Progression of Knowledge and Skills Map - Science

Tiers 1 - 3 and Polysemous Vocabulary. New or Key Words in Bold.			KS1		KS2			
	N	R	Y1	Y2	Y3	Y4	Y5	Y6
	Me Celebrations		**Autumn: Looking At Animals**	**Autumn: Take Care**	**Aut 1: Amazing Bodies**	**Aut 1: Good Vibrations (Sound)**	**Aut 1: Reproduction in Plants & Animals**	**Aut 1: The Nature Library**
	Family World 5 Senses Seasons Weather Inside/ Outside Growing		**Carnivore** **Herbivore** **Omnivore** **Vertebrate** **Fish** **Amphibian** **Reptile** **Mammal** **Bird** **Insect** Feathers Wings Fur Scales Fins Tail Gills Beak Claws Features	Food **Sort** **Classify** Diet Dairy Fruits Vegetables, Meat/Fish Fat Sugar Bread Potatoes Cereals Exercise Physical activity **Heartbeat** **Pulse** Tired Muscles Hygiene/Clean	Survive Balanced diet Nutrition **Nutrients** **Carbohydrates** Protein Fibre **Skeleton** Bones Protect/support Move Joints Ribs Skull Brain Backbone Spine Spinal column Vertebrate **Muscles** **Vitamins Minerals** Investigation Survey Measure Pattern Evidence Draw conclusions	sound, loud, quiet, high, low, repeating, continuous, strike, blow, shake, pluck, **vibration**, vibrate, solid, gas, **volume**, strength of vibrations, **sound source,** fainter, distance, **pitch, particles,** question, investigation, fair test, change, measure, predict, prediction, explanation, observations, draw conclusions	reproduction, reproduce, flower, organ, carpel, stamen, **pollen**, seeds, seed head, berry, fruit, **pollinator**, **pollination**, **fertilisation**, reproduction, reproduce, **propagate**, stem, leaf and root cuttings, runners, **tubers**, bulbs, **rhizomes**, gender, male, female, sex, **sexual, asexual, metamorphosis, mate, sperm**, pregnant, give birth, young, pup, calf, **foal**, chick, hatch, fledge, **fledgling**	identification, classification, **division**, **family, genus, species,** reason, **common characteristics, distinguishing characteristics,** leaves, shape, size, colour, backbone, wings, jointed legs, cased, transparent, antennae, shell, segments, group, **harmful/beneficial, colony**, mould, multiply, Aristotle, Carl Linnaeus, **kingdom**, Phillip Miller, John Ray, botany, conventions **Kingdoms of living things:** Animalia, Plantae, Fungi, Protista, and Monera **Plant kingdom:** flowering plants, conifers, ferns, mosses and algae **Animal kingdom:** vertebrates, fish, amphibians, mammals, birds, reptiles, invertebrates, molluscs, annelids, arachnids, insects, arthropods **Micro-organisms:** (3 kingdoms: Fungi, Monera, Protista), micro-organisms (microbes) bacteria

Tiers 1 - 3 and Polysemous Vocabulary. New or Key Words in Bold.	**Fairytales Dinosaurs**	**Spring: Everyday Materials**	**Spring: Apprentice Gardiner**	**Aut 2: Rocks**	**Aut 2: Where Does Food Go?**	**Aut 2: Feel the Force!**	**Aut 2: Electricity**
	Animals Fossils Past Seeds Plants Life Seasons Weather Growing Baby / Young Adult	Materials **Wood** **Plastic** **Metal** **Glass** Water Rock Brick Paper **Sandpaper** Fabric Shiny/Dull Soft/Hard Rough/Smooth Group **Transparent** (see-through)/ **Opaque** (Can't see through)	**Seeds** **Bulb** Grow Observe Observations, Describe, Identify, Expert, Question, Predict, Prediction, Compare, Answer, Investigate, Soil **Surface** **Test** Bury Light/dark **Germinate** Root Shoot Pattern Measure Height Tallest/Shortest	**Sandstone Granite** **Chalk** **Limestone** **Marble** **Pumice** Rough Smooth Hard/soft Stone Pebble Texture **Particle** Crystal Granule Properties Soil Clay Sandy **Loam** **Peat** **Organic** Weathering Frost Beach Cliff **Trilobite** **Fossil** **Fossilise** Remains	mouth, **oesophagus, stomach,** small intestine, large **intestine, rectum, anus, digestive system, digestion,** carbohydrate, fat, sugar, protein, roughage, dairy, fruit, vegetables, vitamins, minerals, balanced diet, healthy, **mechanical process, chemical process,** absorb, nutrients, water, saliva, chemicals, **enzyme,** teeth, **canine, incisor, premolar, molar,** jaw, cutting, tearing, grinding , dental hygiene, decay, dentist, brushing, toothpaste, floss, mouthwash, food, plants, animals, food chain, **food web**, producer, consumer, predator, prey, herbivore, omnivore, carnivore	**air resistance**, **Aristotle**, balanced , **balanced forces,** **bevel gears, clockwork, cogs,** **compress,** extend, effort, **force arm**, **friction, force arrow, fulcrum, gravity, Galileo, gear ratio, gears, gear trains,** **lever**, lift, machine, mechanisms, movement, **Newton, Newton meter, pinion, pivot, pulley**, pull, push, rack, **resistance, rotary** **motion**, simple machines, speed, time, **unbalanced force, upthrust, water resistance, weight arm**, wheel	cell, battery, lamp, wire, buzzer, motor, circuit, current, filament, electrical **insulator,** electrical conductor, mains electricity, **terminal**, switch, toggle switch, push switch, slide switch, tilt switch, trembler switch, pressure switch, **reed switch,** series circuit, resistance, resistor, **current,** circuit diagram, recognised symbols, generate, **generator**, coal, gas, oil, fossil fuels, nuclear, biomass fired power stations, **wind turbine, wave hub, tidal flow, hydro-electric, grid, pylon, transmission, transformer, solar panels**

Tiers 1 - 3 and Polysemous Vocabulary. New or Key Words in Bold.	**Geog: People Who Help Us**	**Sum 1: Seasons**	**Sum 1: What is Your Habitat?**	**Spring: Plants**	**Spring: States of Matter**	**Spring: All Change! Properties & Changes of Materials**	**Spring: Body Pump – Animals Including Humans**
	Nature Environment Community Countries Scientist Seasons Weather	Seasons Autumn Winter Spring Summer **Evidence** Similar Different **Compare** **Change** Months **Temperature** Weather **Waterproof**	Habitat **Alive/Living** **Once-lived** **Dead** **Never-lived** Decay Air **Food chain** Herbivores Carnivores Omnivores Direction **Source of food** Suited Habitat	Trunk Leaflet Stalk Veins Surface Edge Lobes Root hair **Nutrients** Anchor Germination Seedling Mature plant **Flowering** Pollination Seed formation Bud **Sepal** **Carpel** **Stamen** Pollen Reproduce Nectar **Dispersal/Self-Dispersal** Wind Explosion Sprinkling Competition **Stigma** **Style** **Ovary** **Anther** **Filament** **Life Cycle**	solid, liquid, pour, flow, pile, pool, surface, horizontal, runny, **viscous**, grain, ice, water, temperature, cool, warm, hot, **degree Celsius**, melt, freeze, solidify, heating, **states of matter,** change of state, melting point, freezing point, process, **gas**, air, **carbon dioxide, helium, oxygen**, bubbles, empty, particle, weight, **compress**, squash, volume, evaporate, water vapour, boil, boiling point, steam, thermometer, **data logger,** sensor, droplets, condensation, droplets, cycle, model, expand, scale, **calibrate,** heat sensitive, sensor, variable, collect, present, interpret, data, **axis, scale, interval, control,** keep the same, **accuracy**	material, change, compare, contrast, solid, liquid, gas, change of state, dissolve, melt, reversible, **non-reversible**, mixture, powder, **particle,** tablet, bubbles, **carbon dioxide**, change, **reaction,** inflate, **rust, oxidise,** oxygen, **corrode, tarnish;** types of metal: iron, steel, **chromium, tin, zinc;** boil, vapour, fuel, heat, burn, burning, **flammable, flame,** melts, **solidifies,** candle, **wick,** wax	**aorta, artery, atrium,** blood, blood vessel, body temperature, **capillaries,** carbon dioxide, cells, chamber, chest cavity, circulation, **circulatory system, deoxygenated blood, digestive system, digestive tract,** health, heart, heart valves, humans, hydration, **lubricant**, lungs, **muscular system,** nutrition, oxygen, **oxygenated blood, plasma, platelets,** pump, **red blood cell,** skeletal, system, transport, **valve, vein, vena cava, ventricle, vessel,** waste, waste gases, **white blood cells**

Tiers 1 - 3 and Polysemous Vocabulary. New or Key Words in Bold.		**Sum 2: Plants**	**Sum 2: Growing Up**	**Sum 1: Light – Can You See Me?**	**Sum 1: Switched On**	**Sum 1: Circle of Life**	**Sum 1: Light**
		Plant (verb and noun) Leaf/leaves Bud/Flower Twig Branch Tree Roots Stem Shoot Blossom Petals Stem Stalk **Deciduous** **Evergreen** Soil Compost Manure Water Soil	Baby Need/Want Essential Breathe Shelter Warmth Survival Depend Child Toddler Compare Change Differences Dependent Independent Care Learn Appearance **Annotate** Life cycle Stages Order Pregnancy Birth Teenager Adult Parent Elderly person	Light/Dark **Shadow** Mirror Bright Dim **Reflect** **Eye** **Eye Protection** Opaque Transparent **Translucent Ultraviolet Ray** **Beam** Absorb **Luminous** **Non-luminous Infrared** Question Investigation **Fair test** Change Measure Predict Prediction Explain Explanation Observations Draw conclusions	electricity, electrical, **mains,** plugged in, battery, power, rechargeable, **solar,** wind up, sound, light, heat, movement, cell, wire, **bulb**, bulb holder, buzzer, motor, component, **circuit,** complete circuit, short circuit, flow, **break,** make, metal, connect, disconnect, terminal, positive, negative, switch, press switch, toggle switch, tilt switch, **pendulum** switch, property, **electrical conductor, electrical insulator,** electron, **filament,** sets, Venn diagram, Carroll diagram	life cycle, birth, growth, **old age**, reproduction, ageing, death, animal, mammal, amphibian, insect, bird, elephant, toad, bumblebee, blue tit, hedgehog, bat, polar bear, mountain gorilla, cubs, pups, **hibernate, nocturnal, marsupial**, toad, **newt**, **salamander**, tree frog, metamorphosis, tadpole, **larva**, frog, toad, gills, cold blooded, ladybird, butterfly, dragonfly, head, **thorax, abdomen, antennae**, egg, **pupa, cocoon**, adult, thrush, peregrine falcon, ostrich, emperor penguin, **breeding cycle, clutch, brood**, hatch, **fledge**, prey, predator, reproduce, habitat, environment	light, dark, shadow, mirror, bright, dim, reflect, eye, opaque, transparent, translucent, **ultra violet, ray,** beam, **refraction, periscope, spectrum, dispersion, inverted,** medium, question, investigation, fair test, change, measure, predict, prediction, explanation, observations, draw conclusions

Tiers 1 - 3 and Polysemous Vocabulary. New or Key Words in Bold.			Sum 2: The Power of Forces	Sum 2: Human Impact	Sum 2: Earth and Beyond	Sum 2: Evolution & Inheritance
			Push Pull Twist **Force** Air Turns Fast/Slow Slows down **Surface** **Magnet** **Attracts** **Magnetic Magnetism** Acts at a distance **Non-magnetic** Metal **Non-metal** Strength North pole South pole **Repel**	environment, impact, classification, positive, negative, litter, pollution, waste, **biodiversity,** habitat, derelict, graffiti, traffic, destroy, create, location, food chain, **producer, consumer,** human impact , **global** issue, destruction, deforestation, rainforest, **climate,** climate change, zoo, **endangered,** breed, wild, natural, **predator, prey, conservation,** categories, tally chart, pictogram, bar chart, axes, scale, opinion, point of view, argument, viewpoint, debate	Arctic, Antarctic, Greenwich Meridian, International Date Line, Jupiter, Mars, Mercury, Milky Way, Moon, North Pole, Saturn, South Pole, Neptune, Universe, Uranus, Venus, asteroid, **axis, compass, crescent, degrees,** equator, **equinox,** fixed stars, Full Moon, **galaxy,** gibbous, hemisphere, horizon, **longitude,** lunar month, nebula, New Moon, northern, **orbit,** planet, reflect, rotate, rotation, **solar system, solstice,** southern, spin, star, **telescope,** temperature, tilt, **time zone, waning, waxing,** draw conclusions, explanation, investigation, line graph, measure, **model,** observations, plan, predict, prediction, question, record, review, **scientific diagram**, table	**population, variation, environment, inheritance, adaptation, selective breeding,** survival, **natural selection,** evolution, fossils, **genes, genetics, DNA, extinct,** extinction, **speciation,** question, investigation, fair test, change, measure, predict, prediction, explanation, observations, draw conclusions, **generation**

Nursery

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Topics	**This is Me**	**Let's Celebrate**	**X Factor Rhymes**	**Watch Us Grow**	**Awesome Pawsome**	**What's Out There?**
Birth to 5 Matters – Statutory ELGs	• Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.	• Understand some important processes and changes in the natural world around them, including changing states of matter (cooking).	• Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.	• Explore the natural world around them, making observations and drawing pictures of animals and plants. • Understand some important processes and changes in the natural world around them, including the seasons.	• Explore the natural world around them, making observations and drawing pictures of animals and plants.	• Describe their immediate environment using knowledge from observation, discussion, stories, non-fiction texts and maps.
Development Matters - 3 & 4 Year Olds	• Understand the key features of the life cycle of a plant and an animal.	• Talk about the differences between materials and changes they notice (cooking). • Explore collections of materials with similar and/or different properties.	• Explore how things work. • Explore and talk about different forces they can feel. •	• Plant seeds and care for growing plants. • Begin to understand the need to respect and care for the natural environment and all living things. • Use all their senses in hands-on exploration of natural materials.		• Show interest in different occupations.
Progression	Rec Autumn 1 - Marvellous Me (Biology)	Rec Autumn 2 – Let's Celebrate (Chemistry)	Rec Spring 1 – Once Upon a Time (Physics)	Rec Spring 2 – A Long Time Ago (Biology)	Rec Sum 1 – Explore and Discover (Local Environment)	Rec Sum 2 – People Who Help Us (Scientists)

Reception

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Topics	**Marvellous Me**	**Let's Celebrate**	**Once Upon a Time**	**A Long Time Ago**	**Explore & Discover**	**People Who Help Us**
	Collins Title: **Biology - Animals and Plants** (6 Lessons)	Collins Title: **Chemistry - Objects and Materials**	Collins Title: **Physics - Light, Space, Electricity & Movement**	Collins Title: **Biology - Animals and Plants**	Collins Title: **Our Changing World (The Local Environment)**	**Scientists in the community**
Development Matters – 3 and 4 Year Olds	• Understand the key features of the life cycle of a plant and an animal.	• Talk about the differences between materials and changes they notice (cooking). • Explore collections of materials with similar and/or different properties.	• Explore how things work. • Explore and talk about different forces they can feel.	• Plant seeds and care for growing plants. • Begin to understand the need to respect and care for the natural environment and all living things. • Use all their senses in hands-on exploration of natural materials.		• Show interest in different occupations.
Development Matters - Reception	• Explore the natural world around them. • Recognise some environments that are different from the one in which they live.	• Understand the effect of changing seasons on the natural world around them.		• Describe what they see, hear and feel whilst outside. • Recognise some environments that are different from the one in which they live.	• Explore the natural world around them. • Understand the effect of changing seasons on the natural world around them.	• Describe what they see, hear and feel whilst outside.
Progression	Year 1 Autumn: Animals, Including Humans	Year 1 Spring: Everyday Materials	Year 3 Summer: Light, Forces and Magnets	Year 1 Summer 2: Plants	Year 1 Summer 1: Seasonal Changes	Annual Careers Day.

Year 1

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Pre Learning			Senses (EYFS, Y1 Aut)		Bar Charts are not taught until **Y3**.	EYFS plant-related experiences using their senses.
Topics	Sc1/2.2 **Animals, Including Humans** (Looking at animals and using our senses) Collins Title: **Looking at Animals** **Teacher Information and Subject Knowledge**		Sc1/3.1 **Everyday Materials** Collins Title: **Everyday Materials** **Teacher Information and Subject Knowledge**		Sc1/4.1 **Seasonal Changes** Collins Title: **Sensing Seasons** **Teacher Information and Subject Knowledge**	Sc1/2.1 **Plants** Collins Title: **Plant Detectives** **Teacher Information and Subject Knowledge**
Assess. Tasks	Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. **Mastery:** Can select and name at least two mammals, birds, fish, amphibians and reptiles and give a correct reason for choosing them, according to observable features or known behaviour.		Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. Carroll Diagrams		Observe Changes Across the Four Seasons ~~Bar Charts~~ Choose another method of presenting e.g. Weather Book. **Mastery:** Can identify relevant clues to a particular kind of weather in each image. Can say how they know what the weather is like that day, using appropriate simple vocabulary to describe what they see. Can suggest a season and possibly a month of the year when the scene might have taken place.	Identify and describe the basic structure of a variety of common flowering plants, including trees. Can identify parts of a variety of plants, including recognising that a tree's trunk is like the stem of other plants. Can locate the flowers, fruits, stems, leaves, on different types of plant. Can explain in simple terms that plants have roots, even when they can't be seen.

Substantive Knowledge	• Name and locate parts of the human body, including those related to the senses, and describe the importance of exercise, balanced diet and hygiene for humans. • To understand the terms: 'carnivore', 'herbivore' and 'omnivore'.	• Distinguish between an object and the material from which it is made. • Recognise that the same materials can be made into different objects, for example, a metal can, a metal spoon and a metal car.	• Describe weather associated with the seasons and how day length varies. • Name the four seasons and link to time of year. • Understand what clothing should be worn in different weather conditions and during different seasons of the year.	• Describe basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plant.
Disciplinary Knowledge	• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) • Ask simple questions and recognise that they can be answered in different ways.	• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • Learn how to group and classify materials using separate and overlapping sorting rings, simple tables and Carroll diagrams. • Design and carry out simple tests to make fair comparisons.	• To observe changes across the 4 seasons. • To observe and describe weather associated with the seasons and how day length varies. • Communicate outcomes in a variety of different ways, for example, by adding evidence that they collect to a 'season window' wall display, and recording their findings in a 'Weather big book'	• To identify and describe the basic structure of a variety of common flowering plants, including trees • Group and classify. • To use their observations and ideas to suggest answers to questions.
Progression	**Year 2:** Children learn more about the basic needs of animals.	**Year 2:** The suitability of a range of materials for particular uses are evaluated and children begin to learn how materials can be changed.		

Enquiry Types Key: Classification Research Comparative/Fair Test Observation Over Time Pattern Seeking

Year 2

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Pre Learning	Year 1 Spring Term Carroll Diagrams	Year 1 Spring Term Everyday Materials	Year 1 Plant Modules Year 2 Maths Spring Length in cm		Year 1 Looking at Animals	Senses (EYFS, Y1 Aut)
Topics	Sc2/2.3 **Animals Including Humans** Collins Title: **Take Care** **TISK**	Sc2/3.1 **Everyday Materials** Collins Title: **Good Choices** **TISK**	Sc2/2.2 **Plants** Collins Title: **The Apprentice Gardener** **TISK**		Sc2/2.1 **Living Things and Their Habitats** Collins Title: **What is Your Habitat?** **TISK**	Sc2/2.3 **Animals Including Humans** Collins Title: **Growing Up** **TISK**
Assess. Tasks	Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.	Observe and describe how seeds and bulbs grow into mature plants.		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.	~~Scatter Graphs.~~ Use age appropriate models. Notice that animals, including humans, have offspring that grow into adults. **Mastery:** Can place life cycle of a human (or other animal) in chronological order. When prompted, can use a circle to show that the adults might, in turn, go on to produce young.

Substantive Knowledge	• Know the importance of eating a range of different types of food. • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	• Use knowledge and understanding of the properties of materials, to distinguish objects from materials, identify and group everyday materials, and compare their suitability for different uses.	• Sequence of germination, and comparing and contrasting the requirements of germinating seeds with those of mature plants to maintain healthy growth. • To be able to describe how plants need water, light and a suitable temperature to grow and stay healthy.	• To be able to name different plants and animals and describe how they are suited to different habitats. • Explore habitats by identifying things that are living, once-lived and never-lived. • Construct food chains that show how living things depend on each other. Describe how living things are suited to a particular habitat.	• Describe the basic needs of animals for survival (water, food and air) and the main changes as young animals, including humans, grow into adults. • Notice that animals, including humans, have offspring which grow into adults. • Know simple differences between living and nonliving things. • Learn the sequence of the human life cycle, first through considering how they have changed since birth.

Disciplinary Knowledge	• Work scientifically by identifying and classifying food, using tables, and Venn and Carroll diagrams. • Make observations and collect data while carrying out exercises, and use observations and ideas to answer questions.	• Compare how things move on different surfaces. • Gather and record data to help in answering questions. • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses.	• Make observations every few days in frequent short lessons. • Draw conclusions from observations. • Observing change over time and comparative tests; there is also identifying and classifying, pattern finding and research using secondary sources (videos). • Record series of observations using labelled drawings and photographs in diaries. • Use existing knowledge and observations to make predictions at the start and during investigations.	• 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. • Ask simple questions.	• Research further changes that happen as a human baby grows and develops into and through adulthood. • Consider growth, changes in physical appearance, movement, feeding and diet, self-care, the move from dependency to independence and parenthood (although briefly). • Outcomes from enquiries, such as graphs, group answer sheets and photographs can be displayed and children should be encouraged to add comments using sticky notes, to add to the information and consolidate their understanding.
Progression	**Year 3 Amazing Bodies:** Pupils consider the nutrition that they gain from different types of food.	**Year 5 Everyday Materials:** Pupils classify materials, carrying out comparative tests for different properties and using the results of their tests to suggest suitable (good) choices for a particular purpose.	**Year 3:** Children revisit in more detail the requirements of plants for life and growth, and learn about the functions of plant parts and the life cycle of a flowering plant, including seed production. **Year 5:** Pupils cover bulbs in more detail, along with tubers and cuttings.	**Year 6 Everything Changes:** Pupils examine how the environment affects inhabitants.	**Year 5 Reproduction & Circle of Life:** Pupils learn about other stages in the human life cycle, including puberty, and about human reproduction.

Enquiry Types Key: Classification Research Comparative/Fair Test Observation Over Time Pattern Seeking

Year 3

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Pre Learning	Yr 2 Aut 1 Science Take Care Yr 1 Aut Patterns in Maths		Year 1 and Year 2 Plant Modules		Nursery and Reception – Marvellous Me (senses) topics	
Topics	Sc3/2.2 **Animals Including Humans** Collins Title: **Amazing Bodies** **TISK**	Sc3/3.1 **Rocks** Collins Title: **Rock Detectives** **TISK**	Sc3/2.1 **Plants** Collins Title: **How does your garden grow?** **TISK**		Sc3/4.1 **Light** Collins Title: **Can You See Me?** **TISK**	Sc3/4.2 **Forces & Magnets** Collins Title: **The Power of Forces** **TISK**
Assess. Tasks	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.	~~Bar Charts~~ 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.	Identify and describe the functions of different parts of flowering plants: roots, stem / trunk, leaves and flowers. Explore the role that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.		Notice that light is reflected from surfaces. Recognise that we need light in order to see things and that dark is the absence of light. Recognise that shadows are formed when the light from a light source is blocked by an opaque object.	Compare how things move on different surfaces. 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. Observe how magnets attract or repel each other and attract some materials and not others.

Substantive Knowledge	• Understand that the food we eat provides us with the nutrition that our bodies require to remain healthy. • The range of nutrients that humans need to consume in the correct amounts and the role that these nutrients play in keeping our bodies healthy. • Humans and some other animals have skeletons and muscles for support, protection and movement.	• How rocks are affected by weathering over time. • To learn about what causes rocks to break down and become soil particles and about the organic matter that is an essential part of a healthy soil. • Discover what a fossil is and how they came to be formed from animal and plant remains. Learn the names of a variety of common fossils, and about the stages of the fossilisation process.	• The parts of the flower, their roles in plant reproduction and the stages of the life cycle of a flowering plant (roots, stem/trunk, leaves and flowers). • 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. • The absorption and transport of water and nutrients and the role of the leaf in making food for the plant. • The part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	• How we see objects, the ways in which different objects reflect different amounts of light and how these ideas can be applied to staying safe at night. • What causes a shadow, as well as how the shape and size of a shadow can be affected by its position. • How exposure to sunlight can cause harm, and about ways by which they can protect themselves.	• Some forces need contact between two objects, but that magnetic forces can act at a distance. • Magnets attract some materials and not others and that these are known as magnetic materials. • Some metals, but not all, are magnetic and that all non-metals are nonmagnetic. • Magnets have two poles and that two magnets will attract or repel each other, depending on which poles are facing.

Disciplinary Knowledge	• Ask and answer own questions about the human body and diet through classifying, pattern-seeking investigations and by carrying out research using secondary sources. • Gather data and record and present these in a range of ways.	• Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties, such as hardness and permeability. • Explore a variety of soils first hand, making the link between soils of different types and the rocks from which they are partly made. • Test a variety of soils, including local soils, to discover whether soils of different types let water through at the same rate.	• Ask and answer own questions about plants through classifying, observing over time, conducting fair test investigations and using secondary sources. • Make and record detailed observations using labelled and annotated diagrams. • Investigate the way in which water is transported within plants.	• Ask and answer own questions about light and shadow. • Investigate how some materials block more light than others. • Sort objects according to how much light they block, as well as through simple shadow investigations. • Explain judgements, for example why they have used a certain material for a 'safe at night' piece of clothing or a pair of sunglasses, based on data from their experiments.	• Carry out comparative and fair tests to investigate the strength of magnets and how objects move on different surfaces. • 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. • Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.
Progression	**Year 4 Where Does All That Food Go?** Pupils learn about the digestive system.	**KS3 Chemistry:** Earth and Atmosphere	**Year 5 Reproduction in Plants and Animals:** Pupils learn about different types of plant reproduction in Year 5.	**Year 6 Light Up Your World:** Pupils develop the model of how we see in terms of rays of light.	**Year 5 Feel the Force:** Pupils learn about measuring force and friction.

Enquiry Types Key: Classification Research Comparative/Fair Test Observation Over Time Pattern Seeking

Year 4

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Pre Learning	EYFS & Year 1: Senses Year 3 Aut 1 Amazing Bodies	Year 3 Amazing Bodies	Sum Term Year 3 Statistics (Bar graphs).			Year 2 Looking at Animals (Food Chains) Sum Term Year 4 Line Graphs
Topics	Sc4/4.1 **Sound** Collins Title: **Good Vibrations** **TISK**	Sc4/2.2 **Animals Including Humans** Collins Title: **Where does all that food go?** **TISK**	Sc4/3.1 **States of Matter** Collins Title: **In a State** **TISK**		Sc4/4.2 **Electricity** Collins Title: **Switched On** **TISK**	Sc4/2.1 **Living Things and Their Habitats** Collins Title: **Human Impact** **TISK**
Assess. Tasks	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.	Describe the simple functions of the basic parts of the digestive system in humans. Construct and interpret a variety of food chains, identifying producers, predators and prey.	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 evaporation with temperature. ~~Line Graphs –~~ Summer Term Year 4.		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 environments can change and that this can sometimes pose dangers to living things. EPS Assessment Task: Present collected survey data (e.g. litter survey) via a Line Graph.

Substantive Knowledge	• Develop vocabulary for describing sounds and identify different sound sources. • Sounds are made by something vibrating and that these vibrations travel through a medium to the ear so that we hear them. • Sounds get fainter as the distance from the sound source increases. • Changing the pitch and volume of sounds.	• Main body parts associated with the digestive system; the mouth, tongue, teeth, oesophagus, stomach, intestines, rectum and anus. • The role of the digestive system is to break down the food we eat so that the nutrients energy and other requirements we derive from it can be used in the rest of the body. • How food can be broken down through mechanical and chemical processes. • The roles of the different types of teeth in breaking food down, and how to care for their teeth. • Milk teeth and permanent teeth. • There are also opportunities for children to investigate questions around toothpastes.	• Characteristic properties of solids, liquids and gases, first through physically exploring typical materials and then by classifying examples. • Changes of state and begin to understand freezing and boiling points. • Names of some common gases. • Expansion of liquids and gases when they are heated, using this to make a simple thermometer and explain how it works. • The water cycle, modelling it in different ways and further developing their understanding of changes of state.	• Identify electrical appliances, distinguishing between those which are powered by mains and battery (including those with integral rechargeable batteries) and recognising that electricity can be used to produce light, sound, heat and movement. • Explore the production of light, sound and movement by making simple series circuits with cells, wires, bulbs, buzzers and motors, learning the names of the components. • Work mostly with single components. • Describe the flow of electricity round a circuit and give reasons why some circuits do not work. • Learn to control their circuits with switches. They will test materials, classify them as electrical conductors	• Positive and negative ways that humans change the environment, locally and globally, with a particular focus on how this affects other living things. • Actions can have both positive and negative consequences. Situations are not black and white, and decisions involve compromises. • Consider how industry, housing and thoughtless behaviour can damage local habitats and also how humans can increase biodiversity by developing environments such as country parks and nature reserves.

		This module also explores what animals eat and how this information can be used to build food chains. There are opportunities to explore how the teeth of animals are adapted to the type of food that they eat.		or insulators and recognise that metals are good electrical conductors and plastics are good electrical insulators. • Apply this knowledge when making own switches and electrical quiz boards. • The safe use of electrical components and the dangers of mains electricity.	

Disciplinary Knowledge	• Find patterns between the pitch of a sound and features of the object that produced it. • Find patterns between the volume of a sound and the strength of the vibrations that produced it.	•	• 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). • Make careful observations and explain what they show. • Observe and measure changes over time, first hand and using secondary sources. • Classify materials and record their sorting using Venn diagrams. • Plan and carry out fair tests, learning to identify and control variables and drawing up tables to record their data, presented as bar or bar line graphs. • Identify patterns in the data and use these to answer their investigation. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. • Make careful observations and explain what they show. • Observe and measure changes over time, first-hand and using secondary sources. • Classify materials and record their sorting using Venn diagrams.	• Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • Draw labelled and annotated drawings. • 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 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.	• Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Make survey data manageable and present findings by constructing and labelling pictograms and bar charts. • Present information as oral and written reports, posters and food chains. • Weigh and present evidence, recognise statements that do and do not support an argument, and participate in a debate.
Progression	**KS3 Physics:** Sound Waves		**Year 5 All Change:** Pupils learn about reversible changes.	**Year 6 Danger! Low Voltage:** Pupils Year investigate the effect of adding and changing components in circuits.	**KS3 Biology:** Interactions and Interdependencies

Enquiry Types Key: Classification Research Comparative/Fair Test Observation Over Time Pattern Seeking

Year 5

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Pre Learning	KS1 & Year 3 Spring Life Cycles of Plants	Year 3 Summer 2 The Power of Forces	KS1 & Year 4 Spring In a State Year 4/5 Summer 2 In a State		Year 3 Autumn 1 Amazing Bodies	Year 5 Summer 2 Earth and Space
Topics	Sc5/2.1 **Living Things** Collins Title: **Reproduction in Plants and Animals** **TISK**	Sc5/4.2 **Forces** Collins Title: **Feel the Force** **TISK**	Sc5/3.1 **Properties and Changes of Materials** Collins Title: **All Change!** **TISK**		Sc5/2.2 **Animals Including Humans** Collins Title: **Circle of Life** **TISK**	Sc5/4.1 **Earth and Space** Collins Title: **The Earth and Beyond** **TISK**
Assess. Tasks	Describe the life process of reproduction in some plants and animals. Describe the changes as humans develop to old age.	Identify the effects of air resistance, water resistance and friction that act between moving surfaces. Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.	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		Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. ** As part of Lesson 1, include learning about the human life cycle and changes as humans develop to old age.	Describe the movement of the Earth and other planets relative to the Sun in the solar system. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky. Describe the movement of the Moon relative to Earth.

Substantive Knowledge	• Life cycles of some familiar (and less familiar) mammals, amphibians, insects and birds. • Investigate incredible journeys that some animals undertake to complete their life cycles, and about the different ways in which humans are supporting some endangered animals to increase their population numbers. • Changes as humans develop to old age.	• Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • The effects of air resistance, water resistance, friction, gravitational attraction, upthrust and drag forces that act between moving surfaces. • Some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.	• 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. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Some changes result in the formation of new materials – this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	• Learn that plants can reproduce in other ways, through asexual reproduction. • Specific mammals, birds, insects and amphibians and how they reproduce. • Three lessons focusing on humans, one of which is about the complete human life cycle and two of which focus on puberty. These lessons can be taught to mixed or single gender groups, but all children should learn about changes in boys and girls. • Changes as humans develop to old age.	• Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. • Describe the movement of the Moon relative to the Earth. • Describe the Sun, Earth and Moon as approximately spherical bodies. • Use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky.

Disciplinary Knowledge	• Compare and contrast different life cycles, identifying common features as well as explaining key differences. • Apply knowledge of life cycles to help them as they create a fantastical creature of their own, complete with its own distinct life cycle.	• Plan and carry out fair test and pattern-seeking investigations, observe carefully, record accurate measurements, and construct different mechanisms. • Look at scientific ideas from the past and carry out an activity to find evidence to support or refute famous scientists' ideas. • Make predictions as a result of carrying out simple activities and go on to plan new investigations. • Opportunities to develop graphing, communication and presentation skills.	• Demonstrate that dissolving, mixing and changes of state are reversible changes. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.	• Carry out first-hand observation of flowering and other plants, and also use secondary sources of information. • Group and classify living things according to similarities in reproduction processes. • Report and present findings from enquiries in a variety of ways, including posters, fact cards and guides. • Draw a human life cycle.	• Use models for exploring and demonstrating ideas, first-hand observation made at night either in their gardens or local area, or from visits to local observatories, secondary sources of information (mainly web-based) to answer scientific questions increasingly independently, and diagrams, charts and graphs for recording data. • Report and present findings in different ways, including booklets, oral presentations and annotated diagrams, draw conclusions, identify causal relationships and explain their thinking.
Progression	**KS3 Biology:** Structure and Function of Living Organisms (Reproduction)	**Year 5 Summer 2 Earth and Space:** Pupils extend learning about gravity as a force.	**KS3 Chemistry:** Particulate Nature of Matter, Chemical Reactions, Energetics	**KS3 Biology:** Structure and Function of Living Organisms (Reproduction)	**KS3 Physics:** Space Physics

Enquiry Types Key: Classification Research Comparative/Fair Test Observation Over Time Pattern Seeking

Year 6

	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
Pre Learning	Year 5 Aut 1 Reproduction	Year 4 Sum 1 Switched On Year 4/5 Aut 1 Electricity	Year 5 Sum 1 Circle of Life		Year 3 Sum 1 Light	Year 3 Autumn 1 Amazing Bodies
Topics	Sc6/2.1 **Living Things & Their Habitats** Collins Title: **The Nature Library** **TISK**	Sc6/4.2 **Electricity** Collins Title: **Danger! Low Voltage!** **TISK**	Sc6/2.2 **Animals Including Humans** Collins Title: **Body Pump** Ext: **Body Health** **TISK**		Sc6/4.1 **Light** Collins Title: **Light Up Your World** **TISK**	Sc6/2.3 **Evolution & Inheritance** Collins Title: **Everything Changes** **TISK**
Assess. Tasks	Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. Give reasons for classifying plants and animals based on specific characteristics.	Use recognised symbols when representing a simple circuit in a diagram. 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. Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.	Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Describe the ways in which nutrients and water are transported within animals, including humans. **Body Health:** Recognise the impact of diet, exercise, drugs and lifestyle on the way our bodies function.		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 to explain how objects are seen because they give out or reflect light into the eye. Recognise that light appears to travel in straight lines. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. **Mastery:** Can draw the light ray arrow lines, stopping them where they meet the object and continuing them round the side, over the top and under the bottom. Can use a ruler to draw straight lines. Can draw a black or grey circle T shape the same shape and way up as the image.	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. Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.

Substantive Knowledge	• Become aware of the types and characteristics of organisms that belong in each of the five kingdoms of living things (animals, plants, fungi, bacteria and Protista) and the major sub-groups the kingdoms include. • Learn about how Linnaeus developed the system for classifying all living things using their observable characteristics. • Understand the idea of how scientists use 'conventions' in order to ensure that everyone means the same thing when they refer to, for example, an organism by its scientific name.	• Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • Give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.	• How the heart works, the main components of blood and the function of the different types of blood vessels. • How water is transported through the body and develop their understanding of the importance of water to human health. • How to keep our bodies healthy and how our bodies might be damaged. The focus is on lifestyle choices that humans make, including diet, exercise and drug use, and how these are informed by scientific evidence.	• Recognise that light appears to travel in straight lines and ray diagrams can be used to represent this. • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them (pinhole camera).	• The process of selective breeding, through which humans can select particular characteristics in different plants and animals. • It is a combination of inherited characteristics and the effect of environmental variables that ultimately mould the appearance and behaviour of living things through the process of natural selection. • Living things have changed over time and fossils provide information about living things that inhabited the Earth millions of years ago. • Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. • Animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution and maintain population.

Disciplinary Knowledge	• Devise their own systems of classification. • Identify how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics. • Use a range of approaches to present and communicate their findings to others including questioning themselves and their peers, evaluating the strength of evidence used to support arguments.	• Use recognised symbols when representing a simple circuit in a diagram. • Carry out illustrative practicals, describe circuits using scientific language. • Role play the flow of electricity through a basic circuit and one that includes fuse wire. • Research how electricity is generated both traditionally using coal and gas, and by renewable resources, and investigate how electricity is transmitted across the country.	• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood**.** Describe how these work together to deliver oxygen and nutrients to every part of the body • Use secondary sources in order to find answers to questions about the functions of different parts of the circulatory system that they cannot investigate. Use non- fiction books, web-based material and health education publications. • Carry out and illustrate a practical activity in which they make some 'blood soup', and, in a drama activity, they will model the transport of blood and gases around the body. • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.	• They investigate how white light is made up of many colours of light and how these can be split apart by a prism or in a rainbow, as well as how the colours can be joined together to make white again. • Carry out a fair test investigation to measure the size of shadows compared to the relative positions of the light sources, the object making the shadow and the screen. • To make a periscope.	• Demonstrate how organisms have changed over millions of years. • Carry out investigations to measure the variation between individual organisms of the same species. • Model the process of dog breeding by selecting parents that have the desired characteristics for producing useful offspring, and design their own animal to suit a specific environment.
Progression	**KS3 Biology:** Material Cycles and Energy; Interactions and Interdependencies	**KS3 Physics:** Energy, Electricity and electromagnetism	**KS3 Biology:** Structure and Function of Living Organisms (Skeletal and Muscular Systems; Health)	**KS3 Physics:** Waves (Light Waves)	**KS3 Biology:** Genetics and Evolution

Enquiry Types Key: Classification Research Comparative/Fair Test Observation Over Time Pattern Seeking