow into mature plants. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	*Seasonal changes (How does our world change in each season?) should be taught throughout the year and this lesson should be taught at some point in this unit.* 1) *How has our space changed over the year? (Lesson 6 from Y1 M1 Seasons)* *How do I grow healthy plants?* 1) *How can we care for our plants?* 2) *Do mature plants need light?* 3) *Does temperature affect the growth of mature plants?* 4) *Do mature plants need water?* 5) *What have we learnt about what mature plants need to grow healthily?*	Seasons • **Know that summer is the season that follows spring.** • **Know that summer is the warmest season of the year.** • **Know that the sun is highest in the sky in the summer.** • **Know that many flowering plants produce fruits in the summer.** How do I grow healthy plants? • **Know that seeds and bulbs need water, but not light, to germinate.** • **Know that seeds germinate into seedlings and then grow into mature plants.** • **Know whether a mature plant is healthy or unhealthy by looking at its colour and whether the stems and leaves have drooped, wilted or shrivelled.** • **Know that mature plants (including grass) need light and water to grow healthily.** • **Know that temperature is a measure of how hot or cold something is.** • **Know that temperature is measured in degrees Celsius (°C).** • **Know that a thermometer is the piece of equipment that is used to measure temperature** • Know that generally, an increased temperature will increase plant growth. • Know that really hot and really cold conditions can kill plants. • Know that cacti can grow in hot conditions because they have particular features which help them to do this (such as leaves which are reduced to spines, a deep taproot and many shallow surface roots which can absorb any moisture). • Know that spruce trees can live in very cold conditions because they can stop the water inside them from freezing.	● bulb: a rounded structure which acts as a food store; a new plant will sprout and grow from it ● conditions: factors that affect a living thing ● germinate/germination: when a seed starts to grow ● healthy: well ● light: produced by a light source and makes it possible for the eye to see things ● mature: has completed its development ● seedling: a young plant ● soil: the top layer of the Earth's surface; a mixture of bits of rock and remains of living things that have died ● leaf: a flat part of a plant which is attached to a stem ● roots: the part of a plant which grows under the ground ● seed: a plant part from which a new plant grows ● stem: the part of a plant which grows above the ground and which holds the leaves and flowers
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that squashing, bending, stretching and twisting can change the shape of some materials.** • **Know that a property describes what a material is like (the characteristics of a material – looks and feels like).** • **Know that Lycra fabric, a rubber band and a sponge are all squashy, stretchy, flexible and elastic.** • **Know that knitted cotton fabric, modelling clay and blu tack are all squashy, stretchy and flexible but they do not spring back to how they were before.** • **Know that materials that cannot be squashed or stretched at all, such as a metal block, wooden block and a rock are stiff and rigid and that this is the opposite of squashy and stretchy.** • **Know that objects are made from materials with properties that make them fit for purpose** (CT to choose which of the following are most suitable for the children in their class to know) • **Know that a push or a pull can be used to change the shape of a material and/or an object.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Essential Knowledge in the Lower Key Stage Two Science Curriculum – Cycle A

Term	National Curriculum Expectations	Suggested Learning Questions	Associated Substantive Knowledge	Key Vocabulary
Autumn Term 1 What different types of rocks are there? **(Linked to Snap Science Y3 M1 – Rocks, soils and fossils)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Identifying and classifying Comparative testing Research using secondary sources Y3 Rocks: Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. Describe in simple terms how fossils are formed when things that have lived are trapped within rock. Recognise that soils are made from rocks and organic matter.	*1) How are rocks different and what rock is this?* *2) What are rocks used for?* *3) How are soils different?* *4) Which soils hold water?* *5) What is this fossil?* *6) Who was Mary Anning and how did she become a palaeontologist?*	• **Know that rocks are part of the Earth's surface and are natural materials made of lots of tiny pieces that stick together.** • Know that rocks can be different in appearance, colour and surface patterning and structure (size, shape and evidence of crystals.) • **Know the name of and identify granite, slate, marble, limestone, sandstone, chalk and pumice.** • **Know that granite and marble are hard rocks, pumice is quite hard and that sandstone, chalk, limestone are soft rock.** (When using the terms hard and soft, it is worth making sure children understand that these terms are used comparatively. For example, pumice is soft when compared to marble, but it is hard if compared to cotton wool.) • **Know that sandstone and pumice are rough and limestone, chalk, granite and marble (when polished) are smooth.** • **Know that sandstone, pumice, chalk and limestone are permeable (let water soak through them) and granite, marble and slate are impermeable** • Know that marble is hard; has an attractive texture and colour and can be cut and polished so it can used to make floor tiles, wall tiles and statues. • Know that slate does not let water soak through it and it splits easily into thin sheets so this makes it ideal for making roof tiles. • Know that chalk is a very soft and crumbly rock and wears away easily and this makes it ideal for making marks on chalkboards or the playground. • Know that granite is a very hard rock and is waterproof which makes it good for making buildings as it doesn't wear away easily. • **Know that soils are formed from broken down rock and organic matter.** • **Know that a fossil is the remains or traces of plants and animals that lived long ago and they are found in rocks.** • **Know that fossils are formed when things that have lived are trapped within rock.** • Know that Mary Anning became recognised as a fossil scientist, sharing her knowledge of the natural world with others	●crystal/crystalline: a material that has flat surfaces which form geometric shapes ● erosion: the process of wearing away materials by water, wind or ice ● fossil: the preserved remains or trace of any once-living thing ● hardness: how resistant a material is to scratching (not how easily it breaks) ● organic: made from the remains of living things ● palaeontologist: someone who studies fossils ● remains: left over parts of an animal or plant ● rock: naturally occurring material, part of the Earth's surface ● sediment: small pieces of rock which fall to the bottom of oceans and lakes ● weathering: the effects of weather, breaking down the surface of rocks over time Children will encounter the names of a variety of rocks, soils and fossils in the context of this module. For example, rocks – limestone, chalk, granite, slate, marble, sandstone, pumice; soils – clay, sandy, silty, peaty, chalky, loamy; fossils – trilobite, starfish, sea urchin, ammonite. ● absorb/absorbent: to take in fluid ● durable: able to resist wear, pressure or damage ● material: the substance something is made of ● property: a characteristic of a material ● soil: the top layer of the Earth's surface; a mixture of bits of rock and remains of living things that have died ● waterproof: does not let water pass through it
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: **(Link back to Summer unit from Cycle B or previous year group if in Year 3.)** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Autumn Term 2	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and	*1) What do we need to see?* *2) Which object is the most reflective?* *3) How are shadows made?*	• **Know that we need light and our eyes to be able to see things.**	●bright: giving out a lot of light or having high light levels ● dark/darkness: the absence of light

How are shadows made? **(Linked to Snap Science Y3 M2 – Light and shadows)**	make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Identifying and classifying Comparative testing Y3 Light: Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Recognise that shadows are formed when the light from a light source is blocked by an opaque object. Find patterns in the way that the size of shadows change. The reorganisation of the modules in years 3 and 4 means that all the lessons where KS2 Working Scientifically statement 1 (asking questions) is explicitly taught are in cycle B. There are planned enquiries taking place in cycle A, but the children are not asking questions related to which enquiry type in this cycle. Teachers should therefore develop opportunities for children to do this in cycle A. **How does sound travel? and How are shadows made?** are ideal opportunities for this.	*4) Is my shadow like me?* *5) How can we change the size of a shadow?*	• **Know that light comes from a light source (e.g the sun, an electric lamp, a torch.)** • Know that dark means the complete absence of light. • Know that shiny objects are those with surfaces that are good at reflecting light. • **Know that reflective materials will help to make it safer to be out in the dark.** • **Know that a shadow is made when an opaque material or object is placed in front of a light source and stops or blocks the light from passing through so a dark area or shape is created on a surface as a result.** • **Know that the size of the shadow can be increased by moving the object towards the light source.** • **Know that the size of the shadow can be decreased by moving the object away from the light source.** • Know that too much sunlight can damage our skin because the sun gives out something else (UV light) other than the light we see. • Know that opaque materials block sunlight and so can protect our skin. • **Know that sunglasses, suncream, hats and t-shirts are ways in which we can protect ourselves from the harm that the sun can cause.**	• data logger: a device using sensors to make measurements, including of light • dim: giving out a little light or having low light levels • light: produced by a light source and makes things visible • light source: something, natural or artificial, that produces its own light • lux: the unit used to measure light intensity, abbreviated as lx • opaque: the property of blocking light by absorbing or reflecting all of the light that falls on it • reflect: to send back light • reflective: reflecting back a lot of the light that falls on it, making it shiny in appearance • sensor: a device that detects and responds to certain changes in the environment • shadow: a darker area where some or all of the light has been blocked by an object • Sun: the source of sunlight • sunlight: the combination of visible and invisible forms of light (e.g. ultraviolet) produced by the Sun • translucent: the property of blocking or scattering some light so that not all of it passes through and there is no clear view of what lies behind it • transparent: the property of allowing almost all light that falls on it to pass through, enabling a clear view of what lies behind it • ultraviolet: a type of light, found in sunlight and not detectable by our eyes, which is harmful to our eyes and skin. Abbreviated as UV
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - - BOLD from the unit that feeds into this unit or BOLD learning of previous unit:- BOLD that has been taught in this unit so far. • **Know that rocks are part of the Earth's surface and are natural materials made of lots of tiny pieces that stick together.** • **Know the name of and identify granite, slate, marble, limestone, sandstone, chalk and pumice.** • **Know that granite and marble are hard rocks, pumice is quite hard and that sandstone, chalk, limestone are soft rock.** • **Know that sandstone and pumice are rough and limestone, chalk, granite and marble (when polished) are smooth.** • **Know that sandstone, pumice, chalk and limestone are permeable (let water soak through them) and granite, marble and slate are impermeable** • **Know that soils are formed from broken down rock and organic matter.** • **Know that a fossil is the remains or traces of plants and animals that lived long ago and they are found in rocks.** • **Know that fossils are formed when things that have lived are trapped within rock.**			
Spring Term 1 How amazing	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions**	*1) What nutrition do we get from our food?* *2) Which nutrients are in school midday meals?* *3) What is in a human skeleton?*	• **Know that carbohydrates are nutrients which provide us with energy to move and keep warm.** • **Know that proteins which are found in meat, cheese, fish, eggs, nuts, beans and pulses are needed for growth –**	• calcium: a mineral the body needs to build and maintain strong bones • carbohydrate: a nutrient which is the body's major source of energy • energy: the power to be active • exoskeleton: an external supporting structure for a living thing

are bodies? **(Linked to Snap Science Y3 M4 – Movement and nutrition for the human body)**	about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Identifying and classifying Y3: Animals, including humans Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	4) *How do muscles help humans to move?* 5) *How are vertebrate and invertebrate bodies supported?* 6) *How are human skeletons different to other vertebrates?*	**they provide the building blocks for our muscles.** • **Know that fats are often from plants and fish, and they provide energy.** • **Know that saturated fats found in butter and oil used to fry chicken or chips can be harmful to our bodies if we eat too much of them.** • **Know that fibre is needed to keep our digestive systems healthy and it helps us to poo regularly.** • **Know that vitamins keep us healthy - Vitamin C is needed for healthy skin, gums and joints.** • **Know that we need minerals too - calcium builds strong bones and teeth.** • **Know that a healthy diet contains a balance of the different nutrients we need to keep our bodies working and growing healthily, and also because food tastes good** • **Know that the skull protects the brain.** • **Know that our skeleton protects the organs inside, which are soft and easy to damage.** • **Know that the spine protects the spinal cord which takes messages to the body to and from the brain.** • **Know that the ribs protect the heart and lungs.** • **Know that the muscles move the skeleton so that humans can move around.** • **Know that vertebrates have bony skeletons on the inside for support as well as for movement and protection.** • Know that reptiles, birds, amphibians and fish are vertebrates. • **Know that animals that don't have an internal bony skeleton are called invertebrates.** • Know that a ladybird, octopus, woodlouse and worm are invertebrates. • **Know that some animals have a hard exterior which works as a skeleton and that this is called an exoskeleton.** • Know that ants, bees, beetles, butterflies, spiders, scorpions and crabs have an exoskeleton.	• fat: a nutrient which is a source of energy for the body, produced from animals or plants • fibre: (also called roughage) parts of plant-based food that can't be broken down and help with digestion • fluid: a material that flows easily and takes the shape of the container that holds it: a liquid or gas • heart: the organ in the chest of vertebrates which pumps blood around the body • invertebrate: an animal that has no internal backbone • joint: a part of the skeleton where two or more bones meet which can bend or twist • mineral: a substance needed by the body for good health e.g. calcium • nutrient: a substance that is essential for life and health • organ: body part performing a function • protein: a food type which is needed for muscle repair and growth • ribs: bones originating from the spine which surround the heart and lungs in the chest • skull: the framework of bone that surrounds the brain • spine: a series of small bones which surround the spinal column and hold up the body • sugar: a type of carbohydrate • tendon: a band of tough white tissue that connects a muscle with a bone or other body part • vitamin: a nutrient required by the body to grow, function and repair • X-ray: a beam of high-energy radiation that is able to pass through many kinds of solid material • brain: an organ contained within the skull of all vertebrates. It controls the body's movements and activities and is the centre of thought, memory and feeling • amphibian: an animal that lives in water or on land but must return to the water to reproduce • bird: an animal that has feathers and lays eggs with hard shells • diet: the kind of food an animal usually eats • fish: an animal that lives in water and has gills and fins • mammal: an animal that is covered in hair or fur; the female gives birth to live young and feeds her babies on milk from her own body • reptile: an animal that has dry, scaly skin and lays eggs on land • vertebrate: an animal that has an internal backbone for support
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that we need light and our eyes to be able to see things.** • **Know that light comes from a light source (e.g the sun, an electric lamp, a torch.)** • **Know that reflective materials will help to make it safer to be out in the dark.** • **Know that a shadow is made when an opaque material or object is placed in front of a light source and stops or blocks the light from passing through so a dark area or shape is created on a surface as a result.**			

	• **Know that the size of the shadow can be increased by moving the object towards the light source.** • **Know that the size of the shadow can be decreased by moving the object away from the light source.** • **Know that sunglasses, suncream, hats and t-shirts are ways in which we can protect ourselves from the harm that the sun can cause.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Spring Term 2 Where does all the food we eat go? **(Linked to Snap Science Y4 M4 – Digestion and food chains)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. <u>Working Scientifically:</u>	1) *Where does all the food we eat go?* 2) *What teeth do humans have?* 3) *What do teeth do in the digestive system?* 4) *What happens to food after we put it in our mouths?* 5) *What do animals eat?* 6) *What do animal teeth tell us?.*	• **Know that the digestive system is the parts of the body that work together to break down food into nutrients and get rid of waste.** • **Know that food passes through the digestive system, where nutrients and water are absorbed and any food not used by the body comes out as poo.** • **Know that the main parts of the digestive system are the mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus.** • **Know that humans have different types of teeth: incisors, canines and molars.**	● model: something to show how a system or process works ● anus: the muscle which is relaxed in order to release poo ● canine: a curved, pointed tooth ● chemicals: tiny substances that all materials are made of; they each have specific properties ● constipation: having hard, dry poo that is difficult to pass ● decompose: the process where bacteria and worms, break down natural materials into tiny pieces that help new plants grow ● diarrhoea: liquid poo ● digestion: the process of breaking down food into smaller parts so the body can use it for energy and growth ● extinct: a type of animal that no longer exists ● food web: a network of food chains ● incisor: a sharp front tooth ● jaw: the bone in which teeth grow

	Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Identifying and classifying Pattern seeking Research using secondary sources Y4: Animals, including humans Describe the simple functions of the basic parts of the digestive system in humans. Identify the different types of teeth in humans and their simple functions. Construct and interpret a variety of food chains, identifying producers, predators and prey.		• Know that incisors are used for cutting food, canines for tearing and molars for grinding. • **Know that food is chemically broken down in the stomach and small intestine, where it is absorbed into the blood.** • **Know that the large intestine absorbs any remaining water and the rectum stores poo.** • **Know that a food chain shows how energy and nutrients pass from one living thing to another as they eat or get eaten by each other.** • Know that a producer (a plant) makes the food using water, air and the energy of the sun. • Know that food is passed to the consumer (a herbivore) that eats it and it is then passed to any animal (a carnivore) that eats the consumer. • Know that carnivores have sharp slicing teeth for eating meat. • Know that herbivores have flat-topped teeth for crushing plant matter	● large intestine: a wider tube leading from the small intestine; this is where water is absorbed into the blood ● mechanical: parts moving together ● milk teeth: the first set of teeth ● molar: a large, flat tooth ● oesophagus: the tube connecting the mouth to the stomach ● predator: an animal that hunts or catches other animals to eat ● prey: an animal that is hunted, killed and eaten by another animal ● rectum: the part of the large intestine where poo is stored ● saliva: a liquid in the mouth that helps us to swallow and aids digestion ● small intestine: a long tube connecting the stomach to the large intestine; this is where nutrients are absorbed into the blood ● stomach: the organ that receives food that has been swallowed and begins to digest it ● vomit: partly digested food ejected from the stomach ● carnivore: an animal which only eats other animals (meat) ● consumer: a living thing which has to eat other animals or plants to gain its food ● depend: to rely on something from an outside source in order to live ● diet: the kind of food an animal usually eats ● energy: the power to be active (in context of food and nutrition) ● food chain: a series of living things where each one is food for the next ● fossil: the preserved remains or trace of any once-living thing ● habitat: a natural environment where an animal or plant finds the things it needs to live and grow ● herbivore: an animal that only eats plants ● nutrient: a substance that is essential for life and health ● omnivore: an animal that eats both plants and other animals ● palaeontologist: someone who studies fossils ● producer: a living thing, such as a plant, which makes its own food
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that carbohydrates are nutrients which provide us with energy to move and keep warm.** • **Know that proteins which are found in meat, cheese, fish, eggs, nuts, beans and pulses are needed for growth – they provide the building blocks for our muscles.** • **Know that fats are often from plants and fish, and they provide energy.** • **Know that saturated fats found in butter and oil used to fry chicken or chips can be harmful to our bodies if we eat too much of them.** • **Know that fibre is needed to keep our digestive systems healthy and it helps us to poo regularly.** • **Know that vitamins keep us healthy - Vitamin C is needed for healthy skin, gums and joints.** • **Know that we need minerals too - calcium builds strong bones and teeth.** • **Know that a healthy diet contains a balance of the different nutrients we need to keep our bodies working and growing healthily, and also because food tastes good** • **Know that the skull protects the brain.** • **Know that our skeleton protects the organs inside, which are soft and easy to damage.** • **Know that the spine protects the spinal cord which takes messages to the body to and from the brain.** • **Know that the ribs protect the heart and lungs.** • **Know that the muscles move the skeleton so that humans can move around.** • **Know that vertebrates have bony skeletons on the inside for support as well as for movement and protection.** • **Know that animals that don't have an internal bony skeleton are called invertebrates.**			

	• **Know that some animals have a hard exterior which works as a skeleton and that this is called an exoskeleton.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Summer Term 1 How does sound travel? **(Linked to Snap Science Y4 M5 – Sound)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in	1) *How are sounds made?* 2) *How do sounds reach our ears?* 3) *How can we change the volume of a sound?* 4) *How does the volume of a sound change as we move away from the source?* 5) *How can we change the pitch of a sound?* 6) *What affects the pitch of a plucked note?*	• **Know that a sound is produced when something vibrates.** • **Know that vibration is a rapid backward and forward movement that they may not always be able to see.** • **Know that vibrations travel from the source through a material (a solid, liquid or gas) to the ear so that we can hear them.** • **Know that sound travels best through solids.** • **Know that the stronger the vibrations, the louder the sound.** • Know that striking, plucking or shaking the instrument harder makes the vibrations stronger and the sound louder. • **Know that sounds get fainter as the distance from the sound source increases.** • **Know that the larger the instrument, the lower the pitch.** • **Know that the smaller the instrument, the higher the pitch.**	● air: the invisible gas surrounding the Earth ● decibel: the unit of measurement for sound, abbreviated as dB ● gas: a state of a material where it changes in shape and volume to fill the space it is in; gases flow ● liquid: a state of a material where it flows freely and takes the shape of its container ● pitch: how high or low a sound is; in music, what note it is ● solid: a state of a material which retains its shape unless a force is applied to it; solids have a constant volume ● sound: vibrations that can be detected by the ear ● sound source: an object creating a sound by vibrating ● vibrate/vibration: to move backwards and forwards at high speed without changing location ● volume: the loudness of a sound ● sensor: a device that detects and responds to certain changes in the environment ● material: the substance something is made of

	answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Comparative testing Fair testing Pattern seeking Y4: Sound Identify how sounds are made, associating some of them with something vibrating. Recognise that vibrations from sounds travel through a medium to the ear. Find patterns between the pitch of a sound and features of the object that produced it. Find patterns between the volume of a sound and the strength of the vibrations that produced it. Recognise that sounds get fainter as the distance from the sound source increases. The reorganisation of the modules in years 3 and 4 means that all the lessons where KS2 Working Scientifically statement 1 (asking questions) is explicitly taught are in cycle B. There are planned enquiries taking place in cycle A, but the children are not asking questions related to which enquiry type in this cycle. Teachers should therefore develop opportunities for children to do this in cycle A. **How does sound travel? and How are shadows made?** are ideal opportunities for this..		• Know that the longer the column of air on a wind instrument, the lower the note. • Know that he shorter the column of air on a wind instrument, the higher the note. • Know that the longer the band, the lower the note. • Know that the more taut the band, the higher the note. Know that the thicker the band, the lower the note.	
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that the digestive system is the parts of the body that work together to break down food into nutrients and get rid of waste.** • **Know that food passes through the digestive system, where nutrients and water are absorbed and any food not used by the body comes out as poo.** • **Know that the main parts of the digestive system are the mouth, oesophagus, stomach, small intestine, large intestine, rectum and anus.** • **Know that humans have different types of teeth: incisors, canines and molars.** • **Know that food is chemically broken down in the stomach and small intestine, where it is absorbed into the blood.** • **Know that the large intestine absorbs any remaining water and the rectum stores poo.** • **Know that a food chain shows how energy and nutrients pass from one living thing to another as they eat or get eaten by each other.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Summer Term 2 How are vertebrates and invertebrates classified? **(Linked to Snap Science Y4 M6 – Classification of plants and animals)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Research using secondary sources Y4: Living things and their habitats Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things.	1) *How are living things classified?* 2) *How are vertebrates classified?* 3) *How are invertebrates classified?* 4) *Can you use a branching key?* 5) *What is this living thing?*	• **Know that plants are either flowering or non-flowering.** • **Know that animals are either vertebrates or invertebrates.** • **Know that vertebrates are classified into five main groups: fish, amphibians, reptiles, mammals and birds.** • **Know that vertebrates have an internal backbone for support.** • Know that warm-blooded (mammals and birds) is an ability to control (regulate) their own body temperature. • Know that cold-blooded (fish, amphibians, reptiles) means they are unable to do this and their body temperature changes with the surroundings. • Know that pike and bluefin tuna are fish. • Know that natterjack toads, newts, fire salamander are amphibians. • Know that iguanas, chameleons, Galapagos tortoise and Komodo dragon are reptiles. • Know that the platypus, bottlenose dolphin, grey seal, African elephant are mammals. • Know that the mallard, ostrich, robin and bald eagle are birds. • **Know that invertebrates are classified into three main groups: arthropods, molluscs and annelids.** • **Know that a branching key is a common way to structure identification charts and uses a series of yes/no questions to split the group into subgroups until individual living things can be identified and named.**	● branching key: a way of sorting a small number of items using yes/no questions ● annelid: an invertebrate group with segmented bodies, no legs, no antennae, usually have bristles, although these may be too small to see ● arachnid: an invertebrate group with eight jointed legs, no wings and two body parts: head and abdomen ● cold-blooded: unable to regulate their own body temperature and so it changes with the surroundings ● crustacean: an invertebrate group with ten or more pairs of jointed legs, no wings, three body parts (head, thorax and abdomen) protected by a harder outer shell, a segmented body and two pairs of antennae; most live in water ● flowering plant: a plant that produces flowers and fruit ● mollusc: an invertebrate group of soft-bodied animals with no legs, no segments, no wings, a muscular foot and most have tentacles and shells ● myriapod: an invertebrate group of typically small animals with two body parts (head and abdomen, which has many segments), more than nine pairs of legs, with each segment having one or two pairs of legs, and one pair of antennae; they live on land ● non-flowering plant: a plant that does not have a flowering stage of its life cycle ● organism: a living thing ● warm-blooded: having a body temperature that does not change whatever the surrounding temperature ● amphibian: an animal (vertebrate) that lives in water or on land but must return to the water to reproduce ● bird: an animal (vertebrate) that has feathers and lays eggs with hard shells ● exoskeleton: an external supporting structure for the body of a living thing ● fish: an animal (vertebrate) which lives in water and has gills and fins ● insect: an invertebrate group of small animals with bodies divided into three parts, with three pairs of jointed legs, usually one or two pairs of wings and one pair of antennae ● invertebrate: an animal that has no internal backbone ● mammal: an animal (vertebrate) that is covered in hair or fur; the female gives birth to live young and feeds her babies on milk from her own body ● reptile: a cold-blooded animal (vertebrate) which has dry, scaly skin and lays eggs on land ● vertebrate: an animal that has an internal backbone for support
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on:			

	- BOLD learning of previous unit: • **Know that a sound is produced when something vibrates.** • **Know that vibration is a rapid backward and forward movement that they may not always be able to see.** • **Know that vibrations travel from the source through a material (a solid, liquid or gas) to the ear so that we can hear them.** • **Know that sound travels best through solids.** • **Know that the stronger the vibrations, the louder the sound.** • **Know that sounds get fainter as the distance from the sound source increases.** • **Know that the larger the instrument, the lower the pitch.** • **Know that the smaller the instrument, the higher the pitch.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.

Essential Knowledge in the Upper Key Stage Two Science Curriculum – Cycle A

Term	National Curriculum Expectations	Suggested Learning Questions	Associated Substantive Knowledge	Key Vocabulary
Autumn Term 1 How do we classify living things? **(Linked to Snap Science Y6 M1 – Classification of living things)**	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Observing over time Identifying and classifying	*1) How can we sort the mess?* *2) What plants are there other than flowering plants?* *3) How can we classify animals?* *4) What else is living besides plants and animals?* *5) How can we identify living things?* *6) What lives here?* *7) Where do these organisms fit in my key?*	• **Know that classification is the process of grouping living things together based on how they look and how they're related to each other.** • **know that plants can be grouped as flowering plants, conifers, ferns and mosses** • **Know that ferns, mosses and conifers are plants that do not have flowers as part of their life cycle.** • Know that flowering plants have roots, leaves, stems and they have flowers for reproduction and their life cycle. • Know that conifers are usually evergreen have narrow, pointed leaves called needles or scaled and are plants that do not have flowers and they reproduce by growing seeds inside cones. • Know that mosses have stems and leaved and are plants that do not have flowers or roots and they reproduce by producing spores. • **Know that animals are grouped as vertebrates and invertebrates.** • **Know that vertebrates are then split into five smaller groups: mammals, birds, reptiles, amphibians and fish.** • **Know that invertebrates are split into five smaller groups: arthropods, molluscs, annelids, flatworms and echinodermata.** • Know that arthropods are then split into four groups: insects, arachnids, crustaceans and myriapods. • **Know that plants and animals are two of five kingdoms of living things** and that the three remaining kingdoms are fungi, protista and monera. • **Know that fungi is the kingdom that contains mould, mushrooms and yeast.** • Know that fungi are decomposers in the food chain but they cannot make their own food like plants do. (They are not plants) • Know that for a branching key to be successful, the questions should: - have yes or no as an answer - ensure it divides the living things into some that are 'yes', and some that are 'no' - split the species into groups rather then peel off one species at each layer - include observable characteristics. • **Know the names of some of the species that live in the local area and within the school grounds (CT to identify these as part of learning sequence)**	• arthropod: an invertebrate group that includes insects, arachnids, crustaceans and myriapods • cone: the hard 'egg-shaped' part of a conifer that opens and releases the seeds • conifer: a division of plants that do not have flowers as part of their life cycle • echinodermata: a class of invertebrates that have a calcium skeleton and tube feet operated by fluid pressure • fern: a division of plants that do not have flowers as part of their life cycle • monera: a kingdom of living things that contains the simplest form of organisms (single-celled) • moss: a division of plants that do not have flowers as part of their life cycle • mould: a type of fungus that thrives in moist, damp conditions • protista: a kingdom of living things that contains mostly single-celled organisms that do not fit into any other category; most are water-based and can move • spore: a seed-like cell that allows ferns and mosses to reproduce • taxonomy: a way of organising and classifying different living things • amphibian: an animal (vertebrate) that lives in water or on land but must return to the water to reproduce • annelid: an invertebrate group with segmented bodies, no legs, no antennae, usually have bristles although these may be too small to see • arachnid: an invertebrate group with eight jointed legs, no wings and two body parts: head and abdomen • bird: an animal (vertebrate) that has feathers and lays eggs with hard shells • carpel: female part of a flowering plant, which contains an ovary, style and stigma • cold-blooded: unable to regulate their own body temperature and so it changes with the surroundings • crustacean: an invertebrate group with ten or more pairs of jointed legs, no wings, three body parts (head, thorax and abdomen) protected by a harder outer shell, a segmented body and two pairs of antennae; most live in water • fish: an animal (vertebrate) which lives in water and has gills and fins • flowering plant: a plant that produces flowers and fruit • fungi: the kingdom of living things that contains mould, mushrooms and yeast

	Y6: Living things and their habitats Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.			● insect: an invertebrate group of small animals with bodies divided into three parts, with three pairs of jointed legs, usually one or two pairs of wings and one pair of antennae ● invertebrate: an animal that has no internal backbone ● mammal: an animal (vertebrate) that is covered in hair or fur; the female gives birth to live young and feeds her babies on milk from her own body ● mollusc: an invertebrate group of soft-bodied animals with no legs, no segments, no wings, a muscular foot and most have tentacles and shells ● myriapod: an invertebrate group of typically small animals with two body parts (head and abdomen, which has many segments), more than nine pairs of legs, with each segment having one or two pairs of legs, and one pair of antennae; they live on land ● organism: a living thing ● reproduction: the process by which living things make more of their own kind ● reptile: a cold-blooded animal (vertebrate) which has dry, scaly skin and lays eggs on land ● species: a group of living things that can mate with one another but not with those of other groups ● stamen: male part of a flowering plant made up of a filament and an anther, which makes pollen ● vertebrate: an animal that has an internal backbone for support ● warm-blooded: having a body temperature that does not change whatever the surrounding temperature
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: **(Link back to Summer unit from Cycle B or previous year group if in Year 5.)** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Autumn Term 2 What evidence is there that living things have changed over time? **(Linked to Snap Science Y6 M2 – Evolution and inheritance)**	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. <u>Working Scientifically:</u> Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. <u>Scientific Enquiry Type:</u> Grouping and classifying things Researching using secondary sources of information <u>Y6: Evolution and inheritance</u> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	1) *Why do things vary?* 2) *Can you breed a dog for a specific purpose?* 3) *How is an organism adapted to live in its habitat?* 4) *How do an animal's adaptations help it to survive?* 5) *What can fossils tell us?* 6) *How does evolution happen?* 7) *How did Wallace and Darwin come up with the idea of natural selection?*	• Know that a species is a group of organisms that can reproduce and have offspring • **Know that offspring are similar but vary and are not identical to their parents** • **Know that most characteristics of living things are inherited and passed on from parents to offspring by genes (eye colour, natural hair colour, or the shape of the face).** • **Know that some characteristics are influenced by the environment and cannot be passed on (for example, for humans the language we speak or whether we have scars.)** • **Know that an adaptation is a feature of an organism which helps it to survive in a specific habitat.** CT to add range of adaptations that help animals to survive in their habitats dependent upon animal chosen -Know that a camel has long eyelashes to keep sand out of its eyes and thick eyebrows to shield the eyes from the desert sun. • **Know that extinction occurs when the degree or type of changes in the environment are too great for the animals or plants that live there to adapt and survive.** • **Know that fossils provide evidence of organisms that lived millions of years ago and that are no longer living.** • Know that some fossils show organisms that are extinct. • Know that some fossils show animals that have evolved into a new species. • **Know that when one species develops into another the process is called evolution.** • **Know that natural selection is when the most desirable characteristics get passed down from parents to their offspring.** • Know that Charles Darwin and Alfred Wallace both proposed a mechanism for evolution which is called natural selection. • Know the five steps of natural selection. Step 1: There is variation within the same species. Step 2: There is a change in the habitat of the species. Step 3: Some individuals have adaptations which make them more likely to survive. Step 4: The individuals with the survival adaptation are more likely to reproduce. Step 5: Their offspring are more likely to have the survival adaptation.	● camouflage: the adaptation of the covering of an organism's body that helps it to blend in with the surroundings ● evolution: the formation of a new species; through many gradual changes and over many millions of years, organisms develop from those that preceded them ● extinction: the complete elimination of a species ● inherited: when a characteristic is passed on from parents to offspring ● migrate: to move from one place to another ● natural selection: the mechanism which drives evolution (sometimes referred to as survival of the fittest) ● offspring: the product of reproduction (babies, seeds) ● variation: a difference between an animal or a plant ● adaptation: a feature of an organism which helps it to survive in a particular habitat ● adapted: suited to survive in a particular habitat ● fossil: the preserved remains or trace of any once-living thing ● habitat: the natural environment where an animal or plant finds the things it needs to live and grow ● organism: a living thing ● predator: an animal that hunts or catches other animals to eat ● reproduction: the process by which living things make more of their own kind ● species: a group of similar organisms which can reproduce and produce fertile offspring

Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that classification is the process of grouping living things together based on how they look and how they're related to each other.** • **know that plants can be grouped as flowering plants, conifers, ferns and mosses** • **Know that ferns, mosses and conifers are plants that do not have flowers as part of their life cycle.** • **Know that animals are grouped as vertebrates and invertebrates.** • **Know that vertebrates are then split into five smaller groups: mammals, birds, reptiles, amphibians and fish.** • **Know that invertebrates are split into five smaller groups: arthropods, molluscs, annelids, flatworms and echinodermata.** • **Know that plants and animals are two of five kingdoms of living things** and that the three remaining kingdoms are fungi, protista and monera. • **Know that fungi is the kingdom that contains mould, mushrooms and yeast. .** • **Know the names of some of the species that live in the local area and within the school grounds (CT to identify these as part of learning sequence)** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Spring Term 1	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.**	*1) What's in space?*	• **Know that the main bodies that are found in our solar system are the Sun, Moon, Earth and planets.**	● dawn: when light first appears in the sky before sunrise ● diameter: the distance across the centre of a circle or sphere

What's in space? **(Linked to Snap Science Y5 M3 – Earth and space)**	They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Research using secondary sources of information Observing over time Pattern seeking Y5: Earth and space Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. Describe the movement of the Moon relative to the Earth. Describe the Sun, Earth and Moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	2) *How do the planets move?* 3) *How does the position of the Sun in the sky change?* 4) *What causes day and night?* 5) *How does the Moon move?* 6) *What patterns can we find in data about the planets?*	• **Know that the Sun, Moon, Earth and planets are all spherical.** • **Know that the Sun is a star.** • **Know that we see the Moon because it reflects the Sun's light.** • **Know that the Earth orbits the Sun and the time it takes to complete one orbit is called a year.** • **Know that the planets move in circular orbits around the Sun; these do not overlap** • Know that planets closer to the Sun have shorter orbits and move more quickly, so the length of a year is shortest for the planets that are closest to the Sun. • Know that the planets further from the Sun have longer orbits and move more slowly, so the length of a year is greatest for the planets that are furthest from the Sun. • **Know that the Sun appears to move east to west in an arc across the sky from sunrise to sunset.** • **Know that the shortest shadow appeared when the Sun was highest in the sky.** • **Know that the Earth rotates on its axis and this causes day and night, the apparent movement of the Sun across the sky and the changes in shadows.** • **Know that a day is 24 hours, which is the time for one complete rotation of the Earth on its axis.** • **Know that the Moon orbits the Earth every 28 days and rotates on its axis.** • Know that the Moon as seen from Earth appears to change shape.	● dusk: the time after sunset when there is still some light in the sky ● horizon: where the land and sky appear to meet ● midday: 12 noon ● spherical: shaped like a ball ● sunrise: the time in the morning when the Sun is first seen ● sunset: the time in the evening when the Sun is no longer visible ● axis: an imaginary line that a body (e.g. a planet or moon) rotates around ● moon: a natural satellite that orbits a planet ● orbit: to move in a regular path around another object (verb); the path taken when orbiting (noun) ● planet: a near-spherical body with a predictable orbit around a star ● rotate: to spin or turn in a circle around a fixed point or axis ● solar system: collective term for the Sun, the planets that orbit it, plus any moons and other natural bodies within it ● star: a huge gas body that generates light and heat; some stars have been observed as having planets orbiting them; they are suns at the centre of their own solar systems ● year: the length of time it takes a planet to complete one full orbit of its sun (its orbital period) ● dark/darkness: the absence of light ● light: is produced by a light source and makes things visible ● light source: something, natural or artificial, that produces its own light ● opaque: the property of blocking light by absorbing or reflecting all of the light that falls on it ● shadow: a darker region where some or all of the light has been blocked by an object ● Sun: the star at the centre of our solar system
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that offspring are similar but vary and are not identical to their parents**			

	• **Know that most characteristics of living things are inherited and passed on from parents to offspring by genes (eye colour, natural hair colour, or the shape of the face).** • **Know that some characteristics are influenced by the environment and cannot be passed on (for example, for humans the language we speak or whether we have scars.)** • **Know that an adaptation is a feature of an organism which helps it to survive in a specific habitat.** • **Know that extinction occurs when the degree or type of changes in the environment are too great for the animals or plants that live there to adapt and survive.** • **Know that fossils provide evidence of organisms that lived millions of years ago and that are no longer living.** • **Know that when one species develops into another the process is called evolution.** • **Know that natural selection is when the most desirable characteristics get passed down from parents to their offspring.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.

Spring Term 2 How do I see?	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas	1) *How does light travel?* 2) *What can we change*	• **Know that light appears to travel in straight lines**. • **Know that we can see a light source because some of the light from the source enters our eyes.**	● light ray: a way of showing light travelling from one place to another ● reflection: an image of an object seen in a mirror or other reflective surface ● dark/darkness: the absence of light

(Linked to Snap Science Y6 M3 – What light does)	help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Comparative and fair testing Y6: Light Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	*about a shadow?* *3) What might affect the size of a shadow?* *4) What affects the size of a shadow?* *5) How is light reflected?* *6) How do we see objects?*	• **Know that light rays travel in straight lines, some are blocked by the object and others travel past it creating the outline of the shadow in the same shape as the object, surrounded by a bright patch.** CT to indicate Substantive Knowledge from below based on investigation chosen (size, shape): • **Know that to make the shadow from the puppet bigger we move the puppet closer to the light source and further from the screen.** • **Know that we make the shadow from the puppet smaller by moving it closer to the screen and further from the light source.** • Know that changing the distance between the object and the screen will produce a straight line graph with shadow size increasing as distance increases. • Know that changing the distance between the object and torch will produce a curved graph, eventually levelling off, with shadow size decreasing as distance increases. • **Know that the angle at which light hits the mirror is the same as the angle at which it is reflected.**	● light: is produced by a light source and makes things visible ● light source: something, natural or artificial, that produces its own light ● opaque: the property of blocking light by absorbing or reflecting all of the light that falls on it ● reflect: to be diverted back from a surface ● reflective: reflecting back a lot of the light that falls on it making it shiny in appearance ● shadow: a darker region where some or all of the light has been blocked by an object ● transparent: the property of allowing almost all light that falls on it to pass through, enabling a clear view of what lies behind it ● translucent: the property of blocking or scattering some light so that not all of it passes through and there is no clear view of what lies behind it
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that the main bodies that are found in our solar system are the Sun, Moon, Earth and planets.** • **Know that the Sun, Moon, Earth and planets are all spherical.** • **Know that the Sun is a star.** • **Know that we see the Moon because it reflects the Sun's light.** • **Know that the Earth orbits the Sun and the time it takes to complete one orbit is called a year.** • **Know that the planets move in circular orbits around the Sun; these do not overlap** • **Know that the Sun appears to move east to west in an arc across the sky from sunrise to sunset.** • **Know that the shortest shadow appeared when the Sun was highest in the sky.** • **Know that the Earth rotates on its axis and this causes day and night, the apparent movement of the Sun across the sky and the changes in shadows.** • **Know that a day is 24 hours, which is the time for one complete rotation of the Earth on its axis.** • **Know that the Moon orbits the Earth every 28 days and rotates on its axis.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Summer Term 1 How can we compare, group and use materials?	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They	*1) How can we compare and group materials?* *2) Which materials did the*	• **Know that materials are used in many different ways and for particular purposes based on their properties. (e.g. blinds/curtains: opaque, flexible, durable, thermal insulators)** CT to identify material, property and why used in substantive	● brittle: easily broken if pressure is applied ● ductile: can be stretched or rolled until very thin ● fragile: delicate; easily broken if not handled with care ● impermeable: not allowing fluid to pass through ● malleable/malleability: can be shaped when pressure is applied

(Linked to Snap Science Y5 M2 – Properties and uses of materials)	should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Identifying and classifying Comparative and fair testing Y5: Properties and changes of materials Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. The reorganisation of the modules in years 5 and 6 means that all the lessons where KS2 Working Scientifically statement 4 is explicitly taught are in cycle B, leaving cycle A without a discreet opportunity to use test results to make predictions and set up further tests in their work. There are planned enquiries taking place in cycle A, but the children are not using those results to plan further tests. Teachers should therefore develop opportunities for children to do this in cycle A. **How can we compare, group and use materials?** offers ideal opportunities for this.	*builders use when constructing our school and why?* 3) *Which liquid is the thickest?* 4) *Who invents things?* 5) *Can the same container keep cold things cold and hot things hot?* 6) *Which materials are absorbent, permeable or waterproof?*	knowledge based on what is identified in their lesson. • Know that 'soft' solids, like sponge or foam are still defined as a solid, as are sand and flour, which behave a little like liquids when spilt from a container. • **Know that liquids have properties which include having: [a fixed weight, a fixed volume,] an ability to flow, a level of viscosity and they take on the shape of a container.** • **Know that viscosity is the property of a liquid that describes how fast or slowly it will flow and that the viscosity of a liquid describes how thick or thin it is.** • **Know that a thick liquid, like Greek style yoghurt, is said to have a high viscosity, and will flow slowly.** • **Know that a thin liquid, like water, is said to have low viscosity, and will flow quickly.** • Know that invention is something that someone makes that has not been made before, to serve a particular purpose, using materials in a way not used before. • **Know that a thermal insulator is a material that provides high resistance to heat flow.** • **Know that rubber, wool, wood, polystyrene/foam, plastics are all examples of thermal insulators.** • **Know that a thermal conductor is a material that provides low resistance to heat flow.** • **Know that metals, such as aluminium, copper, steel, and iron are all examples of thermal conductors.** • **Know that a thermal insulator keeps hot things hot and cold things cold.** • **Know that materials can be absorbent and can soak up and take in liquid.** CT to identify which ones when lesson materials chosen. • **Know that some materials are permeable and let water pass through.** CT to identify which ones when lesson materials chosen. • **Know that some materials are waterproof and do not let water pass through**. CT to identify which ones when lesson materials chosen.	● permeable: allowing fluid to pass through it ● thermal conductor: a material that transmits heat well ● thermal insulator: a material that does not transmit heat well ● viscosity/viscous: how fast or slowly a liquid will flow; how 'thick' or 'thin' a liquid is ● wear and tear: deterioration of materials over time due to weathering or regular use ● absorb/absorbent: to take in something ● compost: a mixture of decaying organic matter, used for fertilising soil ● decompose: the process where bacteria and worms break down natural materials into tiny pieces that help new plants grow ● durable: able to withstand wear, pressure, or damage ● elastic/elasticity: able to stretch easily without breaking and then return to original form ● electrical conductor/insulator: a material that allows electricity to flow through it/does not allow electricity to flow through it ● flexible/flexibility: able to bend easily without breaking ● hard/hardness: how resistant a material is to scratching (not how easily it breaks) ● liquid: a state of a material where it flows freely and takes the shape of its container ● magnetic/non-magnetic: able to be attracted by a magnet/ not able to be attracted by a magnet ● opaque: the property of blocking light ● property: a characteristic of a material, what it is like ● solid: a state of material which retains its shape unless a force is applied to it; solids have a constant volume ● transparent/transparency: the property of allowing almost all light that falls on it to pass through, enabling a clear view of what lies behind it ● weathering: the effects of weather, breaking down the surface of rocks over time
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that light appears to travel in straight lines**. • **Know that we can see a light source because some of the light from the source enters our eyes.**			

	• **Know that light rays travel in straight lines, some are blocked by the object and others travel past it creating the outline of the shadow in the same shape as the object, surrounded by a bright patch.** CT to indicate Substantive Knowledge from below based on investigation chosen (size, shape): • **Know that to make the shadow from the puppet bigger we move the puppet closer to the light source and further from the screen.** • **Know that we make the shadow from the puppet smaller by moving it closer to the screen and further from the light source.** • **Know that the angle at which light hits the mirror is the same as the angle at which it is reflected.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			
Summer Term 2 How can I keep my body healthy? **(Linked to Snap Science Y6 M6 – Body health)**	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. <u>Working Scientifically:</u>	1) *How do we make healthy food choices?* 2) *What can happen if you don't eat a balanced diet?* 3) *How does physical activity affect heart rate?* 4) *How does smoking or vaping*	• **Know that proteins help our bodies grow and repair themselves** (They are found in foods such as fish, meat, beans, nuts, seeds, eggs and cheese). • **Know that carbohydrates give us energy** (They are found in foods such as bread, potatoes and pasta). • **Know that vitamins and minerals are good for our skin, bones, teeth and blood and help our bodies grow, function and repair.** • **Know that fats provide energy and help in building our bodies** (They are found in foods such as butter, cheese, nuts and fried food.) • **Know that fibre is important for helping us digest our foods** (It's found in fruit and vegetables).	● arteries: blood vessels that carry blood away from the heart ● heart rate: the number of times the heart beats per minute ● malnutrition: lack of adequate nutrition ● pulse: the rhythmic bulge in an artery felt when blood is pumped through it ● salt: a mineral that our bodies need in small amounts to function properly ● veins: blood vessels that carry blood back to the heart ● carbohydrate: a nutrient which is the body's major source of energy ● chemicals: tiny substances that all materials are made of; they each have specific properties ● fats: nutrients that are a source of energy for the body, produced from animals or plants

	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Research using secondary sources of information Pattern seeking Y6: Animals including humans Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans.	*affect your health?*	• **Know that a healthy diet is a balanced diet. It provides all of the energy we need to keep active and the nutrients we need to help us grow and keep healthy.** • **Know that hearts need to have exercise to stay healthy.** • Know that during exercise the pulse rate increases because the heart is pumping blood quicker to make sure that the muscles have the extra energy and oxygen they need to move. • **Know that regular physical activity prevents obesity, keeps heart, lungs and muscles healthy, increases flexibility and strength and helps to fight off infections.** • **Know that drugs are any substances that alter the way that the body works.** • Know that nicotine is a highly addictive drug that is found in cigarettes and vape products. • Know that nicotine causes an increase in blood pressure, breathing and heart rate. • Know that the long-term effects of smoking can include lung diseases, heart disease and stroke.	● fibre: parts of plant-based food that can't be broken down and which help with digestion ● lungs: the organs that are used for breathing; they allow oxygen to enter the blood ● mineral: a substance needed to keep the body healthy ● nutrient: a substance that is essential for life and health ● oxygen: a gas in the air which most living things need to survive ● protein: a nutrient which is needed for muscle repair and growth ● vitamin: a nutrient required by the body to grow, function and repair
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that materials are used in many different ways and for particular purposes based on their properties. (e.g. blinds/curtains: opaque, flexible, durable, thermal insulators)** CT to identify material, property and why used in substantive knowledge based on what is identified in their lesson. • **Know that liquids have properties which include having: [a fixed weight, a fixed volume,] an ability to flow, a level of viscosity and they take on the shape of a container.** • **Know that viscosity is the property of a liquid that describes how fast or slowly it will flow and that the viscosity of a liquid describes how thick or thin it is.** • **Know that a thick liquid, like Greek style yoghurt, is said to have a high viscosity, and will flow slowly.** • **Know that a thin liquid, like water, is said to have low viscosity, and will flow quickly.** • **Know that a thermal insulator is a material that provides high resistance to heat flow.** • **Know that rubber, wool, wood, polystyrene/foam, plastics are all examples of thermal insulators.** • **Know that a thermal conductor is a material that provides low resistance to heat flow.** • **Know that metals, such as aluminium, copper, steel, and iron are all examples of thermal conductors.** • **Know that a thermal insulator keeps hot things hot and cold things cold.** • **Know that materials can be absorbent and can soak up and take in liquid.** CT to identify which ones when lesson materials chosen. • **Know that some materials are permeable and let water pass through.** CT to identify which ones when lesson materials chosen. • **Know that some materials are waterproof and do not let water pass through**. CT to identify which ones when lesson materials chosen. - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Essential Knowledge in the Key Stage One Science Curriculum – Cycle B

Term	National Curriculum Expectations	Suggested Learning Questions	Associated Substantive Knowledge	Key Vocabulary
Autumn Term 1 What animals live in our local area? **(Linked to Snap Science Y2 M1 – Local habitats)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify.	1) *Are the things I find alive, have never been alive or once were alive?* 2) *What lives in my tree?* 3) *How many birds visit our bird feeding station?* 4) *What animals live in this woody habitat?* 5) *What insects might live in our bug hotel?* 6) *What animals live in this grassy habitat?* 7) *What do animals that live in the woods eat?*	• **Know that living things include plants (and their seeds) and animals.** • **Know that things that were once alive include dead animals and plants, and parts of plants and animals that are no longer attached (for example, leaves and twigs, shells, fur, hair and feathers).** • **Know that objects made of rock, metal, glass and plastic have never been alive.** • **Know that a habitat is a place where plants and animals naturally live and grow.** • **Know that a habitat provides all that a living thing needs to survive - food, water and shelter.** • Know that trees are excellent habitats for lots of different living things as leaves can be eaten by insects; birds build their nests in trees; bats use holes as roosts and plants such as moss or ferns can grow on trees or on their roots. • Know that birds feed from hanging feeders, bird tables and by picking up from the ground.	● compare: to notice how things are the same or different ● feed: to eat food ● move: to change place or position ● record: to draw or write what you observed or measured ● order: to place objects in a sequence or pattern ● alive: living, not dead ● breathe: to draw air into the body and let it out ● consumer: a living thing which has to eat other animals or plants to gain its food ● dead: no longer alive ● decay: to rot ● decomposer: a living thing that breaks down dead plants, animals or waste ● depend: to strongly need and receive help from an outside source in order to live ● food chain: a series of living things where each one is food for the next

	Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type Identify and classifying Noticing patterns Year 2: Living things and their habitats Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including microhabitats. Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.		• **Know that a woody habitat is dark, damp and on the ground there will be soil and leaves.** • Know that in a woody habitat: - under the bark you might find beetles, spiders, centipedes and millipedes. -on top of the leaves you might find caterpillars, aphids and other bugs and insects. -underneath the leaves you might find caterpillars and aphids. - inside dead branches and trunks you might find beetle larvae • Know that bug hotels are suitable for the insects to live in. • Know that you can build bug hotels at any time of year, but lots of natural materials (dry leaves, twigs, hollow stems, dead grass, pine cones, bark) can be found in autumn. *(This is also the time when many animals look for cosy places to hibernate over winter.)* • **Know that a grassy habitat has more light and is open compared to the woody habitat.** • Know that in grassy habitats you may see grasshoppers, spiders, bees, butterflies and worms. • **Know that a food chain can be used to show the way in which animals depend on each other for energy (food.)**	● habitat: a place where an animal or plant finds the things it needs to live and grow ● never been alive: has never been a living thing, or part of one ● once alive: was once a living thing, or part of one, but is now dead ● producer: a living thing, such as a plant, which makes its own food ● shelter: something that provides cover or protection ● survive: to stay alive ● identify: to know and say what something is ● observe: to look carefully at something, to notice what it is like or how it has changed; can involve all senses, not just sight ● pattern: something that happens or appears in a regular and repeated way ● insect: small six-legged animal with body in three parts and often with wings ● omnivore: an animal that eats both plants and other animals
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit **(Link back to EYFS curriculum or Summer unit from Cycle A)** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far			
Autumn Term 2 What are objects made from? **(Linked to Snap Science. Y1 children on this cycle need to start with Y1 M3 Lesson 1 and 2 and then continue to Y1 M4 – Properties and used of materials)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type Identifying and classifying Comparative testing Y1 Everyday Materials: Distinguish between an object and the material from which it is made. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Describe the simple physical properties of a	1) *What material is this? (Y1 M3)* 2) *Can the same object be made from different materials?* 3) *What properties do materials have?* 4) *Does it bend or stretch?* 5) *Do all materials get wet?*	• **Know the name of these everyday materials - wood, plastic, glass, metal, water, rock, paper, fabric.** • **Know what material an object is made from.** • Know that objects can be made from more than one material. • Know that wood and rock are natural materials and that metal, glass, brick and plastic are manufactured materials (gone through a process to change them into a new material). • **Know that a property describes what a material is like (the characteristics of a material – looks and feels like).** • **Know that wood, glass, metal and plastic, rock and brick are hard and fabric is soft.** • **Know that wood and glass are rigid and plastic and fabric are flexible.** • **Know that plastic, glass and metal are waterproof and fabric is not waterproof.** • **Know that fabric and wool are absorbent but metal and plastic are not.** • **Know that glass is usually smooth, shiny and transparent.** • **Know that rock is mostly heavy, but can be rough or smooth.**	● compare: to notice how things are the same or different ● different: not the same ● describe: to use words to tell someone else what something is like ● record: to draw or write what you observed or measured ● similar: not identical but very alike ● sort: to arrange things in a particular way ● suitable: right for the purpose ● use: purpose of something ● bar chart: a way to show measurement or amount by using bars of different heights ● test: to carry out a science enquiry to find something out ● bend: to move from a straight to a curved shape ● flexible: able to bend easily without breaking ● opaque: (a material that) you cannot see through ● rigid: unable to bend ● waterproof: does not let water pass through it ● group: to place objects, materials or living things into sets ● observe: to look carefully at something, to notice what it is like or how it has changed ● absorb/absorbent: to take in fluid ● manufactured: a material that has been made into another material by humans ● material: the substance something is made of ● natural: found in nature; not made by humans

	variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties.			● property: what a material is like ● recycle: to turn waste materials into new materials and objects ● reuse: to use a material or object again ● transparent: (a material that) you can see through.
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit: • **Know that living things include plants (and their seeds) and animals.** • **Know that things that were once alive include dead animals and plants, and parts of plants and animals that are no longer attached (for example, leaves and twigs, shells, fur, hair and feathers).** • **Know that objects made of rock, metal, glass and plastic have never been alive.** • **Know that a habitat is a place where plants and animals naturally live and grow.** • **Know that a habitat provides all that a living thing needs to survive - food, water and shelter.** • **Know that a woody habitat is dark, damp and on the ground there will be soil and leaves.** • **Know that a grassy habitat has more light and is open compared to the woody habitat.** • **Know that a food chain can be used to show the way in which animals depend on each other for energy (food.)** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Spring Term 1 What do animals need to be alive and healthy? **(Linked to Snap Science Y2 M4 – Growing up animals and humans)** **In 2024, this unit will be taught in Term 4 due to a trip booking that had already been made prior to the update of the LTP. Term 3 learning will be Which material should I choose?**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type observing over time identifying and classifying Year 2: Animals, including humans Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	1) *How do animals change as they grow?* 2) *What do animals need to survive?* 3) *How can we sort food into groups?* 4) *How can humans stay clean?* 5) *How can humans stay active?* 6) *How do humans stay healthy?*	• **Know that animals grow and change throughout their lives and that this is called a life cycle.** • Know that animals, including humans, have offspring which grow into adults. • **Know that there are five vertebrate groups in the animal kingdom – amphibians, birds, reptiles, fish and mammals** • Know that reptiles, birds, fish and mammals are born looking like a small version of their species. • Know that amphibians and insects do not look like the adult of the species they grow into when they are born. • **Know that all animals need food, water and air for survival.** • Know that other important needs for young humans are also love, medical care and toys. • **Know that humans need to eat different types of food each day from the four main food groups (fruit and vegetables, starchy carbohydrates, non-dairy proteins and dairy).** • **Know that there is a fifth food group (fatty, sugary and oily foods) and that health experts recommend that this food group should only make up a very small part of our daily diet.** • Know that apples, onions, tomatoes, grapes and frozen peas belong to the fruit and vegetable group. • Know that bread, noodles, potatoes and brown rice belong to the starchy carbohydrates group. • Know that chicken drumsticks, tinned tuna, nuts and eggs belong to the non-dairy proteins. • Know that yoghurt, milk, cheese, and soya milk belong to the dairy and alternatives group. • **Know that keeping clean and hygienic is crucial for humans to stay healthy and to do this we must: wash our hands, whole body and hair; brush our teeth and hair; change our clothes and visit the dentist.**	birth: when a baby animal comes out of an egg or out of its mother ● healthy: well ● hygiene/hygienic: being clean to stay healthy ● invertebrate: an animal that has no internal backbone ● life cycle: the series of changes in the life of an animal from birth to death ● classify: to group objects according to similarities in appearance or properties ● diagram: a drawing that shows the parts of something or how the parts work together ● group: to place objects, materials or living things into sets ● identify: to know and say what something is ● observe: to look carefully at something, to notice what it is like or how it has changed; can involve all senses not just sight ● adult: grown up animal ● amphibian: an animal that lives in water or on land but must return to the water to reproduce ● bird: an animal that has feathers and lays eggs with hard shells ● diet: the kind of food an animal usually eats ● fish: an animal that lives in water and has gills and fins ● insect: a small six-legged animal with body in three parts and often with wings

			• **Know that we need to be hygienic to avoid the spread of diseases; so that we are pleasant to be near and don't smell and to look after and care for our bodies and keep them healthy.** • **Know that young people should have at least 60 minutes of physical activity per day (**playing at break, walking to and from school and taking part in PE lessons and other organised sport). • Know that physical activity: -builds strong bones and muscles -helps us to concentrate better -makes us feel good and happy -builds a strong and healthy body and is -good for our hearts.	● mammal: an animal that is covered in hair or fur; the female gives birth to live young and feeds her babies on milk from her own body ● reptile: an animal that has dry, scaly skin and lays eggs on land ● survive: to stay alive ● vertebrate: an animal that has an internal backbone
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know the name of these everyday materials - wood, plastic, glass, metal, water, rock, paper, fabric.** • **Know what material an object is made from.** • **Know that a property describes what a material is like (the characteristics of a material – looks and feels like).** • **Know that wood, glass, metal and plastic, rock and brick are hard and fabric is soft.** • **Know that wood and glass are rigid and plastic and fabric are flexible.** • **Know that plastic, glass and metal are waterproof and fabric is not waterproof.** • **Know that fabric and wool are absorbent but metal and plastic are not.** • **Know that glass is usually smooth, shiny and transparent.** • **Know that rock is mostly heavy, but can be rough or smooth.** - BOLD from the unit that feeds into this unit or- BOLD that has been taught in this unit so far.			

Spring Term 2 Which material should I choose? **(Linked to Snap Science Y2 M2 – Choosing Materials)** **In 2024, this unit will be taught in Term 3 due to a trip booking that had already been made prior to the update of the LTP. Term 4 learning will be What animals need to be alive and healthy?**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying things, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type: Comparative testing Year 2: Uses of everyday materials Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. The reorganisation of the modules in years 1 and 2 means that all the lessons where KS1 Working Scientifically statement 1 (ask questions) is explicitly	1) *Is that a good choice of material?* 2) *Which ball bounces highest?(or Which ball is the most suitable to play … with?)* 3) *Which material do you think would be best for Scrubbing Brush's protective suit? (Use story Traction Man)* 4) *Who develops new materials?*	• Know what material an object is made from. • **Know that a property describes what a material is like (the characteristics of a material).** • **know that glass is a suitable material for reading glasses as it is transparent and strong** • **know plastic is a suitable material for a raincoat as it is flexible and waterproof** • **know that metal is a suitable material for a car as it is durable and strong** • **know that paper is a suitable material for a book as it is lightweight and smooth** • **know that wood is a suitable material for a door as it is durable, strong and opaque.** • **Know that elasticity is the property that makes a ball bouncy.** • know that the lowest bouncing ball is most suitable for hockey because hockey balls don't need to bounce. • know that the highest bouncing ball is most suitable for tennis because tennis balls do need to bounce. • **Know that durable means that a material is hard-wearing and doesn't tear/damage easily when rubbed by other materials.** • Know that the fabric that took the most rubs before a hole was made would be best for Scrubbing Brush's protective suit. • Know that inventors discover new uses for materials and create new materials. • Know that Charles Macintosh invented a flexible and extremely waterproof fabric which was made into a waterproof coat (called a mackintosh).	● compare: to notice how things are the same or different ● design: to make or draw plans for something new ● discover: to find unexpectedly or as a result of an enquiry ● fit for purpose: well suited for its use ● invent: to create or design something that has not existed before ● record: to draw or write what you observed or measured ● suitable: right for the purpose ● use: the purpose for which a material is chosen ● comparative test: a science enquiry to compare different materials or events ● enquiry: a method scientists use to collect evidence to answer questions ● fair: when everything is kept the same except the thing that is being compared ● measure: to use equipment to find out the exact size or weight of something ● bouncy/bounciness: an adjective used to describe something that springs back or up after hitting something ● durable: able to withstand wear, pressure or damage ● elastic/elasticity: able to stretch, bend or twist without breaking and then return to original form ● bar chart: a way to show measurement or amount by using bars of different heights ● observe/observation: to look carefully at something, to notice what it is like or how it has changed; can involve all senses not just sight ● rank: to put things in an order ● test: to carry out a science enquiry to find something out ● absorb/absorbent: to take in fluid ● flexible: able to bend easily without breaking ● material: the substance something is made of

	taught are in cycle A, leaving cycle B without a discreet opportunity for children to ask questions and recognising that they can be answered in different ways. Teachers should therefore develop opportunities for children to do this in cycle B. **Which material should I choose?** is an ideal opportunity for this.			● opaque: an adjective used to describe a material you can't see through ● property: what a material is like ● rigid: unable to bend ● transparent: an adjective used to describe a material that you can see through ● waterproof: does not let water pass through it
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD from the unit that feeds into this unit or- BOLD that has been taught in this unit so far. - BOLD learning of previous unit • **Know that animals grow and change throughout their lives and that this is called a life cycle.** • **Know that there are five vertebrate groups in the animal kingdom - – amphibians, birds, reptiles, fish and mammals** • **Know that all animals need food, water and air for survival.** • **Know that humans need to eat different types of food each day from the four main food groups (fruit and vegetables, starchy carbohydrates, non-dairy proteins and dairy).** • **Know that there is a fifth food group (fatty, sugary and oily foods) and that health experts recommend that this food group should only make up a very small part of our daily diet.** • **Know that keeping clean and hygienic is crucial for humans to stay healthy and to do this we must: wash our hands, whole body and hair; brush our teeth and hair; change our clothes and visit the dentist.** • **Know that we need to be hygienic to avoid the spread of diseases; so that we are pleasant to be near and don't smell and to look after and care for our bodies and keep them healthy.** • **Know that young people should have at least 60 minutes of physical activity per day.**			
Summer Term 1 How can I sort and group animals? **(Linked to Snap Science Y1 M5 – Animals – Vertebrates)**	**Aims**: Pupils should **experience** and **observe phenomena**, looking more closely at the **natural** and **humanly constructed world** around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their **scientific understanding** by using different types of **scientific enquiry** to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use **scientific language**. Most science learning should be done through **first-hand practical experiences**. Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions. Scientific Enquiry Type identifying and classifying Year 1: Animals, including humans Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets).Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	*Who's who in the animal (vertebrate) world?* *What's so special about birds?* *What makes an amphibian an amphibian?* *Do fish have fingers?* *Are humans mammals?*	• Know that there are five vertebrate groups in the animal kingdom – amphibians, birds, reptiles, fish and mammals. • **Know that reptiles lay eggs, have scaly skin, four legs, claws, teeth and live on land.** • Know that crocodiles, snakes , lizards, tortoises and turtles are reptiles. • **Know that the things that make birds distinct are: eggs, beaks, claws, wings and feathers.** • Know that most birds can fly, and some can swim or spend time underwater. • Know that chickens, penguins, sparrows, barn owls and seagulls are birds. • **Know that carnivores mainly eat meat; herbivores only eat plant materials and omnivores eat both.** • **Know that the things that make amphibians distinct are: eggs, living on land and in water and their diet changing with their stage of life.**. • Know that toads, frogs and newts are amphibians. • **Know that the things make fish distinct are: they lay eggs, they have gills to help them breathe underwater, they have fins and a tail to help them swim, and most fish have scales to protect them.** • Know that trout, sharks, clown fish, goldfish are all fish. • **Know that the things that make mammals distinct are: hair or fur covering their bodies, giving birth to live young, producing milk for offspring, nurturing offspring, looking like a younger version of their parent and having a range of movement**. • Know that humans, horses, tigers, cows, cats, foxes, zebras and giraffes are mammals.	● feature: something that makes a thing special or different ● structure: the way that the parts of something are joined together ● adult: grown up animal ● amphibian: animal, that lives in water or on land but must return to the water to reproduce ● carnivore: an animal that only eats other animals ● diet: the kind of food an animal usually eats ● fish: animal that lives in water and has gills and fins ● herbivore: an animal that only eats plants ● mammal: animal that is covered in hair or fur. The female gives birth to live young and feeds her babies on milk from her own body ● omnivore: an animal that eats both plants and other animals ● reptile: an animal which has dry, scaly skin and lays eggs on land ● vertebrate: an animal that has an internal backbone ● classify: to group objects according to similarities in appearance or properties ● group(verb): to place objects, materials or living things into sets ● identify: to know and say what something is ● bird: animal that has feathers and lays eggs with hard shells
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on:			

<table>
<tr><td></td><td colspan="4">- BOLD learning of previous unit
• Know that a property describes what a material is like (the characteristics of a material).
• know that glass is a suitable material for reading glasses as it is transparent and strong
• know plastic is a suitable material for a raincoat as it is flexible and waterproof
• know that metal is a suitable material for a car as it is durable and strong
• know that paper is a suitable material for a book as it is lightweight and smooth
• know that wood is a suitable material for a door as it is durable, strong and opaque.
• Know that elasticity is the property that makes a ball bouncy.
• Know that durable means that a material is hard-wearing and doesn't tear/damage easily when rubbed by other materials.
- BOLD from the unit that feeds into this unit or
- BOLD that has been taught in this unit so far.</td></tr>
<tr><td>Summer Term 2

What are the parts of a plant?

(Linked to Snap Science Y1 M5 – Identifying plants and their parts)</td><td>Aims: Pupils should experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their scientific understanding by using different types of scientific enquiry to answer questions: observing changes over time, noticing patterns, grouping and classifying thigs, carrying out comparative tests and finding things out using secondary sources. They should begin to use scientific language. Most science learning should be done through first-hand practical experiences.

Working Scientifically: Ask simple questions. Observe closely using simple equipment. Perform simple tests. Identify and classify. Use observations and ideas to suggest answers to questions. Gather and record data to help answer questions.

Scientific Enquiry Type
Identifying and classifying

Year 1: Plants
Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees.</td><td>1) What wild and garden plants can we find around our school?
2) What parts of a plant grow above the ground?
3) What part of a plant grows under the ground?
4) Why are trees plants?
5) What are the similarities and differences between plants that have flowers?</td><td>• Know that a plant is usually called a garden plant if it has been grown by a gardener.
• Know that a plant is usually called a wild plant if it has not been planted by a gardener.
• Know that lilies, daffodils and tulips are garden plants.
• Know that thistles, bluebells, daisies foxgloves, dandelions and buttercups are wild plants.
• Know and can label the different plant parts as stems, flowers, flower buds and leaves.
• Know that the parts of a plant that grow above the ground are the leaves, stems and flowers.
• Know that roots grow under the ground and different plants have different roots (tap roots and branching roots).
• Know that trees are also plants because they have stems, roots, leaves and flowers.
• Know that the stem of a tree is called a trunk, and that trunks are covered in bark.
• Know that evergreen trees are trees that keep their leaves through the winter. (These trees continually shed and replace their leaves throughout the year).
• Know that deciduous trees are trees whose leaves change colour in the autumn and fall off and by the winter the tree has no leaves on its branches.</td><td>• different: not the same
● compare: to notice how things are the same or different
● describe: to use words to tell someone what something is like
● similar: not identical but very alike
● texture: how a surface or material feels
● bark: the covering of the trunk
● roots: the part of the plant which grows under the ground
● stem: the part of the plant which grows above the ground and which holds the leaves and flowers
● trunk: the stem of a tree
● classify: to group objects according to similarities in appearance or properties
● group (verb): to place objects, materials or living things into sets
● identify: to know and say what something is
● observe: to look carefully at something, to notice what it is like or how it has changed
● deciduous: plants which shed their leaves once a year
● evergreen: plants which appear to have leaves all year round
● flower: the part of the plant which is often coloured other than green and grows above the ground
● leaf: a flat part of the plant which is attached to the stem
● plant (noun): a living thing that grows in the ground and usually has leaves, stems, and roots
• tap and branching roots</td></tr>
<tr><td>Connect</td><td colspan="4">One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary.
One session should focus on Science Capital (e.g. A scientist just like me! or something similar)
One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit.

Connect should focus on:
- BOLD learning of previous unit
• Know that reptiles lay eggs, have scaly skin, four legs, claws, teeth and live on land.
• Know that the things that make birds distinct are: eggs, beaks, claws, wings and feathers.
• Know that carnivores mainly eat meat; herbivores only eat plant materials and omnivores eat both.
• Know that the things that make amphibians distinct are: eggs, living on land and in water and their diet changing with their stage of life.
• Know that the things make fish distinct are: they lay eggs, they have gills to help them breathe underwater, they have fins and a tail to help them swim, and most fish have scales to protect them.
• Know that the things that make mammals distinct are: hair or fur covering their bodies, giving birth to live young, producing milk for offspring, nurturing offspring, looking like a younger version of their parent and having a range of movement.
- BOLD from the unit that feeds into this unit or</td></tr>
</table>

	- BOLD that has been taught in this unit so far.

Essential Knowledge in the Lower Key Stage Two Science Curriculum – Cycle B

Term	National Curriculum Expectations	Suggested Learning Questions	Associated Substantive Knowledge	Key Vocabulary
Autumn Term 1 What are changes of states? **(Linked to Snap Science Y4 M1 – Changes of state)** **In 2024, this unit will be taught in Term 2 as What different types of rocks are there? was taught in Term 1.**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Identifying and classifying Observing over time	1) *Is this material a liquid or a solid?* 2) *How is temperature measured?* 3) *What difference does temperature make to how quickly the ice blocks melt?* 4) *What are melting and freezing?* 5) *Are spaces really empty?* 6) *What is evaporation and how does it help to get things dry?* 7) *Where did the water come from?* 8) *Where does the rain come from?*	• **Know that a solid will hold its shape under normal conditions and has a fixed volume.** • **Know that liquids can be poured and will spread out to take on the shape of the container they are in.** • **Know that a liquid has a fixed volume.** • **Know that sand, salt and flour are solids and that these materials are made up of individual solid grains which each hold their shape and have all the properties of a solid.** • **Know that a thermometer is used to measure temperature.** • **Know that the unit of measurement we use for temperature is degrees Celsius.** • Know that a data logger has the advantage that it can take readings when no one is present and can take a series of readings close together. • **Know that freezing/solidifying is when a liquid (water) changes state into a solid (ice) and that the temperature at which this happens is called the freezing point.** • **Know that melting is when a solid (ice) changes state into a liquid (water) and that the temperature at which this happens is called the melting point.** • Know that melting and freezing are reversible processes. • **Know that ice melts faster as the temperature increases.** • **Know that air is a gas.** • **Know some of the gases that are in the air: nitrogen, oxygen, carbon dioxide** (hydrogen, methane, carbon monoxide, argon, helium, neon, krypton) • **Know that evaporation is when water changes state from a liquid into a gas and becomes water vapour.**	• cool: to reduce the temperature • empty: having nothing inside • flow: continuous movement • heat: to increase the temperature • horizontal: a straight line viewed left to right • space: the area or volume between, inside or around objects • vertical: a straight line viewed top to bottom • air: the invisible gas surrounding the Earth • boil: to change from liquid to gas, when the liquid is heated to a specific temperature known as its boiling point; occurs throughout the liquid • boiling point: the temperature at which a liquid turns into a gas • bubble: a ball of gas within a liquid • carbon dioxide: a gas in the air • change of state: moving between solid, liquid and gas as a result of heating or cooling • cloud: a visible group of small droplets of water or ice floating in air • compress: to make something smaller by squeezing it • condense/condensation: to change from gas to liquid • evaporate/evaporation: to change from liquid to gas; occurs at the surface of the liquid • expand: to change in shape and volume to fill a space • freeze: to change from liquid to solid, due to cooling (used at lower temperatures) • freezing point: the temperature at which a liquid becomes a solid • gas: a state of a material where it changes in shape and volume to fill the space it is in; gases flow • granule/granular: a small piece or grain • heat-sensitive: responsive to changes in temperature

	Fair testing <u>Y4: States of Matter</u> Compare and group materials together, according to whether they are solids, liquids or gases. Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.		• Know that when fabric dries, the liquid water changes into a gas, which is why we can no longer see it. • **Know that condensation is when water vapour changes state from a gas into a liquid and becomes water.** • Know that the temperature at which a liquid changes into a gas is called the boiling point. • **Know that the Earth's water can be a liquid (water), a gas (vapour) or a solid (ice).** • **Know that the water cycle is the journey water takes as it moves from the land to the sky and back again.** • **Know that water in the environment evaporates into the air then the warm air cools as it rises, leading to condensation and the formation of clouds.** • **Know that water droplets in the clouds fall as rain (or as snow or hail if cooled below freezing point).** • **Know that the water returns to the sea via streams and rivers to continue the water cycle.**	• helium: a gas that is lighter than air and doesn't have any colour, taste or smell • ice: water in a solid, frozen state • liquid: a state of a material where it flows freely and takes the shape of its container • melt: to change from a solid state to a liquid state • melting point: the temperature at which a solid becomes a liquid • oxygen: a gas in the air which most living things need to survive • powder: fine, loose grains that are made when a solid material has been ground/crushed • rain: drops of water which fall to Earth when clouds become saturated with water droplets • snow: water in clouds that is frozen and falls to Earth as crystals • solid: a state of material which retains its shape unless a force is applied to it; solids have a constant volume • solidify: to change from liquid to solid, due to cooling (used at higher temperatures) • steam: water in a gas state • viscous: having a thick, sticky consistency • water vapour: water in a gas state; slightly cooler than steam and appears as a mist or fog
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit (Link back to Summer unit from Cycle A or previous year group if in Year 3. - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Autumn Term 2 How do forces make objects move, speed up or change direction? **(Linked to Snap Science Y3 M3 – Forces, frictions and magnets)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Comparative and fair tests Identifying and classifying Pattern seeking Y3: Forces and Magnets Compare how things move on different surfaces. Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having 2 poles. Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.	1) *What makes it move?* 2) *How long does a top spin on different surfaces?* 3) *How well can an object slide on different surfaces?* 4) *How do magnets affect each other?* 5) *Which materials are magnetic?* 6) *How strong are the magnets?*	• **Know that a force is a push, pull or twist that makes objects start, move, change direction and stop.** • Know that air makes a pushing force. • **Know that a contact force means that the object providing the force is touching (in contact with) the object it is moving.** • **Know that the top stops more quickly on a rough surface because the bumps make it harder to move.** • **Know that the top spins for longer on a smooth surface because there are fewer bumps to stop it moving.** • **Know that the object slides more easily on a smooth surface because there are fewer bumps to stop it moving.** • **Know that the object does not slide as easily on a rough surface because the bumps make it harder to move.** • Know that a magnet has two poles: north and south. • **Know that the north and south pole of magnets attract each other.** • **Know that north and north pole and the south and south pole of magnets repel each other.** • **Know that only metals (iron and steel) are magnetic.** • Know that not all metals are magnetic (gold, silver, copper, aluminium) • Know that the stronger the magnet, the more paper clips it can hold in a chain. • Know that the stronger the magnet, the heavier the magnetic object it can pick up.	● contact: touching ● pendulum: a weight hanging from a fixed point which swings backwards and forwards ● pull/pulling: (verb) to move toward/(noun) a move toward ● push/pushing: (verb) to move away/(noun) a move toward ● rough: uneven, not smooth ● slide: to slip ● smooth: flat and even, not rough ● surface: the outside or top of something ● texture: how a surface or material feels ● stopwatch: a piece of equipment used to measure time passing ● value: a number or measurement ● attract: to draw something closer ● contact force: where the object providing the force is touching (in contact with) the object it is moving ● force: a push or pull ● like poles: the same poles, i.e. north and north or south and south ● magnet: an object that can pull certain types of metals towards it ● magnetic: able to be attracted by a magnet ● non- contact force: where the force moves something without touching it ● north/south pole: the two points in a magnet where the magnetic force is strongest ● repel: to push something away ● classify/classification: to organise things into scientific groups ● comparative test: an enquiry to compare materials or events. ● data: information (observations and measurements) collected during an enquiry ● diagram: a drawing that shows the parts of something or how the parts work together ● enquiry: a method scientists use to collect evidence to answer questions ● evidence: information, from observations and measurements that supports or disproves ideas ● measure/measurement: using equipment to find the size of something on a numbered scale ● pattern: a relationship between two sets of data ● predict/prediction: using what you already know to try to work out what will happen ● test: to carry out a science enquiry to find something out ● material: the substance something is made of
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary.			

	One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that a solid will hold its shape under normal conditions and has a fixed volume.** • **Know that liquids can be poured and will spread out to take on the shape of the container they are in.** • **Know that a liquid has a fixed volume.** • **Know that sand, salt and flour are solids and that these materials are made up of individual solid grains which each hold their shape and have all the properties of a solid.** • **Know that a thermometer is used to measure temperature.** • **Know that the unit of measurement we use for temperature is degrees Celsius.** • **Know that freezing/solidifying is when a liquid (water) changes state into a solid (ice) and that the temperature at which this happens is called the freezing point.** • **Know that melting is when a solid (ice) changes state into a liquid (water) and that the temperature at which this happens is called the melting point.** • **Know that ice melts faster as the temperature increases.** • **Know that air is a gas.** • **Know some of the gases that are in the air: nitrogen, oxygen, carbon dioxide** (hydrogen, methane, carbon monoxide, argon, helium, neon, krypton) • **Know that evaporation is when water changes state from a liquid into a gas and becomes water vapour.** • **Know that condensation is when water vapour changes state from a gas into a liquid and becomes water.** • **Know that the Earth's water can be a liquid (water), a gas (vapour) or a solid (ice).** • **Know that the water cycle is the journey water takes as it moves from the land to the sky and back again.** • **Know that water in the environment evaporates into the air then the warm air cools as it rises, leading to condensation and the formation of clouds.** • **Know that water droplets in the clouds fall as rain (or as snow or hail if cooled below freezing point).** • **Know that the water returns to the sea via streams and rivers to continue the water cycle** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.

Spring Term 1 **How does an electrical circuit work?** **(Linked to Snap Science Y4 M2 –Electricity circuits)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Identifying and classifying **Y4 Electricity** Identify common appliances that run on electricity. Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.	1) *What makes an appliance work?* 2) *How can you light the bulb?* 3) *What does a switch do?* 4) *Why doesn't the circuit work?* 5) *Which materials conduct electricity?*	• Know that most electrical appliances either require mains electricity, batteries or batteries that can be charged from the mains. • **Know that mains electricity is very powerful and can be dangerous, whereas batteries are a safe source of electricity.** • Know that electricity can be used to produce heat, light, sound and movement. • **Know that a series circuit needs components - cell, wires, bulbs and bulb holders**. (It may also include a switch, buzzer etc) • **Know that a circuit works because of the flow of electricity from the – end of the battery, round the circuit, through the component and back to the + end of the battery.** • **Know that a switch turns the component on (closed switch) and off (open switch) by controlling the flow of electricity.** • **Know that a component will not work if there is a break in the circuit, a loose connection or a short circuit.** • **Know that materials that let electricity flow through them are called electrical conductors and those which the electricity does not flow through are electrical insulators**	● appliance: a piece of equipment designed to do a particular job ● device: a piece of equipment designed to do a particular job ● flow: continuous movement ● function: the purpose of something ● plug: a device that is used to connect an electrical device to a power source ● socket: the device where plugs connect to a power source ● wire: a thin piece of metal, with a layer of plastic around it, that carries the electricity around a circuit Children will learn the following Tier 3 vocabulary in this module: ● Carroll diagram: a chart used to classify objects using two or more criteria ● refute: to use evidence to show that a statement is incorrect ● support: to use evidence to show that a statement is correct ● Venn diagram: a diagram where circles are used to group things ● battery: a component that can be used to provide electricity ● bulb: a device that requires electricity to light up ● buzzer: a component that makes a sound ● cell: the scientific name for a single battery ● circuit: the circular arrangement of components required to enable electricity to flow ● closed circuit: a circuit that creates a complete loop, so the electricity can flow ● connection points: the places on electrical components where wires can be attached ● electrical appliance: an object that needs electricity to do its job ● electrical component: an object making up part of a circuit ● electrical conductor: a material that allows electricity to flow through it ● electrical insulator: a material that does not allow electricity to flow through it ● electricity: what is required to make an electrical appliance work ● mains: electricity that can be used by plugging an electrical device into a socket ● motor: a component that has a part that turns ● open circuit: a circuit that does not create a complete loop, so the electricity cannot flow ● switch: a component that turns another component on or off, by opening or closing a circuit, controlling whether the electricity can flow or not
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that a force is a push, pull or twist that makes objects start, move, change direction and stop.** • **Know that a contact force means that the object providing the force is touching (in contact with) the object it is moving.** • **Know that the top stops more quickly on a rough surface because the bumps make it harder to move.** • **Know that the top spins for longer on a smooth surface because there are fewer bumps to stop it moving.** • **Know that the object slides more easily on a smooth surface because there are fewer bumps to stop it moving.** • **Know that the object does not slide as easily on a rough surface because the bumps make it harder to move.** • **Know that the north and south pole of magnets attract each other.** • **Know that north and north pole and the south and south pole of magnets repel each other.** • **Know that only metals (iron and steel) are magnetic.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Spring Term 2 What impact do humans have on the environment? **(Linked to Snap Science - If in Y3 start with Y3 M1 Lesson 3 and then Y4 M3 – Human impact on the environment)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. 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Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Observing over time Comparative testing Y4 Living Things and Their Habitats Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things	*1) What is the impact of litter in our school?* *2) How do materials change over time?* *3) How do microplastics get into the food chain?* *4) How can we prevent microplastics from getting into our seas and oceans?* *5) How can we clean up birds affected by an oil spill?*	• **Know that litter is things that have been thrown away by humans and that are lying on the ground.** • **Know that recycling is important because it means that we use fewer natural resources (trees, metals, stone and oil) as we use materials more than once.** • **Know that litter can be harmful to the environment:** -Know that animals can become trapped in litter; hurt themselves on sharp edges or mistake it for food. -Know that litter costs money to clean up. -Know that litter can spread disease as germs can be transmitted directly by physically coming into contact with litter. -Know that litter can clog up drains and sewers, so that water does not drain freely. -Know that litter can cover plants, affecting their growth. • **Know that decomposition is when dead plants and animals break down (rot) into very small pieces that can be used to help other living things grow.** • **Know that materials made from things that never lived (plastics, glass, nappies, metal) cannot decompose because they are not biodegradable.** • **Know that biodegradable materials (wood, food waste and green garden waste) can decompose.** • Know that composting is the natural process of recycling organic matter, such as leaves and food scraps, into a valuable fertiliser that can enrich soil and plants. • **Know that pollution is the introduction of non-biodegradable materials into the environment.** • Know that microplastics are tiny pieces of non-biodegradable plastic waste which get into the soil through waste water and sewage. • Know that worms accidentally eat microplastics and the microplastics then pass up the food chain. • **Know that seas and oceans are polluted with plastics which are entering the food chain.** • Know that oil from oil spills at sea damages birds' feathers and wildlife vets use detergents to clean oil from bird feathers.	● litter: things that have been thrown away and that are lying on the ground ● biodegradable: an adjective used to describe a material that breaks down or decays naturally through the action of micro-organisms ● compost: a mixture of decaying organic matter, used for fertilising soil ● decompose: the process where bacteria and worms break down natural materials into tiny pieces that help new plants grow ● environment: the natural world of land, sea, air, plants and animals ● filter: to use a special tool or process to separate materials ● fungi: a group of living things including mould, mushrooms and yeast ● micro-organism: any living thing too small to be viewed by the unaided eye ● organism: a living thing ● pollution: the introduction of harmful, non-biodegradable materials into the environment ● decay: the rotting of once-lived things through the action of bacteria and fungi ● decomposer: a living thing that breaks down things that once lived ● food chain: a series of living things where each one is food for the next ● habitat: a natural environment where an animal or plant finds the things it needs to live and grow ● organic: made from the remains of living things ● recycle: to turn waste materials into new materials and objects ● soil: the top layer of the Earth's surface; a mixture of bits of rock and remains of living things that have died
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that mains electricity is very powerful and can be dangerous, whereas batteries are a safe source of electricity.** • **Know that a series circuit needs components - cell, wires, bulbs and bulb holders**. (It may also include a switch, buzzer etc) • **Know that a circuit works because of the flow of electricity from the – end of the battery, round the circuit, through the component and back to the + end of the battery.** • **Know that a switch turns the component on (closed switch) and off (open switch) by controlling the flow of electricity.** • **Know that a component will not work if there is a break in the circuit, a loose connection or a short circuit.** • **Know that materials that let electricity flow through them are called electrical conductors and those which the electricity does not flow through are electrical insulators** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Summer Term 1 **What do the parts of a plant do?** **(Linked to Snap Science Y3 M5 –Flowering plants and plant growth)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. 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Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Comparative testing Observing over time Research using secondary sources of information. Y3 Plants: Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	1) *What do leaves do?.* 2) *What do roots and stems do?.* 3) *What are the functions of the parts of a flowering plant?* 4) *What happens if plants do not have enough space?* 5) *How are plants different?*	• Know that plants have roots, stems, leaves and flowers. • **Know that the leaves capture sunlight and that they make their own food using the energy from this light.** • Know that a plant may be unhealthy because of lack of light, too little or too much water or being placed in a temperature it is not suited to. • **Know that the roots absorb water and nutrients and anchor the plant.** • **Know that the stem transports nutrients and water to all parts of the plant for it to survive and it supports the plant.** • Know that when plants are overcrowded, they compete with each other for sunlight, water and nutrients. • Know that plants which are able to get more sunlight, water and nutrients will grow faster and bigger than the others. • Know that the cactus is adapted to live in dry conditions because it has a stem which is hollow so that it can store water. • Know that the cushion plant is adapted to live in windy conditions because it has stems which are very short so that it cannot be blown out of the ground by the wind. • Know that the pitcher plant is adapted to live in conditions where there are very few nutrients because it has leaves which trap insects for nutrients.	● investigate: to find out more about a process or object by measuring or observing it ● research: to find information ● adaptation: a feature of a living thing which helps it survive in a particular habitat ● adapted: suited to survive in a particular habitat ● anchor (verb): to hold something down ● capture: to catch and hold ● nutrient: a substance that is essential for life and health ● comparative test: an enquiry which identifies how two variables are linked ● explain/explanation: to give reasons, from scientific knowledge, for observations and conclusions ● enquiry: a method scientists use to collect evidence to answer questions ● identify: the process of naming something ● measure: to use equipment to find the size or weight of something on a numbered scale ● observe: to use senses or instruments to obtain data ● observing over time: an enquiry where observations are made over a fixed period of time ● predict/prediction: to use what you already know to suggest what might happen in an enquiry ● consumer: a living thing which has to eat other animals or plants to gain its food ● flower: the part of the plant which produces seeds ● food chain: a series of living things where each one is food for the next ● habitat: a place where an animal or plant finds the things it needs to live and grow ● producer: a living thing, such as a plant, which makes its own food ● roots: the part of the plant which anchors into the soil and absorbs water and nutrients ● seed: a plant part from which a new plant germinates and grows ● stem: the part of the plant which keeps it upright and transports water from the roots to the rest of the plant ● sunlight: the combination of visible and invisible forms of light (e.g. ultraviolet) produced by the Sun
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that litter is things that have been thrown away by humans and that are lying on the ground.** • **Know that recycling is important because it means that we use fewer natural resources (trees, metals, stone and oil) as we use materials more than once.** • **Know that litter can be harmful to the environment:** • **Know that decomposition is when dead plants and animals break down (rot) into very small pieces that can be used to help other living things grow.** • **Know that materials made from things that never lived (plastics, glass, nappies, metal) cannot decompose because they are not biodegradable.** • **Know that biodegradable materials (wood, food waste and green garden waste) can decompose.** • **Know that pollution is the introduction of non-biodegradable materials into the environment.** • **Know that seas and oceans are polluted with plastics which are entering the food chain.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Summer Term 2 Why are flowers important in the life cycle of a flowering plant? **(Linked to Snap Science Y3 M6 –Flowering plants life cycle)**	**Aims:** To enable pupils to **broaden** their **scientific view of the world around them**. They should do this through **exploring**, **talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make **some decisions** about which **types of scientific enquiry** are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out. Working Scientifically: Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings. Scientific Enquiry Type: Identifying and classifying Y3 Plants: Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. Investigate the way in which water is transported within plants. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	1) *What is inside a flower?* 2) *What is animal pollination?* 3) *What is wind pollination?* 4) *What are fruits?.* 5) *How are seeds dispersed?*	• **Know that the flower produces the plant's seeds.** • **Know that a flower has sepals, petals, stamen, carpel and pollen.** • Know the functions of the different parts of a flower. *Sepal* – the outside part of a bud -protects the parts inside *Petals* – surround the carpel and stamen and are coloured to attract insects *Stamen* – male parts of the flower which produces the pollen *Pollen* - tiny yellow powder grains that help to make the seeds Carpel – female part of the flower where pollination and seed formation happen • Know the main stages in the life cycle of a flowering plant (growth, pollination, seed dispersal, germination, seed formations, flowering.) • **Know that pollination is when the pollen from one flower is transferred to another flower by bees and other insects.** • **Know that after pollination, a fruit develops from the flower and the fruits contain at least one seed.** • **Know that seeds are dispersed in the following ways: catching a ride on an animal; using the wind; being eaten by an animal and 'pooped out'; by explosion of the seedpod (fruit); using water**	● burr: a type of fruit (seed pod) which has hooks on the outside ● carpel: the female reproductive part of a flower ● dispersal: the movement of seeds away from the plant that produced them ● nectar: a sugary, sweet substance produced by the flower ● nutrient: a substance that is essential for life and health ● ovary: the part of the carpel which contains ovules ● ovule: the part of the plant where the seed begins to grow ● pollen: fine yellow powder made by the male part of the plant ● pollination: when pollen is moved from one flower to another ● pollinator: an animal which carries out pollination ● ripe: an adjective used to describe a mature fruit whose seeds are developed ● scent: a smell produced by a flower ● sepal: the part of a flower which provides protection when it is in bud ● stamen: the male reproductive part of a flower ● explain/explanation: to give reasons, from scientific knowledge, for observations and conclusions ● observe/observation: to use senses or instruments to obtain data ● flower: the part of a plant which produces seeds ● fruit: a swollen plant ovary which contains a seed(s); germinate/germination: when a seed starts to grow ● insect: a small six-legged animal with body in three parts and often with wings ● petal: the part of the flower which protects the flower's insides ● seed: a plant part from which a new plant germinates and grows
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that the leaves capture sunlight and that they make their own food using the energy from this light.** • **Know that the roots absorb water and nutrients and anchor the plant.** • **Know that the stem transports nutrients and water to all parts of the plant for it to survive and it supports the plant.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Essential Knowledge in the Upper Key Stage Two Science Curriculum – Cycle B

Term	National Curriculum Expectations	Suggested Learning Questions	Associated Substantive Knowledge	Key Vocabulary
Autumn Term 1 What different forces are there?	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should	1) *What is the friction between different surfaces?* 2) *Why do some objects fall faster than others?*	• **Know that friction is a force that makes it harder to move an object across a surface or slows down an object moving over a surface.** • **Know that force of friction can be measured using a Newton meter.**	● accuracy: shows how close to the true answer readings are and is improved by taking repeat readings and keeping variables the same ● dependent variable: the variable that is being measured

(Linked to Snap Science Y5 M1 – Forces and Mechanisms)	encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Comparative testing and fair testing Y5: Forces Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	3) *How does the size of the canopy affect the time it takes a parachute to fall?* 4) *How does the shape of an object affect its movement in water?* 5) *How does the number of pulleys affect the force needed to lift a load?* 6) *How does the length of the lever affect the force needed to lift a load?* 7) *How do gears work?*	• Know that the rougher the texture of the surface, the bigger the force of friction produced because the bobbles on the surface make it harder to move the box across it. • **Know that gravity is a force that pulls all objects towards the centre of the Earth.** • **Know that air resistance is a force that slows down an object moving through air.** • Know that air resistance increases as the surface area of the object moving through the air gets larger. • **Know that water resistance is a force that slows down an object moving through water.** • **Know that a pulley is a mechanism used for lifting heavy objects (the load) by applying a pulling force at one end of rope attached to the load which passes over a wheel.** • Know that the more pulleys in the mechanism, the less pulling force is required to lift the load. • **Know that a lever is a long, rigid arm that rests on a pivot and that a force is applied to one part of the lever to lift the load at another point on the lever**. • **Know that the longer the lever, the less force is required to lift the load.** • **Know that a gear is a mechanism which consists of wheels with teeth that slot together and that they change the direction of movement and the force required to make something move.** • Know that the smaller the gear, the fewer teeth it has and it rotates faster but requires less force. • Know that the larger the gear, the more teeth it has and it rotates slower and requires more force.	● independent variable: the thing that is being changed ● line graph: a type of chart that displays data points connected by a line ● air resistance: a contact force acting on all objects that are moving through air, whether this is falling, moving along or rising ● force meter: a piece of equipment that measures a force ● friction: a contact force that makes it harder to move an object across a surface or slows down an object moving over a surface ● fulcrum: the point about which a lever turns ● gears: a simple mechanism, consisting of wheels that have teeth that slot together with the teeth on another gear ● gravity: a non-contact force that pulls an object towards the centre of the Earth ● impact: the force produced when two objects collide ● lever: a simple mechanism, consisting of a rigid arm that turns about a fulcrum, which makes it easier to move a load ● load: a heavy object that is being moved ● magnetism: the force of a magnet to attract ● mechanism: a device that makes it easier to move something ● Newton (N): the unit of measurement of a force ● oppose: to move in a direction that is the opposite direction to another movement ● pivot: to turn ● pulley: a mechanism used for lifting heavy objects by applying force at one end of a rope which passes over a wheel ● water resistance: a contact force which slows down an object moving through water due to the water pushing back against the object as it moves
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit (Link back to Summer unit from Cycle A or previous year group if in Year 5. - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Autumn Term 2 How can we mix and change materials? **(Linked to Snap Science Y5 M5 – Separating mixtures and changing materials)**	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data**	1) *How can we separate mixtures?* 2) *What happens when we mix liquids and solids?* 3) *What makes a difference to how fast sugar or salt dissolves?* 4) *How can we clean up contaminated water?*	• **Know that a mixture is used to describe what is formed when two (or more) dry solid materials, or a liquid and a solid or solids are combined.** • **Know that solid, dry mixtures of materials can be separated by sieving.** • **Know that solids which dissolve break down in water to form a solution.** • **Know that the salt and sugar mix into the water and cannot be seen so are soluble and have dissolved.**	● contamination: when something clean gets mixed with something dirty, making it unclean or unsafe ● dissolve: a solid breaks down and combines with a liquid forming a mixture ● filter: to use a special tool or process to separate materials ● insoluble: a material that does not dissolve in a liquid

	and observations, use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Identifying and classifying Comparative testing Research and using secondary sources of information Fair testing **Y5: Properties and changes of materials** Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Demonstrate that dissolving, mixing and changes of state are reversible changes. Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	*5) What makes a change non-reversible?* *6) How much gas can be produced by a non-reversible change?*	• **Know that materials which do not dissolve and are insoluble, such as flour, may form a suspension in the water or remain at the bottom of the container like sand.**. • **Know that materials that do not dissolve (sand) can be separated from a liquid by filtering.** • Know that increasing the temperature of the water seems to speed up the dissolving process.. • Know that the filtering processes can be used to decontaminate polluted water and make it useful for a variety of purposes. • **Know that a** reversible change **is a chemical change where no new materials are created and the original material can be recovered.** • **Know that a reversible change can be reversed using simple methods such as sieving, filtering or evaporating** • Know that freezing water to make ice or melting chocolate are reversible changes (Class teachers to add own examples to form part of knowledge). • **Know that a non-reversible change is a chemical change where a new material is made.'** • Know that …… are non-reversible changes (Class teachers to add own examples to form part of knowledge).	● non-reversible: (also called irreversible) a material change that cannot be reversed. New materials are produced as part of the change process ● react/reaction: two or more materials mixed together change to produce new materials ● reversible: a material change where all materials involved can be changed back to their original state ● saturated: when no more solid can be dissolved into a liquid ● separate: to take apart a mixture of dry or wet and dry materials ● sieve: to separate solid materials from a mixture ● soluble: a material that dissolves in liquid to form a solution ● solution: a mixture containing solids that have dissolved in a liquid
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that friction is a force that makes it harder to move an object across a surface or slows down an object moving over a surface.** • **Know that force of friction can be measured using a Newton meter.** • **Know that gravity is a force that pulls all objects towards the centre of the Earth.** • **Know that air resistance is a force that slows down an object moving through air.** • **Know that water resistance is a force that slows down an object moving through water.** • **Know that a pulley is a mechanism used for lifting heavy objects (the load) by applying a pulling force at one end of rope attached to the load which passes over a wheel.** • **Know that a lever is a long, rigid arm that rests on a pivot and that a force is applied to one part of the lever to lift the load at another point on the lever**. • **Know that the longer the lever, the less force is required to lift the load.** • **Know that a gear is a mechanism which consists of wheels with teeth that slot together and that they change the direction of movement and the force required to make something move.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

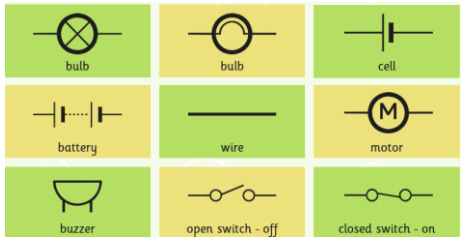
Spring Term 1 What does my circulatory system do? **(Linked to Snap Science Y6 M4 –**	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes	1) *What is blood made of?* 2) *What is the circulatory system and what does it do?* 3) *What is a heart and*	• **Know that blood is carried in blood vessels.** • **Know that blood carries oxygen, water, and the nutrients from food that are used for energy and growth, around the body**. • Know that blood is made up of plasma (a liquid in which blood cells and nutrients travel), red blood cells (which carry oxygen), white blood cells (which fight	● circulate: to move around a closed system or area ● contract: to make smaller by drawing together ● flow: continuous movement ● pump: to move fluid by squeezing it along a tube ● system: a group of things or parts that work together ● transport: to move something about Children will learn the following Tier 3 vocabulary in this module: ● aorta: the main artery from the heart to the rest of the body

Human Circulation)	over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Researching using secondary sources **Y6: Animals including humans** Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans.	*what does it do?* 4) *What are blood vessels and valves and what do they do?.* 5) *What did William Harvey find out about the circulatory system?*	infection) and platelets (which help blood to clot around a cut). • **Know that the human circulatory system pumps blood from the heart to the lungs, back to the heart and onto the rest of the body in a figure-of-eight system.** • **Know that the circulatory system includes the heart, blood and blood vessels.** • **Know that the heart is a muscle that pumps the blood around the body.** • **Know that arteries are blood vessels that carry oxygenated blood away from the heart.** • **Know that veins carry deoxygenated blood from the rest of the body back to the heart**. • Know that William Harvey was a scientist who discovered how the human circulatory system worked.	● arteries: blood vessels that carry blood away from the heart ● atrium: the upper chamber on each side of the heart ● blood: red liquid that flows through our bodies and brings oxygen and nutrients to all the different parts ● blood vessels: tubes that carry blood around the body ● capillaries: small blood vessels that carry blood through the tissues of the body ● cell: a tiny unit of a living thing ● deoxygenated blood: blood which is dark red in colour and has no oxygen in the red blood cells ● hormone: a chemical in the body which causes growth, development or an action ● oxygenated blood: blood which is bright red in colour and has oxygen in the red blood cells ● plasma: the yellow liquid part of blood ● platelets: tiny pieces in the blood which help clotting when we are cut ● pulmonary artery: the blood vessel that carries deoxygenated blood from the heart to the lungs ● pulse: the rhythmic bulge in an artery felt when blood is pumped through it ● red blood cells: the cells which contain haemoglobin which can carry oxygen in our blood ● valve: a flap that allows blood to pass through the heart or a vein in one direction only ● veins: blood vessels that carry blood back to the heart ● ventricle: the lower chamber on each side of the heart ● white blood cells: cells in our blood which fight infection
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that a mixture is used to describe what is formed when two (or more) dry solid materials, or a liquid and a solid or solids are combined.** • **Know that solid, dry mixtures of materials can be separated by sieving.** • **Know that solids which dissolve break down in water to form a solution.** • **Know that the salt and sugar mix into the water and cannot be seen so are soluble and have dissolved.** • **Know that materials which do not dissolve and are insoluble, such as flour, may form a suspension in the water or remain at the bottom of the container like sand.**. • **Know that materials that do not dissolve (sand) can be separated from a liquid by filtering.** • **Know that a** reversible change **is a chemical change where no new materials are created and the original material can be recovered.** • **Know that a reversible change can be reversed using simple methods such as sieving, filtering or evaporating** • **Know that a non-reversible change is a chemical change where a new material is made.'** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Spring Term 2 What do we know about plant and animal life cycles?	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that	*1) How do flowering plants produce seeds?* *2) Do all plants have the same number of*	• **Know that all living things have a life cycle which includes growth and reproduction, eventually ending in death and decay.** • **Know that flowering plants (tulips, roses and daisies) have flowers with both male (stamens) and female parts (carpels).** • **Know that pollination is when pollen from another plant of the same type is moved to a part of the carpel called the stigma for reproduction to take place.**	● anther: the end of the stamen which produces pollen ● asexual: when an organism can reproduce by itself ● breeding: the mating of animals and the production of offspring ● embryo: an animal in the early stages of development ● filament: the stalk of a stamen ● female: the sex that can bear offspring or produce eggs following fertilisation

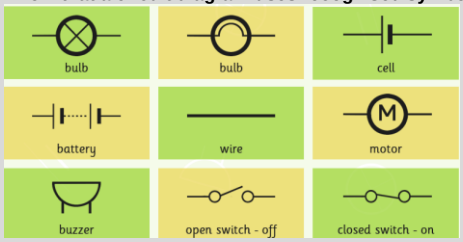
(Linked to Snap Science Y5 M4 – Plant and animal life cycles)	scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Pattern Seeking Research using secondary sources (or observing over time) **Y5: Living things and their habitats** Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Describe the life process of reproduction in some plants and animal.	*reproductive parts?* 3) *How can we grow more plants without using seeds?* 4) *How do birds change over their lifetime?* 5) *Do all mammals have the same gestation period?* 6) *How do amphibians change throughout their life cycle?* 7) *Do all insects go through the same life cycle?*	• **Know that seeds are the product of sexual reproduction.** • Know that different flowers have different numbers of petals, stamens or carpels. (The number is six in the lily family and five in the rose family.) • **Know that asexual reproduction creates new plants that are identical to the parent.** • Know that gardeners may make more plants by taking cuttings, growing new plants from small parts of a parent plant. • **Know that most animals reproduce sexually and that this involves two parents a male and a female.** • **Know that the sperm from the male fertilises the female egg inside her body.** • **Know that female birds lay eggs with hard shells and these may or may not be fertilised.** • Know that life cycle stages of a chicken: -Stage 1: Fertilisation -Stage 2: Incubating (egg) -Stage 3: Hatching (chick) - Stage 4: Pullet (teenager) - Stage 5: Hen/cockerel (adult chicken) • **Know that mammals reproduce by sexual reproduction and the embryo grows inside the womb until it is time to be born.** • **Know that the time between egg fertilisation and giving birth is called the gestation period.** • **Know that the female gives birth to their young and produces milk to feed their young.** • Know that larger animals tend to have longer gestation periods as they are more likely to produce well-developed young than smaller mammals. • **Know that amphibians reproduce by sexual reproduction and the female's eggs are fertilised outside her body.** • Know that when fully mature, most amphibians develop lungs and are able to live both in water and on land. • **Know that frogs go through a process of metamorphosis, when the young body of the frog goes through huge changes to become an adult.** • Know that insects are invertebrates with a hard covering over their bodies, which is known as an exoskeleton (this is a skeleton, but it is on the outside of their bodies). • **Know that complete metamorphosis includes four stages: egg, larva, pupa and adult.** • Know that butterflies, beetles, bees, wasps, ants and flies go through a process of complete metamorphosis. • **Know that incomplete metamorphosis includes three stages: egg, nymph and adult** • Know that stick insects, dragonflies, grasshoppers and earwigs go through a process of incomplete metamorphosis.	● fertilisation: the joining of a male reproductive cell with a female reproductive cell to produce a new organism ● gestation: the time between egg fertilisation and birth ● larva: immature form of an animal ● male: the sex that can fertilise females ● mate: animal reproduction ● metamorphosis: when an animal changes from one form into another ● ovary: the part of the carpel which contains ovules ● ovule: the female part of the plant where the seed begins to grow ● propagation: producing new plants without seeds ● pupa: an insect in its inactive immature form between larva and adult ● reproduction: the process by which living things make more of their own kind ● seed dispersal: the movement of seeds away from the parent plant ● stamen: the male reproductive part of the flower made up of a filament and an anther ● stigma: the top of the carpel which takes in pollen ● style: the part of the carpel that leads from the stigma to the ovary ● thorax: middle part of an insect's body ● pattern: a relationship between variables ● amphibian: an animal (vertebrate) that lives in water or on land but must return to the water to reproduce ● bird: an animal (vertebrate) that has feathers and lays eggs with hard shells ● carpel: female reproductive part of a flowering plant, which contains an ovary, style and stigma ● exoskeleton: an external supporting structure for the body of a living thing ● flower: the part of a plant which produces seeds ● insect: an invertebrate group of small animals with bodies divided into three parts, with three pairs of jointed legs, usually one or two pairs of wings and one pair of antennae ● life cycle: the series of changes occurring in the life of an animal or plant ● mammal: an animal (vertebrate) that is covered in hair or fur; the female gives birth to live young and feeds her babies on milk from her own body ● organism: a living thing ● pollen: fine yellow powder made by the male part of the plant ● pollination: the movement of pollen from the anther to the stigma of another plant ● pollinator: an animal which carries out pollination ● vertebrate: an animal that has an internal backbone for support
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that blood is carried in blood vessels.** • **Know that blood carries oxygen, water, and the nutrients from food that are used for energy and growth, around the body**. • **Know that the human circulatory system pumps blood from the heart to the lungs, back to the heart and onto the rest of the body in a figure-of-eight system.**			

	• **Know that the circulatory system includes the heart, blood and blood vessels.** • **Know that the heart is a muscle that pumps the blood around the body.** • **Know that arteries are blood vessels that carry oxygenated blood away from the heart.** • **Know that veins carry deoxygenated blood from the rest of the body back to the heart**. - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.

Summer Term 1 How can we vary the effects of electricity? **(Linked to Snap Science Y6 M5 – Electricity: changing circuits)**	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. Working Scientifically: Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments. Scientific Enquiry Type: Comparative and fair testing **Y6: Electricity**	*1) How do we light the lamp?* *2) How can we change a circuit?* *3) How can we change the brightness of a lamp?* *4) How can we change how other components work?* *5) How can we predict which circuit will have the brighter lamp?*	• **Know that a circuit needs components - cell, wires, bulbs and bulb holders**. (It may also include a switch, buzzer etc) • Know that electricity is the flow of electrons (current) around a circuit. • Know that a component will not work if there is a break in the circuit. • Know that a switch can be used to turn a lamp on and off by completing the circuit and allowing the electricity to flow and breaking the circuit and stopping the flow of electricity. • **Know that a circuit diagram uses recognised symbols:**  • • **Know that voltage is the 'push' that causes current to flow round a circuit.** • Know that increasing the voltage of the cell or adding more cells makes: the bulb brighter; the buzzer louder; the motor faster. • **Know that if you add more lamps to the circuit, each bulb gets dimmer.** • Know that when there is a higher voltage than other components in a circuit the bulb may blow, (the filament wire will break) and the circuit will break.	● standard symbol: an image used to represent an object that is recognised by people in different countries ● voltage: the measurement of the size of the push sending electricity around a circuit ● volts: the units for voltage ● refute: to use evidence to show that a statement is incorrect ● support: to use evidence to show that a statement is correct ● battery: a component that can be used to provide electricity ● cell: the scientific name for a single battery ● circuit: the circular arrangement of components required to enable the electricity to flow ● connection points: the places on electrical components where wires can be attached ● electrical component: an object making up part of a circuit ● electrical conductor: a material that allows electricity to flow through it ● electrical insulator: a material that does not allow electricity to flow through it ● electricity: what is required to make electrical components work ● lux: the unit used to measure light intensity, abbreviated lx ● switch: a component that turns another component on or off, by opening or closing a circuit, controlling whether the electricity can flow or no

	Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram.			
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that all living things have a life cycle which includes growth and reproduction, eventually ending in death and decay.** • **Know that flowering plants (tulips, roses and daisies) have flowers with both male (stamens) and female parts (carpels).** • **Know that pollination is when pollen from another plant of the same type is moved to a part of the carpel called the stigma for reproduction to take place.** • **Know that seeds are the product of sexual reproduction.** • **Know that asexual reproduction creates new plants that are identical to the parent.** • **Know that most animals reproduce sexually and that this involves two parents a male and a female.** • **Know that the sperm from the male fertilises the female egg inside her body.** • **Know that female birds lay eggs with hard shells and these may or may not be fertilised.** • **Know that mammals reproduce by sexual reproduction and the embryo grows inside the womb until it is time to be born.** • **Know that the time between egg fertilisation and giving birth is called the gestation period.** • **Know that the female gives birth to their young and produces milk to feed their young.** • **Know that amphibians reproduce by sexual reproduction and the female's eggs are fertilised outside her body.** • **Know that frogs go through a process of metamorphosis, when the young body of the frog goes through huge changes to become an adult.** • **Know that complete metamorphosis includes four stages: egg, larva, pupa and adult.** • **Know that incomplete metamorphosis includes three stages: egg, nymph and adult.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			

Summer Term 2 What is the human lifecycle? **(Linked to Snap Science Y5 M6 – Human growth)**	**Aims:** To enable pupils to **develop a deeper understanding of a wide range of scientific ideas.** They should do this through **exploring and talking about their ideas; asking their own questions** about scientific phenomena; and **analysing** functions, relationships and interactions more systematically. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways** to **answer science questions** using **different types of scientific enquiry,** including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. They should **draw conclusions based on their data and observations,** use **evidence** to **justify** their ideas, and use their **scientific knowledge and understanding** to explain their findings. <u>Working Scientifically:</u> Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments.	1) *How do newborn babies change into teenagers?* 2) *How do girls become women?* 3) *How do boys become men?* 4) *What is the human life cycle?*	• **Know that a baby develops in the uterus of a woman, not the stomach.** • **Know that the human life cycle has different stages: gestation, infancy, childhood, puberty, adulthood, ageing, death.** • **Know the main changes of the stage of the human life cycle that occur at puberty in girls** -Growth spurt -Pubic hair grows in groin -Hair grows under arms -Breasts develop -Hips widen -Voice lowers -Sweat production increases (Body odour) -Sebum production increases (spots) -Period/ menstruation begins • **Know the main changes of the stage of the human life cycle that occur at puberty in boys** -The genitals grow bigger. -Facial hair grows. -Pubic hair grows around the genitals. -Underarm hair grows in the armpits. -The body becomes very tall and broad. -The muscles get bigger. -The Adam's apple sticks out a long way.	● abdomen: the lower part of the human torso ● Adam's apple: the visible lump in a man's throat caused by the voice box ● breasts: the soft organs on female chest which produce milk after a baby is born ● childhood: between ages 2 and 12 in the human life cycle ● genitals: external human reproductive organs ● gestation: the time between egg fertilisation and birth ● infancy: between ages 0 and 2 in the human life cycle ● menstruation/having a period: a monthly process where women's bodies release blood from the uterus out of the body through the vagina ● newborn: a baby that has just been born ● pregnancy: when a woman's body is growing a baby inside her uterus ● puberty: the change from child to adult in the human life cycle ● pubic hair: hair growing in the groin around the genitals ● reproduction: the process by which living things make more of their own kind ● sweat: liquid secreted by the skin ● teenage: between ages 13-19 in the human life cycle

	Scientific Enquiry Type: finding things out using a wide range of secondary sources **Y5: Animals, including humans** Describe the changes as humans develop to old age		-The voice breaks. • Know that the human body changes as it gets older.	● umbilical cord: the cord which connects a baby to the mother so it can receive oxygen and nutrients whilst growing in the uterus ● uterus: the female reproductive organ in which a baby grows ● vagina: the tube connecting the outer area of the female body (vulva) to the uterus
Connect	One session should focus on an explorify activity linked to previous unit of learning (or this unit of learning if more appropriate) to build use of key vocabulary. One session should focus on Science Capital (e.g. A scientist just like me! or something similar) One session should focus on the Connect of a WS skill from the previous unit which will then be used again in this unit. Connect should focus on: - BOLD learning of previous unit • **Know that a circuit needs components - cell, wires, bulbs and bulb holders**. (It may also include a switch, buzzer etc) • **Know that a circuit diagram uses recognised symbols:**  • **Know that voltage is the 'push' that causes current to flow round a circuit.** • **Know that if you add more lamps to the circuit, each bulb gets dimmer.** - BOLD from the unit that feeds into this unit or - BOLD that has been taught in this unit so far.			