

SCIENCE

Significant people

Aspire London will:

- Develop pupils' knowledge and understanding of the world and people, past and present, who shape it
- Provide identifiable role models to raise ambition and aspiration

Community

Aspire London will :

- Immerse the children in the historically rich and diverse nature of London
- Give pupils an understanding of the positive impact of migration and a cultural appreciation of our community

Equality & Justice

Aspire London will:

- Empower pupils to be advocates who address issues of prejudice and discrimination
- Ensure pupils value fairness and resolve differences through positive discussion

Environmental Responsibility

Aspire London will:

- Educate children of the need to protect God's planet from environmental damage
- Create eco- friendly citizens who are aware of the impact of their individual actions and those of the wider world.



Autumn Term	Knowledge	Skills	Vocabulary
<p>Year 1 Animals Including Humans</p>	<ul style="list-style-type: none"> • To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • To describe and compare the structure of a variety of common animals. • To identify and name a variety of common animals that are carnivores, herbivores and omnivores. • To identify and name the basic parts of the human body e.g. head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth. • To name the five senses and state which part of the body is associated with each sense. Helen Keller 	<ul style="list-style-type: none"> • To be able to group, sort and classify things. • To use simple scientific language to talk about what they have found out. • To draw and label a basic diagram • To perform simple comparative investigations 	<p>Mammals Birds Reptiles Amphibians Fish Carnivores Herbivores Omnivores</p> <p>Smell Sight Touch Taste Hearing</p> <p>Identify Classify Group Comparative test Investigate</p>
<p>Seasonal Changes</p>	<ul style="list-style-type: none"> • To know the name and order of the seasons. • To name and identify common types of weather • To know how weather can change each day. • To describe how the length of the day changes throughout the year. 	<ul style="list-style-type: none"> • To observe changes over a period of time. • To record data in simple charts and tables. 	<p>Seasons Autumn Winter Spring Summer Weather Sun Rain Wind Cloud Day Length Trees Leaves</p>

<p>Year 2 Uses of everyday materials</p>	<ul style="list-style-type: none"> • To identify a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard. • To know the properties of materials. • To know some objects can be made from a variety of everyday materials. • To know that some materials can be used for a range of purposes. • To know that the properties of materials make them suitable or unsuitable for particular purposes. • To suggest unusual and creative uses for everyday materials. • To find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. • To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. 	<ul style="list-style-type: none"> • To use secondary sources to find information • Identify and classify • Make comparisons • Carry out simple experiments and make predictions • Using their observations and ideas to answer questions. • Use scientific language when recording findings. 	<p>Fabric Squashing Bending Twisting Stretching Opaque Transparent Absorbent Experiment Properties Rigid Flexible</p>
<p>Year 3 Rocks</p>	<ul style="list-style-type: none"> • To name the three different types of rock and explain their formation. • To group rocks according to their appearance and simple physical properties for example which rocks are permeable. • To describe in simple terms how fossils are formed when things that have lived are trapped within rock <p><u>Palaeontology</u></p> <ul style="list-style-type: none"> • To know what a paleontologist does. • To know how paleontology has changed human understanding of prehistoric animals. • To understand Mary Anning's contribution to palaeontology. • To know that soil is made from rocks and organic matter. • To understand soil permeability. 	<ul style="list-style-type: none"> • To make systematic and careful observations • To identify and classify using a hand lens or microscope • To plan for a fair investigation. • To present observations orally. 	<p>Igneous Sedimentary Metamorphic lava formation volcano magma sea floor (bed) cliff layers Permeable Impermeable Buoyancy Fossil fossilisation pressure Palaeontology Organic matter Soil</p>

<p>Year 4 Electricity</p>	<ul style="list-style-type: none"> Identify common appliances that run on electricity To identify how to stay safe when using electricity. Construct a simple series electrical circuit Identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise that a switch opens and closes a 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. <p>Thomas Edison, James Watt, Francois Voltaire and Joseph Swan</p>	<ul style="list-style-type: none"> To report on findings, including oral and written explanations in the context of preparing a presentation. To set up practical enquiries related to simple scientific ideas and processes. Use results to raise further questions. Record findings using a labelled diagram. Making systematic and careful observations To take accurate measurements using standard units. Asking relevant questions and using different types of scientific enquiries to answer them. 	<p>Electricity Charge Flow Current Generate Power Appliance Energy Source Mains Battery Danger Precautions Cell Battery holder Crocodile clip Wires Bulb Bulb holder Complete Incomplete Circuit Conductor Insulator Conduct Insulate Buzzer Motor Switch</p>
<p>Year 5 Properties and changes of materials</p>	<ul style="list-style-type: none"> To know the properties everyday materials, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic 	<ul style="list-style-type: none"> Compare and group together Plan scientific enquiries to answer questions. Take measurements using a range of scientific equipment. To use test results to make predictions and to set up further comparative tests. 	<p>Properties Hardness Solubility Transparency Dissolve Solution Solute Separating</p>

	<ul style="list-style-type: none"> • To know that some materials will dissolve in liquid to form a solution. • To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • To describe how to recover a substance from a solution • To demonstrate that dissolving, mixing and changes of state are reversible changes • To 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. • To know about famous chemists who created new materials. Becky Schroeder - fluorescence material • To know how chemical changes have an impact on our lives. Jamie Garcia (BP website)- Invention of a new plastic 	<ul style="list-style-type: none"> • Compare and group everyday materials according to their properties • Interpret the results of tests and use them to answer questions • Plan a fair test to answer a question 	<ul style="list-style-type: none"> Filtering Sieving Evaporating Reversible changes Mixing Evaporation Filtering melting irreversible chemical rusting residue condensing oxygen powder grain granular crystals steam water vapour heating cooling degrees Celsius melt freeze solidify melting point molten boil
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<p>Living things and their Habitat</p>	<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. • To know about different types of reproduction (sexual and asexual in plants and sexual reproduction in animals.) • To know that species that reproduce in different ways • To learn about naturalists and animal behaviourists such as David Attenborough, Jane Goodall and Steve Backshall 	<ul style="list-style-type: none"> • To observing and compare over time. • To ask pertinent questions and suggest reasons for similarities and differences. • To record data and results of increasing complexity using scientific diagrams and labels. • Record data using bar graphs • To compare and consider reasons why. 	<p>Reproduction Sexual Asexual Life cycles Rainforest, oceans, desert Prehistoric</p>
<p>Year 6 Light</p>	<ul style="list-style-type: none"> ▪ To understand the way that light behaves, including knowing about some light sources. ▪ To understand the idea of reflection and shadows. ▪ To recognise that light appears to travel in straight lines ▪ To 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. 	<ul style="list-style-type: none"> • To planning different types of scientific enquiries to answer questions, including recognising variables ▪ To take measurements, using a range of scientific equipment, with increasing accuracy and precision. ▪ To record data and results of increasing complexity using scientific diagrams and labels, scatter graphs, and line graphs ▪ 	<p>Travels Straight Object Light source Periscope Filter Rainbow</p>

<p>Electricity</p>	<ul style="list-style-type: none"> ▪ To 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. ▪ To understand and use electricity efficiently and safely. ▪ To understand how a simple series circuit works ▪ To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit ▪ To 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 ▪ To use recognised symbols when representing a simple circuit in a diagram. ▪ To know how to make a useful circuit for a purpose. ▪ To find out about notable inventors and scientists in this field <p>Nicola Tesla- Alternating Currents</p> <p>Alessandro Volta- Electrical Battery</p>	<ul style="list-style-type: none"> ▪ To use test results to make predictions to set up further comparative tests <ul style="list-style-type: none"> • To plan a scientific enquiry to answer questions • To recognise and control variables where necessary <ul style="list-style-type: none"> • To record data and results of increasing complexity using scientific diagrams and labels • To use test results to make predictions to set up further fair tests • To report and present findings from enquiries, including finding causal relationship. 	<p>Voltage Brightness Volume Symbols</p>
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	<ul style="list-style-type: none"> • To identify and name a variety of plants and animals in micro-habitats. • To identify and name a variety of plants and animals in British habitats. • To identify and name a variety of plants and animals in world habitats. • To identify that most living things live in habitats and identify how they depend on each other. • To 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. Beckenham Place Park • To 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. 		Reproduction Excretion Nutrition Shelter Woodland Ocean Rainforest Conditions Habitats Urban Rural Forest Coastal Micro-habitats Food chain
Year 3 Animals including Humans	<ul style="list-style-type: none"> • To state why animals, including humans, need the right type and amount of nutrition. Adelle Davis -Nutritionist • To know that humans cannot make their own food; they get their nutrition from what they eat. Marcus Rashford • To name the different food groups and how they affect the human body. • To understand what makes a balanced diet for humans • To name the function and purpose of a skeleton (to help with protection, movement and support) Wilhelm Rontgen - X rays • To name the main larger bones in the human body. • To identify muscles and know how they help humans to move. 	<ul style="list-style-type: none"> • To find similarities and differences related to simple scientific ideas and processes. • To set up an enquiry • To write an explanation of the findings of the enquiry. • To record findings using simple drawings. 	Vitamins Minerals Proteins Carbohydrates Fibre Fats Digest Saturated fats unsaturated fats Skeleton Vertebrate Backbone Skeleton Cranium Ribs Rib cage Fibula Tibia Collarbone Muscle Triceps

<p>Plants and Flowers</p>	<ul style="list-style-type: none"> To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. To explore requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant. To know how water travels through a plant. To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. To demonstrate the differences between how plants and humans obtain food. <p>Joseph Banks- Botanist</p> <p>Ahmed Mumin Warfa - Botanist</p> <p>Marianne North- Botanist</p>	<ul style="list-style-type: none"> Identify similarities, differences or changes related to simple scientific ideas and processes. To ask relevant questions and use scientific enquiry to answer them To set up my investigation carefully To predict the results for new values of the data. To take accurate measurements and record data carefully. To describe observations. To use scientific evidence to answer questions and support findings. To record findings using simple labelled diagrams. 	<p>Bicep Deltoid Pectoralis Abdominals Quadriceps</p> <p>Roots anchor nutrients transport carbon dioxide sunlight absorb H2O plan predict conclusion sepal stamen anther filament stigma style ovary ovule pollen tube pollination fertilisation Transport temperature Dispersal germination life cycle stage</p>
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<p>Year 4 States of matter</p>	<ul style="list-style-type: none"> To know whether materials are solids, liquids or gases To know that some materials change state when they are heated or cooled To know the temperature at which this happens in degrees Celsius (°C) Lord Kelvin -Absolute zero (temperature) Anders Celsius -Temperature Scale Daniel Fahrenheit-Temperature Scale / Invention of the Thermometer To understand how evaporation works To understand how condensation works To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 	<ul style="list-style-type: none"> To compare, classify and group. Setting up practical enquiries and fair tests. To gather data in order to answer questions. To make systematic and careful observations, taking accurate measurements using thermometers. To use results to draw simple conclusions and make predictions for new values Report on findings from enquiries by displaying results and conclusions including bar charts. 	<p>Solid Liquid Gas Particles State Material Properties Carbon dioxide Weight Mass Melt Freeze Thermometer Water Ice Water vapour Process Evaporation Dry Energy Heat Condensation Precipitation Collection</p>
<p>Sound</p>	<ul style="list-style-type: none"> To identify how sounds are made, associating some of them with something vibrating by identifying and explaining sound sources around school. To recognise that vibrations from sounds travel through a medium to the ear To describe and explain sounds. To know the patterns between the pitch of a sound and features of the object that produced it 	<ul style="list-style-type: none"> Ask own questions about what they observe and make decisions about which type of scientific enquiry are likely to be the best ways of answering them. Draw simple conclusions and use scientific language. Carrying out simple comparative and fair tests and finding things out using secondary sources of information. 	<p>Sound Vibration Volume Amplitude Loud Quiet Travel Wave Particles High</p>

<p>Year 5 Animals including humans</p>	<ul style="list-style-type: none"> To know the patterns between the volume of a sound and the strength of the vibrations that produced it To recognise that sounds get fainter as the distance from the sound source increases. To explore how sound is made through vibrations in a range of different musical instruments. Composer To know which material best insulates for sound. <p>Alexander Graham Bell -Invented the telephone</p> <ul style="list-style-type: none"> To describe the changes as humans develop to old age. To know and order the stages in the growth and development of humans. To learn about the changes experienced in puberty. (non-statutory) To know the stages in the gestation period of humans and other animals. 	<ul style="list-style-type: none"> To gather data and analyse to answer questions. To find and observe patterns. <p>To research and compare. To research and accurately record data and results with increasing accuracy using tables and bar graphs. To report and present findings from enquiries in written forms.</p>	<p>Low Pitch Distance Telephone Transmit Soundproof Absorb</p> <p>Gestation Fetus Species Baby Toddler Adolescent Adult Elderly person Puberty Hormones</p>
<p>Year 6 Living things and their habitats</p>	<ul style="list-style-type: none"> To describe how living things are classified into broad groups according to common observable characteristics To describe how living things are classified into broad groups based on similarities and differences To know how including micro-organisms, plants and animals are classified 	<ul style="list-style-type: none"> To record data and results of increasing complexity using scientific diagrams and labels and classification keys To report and present findings from enquiries, such as written and oral explanations or presentations To research using a wide range of secondary sources 	<p>Classify Linnaeus Domain Kingdom Phylum Class Order Family Genus Species Characteristics Microorganism Flowering</p>

	<ul style="list-style-type: none"> • To know how magnets attract or repel each other and attract some materials and not others. • To identify some magnetic materials • Describe magnets as having two poles • To know whether two magnets will attract or repel each other. 		Magnets Magnetic Electromagnetic field Friction Surfaces (textures, tough smooth etc) Horseshoe magnet Bar magnet Wand magnet
Light and Shadows	<ul style="list-style-type: none"> • To know that light from the sun can be dangerous and how we can protect ourselves. • To know that light is needed to see and that darkness is the absence of light. • To identify a range of light sources, including the sun. • To notice that light is reflected from mirrors and other surfaces. • To recognise that shadows are formed when the light from a light source is blocked by an opaque object • To know that the size of shadows can change. 	<ul style="list-style-type: none"> • Find patterns and use to make further predictions. • To make systematical and careful observations. • To record findings using simple scientific language. • Orally suggest improvements to the investigation. 	Light Light source Emit Illuminate Reflect Absorb Shiny Bright Dull Gloss Matt Safety Visibility Unseen Torch Direct light Smooth Rough Scatter Reverse Beam Rays Backing Benefits Dangers Damage UV light Visible / invisible Direct / indirect

			Shade / shadow Block Absence Size Distance Darker Lighter Shade
Year 4 Animals including humans	<ul style="list-style-type: none"> To know that body has different systems and understand their special functions. 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. To know how teeth differ between carnivores and herbivores. To know what damages teeth and how to look after them. Construct and interpret a variety of food chains, identifying producers, predators and prey. 	<ul style="list-style-type: none"> To explore own questions To set up simple practical enquiries, comparative and fair tests by setting up an enquiry To use results to draw simple conclusions and suggest improvements by orally presenting findings. To label model or images. 	Mouth Tongue Teeth Oesophagus Stomach Duodenum Small intestine Large intestine Pancreas Liver Salivary glands Gallbladder Digestion Digestive system Functions Glands Enzymes Acid Teeth Incisors Canines Molars Premolars Predator Consumer Prey Producer Organism Criteria Venn diagram
Living things and habitats	<ul style="list-style-type: none"> Recognise that living things can be grouped in a variety of ways To 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. 	<ul style="list-style-type: none"> To identify, group and classify Explore and use classification keys to help group, identify and name. To identify similarities and differences related to scientific ideas. 	

	<ul style="list-style-type: none"> • To recognise positive and negative changes to the local environment. • To describe environmental dangers to endangered species. 	<ul style="list-style-type: none"> • To ask relevant questions and use a key find answers. • To raise and answer questions based on their observations. • To report on findings of enquiries including oral and written explanations or presentations. • To observing changes over time. 	<p>Carroll diagram Variation Classification Vertebrates Invertebrates Specimen Key Characteristic Habitat Environment Wildlife Change Endangered Extinct Conservation</p>
<p>Year 5 Earth and Space</p>	<ul style="list-style-type: none"> • To learn that the Sun is a star at the centre of our solar system and that it has eight planets • To describe the movement of the Earth, and other planets, relative to the Sun in the solar system • To understand that a moon is a celestial body that orbits a planet. • To describe the movement of the Moon relative to the Earth (including moon phases.) • To describe the Sun, Earth and Moon as approximately spherical bodies • To use the idea of the Earth's rotation on its axis to explain day and night and the apparent movement of the sun across the sky. • To know how the Earth orbits the sun every 365 ¼ days. • To know how the tilt of the Earth create seasons. 	<ul style="list-style-type: none"> • To answer questions through collecting, analysing and presenting data. • To use scientific diagrams and labels. • To report and present finding from enquiries including conclusions and explanations in written forms such as displays and presentations. • To identify scientific evidence that has been used to support or refute ideas • To compare data using internet links and direct communication. • To create simple labelled models. 	<p>Earth Planets Sun Solar system Moon Celestial body Sphere spherical Rotate rotation Spin Night and day Mercury Venus Mars Jupiter Saturn Uranus Neptune</p>

<p>Forces</p>	<ul style="list-style-type: none"> To know about the way that ideas about the solar system have developed, understanding how the geocentric and heliocentric models. To learn about the work of scientists such as Ptolemy, Alhazen and Copernicus. <p>Mae Jemison – Astronaut Helen Sharman and Tim Peake - GB astronaut</p> <ul style="list-style-type: none"> To know that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object To identify the effects of air resistance. To identify the effects of water resistance To identify the effects of friction. To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. <p>Galileo Galilei - Gravity and Acceleration</p> <p>Archimedes of Syracuse- Levers</p>	<ul style="list-style-type: none"> To plan a scientific fair test to answer questions. To recognise variables. To take accurate measurements using scientific equipment. To draw conclusions from an investigation Identify trends in results and draw conclusions . 	<p>Pluto 'dwarf' planet Orbit Revolve Geocentric model Heliocentric model Shadow clocks Sundials Astronomical clocks</p> <p>Fall Force Air resistance Water resistance Friction Moving surfaces Mechanisms Levers Pulleys Gears</p>
<p>Year 6 Animals including humans</p>	<ul style="list-style-type: none"> To name and understand the functions of the main body parts, internal organs and major systems - skeletal, muscular and digestive system To identify and name the main parts of the human circulatory system 	<ul style="list-style-type: none"> To planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate 	<p>Internal organs Heart Lungs Liver Kidney Brain Circulatory system Blood vessels Impact</p>

	<ul style="list-style-type: none"> ▪ To describe the functions of the heart, blood vessels and blood ▪ To recognise the impact of diet and exercise on the way their bodies function ▪ To recognise the impact of drugs and other substances on the way their bodies function ▪ To describe the ways in which nutrients and water are transported within animals, including humans. 	<ul style="list-style-type: none"> ▪ To record data and results of increasing complexity using scientific diagrams, labels, tables, scatter graphs, and line graphs ▪ To use test results to make predictions to set up further comparative and fair tests ▪ To report and present findings from enquiries, including causal relationships and explanations of and degree of trust in results ▪ To identify scientific evidence that has been used to support or refute ideas or arguments. 	<p>Drugs Lifestyle Damage Alcohol substances</p>
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