**Science: Intent Statement**

At Twineham, we want our children to be confident and curious pupils who apply their skills in a scientific way, using lines of enquiry across the curriculum and in later life. They should be able to ask and answer challenging questions and successfully carry out investigations with a good understanding of nature, processes and methods.  Alongside this, they will have the scientific knowledge required to understand the uses and implications of science, today and for the future.

**Science: Sticky knowledge and essential skills (with vocabulary)**

Key units of science studied over the course of the curriculum:

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| Buttercups (Early Years & Year 1) | | Willow (Year 2 & Year 3) | | Oakwood (Year 4, 5 & 6) | |
| \*Animals incl. humans  \*Growth (incl. plants, people and animals)  \*Habitats | \*Materials  \*Minibeasts  \*Seasons | \*Animals incl. humans  \*Forces (magnets)  \*Light & Shadows  \*Living things & habitats | \*Materials  \*Plants  \*Rocks & soils  \*States of matter | \*Animals incl. humans  \*Electricity  \*Evolution  \*Forces  \*Light | \*Living things & habitats  \*Materials  \*Properties & changes of materials  \*Sound  \*Space |

**Golden Threads:**

1. Working Scientifically (disciplinary knowledge – ‘working like a scientist’)
2. Subject specific vocabulary matched to ‘working scientifically’/disciplinary knowledge
3. Scientific Knowledge and Understanding
4. Subject specific vocabulary matched to substantive scientific knowledge

**Buttercup Class – Early Years**

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| Unit of study:  (EYFS framework) | Working scientifically: | WS vocabulary: | Sticky knowledge & key understanding: | Key vocabulary: |
| **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.** | Observing the world around them, making drawings of people, describing processes, asking questions, sorting and grouping | science, experiment, investigation, test, why, world, look closely, observe, watch, touch, feel, smell, listen, same, different, compare, ask questions, record, sort, group | To know about the life cycle of a human.  To know and talk about how I have changed since I was a baby.  To know and talk about similarities, differences, patterns and changes in relation to people.  To know and describe the changes I can see in autumn.  To explore the natural world around me.  To describe what I see, hear and feel whilst outside. | animals, humans, senses (see/sight, hear, touch, taste, smell) decay, rot, environment, change, grow, shadows, baby, child, adult, walk, talk, crawl, cry, sleep, run, grey, red, brown, orange, green, fall, drop, colder, wetter, darker, season, clocks, fireworks, autumn, winter, day light, shorter |
| **Know some similarities and differences between the natural world around them and contrasting environments.**  **Know about changing states of matter.** | Observing the world around them, making drawings of animals, describing processes, asking questions, sorting and grouping | To talk about changes I can see in winter.  To know some similarities and differences between the natural world around me and contrasting environments.  To explore changing states of matter (water/chocolate).  To know and talk about changes I can see in winter/spring.  To recognise environments that are different to the one in which I live.  To know and talk about different habitats and the animals that live there. | hot cold snowy frozen ice melting warm animals, humans materials, change, grow, shadows, green, flowers, blossom, warmer, lighter, sunnier, winter, spring, longer, daylight, night time, hibernate, tree, hedge, field, sea, river, forest, |
| **Explore the natural world around them.**  **Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.** | Observing the world around them, making drawings of plants, describing processes, asking questions, sorting and grouping | To know and name parts of a plant.  To know how to care for growing plants.  To know some similarities and differences in relation to plants.  To know and talk about changes I can see in spring/summer.  To name different features within our school environment and know how they might vary from each other.  To explore, know and talk about materials float and sink (link to design technology). | plants (leaf, stem, root, flower, seeds)  animals, humans  change, grow,  materials, float, sink  shadows, water, soil, air, hotter, sunnier, lighter, warmer, plastic, wood, cardboard, paper, stone, rock |

**Buttercup Class – Year 1**

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| Units of study: | Working scientifically: | WS vocabulary: | Sticky knowledge & key understanding: | Key vocabulary: |
| **Identifying plants**  Cycle A&B: Autumn 1 | To carry out a fair test involving plants  To observe plants very closely using simple resources  To know and describe similarities and differences between animals  To be able to sort animals (using Venn Circles) | observe, changes, patterns, grouping, sorting, compare, same, different, identify (name), measure, data, record results, drawing, picture, table, tally chart, present, pictogram, block chart, Venn diagram, ask questions, test, investigate, explore, equipment, resources, magnifying glass, hand lens, ruler, tape measure, metre stick, pipette, syringe, spoon, teaspoon, answer questions, interpret results, scientific enquiry, pattern seeking, comparative testing, observing over time, classifying, researching using secondary sources | To know a that deciduous trees lose its leaves each year.  To know that evergreen tree keeps its leaves all year round, even in the winter.  To know what the roots of a plant do (take in water/nutrients and keep it anchored)  To know what the stem of a plant does (holds the plant up, carries water/nutrients from the roots to the leaves and flowers).  To know that leaves catch sunlight to help the plant to make its own food.  To know that flowers attract insects and birds. | Deciduous, Evergreen, Tree, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem, Oak, Holly, Willow, Birch, Chestnut, Conker, Daisy, Buttercup, Rose, Daffodil, fruit |
| **Identifying animals**  Cycle A&B: Autumn 2 | To notice similarities and differences between animals and be able to sort/classify.  To use venn diagrams to sort animals.  To gather information using tally charts.  To use gathered information to answer questions. | To know that amphibians live in the water as babies and on land as they grow older.  To know amphibians lay eggs.  To know that all birds have a beak, two legs, feathers, wings and they lay eggs.  To know that fish live and breathe under water and lay eggs.  To know that mammals are animals that breathe air, grow hair or fur and feed on their mother’s milk as a baby and are born alive.  To know that all reptiles breathe air, have scales on their skin and lay eggs.  To know what carnivores, herbivores and omnivores are and identify associated animals.  To know the names of animals which are kept as pets and how to look after them. | Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak |
| **My body**  Cycle A&B: Spring 1 | To ask questions about the human body and how it works.  To understand that questions can be answered in lots of different ways.  To carry out tests and use their observations to answer questions. | To know that people explore the world using five sense; sight, hearing, touch, taste, smell.  To know and label parts of the human body.  To know that all young animals change as they go through the different stages of their life cycle and grow into adults.  To know and identify the key stages of the human life cycle: baby, toddler, child, teenager, adult.  To know that all animals have three basic needs for survival: water, air, food.  To know that we must eat the right types of food and do exercise to be healthy. | Sight, hearing, touch, taste, feel, smell, scent, see, sound, head, face, eyes, nose, mouth, lips, teeth, fingers, toes, skin, ears, babies, children, adults, teenage, toddler, survival, water, air, food, healthy, exercise, arms, legs, feet, hands, wrist, knee, elbow, shoulder, ankle, chest, stomach, back, bottom, |
| **Seasonal change**  Cycle A&B: Spring 2 | To observe the weather and recall how it changes through the seasons.  To carry out simple tests to help them understand the difference between the seasons using simple equipment.  To share observations and ideas with their peers and adults.  To use tally charts and pictograms to collect data to answer questions. | To know the four seasons (we experience in the UK); Winter (December, January, February), Spring (March, April, May), Summer (June, July, August) and Autumn (September, October, November).  To know that the weather includes the temperature outside, the wind direction and strength, as well as rain, cloud, snow and sun.  To that daylight is when it is light outside. To know that the amount of daylight changes with each season.  To know how humans and animals adapt to different seasons. | Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark, months of the year, temperature, wind, rain, snow, sun, cloud |
| **Everyday materials**  Cycle A&B: Summer 1 | Carry out simple tests to help them understand materials and their properties.  Sort different materials into groups using a Venn diagram. | To know that materials can be sorted into groups by thinking about what is the same and what is different about them.  To know that natural materials, such as wood, wool and stone, can be used to make objects (Even though they might be changed a little to make them useful, the material is still the same.)  To know that a material can be changed to create a new material. (These are called **man-made** materials.)  To know that some materials can change shape because they are flexible. | everyday Materials, Wood, Plastic, Glass, wool, stone, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth, natural, man-made, flexible, shape |
| **Super scientists**  Cycle A&B: Summer 2 | To ask simple questions and understand that there may be lots of ways we can find the answer.  To answer questions by carrying out simple research involving the computer and books.  To carry out investigations based on the work of famous scientists.  To make predictions about what will happen in an experiment.  To carry out a comparison test. | To know that an inventor makes or discovers a new way of doing or making something.  To know that scientists study the world around us, the people and animals in it as well as studying space. (They do this through observing and doing experiments.)  To know that an astronaut is a person who is trained to travel into space.  To know that biology is the study of living things. | Inventor, discovery, observation, experiment, astronaut, biology, compare, scientist |

**Willow Class – Year 2 & Year 3**

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| Unit of study: | Working scientifically:  *Year 2* ***Year 3*** | WS vocabulary: | Sticky knowledge & key understanding:  *Year 2* ***Year 3*** | Key vocabulary: |
| **Exploring everyday materials**  Cycle A: Autumn 1 | Use simple equipment to help them find out more about materials.  **Ask simple questions and think about the different ways we can find these out.**  Carry out simple enquiries. | practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve | To know that objects are made from different materials.  **To know what suitability means.**  **To know that objects are made with the right properties for a specific purpose.**  To describe the basic properties of a variety of different everyday materials.  To know that John McAdam developed a highly successful process for building roads.  To know that John Dunlop originally used rubber for creating tyres.  T know that Charles Macintosh invented the first waterproof fabric. | Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil, suitability, properties |
| **Rocks, fossils & soils**  Cycle A: Autumn 2 | Record the results of their enquiries using tables, Venn diagrams and labelled drawings.  **Record and present what they have found out in different ways including posters and labelled diagrams.**  **Use classification keys to help them identify different rock and soil samples.**  **Talk about different scientific ideas relating to fossils and how some of these ideas have changed over time.** | To know the three types of naturally occurring rock: igneous, sedimentary and metamorphic  **To know, identify and be able to classify different types of rocks based on their physical properties.**  To know that soil is the uppermost layer of the Earth. **It is a mixture of different things:**   * **Minerals (minerals in the soil come from finely broken-down rock)** * **Air** * **Water** * **Organic matter (including living and dead animals and plants)** | Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, sedimentary, metamorphic, igneous, absorbent/porous, durable, permeable, impermeable, organic matter, minerals |
| **Living habitats**  Cycle A: Spring 1 | Use magnifying glasses and other equipment to look very closely at plants and animals within a micro habitat.  **Sort animals and plants into different groups based on their similarities and differences.**  Classify things that are living, dead or never been alive | **To know the life processes that all living things do.**  **To know that all living things move, breathe, sense, grow, make babies, get rid of waste and get their energy from food.**  To know that dead things were once living.  To know that tings made out of metal, plastic or rock were never living.  To know what a food chain shows (how each animal gets its food).  To know and identify a variety of habitats and microhabitats.  **To know that there are different habitats and animals are suited to the habitat they live in.** | Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert, move, grow, breathe, waste, energy, sense, babies, microhabitats |
| **Forces & magnets**  Cycle A: Spring 2 | Ask questions about forces and magnets.  **Think about the type of enquiry which would be best to answer them.**  Work in a group to set up and carry out a simple test.  Make very careful observations using different equipment to help them measure and record what they see.  **Use results from an enquiry to write a conclusion.**  **Think of different questions they could investigate.**  **Predict what might happen if variables were changed.**  Use science knowledge to answer simple questions. | To know and explain how things move.  To know and identify forces in action (including push, pull, twist, magnetism, friction).  To know that different surfaces create different amounts of friction.  **To know that the amount of friction created by an object depends on the roughness of the surface and the object, and the force between them.**  To know that a magnetic field is invisible. (Iron filings can be used to see how a magnetic field works by placing them on a piece of paper and placing a magnet underneath).  **To know that like poles repel and opposite poles attract.**  To know that the needle in a compass is magnetic.  To know that a compass always points north-south on earth. | Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull, surface, field, roughness |
| **Light & shadow**  Cycle A: Summer 1 | Think of questions using what they already know about light and shadow.  **Plan a type of enquiry to answer these questions.**  **Make very careful observations and measure these using different equipment such as data loggers.**  **Record what they have found out using scientific language.**  Label diagrams and bar charts accurately.  Use the science they understand to answer simple questions. | To know and be able to name a range of light sources.  **To know, understand explain transparent, translucent and opaque.**  To know that light is needed for us to see things.  **To know that light travels in straight lines.**  To know that light reflects off an object.  **To know that the reflected light hits our eyes, meaning we can see the object.**  **To know that some surfaces and objects reflect light well and other materials do not.**  To know that the pupils control the amount of light entering the eyes.  To know that when the light source is directly above the object, the shadow will be directly underneath.  To know that a shadow is caused when light is blocked by an opaque object. | Light, Shadows, Mirror, Reflective, Dark, Reflection, light source, cast, source, transparent, translucent, opaque, pupil, |
| **Growing plants**  Cycle B: Autumn 1 | **Carry out a fair test** with adult support.  **Use the information they have recorded during their fair test to help them answer questions.**  Use their observations and ideas about plants to try and answer questions.  To ask simple questions. | To know and talk about each stage of the life cycle of a plant;  Seed or bean  **Germination**  Roots  Flowers  Fruit  **Seed dispersal**  Dies  **When the conditions are right, the seed soaks up water and swells, and the tiny new plant bursts out of its shell. This is called germination.**  All plants need light from the sun to grow well. **Some plants need lots of sunlight. Some plants only need a little sunlight.** | Seeds, Bulbs, Water, Light, Suitable temperature, Grow, Healthy, Germinate, Decompose, dispersal |
| **How plants grow**  Cycle B: Autumn 2 | Carry out a fair test when working in a small group.  **Record the results of their fair test using measuring equipment.**  **Use the results of their enquiry to answer the enquiry question and to make predictions about what might happen if the variables were changed.**  Use their science knowledge to answer simple  questions. | To know and label the parts of a plant.  **To know that water moves through the plant using capillary action.**  **To know that the stem acts like a straw and water is sucked up through the different parts of the plant.**  To know that the flower’s job is to create seeds so that new plants can be grown.  **To know that seeds can be dispersed by: water, shaking, dropping, eating, bursting or carrying.**  To know the lifecycle of a plant:   * A seed or bean is planted in soil * **The seed or bean germinates** * Roots to start to grow * Shoots start to appear above the soil * Leaves grow * The plant flowers * The plant fruits * The plant disperses the seeds * The plant dies | Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower, capillary, germinates |
| **Growth & survival**  Cycle B: Spring 1 | Use simple data to describe the importance of exercise and eating healthy and how this can impact on our bodies. | To know that some animals give birth to live young and some animals lay eggs from which the young hatch.  To know that both these different types of young develop and grow into adults.  **To know that some offspring look like their adults when they are born and some don’t.**  **To know that all young animals change as they go through their life cycle and grow into adults.**  **To know that we must eat the right types of food in the right amounts and we must exercise to be healthy.** | Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene |
| **Health & movement**  Cycle B: Spring 2 | Ask questions about how we can keep ourselves healthy and suggest how we can find out the answers.  Talk about how health and movement are linked together.  **Think of ways they can use the science they understand about health to impact on their everyday life.** | To know that living things need food to grow and be strong and healthy.  To know that plants can make their own food, but animals cannot.  To know how to stay healthy; humans need to exercise, eat a healthy diet and be hygienic.  To know that animals, including humans, need food, water and air to stay alive.  **To know the three important jobs of the skeleton:**   * **Protect organs inside the body** * **Allow movement** * **Support the body and stop it from falling on the floor.**   **To know that skeletal muscles work in pairs to move the bones they are attached to by taking turns to contract (get shorter) and relax (get longer).** | Movement, Muscles, Bones, Skull, Nutrition, Skeletons, hygenic, protect, support, contract, relax |
| **Super scientists**  Cycle B: Summer 1 | **Ask simple questions and understand that there may be lots of ways we can find the answer.**  Answer questions by carrying out simple research involving the computer and books.  Carry out investigations based on the work of famous scientists.  Make predictions about what will happen in an experiment.  **Carry out a comparison test.** | To know that an inventor makes or discovers a new way of doing something. (They might make something new.)  To know that scientists study the world around us, the people and animals in it as well as studying space. (They do this by observing and by doing experiments.)  **To know that an astronaut is a person who is trained to travel into space.**  **To know that biology is the study of living things.** | Inventor, discover, observe, experiment, astronaut, biology |

**Oakwood Class - Year 4, Year 5 & Year 6**

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| Unit of study: | Working scientifically (WS):  Year 4 **Year 5 Year 6** | WS vocabulary: | Sticky knowledge & key understanding:  Y4 **Y5 Y6** | Key vocabulary: |
| **Properties & changes of materials** | Plan an enquiry to answer a given question  Report on their findings from an enquiry  **Write conclusions which explain what they have found out**  **Identifying control, independent and dependent variables**  **Identify how much trust they have in the results** | practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve, variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter | To know that different materials are used for particular jobs based on their properties:  Electrical conductivity, flexibility, hardness, insulators, magnetism, **solubility, thermal conductivity,** transparency.  To know what reversible and irreversible change is.  **To know that reversible changes, such as mixing and dissolving solids and liquids together, can be reversed by sieving, filtering and evaporating**  To know what dissolving means.  **To know that a solution is made when solid particles are mixed with liquid particles.**  **To know materials that will dissolve are known as soluble.**  **To know that materials that won’t dissolve are known as insoluble.**  **To know that a suspension is when the particles don’t dissolve.** | Hardness, Solubility, Transparent, Opaque, Translucent, Magnetic, Filter, Evaporation, Dissolving, Mixing, Thermal conductor, thermal insulator, electrical conductor, electrical insulator, soluble, insoluble, sieve, reversible, irreversible |
| **Seeing light** | Plan a fair test  Work with a partner  **Explain and/or present what they have found out to an audience (small group of peers)**  **Explain causal relationships** | To know that light travels as a wave.  **To know that light (unlike waves of water or sound waves) does not need a medium to travel through. This means light can travel through a vacuum – a completely airless space.**  **To know that shadows can be elongated or shortened depending on the angle of the light source.**  To know that a shadow is also larger when the object is closer to the light source. (This is because it blocks more of the light.)  **To know the law of reflection - the angle of incidence is equal to the angle of reflection. Whenever light is reflected from a surface, it obeys this law.** | Waves, vacuum, source, elongated, reflection, angle of incidence, shadow, |
| **States of matter** | Set up simple, practical enquiries when working in a small group.  **Find out information using different types of enquiry and use their observations to answer simple questions**.  **Use the results of an enquiry to conclude what they have observed and suggest improvements to how the enquiry was carried out.**  Use what they know about states of matter to answer simple questions. | To know that there are three states of matter: solid, liquid and gas.  To know that when water and other liquids reach a certain temperature, they change state into a solid or a gas.  **To know the temperatures that these changes happen at are called the boiling, melting or freezing point.**  To know that if a solid is heated to its melting point, it melts and changes to a liquid.  **To know that when freezing occurs, the particles in the liquid begin to slow down as they get colder and colder.**  To know that evaporation occurs when water turns into water vapour.  To know that condensation is when water vapour is cooled down and turns into water.  To know that condensation and evaporation occur within the water cycle:  **- Water from lakes, puddles, rivers and seas is evaporated by the sun’s heat, turning it into water vapour.**  **- This water vapour rises, then cools down to form water droplets in clouds (condensation).**  **- When the droplets get too heavy, they fall back to the earth as rain, sleet, hail or snow (precipitation).** | Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating, Precipitation, water vapour, droplets, boiling point, freezing point |
| **Evolution & inheritance** | Record their findings from an enquiry  **Use labelled, scientific diagrams.**  Present their findings from an enquiry in different ways  **Understand how scientists have changed theories about evolution and inheritance using scientific evidence to support their arguments** | To know that animals and plants produce offspring that are similar but not identical to them.  **To know that offspring often look like their parents because features are often passed on.**  **(In the same way you can see variation between offspring and their parents, you can see variation within any species including plants.)**  To know that characteristics are influenced by the environment that the living things are living in.  **To know that living things can adapt - these adaptations can develop as a result of many things, such as food and climate.**  **To know that evolution is the gradual process by which different species have developed from earlier forms over millions of years.**  **To know that evolution is a continuous process – even today!** | fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics, parents, offspring, variation, environment, |
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| **Changes & reproduction** | Record data taken from a range of sources (**scatter graphs**, bar charts and information tables)  **Present findings from an enquiry using a scientific report format** | To know that humans develop inside their mothers and are dependent on their parents for many years until they are old enough to look after themselves.  To know that amphibians such as frogs are laid in eggs then, once hatched, go through many changed until they become an adult.  To know that some animals, such as butterflies, go through metamorphosis to become an adult.  To know that birds are hatched from eggs and are looked after by their parents until they can live independently.  **To know that mammals use sexual reproduction to produce their offspring:**  **To know that the male sex cell, called sperm, fertilises the female sex cells.**  **To know that the fertilised cell divides into different cells and will from a baby with a beating heart.**  **To know that a baby will grow inside the female until the end of the gestation period when the baby is born.**  **To know that most plants contain both the male sex cell (pollen) and female sex cell (ovules), but more plants can’t fertilise themselves.**  To know that wind and insects help to transfer pollen to a different part of the plant.  **To know that pollen from the stamen of one plant is transferred to the stigma of another. To know that the pollen travels down a tube through the style and fuses with an ovule.** | Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty; Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration, sperm, pollen, style, stigma, ovule, fuses, |

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| Unit of study: | Working scientifically:  Year 4 **Year 5 Year 6** | Working scientifically vocabulary: | Sticky knowledge & key understanding:  Y4 **Y5 Y6** | Subject specific vocabulary (linked to unit of study): |
| Healthy bodies | Plan a fair test to answer a given question when working with a partner**, identifying the variables that will affect the results.**  Take measurements using different scientific equipment and **decide when they will need to repeat readings.**  Present their findings in the form of a poster.  sort and classify food groups  **create diagrams and explanations**  **design investigations and draw conclusions from results.** | practical work, fair testing, relationships, accurate, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics, conclusion, explanation, reason, evaluate, improve, variables, independent variable, dependent variable, control variable, evidence, justify, argument (science), causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter | To know that drugs, alcohol and smoking have negative effects on the body.  To know that a healthy diet involves eating the right types of nutrients and in the right amounts.  To know that mammals have hearts with four chambers.  **To know that blood that has come from the body is deoxygenated, and the blood that has come from the lungs is oxygenated.**  **To know that capillaries are the smallest blood vessels in the body, and it is here that the exchange of water, nutrients, oxygen and carbon dioxide takes place.**  To know that blood transports: gasses (**mostly oxygen and carbon dioxide**); nutrients (**including water**); waste products.  **To know that the heart pumps blood to the lungs to get oxygen.**  **To know that arteries carry oxygenated blood away from the heart.**  **To know that veins carry deoxygenated blood toward the heart.** | Drus, alcohol, drugs, diet, nutrients, exercise, oxygen, oxygenated, deoxygenated, heart, chambers, lungs, capillaries, veins, arteries, carbon dioxide, gasses, |
| Circuits & conductors | Ask simple questions about electricity based on their everyday observations.  Set up simple circuits when working with a partner.  Record what they observe and share this in a variety of ways including labelled diagrams using electronic symbols and simple tables.  **Use the results of their enquiries to think of other questions they would like to explore.** | Examples of Electrical Conductors include; copper and steel.  Examples of Electrical Insulators include: wood, plastic, paper, rubber, glass and fabric.  Many everyday appliance rely on electricity for them to work. Some appliances use mains electricity (are plugged into a socket) and others have a battery to make them work. | Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, brightness, copper, steel, mains, |
| Changing circuits | **Recognise and control variables when planning and carrying out an enquiry, creating a fair test.**  Report and present the findings from out enquiry **and decide how much we can trust the results.**  Use knowledge gained from experiments to make predictions  **draw circuit diagrams with conventional symbols** | **To know the difference between series and parallel circuits.**  **To be able to create a series and parallel circuit.**  To know the key vocabulary in relation to electricity including definitions of circuit, conductor, **current,** insulator, **volt, component, cell**, battery, motor, bulb  To know and use the conventional symbols for circuit components: wires, cell/battery, bulb, motor, buzzer, switch (open and closed)  To know that too much voltage will blow a component. | Circuits, parallel, series, resistance, volt, current, cell, component, symbols |
| Classifying organisms | **Record data using classification keys and scientific diagrams.**  Decide how best to present their findings from an enquiry.  observe the effects of microorganisms and draw conclusions from these | **To know that lving things can be classified by eight levels: Domain, Kingdom, Phylum, Class, Order, Family, Genus and Species.**  To know that scientists observe each group carefully to help them understand the characteristics of living things more clearly.  **To know that microorganisms are viruses, bacteria, moulds and yeast.**  **To know that some animals (dust mites) and plants (phytoplankton are also microorganisms).**  To know that, in 1735, Swedish Scientist Carl Linnaeus first published a system for classifying all living things. An adapted version of this system is still used today: The Linnaeus System. | Domain, Kingdom, Phylum, Class, Order, Family, Genus and Species, microorganisms, bacteria, mould, yeast, Linnaean, vertebrate, invertebrate |
| Earth & space | **Recognise how the theories and understanding of our solar system have changed over time as new technologies have been developed.**  Complete research from secondary sources  Track how shadows change during a day and relate this to the movement of the earth around the sun | **To know and be able to describe the movement of the Earth, and other planets, relative to the Sun in the solar system.**  To know that Mercury, Venus, Earth and Mars are rocky planets.  (They are mostly made up of metal and rock.)  To know that Jupiter, Saturn, Uranus and Neptune are mostly made up of gases (helium and hydrogen)  **To know that the Earth rotates (spins) on its axis.  It does a full rotation once every 24 hours.**  **To know that, at the same time Earth is rotating, it is also orbiting (revolving) the Sun.  It takes a little more than 365 days to orbit the Sun.**  To know that daytime occurs when the side of the Earth is facing towards the Sun and that night occurs when the side of the Earth is facing away from the Sun.  To know that the sun appears to move across the sky during the day but the Sun does not move at all.  **To know that the sun appears to move because of the movements of the Earth.** | Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, full, new, year, month, planets, |
| Forces in action | **To plan different types of enquiries to answer questions based on a hypothesis.**  To take accurate measurements using a Newton Meter and other scientific equipment.  To report and present the findings. | To know that forces can make an object…   * Start to move * Stop moving * Change direction * Move faster (accelerate) * Move more slowly (decelerate) * Change its shape   **To know that water resistance and air resistance are forms of friction.**  **To know that friction is sometimes helpful and sometimes unhelpful.  (For example, air resistance is helpful as is stops the skydiver hitting the ground at high speed.  Friction on a bike chair can make the bike harder to pedal so it is unhelpful.)**  **To know that mass is how much matter is inside an object and is measured in kilograms (KG).**  **To know that weight is how strongly gravity is pulling object down and is measured in newtons (N).** | Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys, lever, force, pivot (fulcrum), mass |
| Living environments | Make observations about the animals that live in the areas that surround our school and record these accurately.  **Answer questions by gathering information and data in different ways and present this information accurately.**  **Identify how science has changed what we now understand about living things and their habitats.** |  | To know that animals can be grouped in lots of different ways based upon their characteristics.  To know that vertebrates have a backbone and invertebrates do not.  To know that vertebrates can be separated into five broad groups: mammals, fish, birds, reptiles, amphibians.  To know and identify a range of invertebrates including slugs, worms, snails, insects and spiders.  To know that plants can be sorted into many different groups including flowering and non-flowering plants.  **To know that plants and animals rely on the environment to give them everything they need. (Therefore, when habitats change, it can be very dangerous to the plants and animals that live there.)**  **To know that natural changes to the environment can be caused by, earthquakes, storms, floods, droughts, wildfires, the seasons.**  **To know that human made changes can be caused by; deforestation, pollution, urbanisation, the introduction of new animal or plant species to an environment, creating new nature reserves** | Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats |
| Eating & digestion | Ask questions about what they would like to find out about eating and digestion and think about how we could answer these.  **Identify how science has changed in how we understand eating and digestion.**  Report on what we have found out either by explaining their ideas verbally, creating a poster or by writing what they know. |  | To know how the human digestive system works.  To label a diagram of the human digestive system.  **To use key scientific vocabulary accurately when talking about the digestive system**  To know that teeth of humans and animals are designed to eat different foods depending on their diet.  To know that the arrows in a food chain show the flow of energy.  To label a diagram of a food chain accurately using key scientific vocabulary. | Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar, digestion, diet, food chain, |
| Changing sound | Ask simple questions about sound based on the observations they have made.  **Say which type of enquiry would be the best to answer their questions.**  Set up simple enquiries and carry them out in a small group.  Answer questions using drawings, labelled diagrams and using simple scientific language. |  | To know that sound is a type of energy.  To know that sound is created by vibrations (the louder the sound, the bigger the vibration).  To know that pitch is a measure of how high or low a sound is (e.g: a whistle being blown creates a high-pitched sound, a rumble of thunder is an example of a low-pitched sound)  To know that sound can travel through solids, liquids and gases.  To know that sound travels as a wave, vibrating the particles in the medium it is travelling in. Sound cannot travel through a vacuum.  **The size of the vibration is called the amplitude. Louder sounds have a larger amplitude, and quieter sounds have a smaller amplitude.** | Volume, Vibration, Wave, Pitch, Tone, Speaker, energy, high, low, vacuum, amplitude |