THE BRAMBLE ACADEMY

Science at The Bramble Academy	
Intent statement:	At The Bramble Academy, we aim to spark a love and a passion for Science. We aim to present learning to children in small, sequential chunks to enable them to develop a deep understanding of new scientific information. By learning about the products of science, pupils are able to explain the material world and 'develop a sense of excitement and curiosity about natural phenomena'. By learning about the practices of science, pupils learn how scientific knowledge becomes established through scientific enquiry. Through an intertwined approach of teaching substantive and disciplinary knowledge, pupils appreciate the nature and status of scientific knowledge.
Substantive knowledge in science	This is the factual content produced by the areas of biology, physics and chemistry e.g. naming the simple physical properties of everyday materials or that plants need water, light and a suitable temperature to grow and stay healthy.
Disciplinary knowledge in science:	This is the scientific methods e.g. using the skills of predicting, investigating, gathering data and hypothesising an idea. It is the opportunity to developing understanding of a substantive knowledge e.g. investigating if a plant will grow healthily in the dark will develop understanding of what a plant needs to be healthy.
Vocabulary:	The teaching of vocabulary is crucial to academic success for our children. Tier 2 and 3 vocabulary is mapped out throughout our curriculum in order to ensure vocabulary is both progressive and ambitious.

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Sequence of Knowledge

EYFS- Nursery

Working Scientifically- Disciplinary Knowledge

A nursery scientist will:

- Begin to ask 'why' questions about their experiences

Sequence of Substantive knowledge

Physical development	Communication and Language	Understanding the World
• Make healthy choices about food, drink, activity and teeth brushing at home and at snack time.	• Know how to respond to 'why questions' such as why are the leaves changing colour?	• Comment on things that they see in the Natural World. • Explore natural materials • Explore materials with different properties such as different textures. • Can talk about what you need to wear in different seasons • Knows how to use a wide range of vocabulary that relates to exploration and things that they see. • Knows how some simple things work such as simple technology • Knows how to plant seeds and care for growing plants with support. • Knows the key features of the life cycle of a plant and animal (butterfly or frog). • Begin to understand the need to respect and care for the natural environment and all living things such as being kind to the nature in the woodland area.
Vocabulary: Healthy, unhealthy, water, sugar, teeth, toothbrush, toothpaste, dentist	**Vocabulary:** Why, question,	**Vocabulary:** Pond, tree, grass, log, stick, stone, hard, soft, smooth, spikey, remote control, TV, oven, hob, seed, flower, plant, water, soil, caterpillar, butterfly, cold, warm, hot, coat, hat, cap, sungalsses

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Sequence of Knowledge

EYFS- Reception

Working Scientifically- Disciplinary Knowledge

A reception scientist will:

- Answer how and why questions about their experiences
- Find ways to solve problems and test their ideas
- Use senses to explore the world around them

Sequence of Substantive knowledge

Physical development	Communication and Language	Understanding the World
• Know and talk about the different factors that support their overall health and wellbeing. • Make healthy choices more independently and know that some foods are bad if too much is eaten.	• Learn new vocabulary. • Ask questions to find out more • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail. • Use talk to work out problems and organise thinking and activities • Explain how things work and why they might happen. • Use new vocabulary in different contexts.	• Explore the natural world around them, making observations and drawing pictures of animals and plants • Knows how to describe what they see, hear and feel whilst outside. • Can recognise some differences in environments • Understand why looking after our oral health is important and know some things to help us do this. • Explore the effects of changing seasons • Discuss the effects of gravity • Know how exercise makes us hot and hearts beat fast. • Explain how things work and why they might happen. • Knows and understands the effect of changing seasons on the natural world around them. • Know some ways they can help look after the world around them • Can talk about lifecycles • Knows how to plant seeds and care for plants with increasing independence
Vocabulary: Healthy, unhealthy, water, sugar, fat, vitamins, teeth, cavity, toothbrush, toothpaste, dentist	**Vocabulary:** How.., why…, what…, reason, explain, describe	**Vocabulary:**

Cross curricular links and enhancements:

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Sequence of Knowledge

KS1- Year 1

Working Scientifically- Disciplinary Knowledge

A year 1 scientist will:

- Ask simple questions and recognising that they can be answered in different ways
- Observe closely, using simple equipment
- Compare and contrast
- Perform simple tests
- Identify and classify

Sequence of Substantive knowledge

Seasonal change	Everyday Materials	Plants	Animals including humans
• Observe changes across the four seasons • Observe and describe weather associated with the seasons • Know how day length varies with different seasons	• 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.	• 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 – draw diagrams • Observe the growth of flowers and vegetables that they have planted.	• 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 • Use the environment to explore animals in their habitats • 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.
Vocabulary: Season, Autumn, Winter, Spring, Summer, weather, sun, cloud, fog, rain, snow,	**Vocabulary:** hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent;	**Vocabulary:** leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem, deciduous, evergreen, wild plants, garden plants	**Vocabulary:** fish, amphibians, reptiles, birds, mammals, herbivore, carnivore, omnivore, head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth

sleet, wind, hot, warm cold, longer, shorter, bare, branches, grow, bud, blossom,	opaque/transparent, brick, paper, fabrics, elastic, foil, wood, metal, plastic.		
Prior learning: EYFS- daily weather EYFS- Observing changes in seasons- woodland area	**Prior learning:** EYFS- Touch lense (Fantastics) developing vocabulary	**Prior learning:**	**Prior learning:**
Cross Curricular links and enhancements: **Geography-** **Math:** • Measurement (days/seasons) • Recognising and using language to dates, weeks, months and years (seasons). • Time: to and half past the hour.	**Cross Curricular links and enhancements:** **Maths** • Number and place value. • Identify and represent numbers. • Language: equal to, more than, less than.	**Cross Curricular links and enhancements:** **Maths** • Lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] • Mass/weight [for example, heavy/light, heavier than, lighter than] • Capacity and volume [for example, full/empty, more than, less than, half, half full,	**Cross Curricular links and enhancements:** **Maths** • Grouping and sharing small quantities

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Sequence of Knowledge

KS1- Year 2

Working Scientifically- Disciplinary Knowledge

A year 2 scientist will:

- Ask simple questions and recognise that they can be answered in different ways
- Observe closely, using simple equipment
- Compare and contrast
- Perform simple tests
- Identify and classify
- Use observations and ideas to suggest answers to questions
- Gather and record data to help in answering questions.

Sequence of Substantive knowledge

Living things and their habitats	Animals including humans	Plants	Everyday materials
• 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, including 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.	• Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	• 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.	• Identify and compare the suitability of a variety of everyday materials, including 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
Vocabulary:	**Vocabulary:**	**Vocabulary:**	**Vocabulary:**

Habitat, dead, alive, microhabitat, plants, food, food chain, food source, environment, shelter, seashore, woodland, ocean, rainforest, conditions, hot, warm, cold, dry, damp, wet, bright, shade, dark	survival, water, food, air, exercise, hygiene, nutrition, reproduction, growth, egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep, baby, toddler, child, teenager, adult, off spring	Germination, growth, survival, reproduction, growth, plants, seeds, bulbs, requirements, water, light, food, common plants, wild plants, garden plants, leaf, root, leaves, bud, flowers, blossom, petals, root, stem	Suitable, unsuitable, wood, metal, plastic, glass, brick, rock, paper, cardboard, squash, twist, bend,
Prior learning: **EYFS- Pets and how to care for them** **EYFS-** Growing and caring for plants **Year 1-** Children taught to name a variety of plants- wild, garden and common	**Prior learning:** Animals **EYFS:** Life cycle of butterfly **Year 1:** fish, amphibians, reptiles, birds and mammals. Definition of herbivore, carnivore, omnivore. Structure of animals **Humans** **EYFS:** The five senses are sight, touch, taste, smell, hearing (supporting the use of the FANTASTICS) **Year 1:** Humans are mammals and have 5 senses, part of the body, alongside this, humans need a healthy diet to grow.	**Prior learning:** **EYFS:** Experience of planting and taking care or plants. Children learn that plants need water and sun to grow. **Year 1:** Children are taught about a variety of common and wild plants, including deciduous and evergreen trees. All plants grow from a seed and have roots, a stem, leaves, some have a flower.	**Prior learning:** **EYFS:** Exploring plastic and its effect on the environment. Vocab linked to the 'touch lens' to describe natural and man-made materials. **Year 1**: Common materials around us include wood, plastic, glass, metal, water and rock- and their properties.
Cross Curricular links and enhancements: **Maths:** • Interpret and construct simple pictograms, tally charts, block diagrams and simple tables (Comparing living and dead). • Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity • Ask and answer questions about totalling and comparing categorical data. **Art-**	**Cross Curricular links and enhancements:** **Maths:** • Tally charts, tables, block diagrams (linking to exercise- monitoring pulse rate). **Art-**	**Cross Curricular links and enhancements:** **Maths:** • Length/height in any direction (m/cm); temperature (°C); to the nearest appropriate unit, using rulers, scales and thermometers. • Compare and sequence intervals of time **Art-**	**Cross Curricular links and enhancements:** **Maths:** • Properties of 2D and 3D shapes (retrieval of shape, how shapes can be change and altered) **D&T-**

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Sequence of Knowledge

KS2- Year 3

Working Scientifically- Disciplinary Knowledge

A year 3 scientist will:

- Ask relevant questions and use different types of scientific enquiries to answer them
- Set up simple practical enquiries, comparative and fair tests
- Gather, record, classify and present data in a variety of ways to help in answering questions
- Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Use straightforward scientific evidence to answer questions or to support their findings.
- Make systematic and careful observations
- Gather, record, classify and present data in a variety of ways to help in answering questions
- Use results to draw simple conclusions, make predictions

Sequence of Substantive knowledge

Light	Rocks	Forces and magnets	Plants	Animals including humans
• 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.	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.	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	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	Identify 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

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		Predict whether two magnets will attract or repel each other, depending on which poles are facing		
Vocabulary: Light, dark, reflect, surface, natural, blocked, solid, artificial, torch, candle, lamp, sunlight dangerous	**Vocabulary:** Grains, crystals, fossils, sedimentary rock, soil, organic matter, appearance, properties, hard, soft, dull, shiny, rough, smooth, absorbent , non absorbent	**Vocabulary:** Forces, push, pull, open, surface, magnet, magnetic, attract repel, magnetic poles, north, south	**Vocabulary:** Structure, function, root, stem, trunk, nutrition, leaves, nutrition, flowers, reproduction, air, light , water, nutrients, pollination, seed dispersal, seed formation	**Vocabulary:** Nutrition, vitamins, minerals, skeleton, skull, ribs, muscles, functions, support, movement
Prior learning: EYFS and Year 1- Experience of torches and shadows during CP	**Prior leaning:** **EYFS:** Vocab from touch lens (Fantastics) **Year 1:** Common materials around us including wood, plastic, glass, metal, water and rock and their properties **Year 2**: Materials, their properties and potential uses	**Prior learning:** **EYFS and Year 1**- Exploration of magnets during continuous provision	**Prior learning:** **EYFS:** Experience of planting and taking care or plants. Children learn that plants need water and sun to grow. **Year 1:** Children are taught about a variety of common and wild plants, structure of plant **Year 2** Observe and describe how seeds and bulbs grow. Know plants need water, light and a suitable temperature to grow and stay healthy.	**Prior learning:** **Year 2-** Animal offspring, basic needs of animals, including humans, for survival (water, food and air), importance of humans to exercise, eating the right amounts of different types of food, and hygiene
Cross Curricular links and enhancements: **Math:** • Shadows - measure, compare, add and subtract: lengths (m/cm/mm • **Data from experiments -** interpret and present data using bar charts, pictograms and tables (recap statistics from Year 2: tally, tables, pictograms. • solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] u	**Cross Curricular links and enhancements:** **English-** texts chosen to support **History**- Sone Age **D&T**- Clay jewellery **Secondary laboratories used.**	**Cross Curricular links and enhancements:** **Maths:** • interpret and present data using bar charts, pictograms and tables (recap statistics from Year 2: tally, tables, pictograms.. • solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?']	**Cross Curricular links and enhancements:** **Maths** • measure, compare, add and subtract: lengths (m/cm/mm **Art-** Heather Galler- vibrant paintings linked to planst	**Cross Curricular links and enhancements:** Maths- Tally charts, tables, block diagrams (linking to exercise-monitoring pulse rate).

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Sequence of Knowledge

KS2- Year 4

Working Scientifically- Disciplinary Knowledge

A year 4 scientist will:

- Ask relevant questions and using different types of scientific enquiries to answer them
- Set up simple practical enquiries, comparative and fair tests
- Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identify differences, similarities or changes related to simple scientific ideas and processes

Sequence of Substantive knowledge

States of matter	Electricity	Sound	Living things and their habitats	Animals including humans
• Compare and group materials together, according to whether they are solids, liquids or gases • 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) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of	• Identify common appliances that run on electricity • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • 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 • Recognise that a switch opens and closes a	• Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch of a sound and features of the object that produced it • Find patterns between the volume of a sound	• Recognise that living things can be grouped in a variety of ways • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • Recognise that environments can change and that this can sometimes pose dangers to living things	• Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers,

evaporation with temperature.	circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors.	and the strength of the vibrations that produced it • Recognise that sounds get fainter as the distance from the sound source increases.		predators and prey
Vocabulary: Solid, solidify, ice, melt, freeze, liquid, evaporate, condense, gas, changing state, heated, cooled, degrees Celsius, thermometer, water cycle, temperature, melting, Water vapour	**Vocabulary:** Appliance, electricity, electrical circuit, cell, wire, bulb, buzzer, danger, insulator, conductor, switch	**Vocabulary:** Vibrate, air, medium, ear, hear, sound, volume, pitch, faint, loud,	**Vocabulary:** Environment, flowering, plants, animals, vertebrate, fish, amphibians, reptiles, birds, mammals, invertebrates, snails, slugs, worms, human impact	**Vocabulary:** Digestion, mouth, tongue, saliva, oesophagus, transport, stomach, acid, enzymes, small intestine, vitamins, water, large intestine, teeth- incisors, canines, molars, grinding, floss, brush, sun, producers, prey, predators, carnivores, herbivores, omnivores
Prior learning: EYFS- Melting chocolate for cooking- observing changes Observing the weather- water turning to ice, melting snow	**Prior learning:** Knowledge of sources of electricity- appliances around the house Why we need electricity	**Prior learning:** Year 1- parts of the body- senses Year 2 and 3- humans- parts of the body and their purpose	**Prior learning:** Year 2- compare things that are alive, dead or have never been alive. Types of habitats suited to needs of animals. Names of plants and animals. Knowledge of food chain	**Prior learning:** Year 3- Animals and humans- need for nutrition Year 3- Humans and some other animals have skeletons and muscles for support, protection and movement
Cross Curricular links and enhancements: **Maths** Estimate, compare and calculate different measures Geography- water cycle and thunderstorms	**Cross Curricular links and enhancements:** **Geography**- physical and human features	**Cross Curricular links and enhancements:** **Maths:** Rounding – round data to nearest 10/100/100 Interpret and present data using bar charts, pictograms and tables. Solve one-step and two-step	**Cross Curricular links and enhancements:** Trip to Wollaton Park- focus on habitats Interpret and present data using bar charts, pictograms and tables. Solve one-step and two-step questions involving the four operations	**Cross Curricular links and enhancements:** D&T- Make an interactive model of the digestive system

		questions involving the four operations		

Sequence of Knowledge

KS2- Year 5

Working Scientifically- Disciplinary Knowledge

A year 5 scientist will:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Record and report data and results including conclusions in oral and written forms including scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Use test results to make predictions to set up further comparative and fair tests

Sequence of Substantive knowledge

Properties and changing of materials	Forces	Earth and Space	Living things and their habitats	Animals including humans
• 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	• 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, including levers,	• 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	• 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	• Describe the changes as humans develop to old age.

particular uses of everyday materials, including metals, wood and plastic • Demonstrate that dissolving, mixing and changes of state are reversible changes • 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.	pulleys and gears, allow a smaller force to have a greater effect.	explain day and night and the apparent movement of the sun across the sky.		
Vocabulary: continuation, bacteria, microbes, saturated, oxidise (rust), hardness, soluble, insoluble, durability, dissolve, reversible/non-reversible, sieve, filter, particle, solution/solute	**Vocabulary:** fulcrum, gears, cogs, wheel, teeth, surface area, rotate, reaction force, water resistance, streamlined, lever, pivot, mechanism	**Vocabulary:** Sun, moon, satellite, orbit, planet, star, solar system, axis, heliocentric model, geocentric model	**Vocabulary:** reproduction, reproduce, organ, carpel, stamen, anther, filament, pollen, seeds, seed head, berry, fruit, pollinator, pollination, fertilisation, life cycle, gestation, metamorphosis, sex, sexual, asexual, sexual reproduction, reproduction, types of birds e.g. thrush, falcon	**Vocabulary:** reproduction, reproduce, gender, male, female, sex, metamorphism, mate, sperm, pregnant, give birth, young, pup, calf, foal, chick, hatch, fledge, pregnancy, gestation, puberty, genitals, vagina, pubic hair, underarm hair, menstruation, period, eggs, breasts, hips, larynx (Adam's apple)
Prior learning: • **Year 4- states of matters-** compare materials change state when they are heated or cooled. Temp of change • Evaporation, condensation linked to water cycle	**Prior learning:** Mechanisms in DT- Pulleys, levers, gears	**Prior learning:** Forces- knowledge of gravity	**Prior learning:** **Year 4**- categorising of living things. classification keys to group, identify and name living things in the environment. Recognise that environments posing danger to living things	**Prior learning:** Year 3- Animals and humans- need for nutrition. Humans and some other animals have skeletons and muscles for support, protection and movement Year 4- digestive system, food chain and teeth
Cross Curricular links and enhancements:	**Cross Curricular links and enhancements:** **Maths**	**Cross Curricular links and enhancements:**	**Cross Curricular links and enhancements:**	**Cross Curricular links and enhancements:**

	Measurement - convert between different units of metric measure; solve problems between different units of time. Statistics - Solve comparison, sum and difference problems using information presented in a line graph. Complete, read and interpret information in tables, including timetables	**English-** texts related to space- further opportunity to acquire knowledge **Maths** • Position and direction	**English** texts- linked to habitats in north and south poles	• INTU university- PP- Animals including humans workshop

Sequence of Knowledge

KS2- Year 6

Working Scientifically- Disciplinary Knowledge

A year 6 scientist will:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Take 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
- Use test results to make predictions to set up further comparative and fair tests
- Report and present 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.

Sequence of Substantive knowledge

Animals including humans	Electricity	Light	Living things and their habitats	Evolution and inheritance
• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood	• Associate the brightness of a lamp or the volume of a buzzer with the number and	• Recognise that light appears to travel in straight lines • Use the idea that light travels in	• Describe how living things are classified into broad groups according to common	• Recognise that living things have changed over time and that fossils provide information

• 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	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.	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.	observable characteristics and based on similarities and differences, including microorganisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics.	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
Vocabulary: blood vessels, veins, arteries, lungs, circulatory system, oxygenated blood, deoxygenated blood, aorta, capillaries, chamber, valves, ventricle, red blood cell, plasma, platelets, white blood cells, food groups, RDA, beats per minute, recovery rate, drugs, medicine, alcohol, caffeine, solvents,	**Vocabulary:** resistance, resistor, current, filament, flow, insulator, conductor, switch, electrical insulator, Carroll diagram, electrical conductor, electrons, series circuit	**Vocabulary:** Resistance, resistor, current, filament, flow, insulator, conductor, switch, electrical insulator, Carroll diagram, electrical conductor, electrons, series circuit	**Vocabulary:** conifers, ferns, mosses, algae, colony, Aristotle, Carl Linnaeus, Animalia, Plantae, Fungi, Protista, Monera	**Vocabulary:** Adaptation, ancestor, body fossil, breeding, characteristics, chromosome, DNA, Environment, Evolution, Fossil, Fossilisation, Genes, Habitat, homo sapiens, inherit, offspring, natural

short term and long term, consequences, peer pressure				selection, reproduction, selective breeding, species, theory, trace fossil, variety
Prior learning: **Year 4-** digestive system, food chain and teeth **Year 5-** Changes as humans develop to old age	**Prior learning:** **Year 4-** Identify common appliances that use electricity. Construct a simple series electrical circuit, naming its basic parts. Know if a light will work in a simple circuit- knowledge of switches. Common conductors and insulators, and associate metals with being good conductors	**Prior learning:** **Year 3-** Light is reflected from surfaces . Light from the sun can be dangerous. Shadows are formed when the light from a light source is blocked by an opaque object. Size of shadows and how they change.	**Prior learning** **Year 5 -** life cycles of a mammal, an amphibian, an insect and a bird and life process of reproduction in some plants and animals	**Prior learning:** Lifecycles and offspring of animals Animals and their habitats- types of habitat and how they are changing. Year 4- teeth Knowledge of herbivores, omnivores and carnivore
Cross Curricular links and enhancements: **Maths** • Diet – use knowledge to tlve problems which require knowing percentage and decimal equivalents e.g. diets to comprise of 45-65% Carbohydrates, 10-35% Protein and 20-35% etc • Exercise - measurement – (use all four operations to solve problems involving measure distance/time) • Rounding – round to the nearest 10/100/100/whole number/ decimal place)	**Cross Curricular links and enhancements:** **Maths** • Magna Science **D&T-**	**Cross Curricular links and enhancements:** Maths • Reflection (mirror line). position and direction - describe positions on the full coordinate grid (all four quadrants). Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. • Angle of incidence /angles) - know angles are measured in degrees: estimate and compare acute, obtuse	**Cross Curricular links and enhancements:** **Maths** • Data - Interpret and construct pie charts and line graphs and use these to solve problems • Calculate and interpret the mean as an average - Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts	**Cross Curricular links and enhancements:**

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• Statistics - solve comparison, sum and difference problems using information presented in a line graph. Complete, read and interpret information in tables, including timetables.		and reflex angle. Draw given angles, and measure them in degrees Angles at a point on a straight line total 180.		