

CALTON SCIENCE CURRICULUM KNOWLEDGE PROGRESSION

| | YR | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
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| Animals including Humans | <ul style="list-style-type: none"> Identify and name pets: dog, cat, rabbit, guinea pig, fish, hamster. Identify and name farm animals: cow, pig, sheep, horse, hen To name and identify body parts: head, shoulders, knees, toes, eyes, ears, mouth and nose. To know the senses: see, hear and feel and the body parts that are responsible for each. To know about oral hygiene. | <ul style="list-style-type: none"> Know the terms mammals, amphibians, reptiles, birds, fish. Know that mammals have babies, amphibians live in water and on land, reptiles have scales, birds lay eggs, fish live in water. Understand the terms carnivores, herbivores, omnivores. Know that humans are also mammals. Name visible body parts (incl. heel, hips, shin, thigh, elbow, knuckles, wrist, calf). Name the 5 senses and know which body part is responsible for each. | <ul style="list-style-type: none"> Know that mammals are hot-blooded and have live young (recognise these features include humans) Know that amphibians live on water or land and lay eggs. Know that reptiles are cold-blooded. Know that birds tend to have feathers and lay eggs (some can fly some are ground-dwelling) Know that fish live in water and have gills for breathing. Know the range of animal diets. Know the stages of human development (baby, toddler, child, teenager, adult) and describe some feature of each stage. Describe the basic needs of humans for survival (air, water, food). Know that food can be categorised into different groups. Know the main food groups (protein, sugars, fat, dairy, fruit and vegetables). Know what makes a healthy plate. Know the importance of hand washing and brushing teeth. | <ul style="list-style-type: none"> Know the main food groups (carbohydrate, protein, fat, vitamins/minerals, fibre). Know that humans need food as a source of fuel (as oppose to plant that photosynthesise). Understand the importance of a balanced diet (the right amount of nutrition) Name main bones that make up the human skeleton (tibia, fibia, phalanges, metatarsal, metacarpals, patella, skull, clavicle, spine, radius, ulna). Know that the skeleton has multiple functions including, support, movement and protection. Know which organs the ribcage protects (heart, lungs). Know that humans have muscles for support, protection and movement. Know that muscles protect the bones and organs by absorbing shock and reducing friction in the joints. Name some muscle groups (bicep/tricep, pectorals, abdominals, hamstring/quads) Name and identify animals with exoskeletons and endoskeletons. | <ul style="list-style-type: none"> Name the organs that make up the digestive system (incl. mouth, oesophagus, stomach, small intestine, large intestine, colon, rectum). Understand the basic function of the gallbladder, pancreas, liver. Know the journey of food from mouth to rectum. Know the importance of saliva (enzymes) in digestion. Know that digestion is how the body absorbs nutrients. Name the different types of human teeth and know their function (incisors, canines, pre-molars, molars). Know that adult humans have 32 teeth. Know that animal teeth vary depending on diet (e.g. canines in carnivores). Know how to produce more complex food chains (4/5 links, including apex predators). Define the terms consumer, producer, prey, predator). | <ul style="list-style-type: none"> Know the stages of foetal development in humans. Know the main changes that happen during puberty, including the difference between boys and girls. Know the main changes that happen during old age (physical and mental changes to the body). | <ul style="list-style-type: none"> Name the four chambers of the heart. Know that the circulatory system is a closed system and the heart is a pump. Understand the role of the lungs in oxygenation of blood (oxygenated/deoxygenated). Know the role of arteries, veins and capillaries. Know the consequences of poor diet and lifestyle on the circulatory system. Know that the heart beats faster to deliver oxygenated blood to the organs and muscles. Know that nutrients and water are transported around the body by the blood and absorbed in both the small and large intestine. Know about open circulatory systems in animals with an exoskeleton. |
| Living Things and their Habitats | <ul style="list-style-type: none"> To know where our pets and farm animals live. | | <ul style="list-style-type: none"> Know the signs of life (movement, respiration, sensitivity, growth, reproduction, excretion, nutrition). Know that some things are alive, some have been alive and have died and some have never lived. Understand the features of different world habitats for living things (desert, woodland, grassland, tundra, rainforest, ocean). Know a variety of plants and animals that live in a range of world habitats and know the adaptations of some plants and animals to these environments. | | <ul style="list-style-type: none"> Know a variety of living things (plants and animals) in Gloucester and the school grounds. Know that animals from different habitats can be grouped by size, land/air/sea, number of legs, features, fur/feathers/scales, vertebrates/invertebrates. Know that animals can be grouped into mammals, amphibians, reptiles, birds, fish, insects, arthropods, arachnids. Know how animals and plants are affected by natural environmental changes (earthquakes, storms, floods, hurricanes, wildfires, droughts) | <ul style="list-style-type: none"> Know birth, growth, reproduction and death represent the stages of the life cycles of all animals. Know the similarities and differences between the life cycles of a mammals, amphibian, insect and bird. Know the difference between sexual and asexual reproduction. Know different ways that plants can be pollinated (insect or wind). Know how new plants can grow other than from seeds (cuttings, grafts, runners e.g. strawberries). | <ul style="list-style-type: none"> Know about the order of Linnean taxonomy family. Know how to group animals using observable characteristics using dichotomous keys. Understand the difference between animals, plants, fungi, and bacteria. Know that bacteria are single-celled organisms and animals are multi-celled organisms. Know different types of microorganism (virus, bacteria, fungus). Know the useful and harmful effects of different types of microorganism. |

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| | | | <ul style="list-style-type: none"> • Know a variety of plants and animals that live in microhabitats (minibeasts). • Know how animals obtain their food from plants and other animals using a simple food chain. | | or human causes (deforestation, pollution, urbanisation, introducing invasive species). | | |
| Plants | <ul style="list-style-type: none"> • Describe plants using the following vocabulary: plant, flower, shrub. • Name some common plants: daisy, buttercup, clover. • To know about how plants grow and change (cress and planting outside). | <ul style="list-style-type: none"> • Name different parts of a plant: roots, stem, leaf, stamen, petals. • Name and identify wild and garden plants (Recap - daisy, buttercup, clover. Teach - nettle, dandelion, ivy, bramble, bluebell, rose, poppy, sunflower). • Name and identify trees (beech, ash, holly, oak, horse chestnut). | <ul style="list-style-type: none"> • Know that seeds and bulbs need water, sunlight, nutrients (soil) and air to germinated and grow into mature plants. • Understand the functions of roots, stem, trunk, leaves and flowers. | <ul style="list-style-type: none"> • Describe the functions of roots, stem, trunk, leaves and flowers. • Know the requirements for survival and growth of plants (air, nutrients, light, space to grow). • Understand the different requirements for survival of small common garden plants vs. trees (leaf size, growth rate, stem thickness – support/water transportation), room to grow). • Understand transpiration as the movement of water through the plant from the roots. • Know the life cycle of a flowering plant (germination, growing and flowering, pollination, fertilisation and seed formation, seed dispersal). • Know that petals are used to attract pollinators. • Know different methods of seed dispersal (water, gravity, wind, animal, ballistic). • Know that plants obtain their nutrition through the process of photosynthesis. | | | |
| Evolution and Inheritance | | | | | | | <ul style="list-style-type: none"> • Know that inheritance refers to the characteristic traits that are genetically passed to their offspring from parents (eye colour, hair colour, height). • Know that natural selection refers to the strongest traits survive over generations (Darwin). • Know that Charles Darwin wrote 'The Origin of Species'. • Know that animals change over time and adapt to the surrounding in which they live. • Know that living things produce offspring of the same kind but are not identical to their parents. |

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| | | | | | | | <ul style="list-style-type: none"> • Know that plants and animals are adapted to their environment in different ways and that adaptation may lead to evolution. • Know that fossils provide information and evidence of the changes to living things. |
| Materials | <ul style="list-style-type: none"> • Talk about natural materials (leaves, sticks, pebbles, bark) • Cooling and heating when cooking –talk about changes • Combining ingredients when cooking – talk about changes • Sinking and floating – say what can float and what can sink | <ul style="list-style-type: none"> • Recognise different materials (wood, plastic, metal, fabric, cardboard, paper, sponge, glass). • Talk about some of the properties of these materials. • Distinguish between what an object is and what it is made from. • Understand how the following properties link to the range of materials taught in Y1: hard/soft, rough/smooth, shiny/dull, heavy/light, colour | <ul style="list-style-type: none"> • Know the properties of wood, plastic, metal, fabric, cardboard, paper, sponge, glass, brick, stone and rubber. • Know the uses of wood, plastic, metal, fabric, cardboard, paper, sponge, glass, brick, stone and rubber • Understand how the following properties link to the range of materials taught in Y2: opaque/translucent/transparent, waterproof/absorbent. • Know which materials can be stretched, twisted, bent or squashed. | <ul style="list-style-type: none"> • Know and group different types of rocks based on their appearance and simple physical properties (igneous, sedimentary, metamorphic). • Understand the difference between man-made and anthropic rocks. • Know how fossils are formed (things that have lived are trapped in rock). • Know that soil is made from rock and organic matter. • Know the different types of soil (clay, peat, chalk, loam, silt, sand) • Understand what happens to soil over time (additions, losses, translocations, transformations). | <ul style="list-style-type: none"> • Know the properties and behaviours of solids, liquids and gases. • Know that all materials will change state in response to heating or cooling. • Know that melting point of water is 0°C and boiling point is 100°C. • Understand the part that evaporation and condensation play in the water cycle. • Understand that the rate of evaporation is dependent on temperature. | <ul style="list-style-type: none"> • Understand how the following properties link materials: hardness, solubility, transparency, conductivity (electrical & thermal), response to magnets. • Know which materials are conductors and insulators. • Know that some materials will dissolve in liquid to form a solution (salt/sugar). • Know how to recover a substance from a solution. • Know how to separate mixture by using knowledge of solids, liquids and gases (filtering, sieving, evaporating). • Know which materials to use for a particular purpose (see Y1/2). • Know that changes of state are sometimes reversible (dissolving/mixing). • Know that some changes result in the formation of new materials and are not usually reversible (burning, acid-base reactions). | |
| Seasonal changes | <ul style="list-style-type: none"> • Name the seasons • Know about weather conditions in each season. | <ul style="list-style-type: none"> • Name the seasons • Know the months of the year. • Recording temperatures • Know the difference between day and night. | | | | | |
| Light | <p>Explore how we can shine light through some materials</p> <p>Investigate shadows</p> | | | <ul style="list-style-type: none"> • Know different sources of light. • Know that the moon, windows and mirrors are not light sources. • Know that light is a form of energy. • Know that darkness is absence | | | <ul style="list-style-type: none"> • Know that the colours of the visible spectrum have different wavelengths. • Know that light enables us to see colours as some objects absorb or reflect particular wavelengths of light. |

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| | | | | <p>of light.</p> <ul style="list-style-type: none"> • Know that light travels in straight lines. • Understand that we need light to see. • Understand how light reflects on surfaces and know that this reflected light travels to the eye so we can see the object. • Know the main part of the human eye (cornea, retina, iris, pupil). • Understand how the sun can damage parts of the eye and how the eyes can be protected. • Know that some light is invisible to the human eye but we can see and feel its effects. • Know that shadows are formed when light is blocked from a light source by a solid object. • Know how shadows change size. | | | <ul style="list-style-type: none"> • Know how a prism allows us to see the visible spectrum. • Know that objects can be seen because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • Know that the angles of incidence and reflection are equal. • Know that refraction changes the direction in which light travels. • Know that shadows are the same shape as the object that cast them because light travels in straight lines. |
| Sound | | | | | <ul style="list-style-type: none"> • Know how sounds are made, associating some of them with something vibrating. • Know that sounds can be high or low (pitch), loud or quiet (loudness) and how this relates to vibrations. • Know that the volume of sound changes over distance and understand that it gets fainter as the distance from the sound's source increases. • Know that vibrations from sounds travel through a medium to the ear and understand why sound cannot travel in a vacuum. • Know some materials that will absorb sounds. | | |
| Forces and Magnets | | | | <ul style="list-style-type: none"> • Know that forces are pushes or pulls. • Know that some forces require contact between two surfaces but magnetic forces can act at a | | <ul style="list-style-type: none"> • Know that unsupported objects fall towards the Earth because of the forces of gravity acting between the Earth and the object. • Know how air resistance, water | |

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| | | | | <p>distance.</p> <ul style="list-style-type: none"> • Know that friction is a force that slows down objects. • Know that a magnet has two poles which repel and attract and have different strengths. • Know some materials which will be attracted to a magnet. | | <p>resistance and friction act on an object in motion.</p> <ul style="list-style-type: none"> • Know that friction can be used to affect the rate of travel of an object (e.g., car brake pads). • Know that levers, pulleys and gears allow a smaller force to have a greater effect. | |
| Space | | | | | | <ul style="list-style-type: none"> • Know how the Earth and planets move relative to the Sun in our solar system (geocentric/heliocentric) • Know the movement of the Moon relative to the Earth. • Know the names of the 8 planets in our solar system and their order in distance from the Sun. • Know that day and night is due to the rotation of the Earth. • Know that different places on the Earth experience day and night at different times. • Know that the Earth, Sun and Moon are approximately spherical bodies. • | |
| Electricity | | | | | <ul style="list-style-type: none"> • Know a range of appliances that are powered by electricity. • Know a range of components (cell, battery, wire, lamp, buzzer, switch) that can make a simple series circuit. • Know the difference between a complete or incomplete simple series circuit. • Know that switch opens or closes a circuit. • Know some materials which will act as a conductor or insulator. | | <ul style="list-style-type: none"> • Know that the brightness of a lamp or the volume of a buzzer is affected by the number of cells used or voltage in a circuit. • Know how to represent a series circuit using recognised circuit symbols. • Know that a typical cell (battery) has a voltage of 1.5V and that these can be connected together to create circuits with a higher voltage. |