

TOPIC	FORCES	EARTH AND SPACE	PROPERTIES AND CHANGES OF MATERIALS	LIVING THINGS AND THEIR HABITATS (LIFE CYCLES AND REPRODUCTION)	ANIMALS INCLUDING HUMANS (CHANGES IN HUMAN DEVELOPMENT)
KEY SCIENTIST	Albert Einstein (Theoretical Physicist)	Nicolaus Copernicus	Arthur Fry Spencer Silver	Marjory Stoneman Douglas	Maya Hanspal (Neuroscientist)
NATIONAL CURRICULUM OBJECTIVES (SUBSTANTIVE KNOWLEDGE)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Describe the changes as humans develop to old age.
SCIENTIFIC ENQUIRY (DISCIPLINARY KNOWLEDGE)	<ul style="list-style-type: none"> Raise different types of scientific questions and hypotheses. Make decisions about different enquiries including recognising when a fair test is necessary and begin to identify variables. Plan and carry out comparative and fair tests making systematic and careful observations. Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models. 	<ul style="list-style-type: none"> Raise different types of scientific questions and hypotheses. Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models. 	<ul style="list-style-type: none"> Raise different types of scientific questions and hypotheses. Make decisions about different enquiries including recognising when a fair test is necessary and begin to identify variables. Plan and carry out comparative and fair tests making systematic and careful observations. Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models. 	<ul style="list-style-type: none"> Raise different types of scientific questions and hypotheses. Use and develop keys to identify, classify and describe living things and materials. Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models. 	<ul style="list-style-type: none"> Raise different types of scientific questions and hypotheses. Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models.
SUGGESTED TASKS	<ul style="list-style-type: none"> Investigate the principle of gravity and research Isaac Newton. Investigate air resistance around us: sycamore seeds, parachutes- draw and label diagrams to show the forces Investigate bike brakes as a resistant force and the effects of friction to slow an object down. Can you design a toy which uses only air resistance? Test several prototypes, recording results and making changes. Design parachute style toys based on the principles of air resistance. Test it and 	<ul style="list-style-type: none"> Create questions to answer Use PE and physical modelling to explain rotation, movement and orbit. Complete diagrams to explain findings. Label the planets of the universe and why Pluto has been classed as a dwarf planet in 2006. Create facts about the geocentric and heliocentric solar system models. (create mobile models) Demonstrate the phases of the moon using biscuits and labels. 	<ul style="list-style-type: none"> Identify the features of changes by: Investigate burning, cooking and rusting compared to dissolving and mixing and by attempt to separate by filtering, sieving, melting or evaporating. Research the story of Chewing Gum and how that is made and cannot be reversed. Reversible and irreversible changes: Identify the features of changes by: Investigate burning, cooking and rusting compared to dissolving and mixing and by attempt to separate by filtering, sieving, melting or evaporating. Conductivity- explore materials that when placed near heat retain it or do not. Insulators- explore those that will let electricity 	<ul style="list-style-type: none"> Look at statistical information on height and weight at different stages of life and make predictions for future height etc Compare life cycles which include eggs to the human life cycle (including time) Make drawings and annotations to show sexual and asexual reproduction in plants. (exploded diagrams DT link) Study the work of David Attenborough. 	<ul style="list-style-type: none"> Draw timelines to indicate stages in growth and development from birth to death Look at gestation periods of animals and compare them with humans. Compare length and mass of a baby as it grows. Create line graphs to predict continued growth of a child

	<ul style="list-style-type: none"> report the findings. Investigate how to reduce a force required to move something using pre made pulleys, levers, gears and springs. Match pulleys, levers, gears and springs to a suitable use 		<ul style="list-style-type: none"> pass through them and those that will not. Use a probe style thermometer to collect results and report. 		
STICKY KNOWLEDGE	<ul style="list-style-type: none"> 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. Some objects/animals are streamlined to minimise the effects of air/water resistance 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. Reversible changes can be reversed by: sieving, filtering, evaporating. Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature). Changes can be reversed by: sieving, filtering, evaporating. 	<ul style="list-style-type: none"> Different animals mature at different rates and live to different ages. Some organisms reproduce sexually where offspring inherit information from both parents. Some organisms reproduce asexually by making a copy of a single parent. Environmental change can affect how well an organism is suited to its environment. Different types of organisms have different life cycles. 	<ul style="list-style-type: none"> Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction. Hormones control these changes, which can be physical and/or emotional. Humans reproduce sexually where offspring inherit information from both parents. The average length of gestation in humans is 280 days, or 40 weeks.
PRIOR LEARNING ←	<p>Year 1 - Everyday materials (Identifying and simple properties of materials)</p> <p>Year 2 - Use of materials. (Suitability of materials and changes of solids)</p> <p>Year 3 - Forces and magnets</p>	Year 3 - Forces and Magnets	<p>Year 1 - Everyday materials (Identifying and simple properties of materials)</p> <p>Year 2 - Use of materials. (Suitability of materials and changes of solids)</p> <p>Year 3 - Rocks and Soils</p> <p>Year 4 - States of Matter</p>	<p>Year 1 - Plants (Identify and describe basic structure)</p> <p>Year 2 - Living things and their habitats (Identifying habitats and needs) & Plants (How seeds and bulbs grow and mature and plants needs)</p> <p>Year 3 - Living things and their habitats (Plants)</p> <p>Year 4 - Living things and their habitats (Grouping & Identifying and Environmental changes)</p>	<p>Year 1 - Animals including humans (Identifying and classifying animals and body parts)</p> <p>Year 2 - Animals including humans (Offspring growing into adults and animals basic needs) Healthy Me (Exercise, diet and hygiene)</p> <p>Year 3 - Animals including humans (Skeletons and nutrition)</p> <p>Year 4 - Animals including humans (Food chains, Teeth and Digestion)</p>
FUTURE LEARNING →	KS3 Energy changes and transfer, forces and motion	KS3 Earth and atmosphere		Year 6 - Living things and their habitats (Classification)	Year 6 - Animals including humans (Circulatory system and how bodies function)
VOCABULARY	air resistance, Earth, fall, faster, force, friction, gear, gravity, greater, level, machines, mechanism, movement, object, opposing, parachute, pulley, slow down, smaller, stop, surface, theory of gravitation, unsupported, water resistance	astronomical clock, axis, celestial body, day, Earth, geocentric, heliocentric, Jupiter, Mars, Mercury, Moon, movement, Neptune, night, orbit, phases, planets, rotation, Saturn, shadow clock, solar system, spherical, star, Sun, sundial, Uranus, Venus	acid, bicarbonate of soda, burning, chemical changes, chemists, dissolve, electrical conductivity, evaporate, everyday materials, filter, formation, gas, hardness, irreversible, liquid, magnets, melt, metal, mixtures, new materials, plastic, properties, reactions, reversible changes, rusting, separate, sieve, solid, solubility, solution, suspension, thermal conductivity, transparency, wood	amphibians, animals, asexual, birds, bulb, changes, cuttings, differences, dispersal, fertilisation, gestation, habitats, insects, life cycle, life process, mammals, parent plant, plants, pollination, reproduction, root, seed, sexual, similarities, stem, tuber	adolescent, adult, animals, baby, changes, develop, embryo, foetus, gestation, growth, hormones, humans, old age, puberty, teenager, timeline, toddler
SCIENCE CAPITAL	<ul style="list-style-type: none"> Forces used in the home. Use of forces in the wider world. Jobs that rely on the use of forces. 	<ul style="list-style-type: none"> Jobs that rely on the knowledge of space Real life applications of Earth and space. 	<ul style="list-style-type: none"> Changes of state applied to the world (real world uses) Who needs knowledge of material changes in their jobs? How States of Matter impact on our lives. 	<ul style="list-style-type: none"> Who might need knowledge of life cycles and reproduction in their jobs? Real world application. 	<ul style="list-style-type: none"> Who might need knowledge of human development in their jobs? Real world application.