SCIENCE CURRICULUM

Spring 1 : EYFS – YEAR 6

SCIENCE CURRICULUM INTENT

The Aims of the National Curriculum for Science:

The national curriculum for Science aims to ensure that all pupils:

● develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics

● develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them

● are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Spring 1

EYFS	Focus of Study
FS 1 – Nursery **Milestones** • Explore and talk about different forces they can feel .e.g. how the water pushes up when they try to push a plastic boat under it (Sci) • Children will explore how things work. (Sci)	**Context for study:** Children will explore and investigate through planned opportunities to develop their scientific skills and enquiry. **Knowledge Content:** Children will be able to explore and talk about the different forces they can feel. Children will be able to explore how things work linked to transport topic. **Children will partake in science experiments.** How can we make the paper boats move across the water? What can we use to move the paper boat? How can we make the toy cars move? Pushing and pulling How can we make the paper aeroplanes fly? Push and pull down – can you make your own paper aeroplane? Which shape paper plane will you make? How can we make the train go? **Key vocab will include,** push, pull, soft, hard, how, why, when, force **Working Scientifically in EYFS** I can say how things move **Scientific Enquiry in EYFS** I can identify which forces are used. I can use forces to make items move.

F2 - Reception	**Context for study:** Children will explore and investigate through planned opportunities to develop their scientific skills and enquiry. **Knowledge Content:** Children will be able to name different materials to recycle. Children will be able to identify which items are magnetic. Children will know when water starts to melt and know how to make water into ice going from liquid to solid. Children will partake in science **experiments**: What happens to ice when it melts? Children will predict what they think might happen to the ice balloons when they bring them inside. Children to **observe** what happens to the ice. Children will be able to discuss their findings. What happens to water when it is put in the freezer? Children will be able to predict what will happen to the water when it is left in the freezer. They will be able to predict how long it will take to freeze solid. What items can we reuse? Children will think of different materials we could reuse to make bird feeders. What items can we recycle? Children will name and sort materials to recycle – which materials can be recycled and which cannot? Which items are magnetic? Sorting objects into items which are magnetic and which are not – can you work out why they are magnetic? **Key vocab will include** magnets, magnetic, sort, recycle, reuse, plastic, cardboard, paper, tin, metal, freeze, melt, liquid, solid. **Working Scientifically in EYFS** I can talk about the different materials we can recycle. I begin to **ask simple questions** about what is going on and make **simple observations**. I can **evaluate** my findings. **Scientific Enquiry in EYFS** . I can **identify** different materials to recycle such as plastic and cardboard. I can **observe** how water can freeze solid. I can **observe** how ice melts over time. I can **sort** items which are magnetic by testing using magnets.
Milestones • Children will begin to understand that when water gets cold enough it freezes and becomes ice. (Sci) • Children will begin to understand that when ice warms up it melts and changes back to water. (Sci) • Children can identify and sort different materials to be recycled. (Sci) • Children begin to understand how magnets work and use this to sort what is or isn't metal. (Sci)	

Year 1	Focus of Study: Exploring everyday materials
NC Objectives	**Key Explicit Knowledge and Vocabulary**
Pupils will be taught to: 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	**Context for study:** This unit is the first of five science units where pupils study **materials** as part of the discipline of **chemistry** - the identification of the properties a substance is made from. In this Year 1 unit, pupils identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Pupils distinguish between an object and the material from which it is made including if it is 'man-made' or 'natural'. New learning includes describing the simple physical properties of a variety of everyday materials. The knowledge acquired will help pupils at the end of the unit as they compare and group together a variety of everyday materials on the basis of their simple physical properties. Pupils study the work of **Charles Mackintosh** and the 'waterproof garment' and **John Dunlop**. This unit is the precursor to work in Year 2 as pupils compare the suitability of objects and compare how things move on different surfaces. **Begin with a re-visit of elements of materials from EYFS.** Key Vocabulary: object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through. **Knowledge Content:** The study of **materials** is part of the discipline of **Chemistry** - the identification of the properties that a substance is made from. Know that matter (stuff) is made from tiny building blocks. This comes in three forms - **solids, liquids** and **gases**. Solids include glass, plastic and stone. Liquids include water, blood, milk. Gas includes air that we breathe. Know that many materials are **solid** and have different **properties**. Water is a **liquid** and is different because it can change its shape. Know that some materials are **natural** and others are **man-made**. Natural materials come from materials found in nature and man-made materials are those which humans make. Natural materials: **iron, gold, silver, silk, cotton, leather, wood, water and rock**. (know that iron, gold, silver are collectively known as metals)

Common Misconceptions: • only fabrics are materials • only building materials are materials • only writing materials are materials • the word 'rock' describes an object rather than a material • 'solid' is another word for hard.	Man-made materials: plastic, glass (know that glass is heated sand), brick, paper, concrete, rubber and some metals like steel. Identify different items and name what material or materials they are made from. e.g., Canoe: wood or plastic. Car: metal and rubber tyres. Know that plastic is a waterproof material and that it keeps water out Know that **Charles Macintosh** invented a method for making a **waterproof item of clothing**. Know that John Dunlop invented the **inflatable (pneumatic) tyre**. He watched his son riding a bicycle over **cobbles** with solid tyres and noticed how uncomfortable the bike was to ride. John Dunlop was a vet and he used **rubber** sheets to protect his tables when performing surgery on animals. He used these rubber sheets to make an **airtight** tube which he stitched together by hand. He then attached this to the bike wheel and wrapped **canvas** material around it and sealed it with **liquid rubber.** He then pumped the tube with air and invented the first **inflatable** (or pneumatic) tyre. The air meant that the bumps in the road did not shake the bike as much as solid wheels and it was much more comfortable to ride. These tyres are now used all over the world on all sorts of vehicles including cars, planes and bikes. Describe materials using key property vocabulary: **hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.** **<u>Working Scientifically</u>** I can use observations to classify I can record in a table I can ask and answer questions I can perform a simple test I can make predictions on best materials. I can evaluate a test **<u>Scientific Enquiry</u>**

	Identify materials and classify Classify based on how they feel. Compare suitability of materials Find patterns in test results
Year 2	Focus of Study: **Animals inc. humans**
NC Objectives	**Key Explicit Knowledge and Vocabulary**
Pupils should be taught to: 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	**Context for study:** This unit is the second of eight science units where pupils study animals, including humans, as part of the discipline of **biology** - the study of living **organisms.** Pupils have a secure knowledge of common animals, their babies and their habitats. Pupils can identify and name a variety of common animals that are carnivores, herbivores and omnivores. Pupils can identify, name, draw and label the basic parts of the human body. In Year 2, pupils study life cycles and learn that animals, including humans, have offspring which grow into adults. New learning includes the basic needs of animals, including humans, for survival and the importance of exercise, eating the right amounts of different types of food, and hygiene. This unit is the precursor to work studied in lower key stage 2 where pupils learn to classify and group animals and learn about skeletons, vital organs and the digestive system. In Upper key stage 2 pupils continue their learning looking in more depth at food chains, life cycles, vital organs and the circulatory systems. **Begin with a re-visit of elements of animals inc. humans from Year 1.** Key Vocabulary: offspring, grow, adults, nutrition, reproduce, survival, water, food, air, exercise, hygiene. **Knowledge Content:** The study of animals, including **humans** is part of the discipline of **biology** - the study of living **organisms.** Life Cycles Know animals and their babies and identify them in photos

Maths N.C Statistics objectives: Power Maths, unit 7, lesson 6. Common Misconceptions: • an animal's habitat is like its 'home' • all animals that live in the sea are fish • respiration is breathing • breathing is respiration.	Know that animals grow and change over their lifetime. Know that animals grow in a **womb**, and are **born** or **hatch.** Know the following animals that hatch from eggs and those that have live young - (video clip - https://www.bbc.com/bitesize/clips/zdw9wmn) Know that most snakes lay eggs but some produce live young. Know that some animals need milk and care from their mothers (including lambs, calves, piglets, goat kids) and some fend for themselves (including ducks and geese). Know the life cycle of a human – baby, toddler, child, teenager, adult, elderly Know the **life cycle** of a butterfly - **egg**, **caterpillar**, **pupa**, **butterfly** (know that the term **metamorphosis** describes the change from a caterpillar to butterfly. Frogs also demonstrate metamorphosis when changing from tadpole to adult frog). Know that caterpillars **moult** to remove their old layer of skin. Know that a butterfly **pupa** is often known as a **cocoon** or **chrysalis**. Video clip https://www.youtube.com/watch?v=3kZD6rlSLUw Know the life cycle of a chicken - **egg**, **chick**, **chicken** Know the life cycle of a frog - **frogspawn**, **tadpole**, **frog**. Know that frogs have four legs - two front legs and two back legs. (address the misconception that frogs have arms) CORE READING The Very Hungry Caterpillar by Eric Carle Tadpole's Promise by Jeanne Willis <u>Health</u> Know that animals and humans need **water**, **food** and **air** to survive (relate to looking after pets) Know that humans need **exercise** to stay **fit** and **healthy** (exercise can include, running, swimming, playing sport etc.)

	Know the following terms - **muscles, flexible, strength, circulation** to describe the effects of exercise on the body and the benefits to health and wellbeing. Know that the **heart** pumps blood around the body through the veins and that **lungs** are used for breathing. The heart and lungs are called **organs.** Know that when we breathe in we take **oxygen** from the air. Know why we need a heart and why we need lungs. <u>Diet</u> Know that a **balanced diet** consists of the five **food groups**. Know examples from each and the health benefit of each food group ● **Carbohydrates** give us energy (e.g. bread, pasta, rice) ● **Protein** helps the body to grow and repair itself (e.g. meat, fish, eggs) ● **Dairy products** keep bones and teeth healthy (e.g. milk, yoghurt, cheese) ● **Fruit and Vegetables** keep your **digestive** system healthy. (e.g. apple, orange, pear, strawberry, melon) ● **Fats and Sugars** give us energy but should not be eaten too often (e.g. butter, cooking oil, cream, chocolate, sweets, jam, cakes, biscuits) Know that we need to drink water to be **hydrated** and stay healthy. Know that water is good to drink as it does not contain **calories** and is not harmful to teeth. Know that **calories** are 'a measure of the amount of energy in food'. <u>Unhealthy food and drink</u> Know that sugary soft drinks can damage teeth and contain sugar which can be harmful to the body and cause weight gain. Know that sports and energy drinks are not suitable for children to drink. (https://www.nutrition.org.uk/attachments/article/588/Childrens%20Hydration%20Guide_Nov16.pdf) <u>Hygiene</u> Know that a **germ** is 'a very small living thing that causes disease'. Know that they are only **visible** through a **microscope**. Know basic **hygiene** rules to prevent the spread of **germs**

	● Wash hands regularly especially before eating and after using the toilet ● Cover your mouth when sneezing or coughing ● Have a bath or shower regularly ● Wash your hair at least twice a week ● Wear clean clothes ● Brush teeth twice a day **WORKING SCIENTIFICALLY** I can identify a variety of animals and match to its offspring. I can communicate findings using correct scientific language and illustrations. I can ask simple questions relevant to the topic. I can communicate how you can look after different animals based on what they eat and where they live. I can plan and carry out simple tests. I can sort foods into their food groups and record my results. I can use drawings and art to represent my knowledge of a balanced diet. I can make simple predictions from what I have observed. I can communicate my findings using models. I can evaluate a comparative test. I can answer questions using my scientific knowledge and vocabulary. Scientific Enquiry Look for patterns in animals Observe lifecycle over time Research acts about animals Identify foods animals eat Set up comparable test Identify and classify foods

Year 3	Focus of Study: Forces and Magnets
NC Objectives	**Key Explicit Knowledge and Vocabulary**

Pupils should be taught to: compare how things move on different surfaces notice that some forces need contact between two 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 two poles predict whether two magnets will attract or repel each other, depending on which poles are facing.	**Context for study:** This unit is the first of three science units where pupils study **forces** as part of the discipline of **physics** - the study of the processes that shape our world and how we use it**.** There are also many links to the discipline of **Chemistry** - the identification of the properties a substance is made from. Pupils have a secure knowledge of resistance and friction, are able to compare how things move on different surfaces and know that applying forces to objects can change their shape. Previous learning includes studying the work of scientist John MacAdam and his invention of the tarmac road. This Year 3 unit builds on pupils' knowledge of how things move on different surfaces with a focus on the force friction. New learning is based on magnetism as pupils notice that some forces need contact between two objects, but magnetic forces can act at a distance. Pupils describe magnets as having two poles and observe how magnets attract or repel each other. Pupils further develop their knowledge of everyday materials as they compare and group according to whether they are attracted to a magnet, and identify some magnetic materials. The knowledge acquired in this unit will help pupils as they learn more about materials and their properties. This unit is the precursor to work in year 5 as pupils revise magnetism and learn about thermal and electrical conductivity. **Begin with a re-visit of elements of materials from Year 2.** **Key Vocabulary:** force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole. **<u>Knowledge Content:</u>** The study of **forces** and **magnetism** is part of the discipline of **physics** - the study of the processes that shape our world and how we use it**.** Know that a force can be thought of as a push or a pull. Know that there are three types of **contact** force: **impact** forces (when two surfaces **collide**), **frictional** forces (when two surfaces are already in contact) and **strain** forces (when an elastic material is stretched or squashed). **FRICTION** Know that the **texture** of a **surface** will affect how another object moves along that surface.

Maths N.C Statistics objectives: Present data using bar charts, pictograms and tables (Bar charts could be used to present how things move on different surfaces. Pictograms and tables could be used present the findings from experiments involving magnets) **Power Maths, unit 7** Common Misconceptions: • the bigger the magnet the stronger it is • all metals are magnetic.	Know that **smooth** surfaces allow things to move **quickly** but **rougher** surfaces create a **pull** that keeps the object **stuck** there longer. Know that the term **motion** means 'moving from one place to another' Know that the force between two surfaces rubbing together is called **friction**. Know that a **balanced force** is when two forces are **equal** and there is no motion. Know that **accelerate** means to get faster. Know that **decelerate** means to slow down. Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force. **Magnetism** Know that a magnet is a piece of iron or other material which **attracts** some metals towards it Know that a magnet has two **poles** - **North** and **South** Know that the word **attract** means one object pulling another object towards it Know that **repel** means one object pushing another object away from it Know that magnets have a **magnetic field** around them and that this is the area around a magnet where the magnetic forces work Understand that **magnetic** forces can work at a **distance** and do not need to have contact. Know that when materials are drawn to magnets this is called **attraction**. Know that when materials are not drawn to magnets this is called **repulsion**. Know that magnets can come in different forms: horseshoe, ring, button, bar. Know the benefits of magnetic materials: sorting through different types of metals, keeping fridge doors sealed, attaching items to whiteboards without damaging them. Know examples of magnetic materials e.g. iron, steel and nickel Know examples of non-magnetic material e.g. aluminium, copper, gold and silver Know the information (red = North and blue = South) Know what a compass looks like e.g. 1. A compass is used to find which direction you are facing.

	2. They were invented over 2000 years ago 3. It was often used by sailors and explorers in the past to help find their way 4. The thin metal pin inside is **suspended** so it can spin freely 5. The pin always points North 6. Now people often use Global Positioning Systems (GPS) rather than a compass (Recap the 8 points of the compass from Year 2) Know that the Earth is also a giant magnet. This is how compasses work. Know that Isaac Newton is famous for his discovery of gravity Know that John McAdam is famous for modernising roads Know that Albert Einstein has theories of forces **WORKING SCIENTIFICALLY** I can observe different forces I can evaluate my choices and suggest further improvements. I can predict whether materials are magnetic or not. I can plan a fair test I can record my findings using scientific drawings I can use models to explain findings. **Scientific Enquiry** Group and identify forces based on observations. Research John McAdam to create own road surfaces Sort and classify materials into magnetic and non-magnetic. Carry out a fair test using magnets. Spot patterns in my drawings and explain what is happening using magnetic fields. Use research and secondary sources to aid my explanations.

Year 4	Focus of Study: Animals inc. humans (digestive system)
NC Objectives	**Key Explicit Knowledge and Vocabulary**
Pupils should be taught to: 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.	**Context for Study:** This unit is the sixth of eight science units where pupils study animals, including humans, as part of the discipline of **biology** - the study of living **organisms.** Pupils have a secure knowledge of life cycles and what animals, including humans, need to survive. Pupils know the importance of a healthy lifestyle, including a balanced diet and the effects of sugar, the food groups and their role in human development. Pupils can identify and name a variety of animals, including the names of animals native to the sea, rivers and canals and the features that help them to live there. Pupils can use classification keys to help group, identify and name a variety of living things in their local and wider environment. Pupils know that humans and some other animals have skeletons and muscles for support, protection and movement. In this Year 4 unit, pupils learn about the simple functions of the basic parts of the digestive system in humans. New learning includes identifying the different types of teeth in humans and their simple functions. Pupils construct and interpret a variety of food chains, identifying producers, predators and prey. This unit is the precursor to work in year 5 as pupils learn about puberty and gestation periods of animals. The knowledge acquired in this unit will help pupils in Year 6 to learn about the circulatory system and dental structures. **Begin with a re-visit of elements of from Animals inc. humans from Year 3** **Key Vocabulary:** digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, incisor, canine, herbivore, omnivore. **<u>Knowledge Content:</u>** The study of animals, including **humans** regarding **nutrition**, **skeletons** and **muscles** is part of the discipline of **biology** - the study of living **organisms.** **<u>The digestive system:</u>** Know that **digestion** is the breaking down of food **mechanically** in the mouth before **chemically** in the stomach.

Common Misconceptions: • arrows in food chains mean 'eats' • the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain • there is always plenty of food for wild animals • your stomach is where your belly button is • food is digested only in the stomach • when you have a meal, your food goes down one tube and your drink down another • the food you eat becomes "poo" and the drink becomes "wee".	Know that the **mouth, tongue, teeth, oesophagus (**sometimes spelled **esophagus) , stomach, small and large intestine** make up the human digestive system. Know where each part is within the human body. Know the function of each part - 1. Mouth: food enters the digestive system and is mixed with **saliva** to make it softer 2. Tongue: moves food around to be broken down. 3. Teeth: break down the food so it can travel through the esophagus. 4. Oesophagus: moves food from the mouth to the stomach. 5. Stomach: uses chemicals to break down the food into small parts before passing on to the small intestine. 6. Small intestine: digested food here is passed into the **bloodstream** where it can be taken to the body parts that require it. 7. Large intestine: any food leftover is unwanted, and is passed along the large intestine to the **rectum.** Know that, without digestion, we could not **absorb** nutrients from food into our bodies and use them. Know that, in humans, the small intestine is about 6 metres long and the large intestine is about 1.5 metres long. <u>Teeth</u> Know that there are different teeth for different purposes. **Incisors**: the front teeth help bite off chunks of food to be broken down. **Canines**: pointed teeth designed to rip and tear meat and fish. **(Premolars and) Molars**: flatter, thicker teeth at the back of the mouth designed to crush and grind food. Know that you get two sets of teeth during your lifetime - the first set is often called the milk or baby teeth. Know that a child has 20 teeth and an adult has 32. Know that adults have **wisdom teeth** which grow at the end of each row of teeth. These are often removed in adults because they can affect the growth of the teeth nearby and can be painful. Know that it is important to look after teeth by brushing at least twice a day for two minutes at a time. It is important to use toothpaste which contains **flouride** as this protects teeth from tooth decay. (Video clip to understand the most effective way to brush teeth https://www.youtube.com/watch?v=xm9c5HAUBpY) Know that you can also use mouthwash and dental floss to help look after your teeth.

	Food Chains Know that a **food chain** is a series of living things which are linked to each other because each thing feeds on the one next to it in the series. Know that plants are **producers**, and create their own food through a process called **photosynthesis** (which they will find out about in secondary school) Know that all animals are **consumers**, they eat food (either plants or other animals) rather than produce their own (as plants are able to) Know that **prey** are animals that are consumed by other animals and **predators** are animals that consume other animals. Understand that some animals can be both predator and prey (e.g. a baboon eats grasshoppers but is eaten by a leopard) Know examples of food chains **WORKING SCIENTIFICALLY** I can observe the similarities and differences in human/animal teeth. I can interpret and present learning of digestive system through models. I can set up my own test to see the effects of different liquids on tooth decay. I can make predictions based on knowledge of liquids to decay teeth. I can record my results in a table and bar graph. I can ask questions to find out what animals eat. I can evaluate learning **Scientific Enquiry** Identify the organs of the digestive system and use model to explain thinking. Identify the different teeth and know their function. Identify and compare similarities and differences in human and animal teeth. Set up a comparative test to show effects of tooth decay. Observe tooth decay over time.

	Research animal food chains to find out what animals eat. Identify foods animals eat to classify. Identify patterns

Year 5	Focus of Study: Earth and Space
NC Objectives	**Key Explicit Knowledge and Vocabulary**
Pupils should be taught to: 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. **Maths N.C Statistics objectives:** Solve comparison, sum and	**Context for study:** This unit is the last of three science units where pupils study **forces** as part of the discipline of **physics** - the study of the processes that shape our world and how we use it**.** There are also many links to the discipline of **chemistry** - the identification of the properties a substance is made from. Pupils have a secure knowledge of the effects of air resistance, water resistance and friction, that act between moving surfaces. Pupils know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Previous learning includes how some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. Pupils know about magnetic and non-magnetic materials, and thermal and electrical conductivity. They know some forces need contact between two objects, but magnetic forces can act at a distance. Pupils know magnets have two poles and that they attract or repel each other. In this Year 5 unit, pupils describe the Sun, Earth and Moon as approximately spherical bodies. New learning includes knowing about the movement of the Earth, and other planets, relative to the Sun in the solar system. Pupils learn the movement of the Moon relative to the Earth. By the end of the unit, pupils use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. This unit is the precursor to work studied in KS3 when pupils continue to study **forces** as part of the discipline of **physics.** The knowledge acquired in this unit will help pupils as they learn more about forces and movement, including measuring forces. **Begin with a re-visit of elements of Forces from Year 5.** **Key Vocabulary:** Earth, sun, moon, Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune, Pluto (dwarf planet), spherical, solar system, rotates, star, orbit, planets, axis, night, day, season, galaxy, meteorite, celestial.

difference problems using information presented in a line graph (This could be linked to the movement of the sun) **Power Maths, unit 4, lesson 3 & 4.** Common Misconceptions: • the Earth is flat • the Sun is a planet • the Sun rotates around the Earth • the Sun moves across the sky during the day • the Sun rises in the morning and sets in the evening • the Moon appears only at night • night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.	**Knowledge Content** The study of Earth and Space is part of the discipline of **physics** - the study of the processes that shape our world and how we use it**.** **Sun, Moon, Earth** Know that the Earth, sun and moon are approximately **spherical bodies** in space. Know that the sun is a **star** and the moon is a **satellite**, not planets. Know that the Earth **rotates** once every 24 hours. Know that this creates **day and night** as the Earth takes 24 hours to complete one spin on its **axis**. Know that the Earth orbits around the sun once every 365 and a quarter days (one year). Know that the sun is the ball of gas in the sky that the Earth goes round, and that gives us heat and light. Know that it is not safe to look directly at the Sun, even when wearing dark glasses Know that the orbit is the curved path in space that is followed by an object going round and round a planet, moon, or star Know that every 4 years the Earth year is 366 days long due to the 4 quarter days equalling an extra day. We refer to this as a **leap year**. Know that the extra day occurs on Feb 29th. Know that the Earth **spins** on an imagined **axis**, **tilted** at approximately 23° Explain how this also alters how we see the sun in different **positions** in the sky throughout the day, and this makes the sun look as if it is moving when it is in fact Earth. Know that the sun appears to rise in the east and sets in the west. Moon Know that the moon is not a **light source** it reflects the light from the sun. Know that the moon orbits our Earth every 28 days, and this is called the **lunar cycle**. Know that Earth has one moon; Jupiter has four large moons and numerous smaller ones. Know that in **folklore** a full moon is when werewolves are supposed to transform from humans into werewolves. Know that a full moon is regarded as a spooky symbol. (no requirement to teach the names of the phases of the moon) Know that over 28 days the moon goes from a full moon to a sequence of shrinking crescent moons to a new moon (not visible) a sequence of increasing crescent moons to a full moon over 28 days.

	Solar System Know the names of the planets in our solar system in order from the sun - **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, (Pluto)**. Know that recently Pluto has been designated as a **dwarf planet** and is no longer included as a planet in the solar system. Know the mnemonic - My Very Easy Method Just Speeds Up Naming Planets Know that there is an **asteroid belt** between Mars and Jupiter Know the **approximate relative size** of planets from this diagram. Know that planets have their own moons Know that only Earth is **habitable**. The gas giants are: Jupiter, Saturn, Uranus and Neptune. The others are **terrestrial** planets: **terra** meaning land. Solar System Models Know the way that ideas about the solar system have developed, Know how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. Space Exploration Know that the first animal in space was a dog named Laika Know that the first man in space was **Yuri Gagarin** on VOSTOCK 1 in 1961 Know that the first moon landing was **Apollo 11** in **1969** Know that **Helen Sharman** was the first British woman in space in 1963 Know that there was a '**space race**' to be the first country to put a person on the moon between Russia and USA Know that **Neil Armstrong** was the first person on the moon in 1969 Know that **Edwin 'Buzz' Aldrin** was the second person on the moon after Neil Armstrong in 1969. Know that this moon landing was a key cultural event watched by **approximately** 600 million people. Know that **Tim Peake** was the most recent Briton to go into space in 2015

	Know the following quote **"The eagle has landed**" which was said when the Apollo 11 ship first touched down on the moon Know the following quote "**That's one small step for man, one giant leap for mankind**" which was said when Neil Armstrong first stepped off the ladder of the **lunar lander** onto the moon. Know that this phrase has passed into popular culture. Know that **NASA** stands for **National Aeronautics and Space Administration** and they are the government operated agency that carries out scientific investigation into space. Time Zones Know that there are different time zones across the world because of the rotation of the earth. Know that as you move eastwards from the UK you add time on. Know that as you move westwards you subtract time. **WORKING SCIENTIFICALLY** I can raise questions and suggest reasons for similarities and differences. I can use measurement to represent planets in a model I can record my work using scientific diagrams and labels. I can use a model to discuss, communicate and justify scientific ideas using scientific vocabulary. I can present results in a variety of ways to answer a question. I can plan own test and control variables. **Scientific Enquiry** Identify and classify planets Observe changes over time Use research and secondary sources to find out about the moon. Look for patterns in day light hours.

	Conduct a fair test where variables are controlled.

Year 6	Focus of Study: Living things and their habitats
NC Objectives	**Key Explicit Knowledge and Vocabulary**
Pupils should be taught to: describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, **plants** and animals give reasons for classifying **plants** and animals based on specific characteristics. Common Misconceptions: • all micro-organisms are harmful • mushrooms are plants.	**Context for study**: This unit is the final of six science units where pupils learn about plants and animals as part of the discipline of biology- the study of living organisms. This unit comes after pupils have studied a variety of living things in their local and wider environment. Pupils know different species of animals and plants, how they are adapted to suit their environment and that adaptation may lead to evolution. Pupils can describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Pupils have secure knowledge of the seven life processes, the requirements of plants for life and growth and food chains. This unit builds on pupils' previous knowledge of the classification of living things. In Year 6, pupils describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. Pupils learn about plant taxonomy- the science that finds, identifies, describes, classifies, and names plants. Pupils learn about the modern classification system created by Carl Linnaeus and that each species is given a name using Latin words. Pupils are introduced to the taxonomic hierarchy in relation to the red fox which is the precursor to work pupils will study in KS3. **Begin with a re-visit of elements of Living things and their habitats from Year 4/5.** Key Vocabulary: vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering. **Knowledge Content** Classification The study of plants is part of the discipline of **biology** - the study of living **organisms.** Know that **plant taxonomy** is the science that finds, identifies, describes, classifies, and names plants.

	Classifying organisms Know that there are millions of species of living things on our planet. Know that it would be difficult to describe and name each one individually. Know that while species can be very different from each other, many of them have similar features that allow us to put them into groups. Know that grouping things helps scientists identify gaps in their research and they get an idea of what to investigate next. **Modern classification system** Know that, in 1735 (in the eighteenth century), **Carl Linnaeus** started the modern system of organising species of organisms into certain groups and giving them scientific names. Carl Linnaeus (1707 - 1778) Each species is given a name using **Latin** words, so that the same name can be used all over the world. Know that Latin is the language which the ancient Romans used to speak and is used frequently in science for classifying animals (relate to Latin content in the UKS2 Languages curriculum) Know that the scientific name for modern human beings is '**homo sapiens**'. Know that homo means 'man' and sapiens means 'wise'. Know that homo is the **genus** name and sapiens is the **species** name. Putting different species into different groups according to their features is called **classification**. Know that a genus is a class of similar things, especially a group of animals or plants that includes several closely related species. Use the diagram below to introduce the taxonomic hierarchy in relation to the red fox. They will learn more about this in KS3. Know that a **species** is a class of plants or animals whose members have the same main characteristics and are able to breed with each other. Know that plants can be classified into two groups - flowering and non-flowering. Know that non-flowering plants can be divided into two groups - 1. those that reproduce with dust-like particles called **spores**

	2. those that use seeds to reproduce Know the following plants by their appearance. For example, flowering plants – bluebell, poppy, rose, dandelion, daisy, honeysuckle, ivy and snowdrop For example, non-flowering plants – ferns, pine and moss Know that mushrooms and fungi are not plants - they belong to a separate classification of living things called fungi. Know that there are 3 types of microbes: Viruses, bacteria and fungi Know that bacteria are single-celled organism Know that bacteria can cause illness Know that bacteria can also be helpful - bacteria are used to make cheese and yoghurt! Know that microorganisms an only be seen with a microscope but they are found everywhere. Know that MRS NERG is an acronym that explains features of living things. M- Movement R- Respire (Breathe) S- Sensitivity N- Nutrients E- Excrete R- Reproduce G- Grow

	Know that vertebrates are living things with a spine or backbone. Know that invertebrates are living things without a spine or backbone. Know that deciduous means loses leaves after growing season. then grows again. Know that evergreen means stays green all year. Know examples of vertebrates and invertebrates Know features of deciduous and evergreen trees (re-cap from LKS2) Know that it is important for biologists to be able to understand how living things are related to and depend on each other, in order to appreciate the diversity of life and the need for conservation. Know that there are over 8 million species of living things Know that Aristotle was the first person to classify living things into groups **WORKING SCIENTIFICALLY** I can record in a table I can answer my own questions. I can use classification keys. I can raise questions about animals to group. I can observe and raise questions. I can predict how microorganisms will decay food I can evaluate effects of yeast. **Scientific Enquiry** Sort based on observable characteristics. Classify and sort using classification keys.

	Research genus and species. Research animals to classify Observe microorganisms over time. Notice patterns.