Science – Year 5

Science National Curriculum: https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study

Support for teaching and learning - planning, assessment and resources: https://drive.google.com/drive/folders/1agp6JVxYc0qvr8xJbKTQb4zjpqQ3H3Ty

PLAN website: https://www.planassessment.com/

Science PROGRESSION in KNOWLEDGE: https://docs.google.com/document/d/1hri61UtxP9TDHPKpMWnZq2hXl8ipUK-g/edit?usp=drive_web&ouid=104586050837987232444&rtpof=true

Science PROGRESSION in WORKING SCIENTIFICALLY: https://docs.google.com/document/d/1E2WidsJqKdX1D-br8YwHalSWyQqCds4k/edit?rtpof=true

Science PROGRESSION in WORKING SCIENTIFICALLY objectives: https://docs.google.com/document/d/1E2WidsJqKdX1D-br8YwHalSWyQqCds4k/edit

Science PROGRESSION in VOCABULARY: https://docs.google.com/document/d/1bpUKRkixOdybZDnsq0zt0u370sSKf9rj/edit?usp=drive_web&ouid=104586050837987232444&rtpof=true

Science Vocabulary by year group: https://drive.google.com/drive/folders/1h6G3G-i9PNBF-MeloVRKdO8JxfkfVQ9u

	AUTUMN	SPRING	SUMMER
Prior Learning	**Materials** **EYFS – see curriculum** ● Nursery ● Reception **Year 1** **Everyday materials** Pupils should be taught to: ● 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 **Year 2** **Uses of everyday materials** Pupils should be taught to: ● 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 **Year 4** **States of matter** Pupils should be taught to: ● 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	**Earth and Space** **EYFS – see curriculum** ● Reception **Forces** **EYFS – see curriculum** ● Nursery ● Reception **Year 3** **Forces and magnets** Pupils should be taught to: ● compare how things move on different surfaces: ● notice that some forces need contact between 2 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 2 poles ● predict whether 2 magnets will attract or repel each other, depending on which poles are facing	**Living things and their habitats** **EYFS – see curriculum** ● Nursery ● Reception **Year 2** **Living things and their habitats** Pupils should be taught to: ● 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 **Year 4** **Living things and their habitats** Pupils should be taught to: ● 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 **Animals excluding humans** **EYFS – see curriculum** ● Nursery ● Reception **Year 1** **Animals including humans** Pupils should be taught to:

			• 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 • 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 **Year 2** **Animals including humans** Pupils should be taught to: • 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 **Year 3** **Animals including humans** Pupils should be taught to: • 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 • identify that humans and some other animals have skeletons and muscles for support, protection and movement **Year 4** **Animals including humans** Pupils should be taught to: • 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, predators and prey
Next Steps in Learning	**Materials** KS3 Curriculum • the concept of a pure substance • mixtures, including dissolving • diffusion in terms of the particle model	**Earth and Space** KS3 Curriculum • gravity force, weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars; gravity forces between Earth	**Year 6** **Living things and their habitats** Pupils should be taught to: • describe how living things are classified into broad groups according to common observable

	• simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography the identification of pure substances	and Moon, and between Earth and Sun (qualitative only) • our Sun as a star, other stars in our galaxy, other galaxies • the seasons and the Earth's tilt, day length at different times of year, in different hemispheres The light year as a unit of astronomical distance **Forces** KS3 Curriculum • opposing forces and equilibrium: weight held by stretched spring or supported on a compressed surface • forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (qualitative only) • change depending on direction of force and its size	characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics **Year 6** **Animals including humans** Pupils should be taught to: • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • 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
Working Scientifically	**Working scientifically** During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking 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 • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a 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 **Working Scientifically Resources:** https://drive.google.com/drive/folders/1NMcf5LDZ5Drykr1kof0_W2Z9rZE3zh_o **5 Lines of Enquiry Labels:** https://docs.google.com/document/d/1hd0wbQnW19h8ST0h1JyUXl4CEjawFNhf/edit		
Curriculum Units and Endpoints **PLAN – Planning for Assessment** https://drive.google.com/drive/folders/1agp6JVxYc0qvr8xJbKTQb4zjpqQ3H3Ty	**Properties and changes of materials** Pupils should be taught to: • 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	**Earth and Space** Pupils should be taught to: • 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 **Non-Statutory**	**Living things and their habitats** Pupils should be taught 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 **Non-Statutory** Pupils should study and raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and

Knowledge Organisers https://drive.google.com/drive/folders/1FrIvv9ALMCbX2ycaHVQGnJSwjD2ZuiWR	• give reasons, based on evidence from comparative and fair tests, for the 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 **Non-Statutory** *Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinklefree cotton. Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials.*	*Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet. Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils should find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.* **Forces** Pupils should be taught to: • 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, pulleys and gears allow a smaller force to have a greater effect **Non-Statutory** *Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their e Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).*	Jane Goodall. Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. **Animals including humans** Pupils should be taught to: • describe the changes as humans develop to old age **Non-Statutory** Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.

		They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils should find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.	
Key Ideas **Milestone Resources** https://drive.google.com/drive/folders/1GpxFKswZLHxFeFWwPgc3vvMdoDyGI_Oa	**Properties and changes of materials Key Ideas** ● all matter (including gas) has mass ● sometimes mixed substances react to make a new substance. These changes are usually irreversible ● heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible	**Earth and Space Key Ideas** ● stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance ● objects with larger masses exert bigger gravitational forces ● objects like planets, moons and stars spin. ● smaller mass objects like planets orbit large mass objects like stars ● stars produce vast amounts of heat and light. All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars **Forces Key Ideas** ● air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way ● friction is a force against motion caused by two surfaces rubbing against each other some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move	
Cross Curricular Links and Enrichment	**Properties and changes of materials** **English:** ● develop explanation writing – conclusions and describing fair tests **Maths:** ● venn diagrams to sort and classify ● bar and line graphs to analyse data ● measuring	**Earth and Space** **English:** ● chronological Report Writing ● laboratory report writing ● to write a biography **Maths:** ● to use scales to interpret photographs and diagrams ● to create a scale to model the solar system ● to draw bar charts and line graphs to compare planetary data ● to use Venn diagrams to compare planets ● to draw line graphs to compare gravity on different planets	**Animals including humans** **English:** ● to write an information text about puberty ● to write a report on average height across the school investigation **Maths:** ● to create and interpret line graphs to illustrate human growth ● collecting large sets of measurement data, repeats to check for reliability and average calculations ● interpreting baby growth charts from health visitor books

		Forces **English:** ● to write full report of investigations ● to write a chronological report of the race to the moon **Maths:** ● measuring Angles and forces ● tabulating data ● drawing line graphs	
Working Scientifically Investigation ideas **Milestone Resources** https://drive.google.com/drive/folders/1GpxFKswZLHxFeFWwPgc3vvMdoDyGI_Oa	**Working Scientifically** Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting. **Properties and changes of materials** ● which material is the hardest? (Scratch testing with iron nail and magnifying glass) ● which material dissolves best in water? (comparing the time for salt, sugar, flour, washing powder to dissolve) ● what factors affect how quickly a solid dissolves? (Different sized particles of sugar/ different temperatures) ● what happens to the transparency of a material as it gets thicker? (data logger to measure light intensity with increasing layers) ● which material is the best thermal insulator? (Hot Chocolate/Penguins investigation) ● which material is most magnetic? (Measure the distance in mm that a material can move towards a magnet before it experiences a force)	**Working Scientifically** Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks. **Earth and Space** ● investigating trends in planetary data eg. Size vs distance from the Sun or Temperature vs. Distance from the Sun ● how does the Moon appear to change over a month? – keep a moon diary ● investigating the movement of the Sun in the Sky. (Ping pong ball on a stick) ● investigating shadows over a day ● investigating the link between mass and weight on Earth – comparing with other places in space **Working Scientifically** Pupils might work scientifically by: exploring falling paper cones or cupcake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects. **Forces**	**Working Scientifically** Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows. **Animals including humans** ● observation over time the growth of an animal ● research gestation periods of animals compare and contrast **Working Scientifically** Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow. **Living things and their habitats** ● first hand experience of a life cycle

		• what shape would be best for a sensor that you want to fall to the bottom of the ocean? Different shaped plasticine shapes –time the fall – could change liquid and look at viscosity • which surface gives the greatest friction? Measuring the angle of the slope that will make a object move. Best grip for shoes. • what is the best design for a rocket? Changing nose cone shapes and investigating effect on distance travelled. • which boat shape or sail shape would reduce friction forces the most?	
Assessment for learning and Moderation Support	**PLAN – Planning for Assessment:** https://drive.google.com/drive/folders/1agp6JVxYc0qvr8xJbKTQb4zjpqQ3H3Ty **Assessment in Science Lessons:** https://pstt.org.uk/unique-resources/taps/?_sft_age_ranges=nine-twelve **Working Scientifically Resources:** https://drive.google.com/drive/folders/1NMcf5LDZ5Drykr1kof0_W2Z9rZE3zh_o **Knowledge Organisers:** https://drive.google.com/drive/folders/1FrIvv9ALMCbX2ycaHVQGnJSwjD2ZuiWR		

Year 5 Science Vocabulary

Working Scientifically	Living Things and Their Habitat	Animals Including Humans	Properties and Changes of Materials	Earth and Space	Forces
variables, independent variable, dependent variable, control variable, evidence, justify, argument, causal relationship, accuracy, precision, scatter graphs, bar graphs, line graphs, force meter	life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, cuttings	puberty, the vocabulary to describe sexual characteristics in line with the school's RSE policy	Thermal insulator, conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non -reversible change, burning, rusting, new material	Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit	force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys,