

Curriculum Connection
Science Subject Strands- National Curriculum

| Strand | Biology | Chemistry | Physics |
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| Pre KS1 | Pupils know some things are alive and some are not alive. They are able to sort animals or plants into given categories e.g. animals with fur or plants you can eat. Pupils are able to communicate observations through drawings, which can be recognised e.g. a plant with green coloured leaves. They are able to describe a familiar animal from memory by physical appearance or characteristics. Pupils can request actions and events regarding taking care of living things e.g. 'Water the plant' or 'Feed the dog'. | Pupils can collect objects or materials when given a simple property. They can name simple objects and match them e.g. naming a plastic bottle and matching it to a piece of plastic. Pupils can sort by a given criterion e.g. runny things. They can repeat actions and modify them e.g. mixing sand with water to create a better sandcastle. Pupils begin to make predictions e.g. expect ice cream to melt. They can describe characteristics of objects and events they observe e.g. it's soft or it's sloppy. | Pupil can collect objects or materials e.g. vehicles to push. They can carry out simple instructions when given gesture or a physical prompt e.g. push the car. Pupils can name simple actions and events e.g. pushing and pulling. Using some simple descriptions, pupils say what happened when an action is performed. They can request actions for simple cause an effect e.g. light on/ off. |
| KS1 | <p>Animals Including Humans- Pupils can compare differences between living, dead, and non- living things. They can compare and sort animals into categories by type, what they eat and their body structures. Pupils can label the basic human body parts and identify the parts associated with each sense. They can describe the basic needs for animal and human survival and how animals obtain their food. Pupils can also describe the importance of humans exercising, eating right and hygiene.</p> <p>Plants- Pupils can name the key parts of plants and trees. They can compare deciduous and evergreen trees. Pupils can plant their own seeds/ bulbs to describe how they mature. They can identify what plants need to grow and stay healthy.</p> <p>Living things and their Habitats- Pupils can identify that most living things live in habitats to which they are suited and can match plants/ animals to their habitats. They can describe how habitats provide the basic needs for different living things.</p> | <p>Materials and Rocks- Pupils can describe materials using simple adjectives and properties. They can name some common materials and compare and group them based on simple physical properties. They can investigate how the shape of solid objects can change and how other materials change. Pupils can identify and compare the sustainability of a variety of materials. They can sort materials into groups and give reasons for their groupings.</p> | <p>Seasons, Earth and Space- Pupils observe changes across the four seasons, describe weather associated with the seasons and how the length of day vary. They can observe changes in position and size of shadows during the day.</p> <p>Forces, Motion and Magnets- Pupils can compare how different things move on the same surface. They can describe how different things move using simple comparisons such as faster and slower.</p> |
| KS2 | <p>Animals Including Humans- Pupils can describe the simple functions of muscles, the skeleton and types of teeth. They are able to describe the main functions of organs in the human body and outline the digestive and circulatory system in some detail. Pupils can describe the human life cycle and the life process of reproduction in plants and animals. They begin to describe hereditary features of human offspring. Pupils can explain the importance of humans exercising, eating right and hygiene and the impact of drugs and lifestyle on the functioning of the body. They are able to read and construct classification keys to animals based on their characteristics.</p> <p>Plants- Pupils can describe simple functions of the main plant parts including reproductive parts. They explore plant requirements in detail e.g. room to grow and why this is important. They can describe the plant life cycle and investigate how water is transported within plants.</p> <p>Living things and their Habitats- Pupils can construct food chains and use classification keys to identify and group living things. They can recognise that environments can change posing dangers to living things. Pupils can explain that environmental factors determine different organism habitats. They can also describe life cycles of different animal groups and the reproduction process of some plants/ animals.</p> <p>Evolution, Inheritance and Genetics- Pupils can describe evolution and how some species can adapt. They can recognise skeletal changes over time and comment on why these may have occurred.</p> | <p>Materials and Rocks- Pupils can group and compare different kinds of rocks. They can describe properties of sedimentary, metamorphic and igneous rocks, fossil formation and the layers of soil. Pupils can describe dissolving and melting. They investigate different methods of separating mixtures for the three states of matter and predict whether they are reversible or irreversible. Pupils can give evidence-based reasons to compare uses of everyday materials.</p> <p>States of Matter- Pupils can compare, group and describe the properties of solids, liquids and gases. They can measure temperatures of materials when they change state when heated or cooled. Pupils can describe evaporation and condensation in the water cycle and explain how temperature affects this.</p> | <p>Seasons, Earth and Space- Pupils can describe how the planets of the solar system orbit around the sun and the moons orbit around the Earth. They describe the Sun, Earth and Moon as approximately spherical bodies. Pupils can describe how the Earth's rotation causes the day/night cycle.</p> <p>Forces, Motion and Magnets- Pupils compare how things move on different surfaces and recognise the difference between contact and non-contact forces. Pupils observe and group materials which are magnetic (attract and repel). They can describe magnets as having two poles and can predict two magnets will attract and repel each other depending on which poles are facing.</p> <p>Light- Pupils can name a variety of light sources and understand sunlight can damage the eyes to describe ways to protect them. Pupils know light is reflected from surfaces and how shadows are formed. They can find patterns in the size of shadows. Pupils can describe light travelling in straight lines and how objects are seen by the human eyes. They can link light travelling in straight lines to the shape of shadows.</p> <p>Sound and Waves- Pupils can investigate sounds made through vibrations. They can find patterns in the pitch of sound and the volume of sound. Pupils can make simple generalisations about abstract sound phenomena.</p> <p>Electricity- Pupils can identify common appliances that run on electricity. They can construct a simple series circuit and describe a complete circuit. Pupils can describe how a switch operates in a circuit. They can name some common conductors and insulators.</p> |

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| <p>KS3</p> | <p>Animals Including Humans- Pupils can describe the seven life processes and the transport of nutrients and water within animals/humans. They can further describe functions of the skeleton and muscle groups to then explain the biomechanics and interaction between both. Pupils can describe the respiratory and digestive processes in depth and the consequences of related diseases. They can describe the structure and function of the male and female reproductive systems and outline the female menstrual cycle. Pupils understand the effect of maternal lifestyle including drugs on the foetus development.</p> <p>Plants- Pupils can explain respiration and photosynthesis within the carbon cycle. They can describe the importance and process of photosynthesis and adaptations of leaves for photosynthesis. Pupils can explain reproduction in plants and the importance of insect pollination for human food.</p> <p>Living things and their Habitats- Pupils can describe and give reasons for classifying living things based on specific observable characteristics. They can describe the effect of environmental factors on organisms and how organisms affect the environment. Pupils can construct food webs and pyramid numbers to show feeding relationships. They can investigate variation and organisms adapting to survive in their ecosystems.</p> <p>Evolution, Inheritance and Genetics- Pupils describe the development of the chromosome, gene, DNA model. They can sort hereditary and environmental factors causing variation between individuals. Pupils can analyse variation within species including continuous and discontinuous variations. Pupils can describe how competition leads to adaptation, changes in environmental leads to extinction and the importance of preserving genetic material. They can use fossil evidence to describe how living things have changed over time and how animals and plants adapt to suit their environment.</p> <p>Cells- Pupils can identify and describe adaptations of different human body cells. They are able to observe cells under the microscope and name the subcellular structures of animal and plant cells giving their functions. They can describe structural adaptations of unicellular organisms and the hierarchical organisation of multicellular organisms. They can compare and explain anaerobic and aerobic respiration.</p> | <p>Materials and Rocks- Pupils can explain irreversible reactions forming new materials e.g. burning and acid on bicarbonate of soda. They can order metals and carbon in the reactivity series and the use of carbon in obtaining metals from metal oxides. Pupils can describe ceramics, polymers and composites.</p> <p>States of Matter- Pupils can demonstrate the particle models and describe the properties in terms of particle kinetics (gas pressure and diffusion) for solids, liquids and gases. They understand the changes of state in terms of energy changes.</p> <p>Earth and Atmosphere- Pupils know the structure of the Earth and the composition of its atmosphere describing atmospheric changes since its formation. They can describe the rock cycle and how different rocks are formed. Pupils know the carbon cycle and how carbon dioxide produced by human activity impacts on climate. They can explain the efficacy of recycling.</p> <p>Atoms, Elements, Compounds and Chemical Reactions- Pupils can understand the nature of atoms, elements and compounds. They understand the law of conservation and the concept of a pure substance. Pupils know the principles underpinning the Mendeleev Periodic Table. They know chemical symbols/formulae for elements and compounds to then represent chemical reactions as equations. They can describe physical and chemical properties of elements and patterns of reactions with reference to the periodic table. Pupils know about combustion, thermal decomposition, oxidation and displacement reactions. They know about the pH scale and indicators to measure acidity and alkalinity. Pupils can define acids, bases and alkalis in terms of neutralisation reactions. They can describe the reactions between acids with metals and acids with bases and metals. Pupils understand what catalysts do and the difference between exothermic and endothermic chemical reactions.</p> | <p>Seasons, Earth and Space- Pupils know about gravity forces between the Earth and sun and the Earth and moon. They can calculate the force of gravity on Earth and know the gravitational field strength on Earth is 10 N/kg and changes depending on the different planets and stars. Pupils know the Sun as a star and the galaxy contains millions of stars. They know about the Earth's tilt causing seasonal and day length changes at different times of year, in different hemispheres. Pupils understand a light year is used to measure the distance in space.</p> <p>Forces, Motion and Magnets- Pupils can identify the effects and understand forces associated with air resistance, water resistance and friction. They can use force arrows in diagrams and understand turning forces as moments. Pupils understand the relationship between speed, distance and time and represent this on distance-time graph. Pupils can illustrate magnetic fields, describe the Earth's magnetism and explain the magnetic effect of a current, electromagnets and D.C. motors.</p> <p>Light- Pupils know about light waves and the speed of light. They can describe the human eye using the ray model and know the causes of chemical and electrical effects. Pupils can describe how light can be reflected, refracted and dispersed. Ray diagrams show what happens to light in mirrors and lenses. Pupils can describe that eyes and cameras detect light.</p> <p>Sound and Waves- Pupils will understand that sound is a form of energy and explain the sound wave in terms of amplitude and wavelength. They can understand the properties of sound waves and calculate the speed sound. Pupils can explain how sound travels and the structure of the ear.</p> <p>Electricity- Pupils can investigate the brightness of a lamp and volume of a buzzer. They know about electric current in parallel and series circuits. Pupils can investigate resistance and know the link between resistance and potential difference. They can explain how electrons are transferred between electrically charged objects link this understanding to how electric fields are created.</p> <p>Energy- Pupils will compare the amounts of energy transferred by different foods and activities. They will use the cost formula to compare energy usage and costs of running home devices. Pupils will explain advantages and disadvantages of different energy resources and be able to represent energy transfers. Pupils will describe energy transferred and variables that can affect this. They will show how energy is transferred between energy stores in a range of real-life examples. Also, calculate the useful energy and the amount dissipated and explain how energy is dissipated in a range of situations. They will understand the definition of work and explain how machines make this easier. Pupils will compare the work needed to move objects different distances. They will explain thermal energy transfers and investigate how to prevent heat loss by conduction, convection and radiation.</p> <p>Matter- Pupils will relate the features of the particle model to the properties of materials in different states. They will devise ways to separate mixtures, based on their properties. They will sort elements using chemical data and relate this to their position in the periodic table. Pupils will compare the properties of elements with the properties of a compound formed from them.</p> |
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