

Humber Education Trust

Knowledge and Vocabulary

Progression Intent

Science

The intention of the Science curriculum

Through building up a body of key foundational knowledge and concepts, all pupils will be enthused about science and learning about the world we live in. By working together on a hands on, enquiry based approach, pupils will have the opportunity to become the scientists of the future.

The science curriculum will:

- encourage pupils to recognise the power of rational explanation
- develop pupils' sense of excitement
- develop pupils' curiosity about natural phenomena
- encourage pupils to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

What are the key features of 'knowledge-rich' assessment for Science?

At both key stages the sticky knowledge takes full account of the national curriculum's main characteristics of Physics, Chemistry, Biology, Working scientifically

There are more assessments in science because the national curriculum specifies on a year-by-year basis what has to be taught. In addition, science is a core subject and should have more time devoted to it than non-core subjects

The working scientifically part does not conform with the knowledge-rich system as it is checking on pupils' ability to, amongst other things, carry out research, ask questions and carry out tests.

The working scientifically statements should be assessed as an on-going feature of the science lessons, whilst the scientific knowledge should be assessed away from the point of teaching.

Working Scientifically – Year 1 and 2

These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the PoS can be met by the end of Y2. Pupils are not expected to cover each aspect for every area of study.

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

| Year 1 | | | | |
|---|---|---|---|--|
| | Biology | | Chemistry | Physics |
| | Animals, including Humans | Plants | Everyday Materials | Seasonal Change |
| National Curriculum | <ul style="list-style-type: none"> • 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. | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • 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. | <ul style="list-style-type: none"> • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies. |
| Sticky knowledge | <ul style="list-style-type: none"> • Know how to classify a range of animals by amphibian, reptile, mammal, fish and birds • Know and classify animals by what they eat (carnivore, herbivore and omnivore) • Know how to sort by living and non living things • Know the name of parts of the human body that can be seen | <ul style="list-style-type: none"> • Know and name a variety of common wild and garden plants • Know and name the petals, stem, leaves and root of a plant • Know and name the roots, trunk, branches and leaves of a tree | <ul style="list-style-type: none"> • Know the name of the materials an object is made from • Know about the properties of everyday materials | <ul style="list-style-type: none"> • Name the seasons and know about the type of weather in each season |
| Vocab | Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak | Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem | Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth | Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark |
| Year 1 Enquiry Types (Ideas – not all need to be covered) | | | | |
| Observing Over Time | How does my height change over the year? (half termly, with photos) | How does my sunflower change each week? How does a daffodil bulb change over the year? | What happens to materials, over time, if I bury them in the ground? What happens to shaving foam over time? How does the colour of a UV bead change over the day? | How does the oak tree change over the year? |
| Pattern Seeking | | Do trees with bigger leaves lose their leaves first in Autumn? Is there a pattern where we find moss in the school grounds? | Is there a pattern in the types of materials that are used to make objects in our school? | Does the wind always blow the same way? |
| Identifying & Classifying | How can we organise all of the animals? What are the names for all of the parts of our body? | How can we sort the leaves that we collected on our walk? | Which materials are waterproof? Which materials will float and which will sink? | How would you group these things, based on which season you are most likely to see them in? |
| Comparative Tests | Is our sense of smell better when we can't see? | Which tree has the biggest leaves? Which type of compost grows the tallest sunflower? | Which materials are the most absorbent? Which materials are the most flexible? | In which season does it rain the most? |
| Researching using Secondary Sources | How are the animals in Australia different to the ones that we find in Great Britain? Do all animals have the same senses as humans? | What are the most common British plants and where can we find them? Are there plants that are in flower every season? What are they? | Which materials can be recycled? How are bricks made? | |

Working Scientifically – Year 1 and 2

These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the PoS can be met by the end of Y2. Pupils are not expected to cover each aspect for every area of study.

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions.

| Year 2 | | | | |
|---|---|--|---|--|
| | Biology | | | Chemistry |
| | All living things and their habitats | Animals, including Humans | Plants | Everyday Materials |
| National Curriculum | <ul style="list-style-type: none"> • 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, incl 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. | <ul style="list-style-type: none"> • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, incl 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. | <ul style="list-style-type: none"> • 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. | <ul style="list-style-type: none"> • identify and compare the suitability of a variety of everyday materials, incl 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 |
| Sticky knowledge | <ul style="list-style-type: none"> • Classify things by living, dead or never lived • Know how a specific habitat provides for the basic needs of things living there (plants and animals) • Match living things to their habitat • Name some different sources of food for animals • Know about and explain a simple food chain | <ul style="list-style-type: none"> • Know the basic stages in a life cycle for animals, (including humans) • Know why exercise, a balanced diet and good hygiene are important for humans | <ul style="list-style-type: none"> • Know and explain how seeds and bulbs grow into plants • Know what plants need in order to grow and stay healthy (water, light & suitable temperature) | <ul style="list-style-type: none"> • Know how materials can be changed by squashing, bending, twisting and stretching • Know why a material might or might not be used for a specific job |
| Vocab | Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene | Seeds, Bulbs, Water, Light, Temperature, Growth | Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert | Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil |
| Year 2 Enquiry Types (Ideas – not all need to be covered) | | | | |
| Observing Over Time | How does a pond change over a year? | How much food and drink do I have over a week? How does a tadpole change over time? | What happens to my bean after it has been planted? | How long do bubble bath bubbles last for? What will happen to our snowman? Would a paper boat float forever? |
| Pattern Seeking | Which conditions do woodlice prefer to live in? Which habitats do worms prefer/where can we find the most worms? | | Do bigger seeds grow into bigger plants? | Do magnetic materials always conduct electricity? |
| Identifying & Classifying | How would you group these plants and animals based on what habitat you would find them in? How do we group things to show which are dead, living, never been alive? | Which babies belong to which animal? | How can we identify the seeds/plants? How can we identify the trees that we observed on our tree hunt? | Which materials are shiny and which are dull? Which materials will let electricity go through them and which will not? |
| Comparative Tests | | Do amphibians have more in common with reptiles or fish? Do bananas make us run faster? | Do cress seeds grow quicker inside or outside? | Which material would be the best for...? Which shape makes the strongest paper bridge? |
| Researching using Secondary Sources | What do you need to do to look after a ___ at The Deep and keep it healthy? How does the habitat of the Arctic compare to the habitat of the rainforest? | What food do you need in a healthy diet and why? What do you need to look after a pet dog/cat/lizard and keep it healthy? | How does a cactus survive in a desert with no water? | How does the habitat Savannah compare to the UK? How have the materials we use changed over time? How are plastics made? |

Working Scientifically – Year 3 and 4

These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the PoS can be met by the end of Y4. Pupils are not expected to cover each aspect for every area of study.

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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, incl 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, incl oral and written explanations, displays or presentations of results & 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 straight forward scientific evidence to answer questions or to support their findings.

| Year 3 | | | | | |
|---|--|--|--|--|---|
| | Biology | | Chemistry | Physics | |
| | Animals, incl humans | Plants | Rocks | Forces and Magnets | Light |
| National Curriculum | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. |
| Sticky knowledge | <ul style="list-style-type: none"> Know about the importance of a nutritious, balanced diet Know how nutrients, water and oxygen are transported within animals and humans Know about the skeletal and muscular system of a human | <ul style="list-style-type: none"> Know the function of different parts of flowering plants and trees Know how water is transported within plants Know the plant life cycle, especially the importance of flowers | <ul style="list-style-type: none"> Compare and group rocks based on their appearance and physical properties, giving reasons Know how soil is made and how fossils are formed Know about and explain the difference between sedimentary, metamorphic and igneous rock | <ul style="list-style-type: none"> Know about and describe how objects move on different surfaces Know how a simple pulley works and use to on to lift an object Know how some forces require contact and some do not, giving examples Know about and explain how magnets attract and repel Predict whether magnets will attract or repel and give a reason | <ul style="list-style-type: none"> Know that dark is the absence of light Know that light is needed in order to see and is reflected from a surface Know and demonstrate how a shadow is formed and explain how a shadow changes shape Know about the danger of direct sunlight and describe how to keep protected |
| Vocab | Movement, Muscles, Bones, Skull, Nutrition, Skeletons, | Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower | Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent | Light, Shadows, Mirror, Reflective, Dark, Reflection | Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull |
| Year 3 Enquiry Types (Ideas – not all need to be covered) | | | | | |
| Observing Over Time | | What happens to celery when it is left in a glass of coloured water? How do flowers in a vase change over time? | What happens when water keeps dripping on a sandcastle? | If we magnetise a pin, how long does it stay magnetised for? | How do our shadows change over time? When is our classroom darkest? Is the sun the same brightness all day? |
| Pattern Seeking | Do male humans have larger skulls than females? Are you more likely to have bad eyesight/wear glasses if you are older? | What colour flowers do pollinating insects prefer? | Is there a pattern in where we find volcanoes? | Does the size and shape of a magnet affect how strong it is? | |
| Identifying & Classifying | How can we group the food we eat? How do skeletons of different animals compare? | How many different ways can we group our seed collection? | Can you use the identification key to find out the names of each of the rocks? | Which materials are magnetic? | How would you organise these light sources into natural and artificial sources? |
| Fair and Comparative Tests | How does the skull circumference of a girl compare to that of a boy? © How does the angle that your elbow is bent affect the circumference of your upper arm? (F) | Which conditions help seeds germinate faster? © How does the length of the carnation stem affect how long it takes for the fruit colouring to dye the petals? (F) | Which soil absorbs the most water? © How does adding different amounts of sand to soil affect how quickly water drains through it? (F) | Which magnet is the strongest? © Which surface is best to stop you slipping? © How does the mass of an object affect how much force is needed to make it move? (F) | Which pair of sunglasses will be best at protecting our eyes? © How does the distance between the shadow puppet and the screen affect the size of the shadow? How does the number of layers of transparent plastic affect how much light can pass through? (F) |
| Researching using Secondary Sources | Why do different types of vitamins keep us healthy? Which foods can we find them in? | What are all the different ways that seeds disperse? | Who was Mary Anning and what did she discover? | How have our ideas about forces changed over time? How does a compass work? | How does the sun make light? |

Working Scientifically – Year 3 and 4

These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the PoS can be met by the end of Y4. Pupils are not expected to cover each aspect for every area of study.

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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, incl 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, incl oral and written explanations, displays or presentations of results & 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.

| Year 4 | | | | | |
|---|---|---|--|--|---|
| | Biology | | Chemistry | Physics | |
| | Animals, including humans | Living things and their habitats | States of Matter | Electricity | Sound |
| National Curriculum | <ul style="list-style-type: none"> • Identify and name the parts of the human digestive system • Know the functions of the organs in the human digestive system • Identify and know the different types of human teeth • Know the functions of different human teeth • Use and construct food chains to identify producers, predators and prey | <ul style="list-style-type: none"> • Use classification keys to group, identify and name living things • Know how changes to an environment could endanger living things • recognise that living things can be grouped in a variety of ways | <ul style="list-style-type: none"> • Know the temperature at which materials change state through investigation • Know about and explore how some materials can change state • Know the part played by evaporation and condensation in the water cycle • Group materials based on their state of matter (solid, liquid, gas) | <ul style="list-style-type: none"> • Identify and name appliances that require electricity to function • Construct a series circuit • Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) • Predict and test whether a lamp will light within a circuit • Know the function of a switch • Know the difference between a conductor and an insulator; giving examples of each | <ul style="list-style-type: none"> • Know how sound is made, associating some of them with vibrating • Know how sound travels from a source to our ears • Know the correlation between pitch and the object producing a sound • Know the correlation between the volume of a sound and the strength of the vibrations that produced it • Know what happens to a sound as it travels away from its source |
| Sticky knowledge | <ul style="list-style-type: none"> • Identify and name the parts of the human digestive system • Know the functions of the organs in the human digestive system • Identify and know the different types of human teeth • Know the functions of different human teeth • Use and construct food chains to identify producers, predators and prey | <ul style="list-style-type: none"> • Use classification keys to group, identify and name living things • Know how changes to an environment could endanger living things • Group materials based on their state of matter (solid, liquid, gas) | <ul style="list-style-type: none"> • Know the temperature at which materials change state • Know about and explore how some materials can change state • Know the part played by evaporation and condensation in the water cycle | <ul style="list-style-type: none"> • Identify and name appliances that require electricity to function • Construct a series circuit • Identify and name the components in a series circuit (including cells, wires, bulbs, switches and buzzers) • Predict and test whether a lamp will light within a circuit • Know the function of a switch • Know the difference between a conductor and an insulator; giving examples of each | <ul style="list-style-type: none"> • Know how sound is made, associating some of them with vibrating • Know how sound travels from a source to our ears • Know the correlation between pitch and the object producing a sound • Know the correlation between the volume of a sound and the strength of the vibrations that produced it • Know what happens to a sound as it travels away from its source |
| Vocab | Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar | Vertebrates, Invertebrates fish, birds, Amphibians, Reptiles, Mammals, , Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats | Solid, Liquid, Gas, Evaporation, condensation, Particles, Temperature, Freezing, Heating | Volume, Vibration, Wave, Pitch, Tone, Speaker | Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators |
| Year 4 Enquiry Types (Ideas – not all need to be covered) | | | | | |
| Observing Over Time | How does an egg shell change when it is left in cola? | How does variety of invertebrates on the school field change over the year? | Which material is best for keeping our hot chocolate warm? How does the level of water in a glass change when left on the windowsill? How does the mass of an ice cube change over time? | How long does a battery light a torch for? | When is our classroom the quietest? |
| Pattern Seeking | Are foods that are high in energy always high in sugar? | How has the use of insecticides affected bee population? | Is there a pattern in how long it takes different sized ice lollies to melt? | Which room has the most electrical sockets in a house? | Is there a link between how loud it is in school and the time of day? What is the pattern? |
| Identifying & Classifying | What are the names of the organs involved in the digestive system? How can we organise teeth into groups? | Can we use classification keys to identify all the animals that we caught? | Can you group these materials and objects into solids, liquids and gases? How would you sort these objects/materials based on their temperature? | How would you group these electrical devices based on where the electricity comes from? | Can you group these materials into insulating materials? |
| Fair and Comparative Tests | Are two ears better than one? Do left ears hear the same sounds as right ears? | In our class, are omnivores taller than vegetarians? ☺ Does the amount of light affect how many woodlice move around? (F) | Does sea water evaporate quicker than fresh water? ☺ How does the mass of a block of ice affect how long it takes to melt? (F) How does the surface area of a container of water affect how long it takes to evaporate? (F) | Which metal is the best conductor for electricity? (C) How does thickness of a conducting material affect how bright the lamp is? (F) | Which material is best for muffling sound in ear defenders? (C) How does a volume of a drum change as you move further away from it? (F) How does the length of a guitar string/tuning fork affect the pitch of a sound? (F) |
| Researching using Secondary Sources | How do dentists fix broken teeth? | Why are people cutting down the rainforests and what affect does it have? What are hurricanes and why do they happen? | | How does a lightbulb work? How has electricity changed the way we live? | Do all animals have the same hearing range? |

Working Scientifically – Year 5 and 6

These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the PoS can be met by the end of Y6. Pupils are not expected to cover each aspect for every area of study.

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, incl 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, incl conclusions, causal relationships and explanations of and 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.

| Year 5 | | | | | |
|---|--|--|---|---|---|
| | Biology | | Chemistry | Physics | |
| | Living things and their habitats | Animals, including humans | Properties and changes in materials | Forces | Earth and Space |
| National Curriculum | <ul style="list-style-type: none"> 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 animals. | <ul style="list-style-type: none"> describe the changes as humans develop to old age. | <ul style="list-style-type: none"> 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, incl metals, wood plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain some changes result in the formation of new materials, and that this kind of change is not usually reversible, incl changes associated with burning and the action of acid on bicarb of soda. | <ul style="list-style-type: none"> 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, incl levers, pulleys and gears, allow a smaller force to have a greater effect. | <ul style="list-style-type: none"> 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. |
| Sticky knowledge | <ul style="list-style-type: none"> Know the life cycle of different living things e.g. mammal, amphibian, insect and bird Know the differences between different life cycles (plants/ animals in the local environment) Know the process of reproduction in plants Know the process of reproduction in animals | <ul style="list-style-type: none"> Create a timeline to indicate stages of growth in humans | <ul style="list-style-type: none"> Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets Know and explain how a material dissolves to form a solution Know and show how to recover a substance from a solution Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating) Know and demonstrate that some changes are/aren't reversible Know how some changes result in the formation of a new material and that this is usually irreversible | <ul style="list-style-type: none"> Know what gravity is and its impact on our lives Identify and know the effect of air and water resistance Identify and know the effect of friction Explain how levers, pulleys and gears allow a smaller force to have a greater effect | <ul style="list-style-type: none"> Know about and explain the movement of the Earth and other planets relative to the Sun Know about and explain the movement of the Moon relative to the Earth Know and demonstrate how night and day are created Describe the Sun, Earth and Moon (use term spherical) |
| Vocab | Foetus, Embryo, Womb, gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty | Mammal, Reproduction, Insect, amphibian, Bird, Offspring | Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing | Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, spherical | Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation |
| Year 5 Enquiry Types (Ideas – not all need to be covered) | | | | | |
| Observing Over Time | How does a bean change as it germinates? How does our compost heap change over time? | | How does a container of salt water change over time? How does a sugar cube change a it is put into a glass of water? How does a nail in salt water change over time? | How long does a pendulum swing before it stops? | |
| Pattern Seeking | | Are the oldest children in our school the tallest? Is there a relationship between a mammal size and its gestational period? | Do all materials stretch in the same way? | Do all objects fall through water in the same way? How does the surface area of a parachute affect the time it takes to fall? (F) | Is there a pattern between the size of a planet and the time it takes to travel around the sun? |
| Identifying & Classifying | | Can you identify all the stages in the human life cycle? Compare this collection of animals based on sim/diff in their life cycle? | Can you group these materials based on whether they are transparent or not? | Can you label and name all of the forces acting on objects in each of these situations? | Can you observe and identify all of the phases in the cycle of the moon? |
| Fair and Comparative Tests | | Who grows the fastest, girls or boys? © How does age affect a human's reaction time? (F) | Which type of sugar dissolves the fastest? How does the temperature of tea affect how long ot takes a sugar lump to dissolve? (F) | Which seed shape takes the longest time to fall? © Which shoe is the most slippy? © Which shape parachute takes the longes time to fall? © How does the angle of launch affect how far a paper rocket will go? (F) How does the surface area of a container affect the time it takes to sink? (F) | How does the length of daylight hours change with each season? |
| Researching using Secondary Sources | What are the differences between the life cycle of an insect and a mammal? | Why do people get grey/white hair when they get older? | What are microplastics and why are they harming our planet? | How do submarines sink if they are full of air? | How have our ideas about the Solar System changed? Solar system research. |

Working Scientifically – Year 5 and 6

These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the PoS can be met by the end of Y6. Pupils are not expected to cover each aspect for every area of study.

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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 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.

| Year 6 | | | | | |
|----------------------------|---|--|--|--|--|
| | Biology | | | Physics | |
| | Animals, including humans | Living things and their habitats | Evolution and Inheritance | Electricity | Light |
| National Curriculum | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. | <ul style="list-style-type: none"> 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. |
| Sticky knowledge | <ul style="list-style-type: none"> Identify and name the main parts of the human circulatory system Know the function of the heart, blood vessels and blood Know the impact of diet, exercise, drugs and lifestyle on health Know the ways in which nutrients and water are transported in animals, including humans | <ul style="list-style-type: none"> Classify living things into broad groups according to observable characteristics and based on similarities and differences Know how living things have been classified Give reasons for classifying plants and animals in a specific way | <ul style="list-style-type: none"> Know how the Earth and living things have changed over time Know how fossils can be used to find out about the past Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents) Know how animals and plants are adapted to suit their environment Link adaptation over time to evolution Know about evolution and explain what it is | <ul style="list-style-type: none"> Compare and give reasons for why components work and do not work in a circuit Draw circuit diagrams using correct symbols Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer | <ul style="list-style-type: none"> Know how light travels i.e in straight lines Know and demonstrate how we see objects i.e give out or reflect into the eye Know why shadows have the same shape as the object that casts them Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc. |
| Vocab | Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration | Insects, Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, | Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics | Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell | Refraction, Reflection, Light, Spectrum, Rainbow, Colour, |

| Enquiry Types (Ideas – not all need to be covered) | | | | | |
|--|--|--|--|---|--|
| Observing Over Time | How does my heart rate change over the day? How much exercise should we do in a week? How do different animal embryos change? | What happens to a piece of bread if you leave it on the windowsill for two weeks? | How have the features of animals changed over time? | How would you group electrical components and appliances based on what electricity makes them do? Which brand of battery lasts the longest? | How does my shadow change over the day? |
| Pattern Seeking | Is there a pattern between what we eat for breakfast and how fast we can run? | | Is there a pattern between the size and shape of a bird's beak and the food it will eat? | | Is there a pattern between how bright it is in the school over a day? and, if there is a pattern, is it the same in every classroom? Does the temperature of a lightbulb go up the longer it is left on? |
| Identifying & Classifying | Which organs of the body make up the circulation system, and where are they found? | Do larger flowers have more petals? How would you make a classification key for vertebrates/invertebrates/microorganisms? | Compare the skeletons of apes, humans and neanderthals- how are they similar, and how are they different? Can you classify these observations into evidence for the idea of evolution, evidence against? | How does the voltage of the batteries in a circuit affect the brightness of the lamp? How would you group electrical components and appliances based on what electricity makes them do? | Can you identify all of the colours of light that make white light when mixed together? What colours do you get if you mix different colours of light together? |
| Fair and Comparative Tests | Which type of exercise has the greatest effect on our heart rate? (C) | Which invertebrate is the most common in our school field? (C) | Which eye colour is the most common in our class? (C) | Which make of battery lasts the longest? (C) Which type of fruit makes the best fruity battery? (C) | Which material is the most reflective? (C) |
| Researching using Secondary Sources | How does the length of time we exercise for affect our heart rate? (F) Does exercising regularly affect your lung capacity? (F) How have our ideas about disease and medicine changed over time? | What did Newton discover about the spectrum of light? How does the temperature affect how much gas is produced by yeast? (F) What do different types of micro organisms do? Are they always harmful? | What happened when Charles Darwin visited the Galapagos Islands? | How does the voltage of the battery in the circuit affect the brightness of the lamp? (F) How does the voltage of a battery in the circuit affect the volume of a buzzer/ (F) How has our understanding of electricity changed over time? | How does the angle that a light ray hits a plane mirror, affect the angle at which it reflects off its surface? (F) How do astronomers know what stars are made of? |