

# Brockwell Junior School Science Progression Map

'If I have seen further than others, it is by standing on the shoulders of giants' – Isaac Newton

## NATIONAL CURRICULUM

**Aims** – The national curriculum for languages aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

**Key stage 2** – A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

At Brockwell, we are committed to delivering excellence in science education. We believe that children should develop a genuine love and respect for a subject that continually seeks truth—adapting and evolving as new evidence emerges, and refining or replacing previous understanding. As Isaac Newton reminded us, we advance in science by “*standing on the shoulders of giants,*” and we want our pupils to understand how their learning builds on the ideas and discoveries of others.

We aim to cultivate a strong sense of curiosity and excitement in our pupils as they embark on their scientific journey. Our curriculum encourages them to develop rigorous scientific skills: making predictions rooted in prior knowledge, working systematically, and seeking clear explanations for their findings.

These skills not only prepare pupils for the next stage of their education but also equip them for adulthood, empowering them to question, investigate, and evaluate with clarity and confidence.

In keeping with our motto, “**Safe, Smile, Succeed,**” we prioritise a supportive learning environment where children feel secure to explore, take risks, and enjoy the process of discovery. Through this joyful and purposeful approach to science, our pupils grow as thinkers, problem-solvers, and successful learners both inside and beyond the classroom.

# National Curriculum Program of Study

Year Group	Year 3			Year 4			Year 5			Year 6		
Term	Sep - Dec	Jan - Apr	May - July	Sep - Dec	Jan - Apr	May - July	Sep - Dec	Jan - Apr	May - July	Sep - Dec	Jan - Apr	May - July
Module 1	<p><b>Rocks, soils and fossils</b> compare and group together different kinds of rocks on the basis of their appearance and simple physical properties</p> <p>recognise that soils are made from rocks and organic material</p> <p>describe in simple terms how fossils are formed when things that have lived are trapped within rock</p>	<p><b>Forces, friction and magnets</b> compare how things move on different surfaces</p> <p>notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>observe how magnets attract or repel each other and attract some materials and not others</p> <p>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</p> <p>describe magnets as having two poles</p> <p>predict whether two magnets will attract or repel each other, depending on which poles are facing</p>	<p><b>Flowering plants and plant growth</b> identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers</p> <p>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</p> <p>investigate the way in which water is transported within plants</p>	<p><b>Changes of state</b> compare and group materials together, according to whether they are solids, liquids or gases</p> <p>observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)</p> <p>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p>	<p><b>Human impact on the environment</b> recognise that environments can change and that this can sometimes pose dangers to living things</p>	<p><b>Sound</b> identify how sounds are made, associating some of them with something vibrating</p> <p>recognise that vibrations from sounds travel through a medium to the ear</p> <p>find patterns between the pitch of a sound and features of the object that produced it</p> <p>find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>recognise that sounds get fainter as the distance from the sound source increases</p>	<p><b>Forces and mechanisms</b> explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect</p>	<p><b>Earth and space</b> describe the movement of the Earth, and other planets, relative to the Sun in the solar system</p> <p>describe the movement of the Moon relative to the Earth</p> <p>describe the Sun, Earth and Moon as approximately spherical bodies</p> <p>use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p>	<p><b>Separating mixtures and changing materials</b> know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda</p>	<p><b>Classification of living thing</b> describe how living things are classified into broad groups according to common observable characteristics and differences, including micro-organisms, plants and animals</p> <p>give reasons for classifying plants and animals based on specific characteristics</p>	<p><b>What light does</b> recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p>	<p><b>Electricity: changing circuits</b> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>use recognised symbols when representing a simple circuit in a diagram</p>

Module 2

<p><u>Light and shadows</u> recognise that they need light in order to see things and that dark is the absence of light</p> <p>notice that light is reflected from surfaces</p> <p>recognise that light from the sun can be dangerous and that there are ways to protect their eyes</p> <p>recognise that shadows are formed when the light from a light source is blocked by a solid object</p> <p>find patterns in the way that the size of shadows change</p>	<p><u>Movement and nutrition for the human body</u> 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</p> <p>identify that humans and some other animals have skeletons and muscles for support, protection and movement</p>	<p><u>Flowering plants life cycle</u> explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal</p>	<p><u>Electricity: circuits</u> identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>recognise some common conductors and insulators, and associate metals with being good conductors</p>	<p><u>Digestion and food chains</u> describe the simple functions of the basic parts of the digestive system in human</p> <p>identify the different types of teeth in humans and their simple functions</p> <p>construct and interpret a variety of food chains, identifying producers, predators and prey</p>	<p><u>Classification of plants and animals</u> recognise that living things can be grouped in a variety of ways</p> <p>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p>	<p><u>Properties and uses of materials</u> 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</p> <p>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p>	<p><u>Plant and animal life cycles</u> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>describe the life process of reproduction in some plants and animals</p>	<p><u>Human growth</u> describe the changes as humans develop to old age</p>	<p><u>Evolution and inheritance</u> recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p>	<p><u>Human circulation</u> identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>describe the ways in which nutrients and water are transported within animals, including humans</p>	<p><u>Body health</u> recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p>
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# Key Vocabulary

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Module 1</p>	<p>evidence, identifying and classifying, microscope, crystal/crystalline, erosion, fossil, hardness, organic, palaeontologist, remains, rock, sediment, weathering</p>	<p>stopwatch, value, attract, contact force, force, like poles, magnet, magnetic, non-contact force, north/south pole, repel</p>	<p>consumer, flower, food chain, habitat, producer, roots, seed, stem, sunlight, investigate, research, adaptation, adapted, anchor (verb), capture, nutrient</p>	<p>air, boil, boiling point, bubble, carbon dioxide, change of state, cloud, compress, condense/condensation, evaporate/evaporation, expand, freeze, freezing point, gas, granule/ granular, heat-sensitive, helium, ice, liquid, melt, melting point, oxygen, powder, rain, snow, solid, solidify, steam, viscous, water vapour</p>	<p>biodegradable, compost, decompose, environment, filter, fungi, micro-organism, organism, pollution, decay, decomposer, food chain, habitat, organic, recycle, soil,</p>	<p>communicate, compare, pluck, taut, travel, evaluate, fair test, refute, support, variable, air, decibel: gas, liquid, pitch, solid, sound, sound source, vibrate/vibration, volume</p>	<p>accuracy, dependent variable, independent variable, line graph, air resistance, force meter, friction, fulcrum, gears, gravity, impact, lever, load, magnetism, mechanism, Newton (N), oppose, pivot, pulley, water resistance</p>	<p>dawn, diameter, dusk, horizon, midday, spherical, sunrise, sunset, axis, moon, orbit, planet, rotate, solar system, star, year</p>	<p>contamination, dissolve, filter, insoluble, non-reversible, react/reaction, reversible, saturated, separate, sieve, soluble, solution, accurate, comparative test, control variable, conclude/conclusion, data, evidence, explain/explanation, evaluate, fair test, observe, pattern, predict/prediction, secondary source, variable, condense, carbon dioxide, crystal/crystalline, evaporate/evaporation, gas, liquid, solid</p>	<p>arthropod, cone, conifer, echinodermata, fern, flatworm, monera, moss, mould, needle, protista, spore, taxonomy</p>	<p>block, travel, light ray, reflection, dark/darkness, light, light source, opaque, reflect, reflective, shadow, transparent, translucent, conclude/conclusion, control variable, data, dependent variable, diagram, enquiry, evidence, explain/explanation, fair test, independent variable, measure/measurement, model, observe/observation, pattern, predict/prediction, support, variable</p>	<p>standard symbol, voltage, volts, comparative test, dependent variable, diagram, evidence, independent variable, predict/prediction, refute, support, battery, cell, circuit, connection points, electrical component, electrical conductor, electrical insulator, electricity, lux, switch</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Module 2</p>	<p>bright, dark/darkness, data logger, dim, light, light source, lux, opaque, reflect, reflective, sensor, shadow, Sun, sunlight, translucent, transparent, ultraviolet</p>	<p>data, evidence, investigate, sequence, calcium, carbohydrate, cartilage, energy, exoskeleton, fat, fibre, fluid, heart, invertebrate, joint, mineral, nutrient, organ, protein, ribs, skull, spinal cord, spine, sugar, tendon, vitamin, X-ray</p>	<p>burr, carpel, dispersal, nectar, nutrient, ovary, ovule, pollen, pollination, pollinator, ripe, scent, sepal, stamen, flower, fruit, insect, petal, seed</p>	<p>Battery, Bulb, Buzzer, Cell, Circuit, cCosed circuit, connection points, electrical appliance, electrical component, electrical conductor, electrical insulator, electricity, mains, motor, open circuit, switch</p>	<p>Model, anus, canine, chemicals, constipation, decompose, diarrhoea, digestion, extinct, food web, incisor, jaw, large intestine, mechanical, milk teeth, molar, oesophagus, predator, prey, rectum, saliva, small intestine, stomach, vomit</p>	<p>branching key, annelid, arachnid, cold-blooded, crustacean, flowering plant, mollusc, myriapod, non-flowering plant, organism: warm-blooded, classify, research, amphibian, bird, deciduous, evergreen, exoskeleton, fish: flower, insect, invertebrate, mammal, reptile, skeleton, vertebrate</p>	<p>comparative test, control variable, data, evaluate, observe/observation, predict/predicting, scale, variable, absorb/absorbent, compost, decompose, durable, elastic/elasticity, electrical conductor/insulator, flexible/flexibility, hard/hardness, liquid, magnetic/non-magnetic, opaque, property, solid, transparent/transparency, weathering</p>	<p>anther, asexual, breeding, embryo, filament, female, fertilisation, gestation, larva, male, mate, metamorphosis, ovary, ovule, propagation, pupa, reproduction, seed dispersal, stamen, stigma, style, thorax, pattern, amphibian, bird, carpel, exoskeleton, flower, insect, life cycle, mammal, organism, pollen, pollination, pollinator, vertebrate</p>	<p>abdomen, Adam's apple, breasts, childhood, genitals, gestation, infancy, menstruation/having a period, newborn, pregnancy, puberty, pubic hair, reproduction, sweat, teenage, umbilical cord, uterus, vagina, diagram, evidence, hygiene, large intestine, life cycle, mammal, muscle, organ, oesophagus, small intestine, stomach</p>	<p>anomaly, camouflage, evolution, extinction, inherited, migrate, natural selection, offspring, variation, classify, evidence, explain/explanation, model, adaptation, adapted, fossil, habitat, organism, predator, reproduction, species</p>	<p>aorta, arteries, atrium, blood, blood vessels, capillaries, cell, deoxygenated blood, hormone, oxygenated blood, plasma, platelets, pulmonary artery, pulse, red blood cells, valve, veins, ventricle, white blood cells, evaluate, model, secondary source, amphibian, bird, brain, breathe, carbon dioxide, chemicals, digestion, fish, gas, heart, large intestine, lungs, mammal, mechanical, nutrient, organ, oxygen, reptile, small intestine, vertebrate</p>	<p>arteries, heart rate, malnutrition, pulse, salt, veins, data, line graph, secondary source, carbohydrate, chemicals, fats, fibre, lungs, mineral, nutrient, oxygen, protein, vitamin,</p>

## STEM Opportunities / Enrichment

Ozobot (colour)	K'Nex Science Week	Digital World Wearable technology (Kapow)	Ozobot (coding) Crumble	K'Nex Science Week Electrical systems Torches (Kapow) adapted to make museum question boxes		TurtleStitch project Chesterfield Football Club  Crumble	K'Nex Science Week	Digital world Monitoring devices (Kapow)	3D Printing micro:bit	K'Nex Science Week	Electrical systems Steady hand game (Kapow) adapted to include micro:bit
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## Enrichment

Magnets - Magna trip	VEX GO				TurtleStitch Chris Barnes workshop K'Nex Solids, Liquids and Gases – Gases All Around workshop (BOC)	TurtleStitch project Chesterfield Football Club  Chris Barnes workshop K'Nex	Chris Barnes Workshop – paper bridges				TurtleStitch Leavers T-Shirts
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