SCIENCE AT ALBAN CITY SCHOOL

Following the National Curriculum for Science, at Alban City School, we aim to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific skills required to understand the uses and implications of science, today and for the future.

We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

At Alban City School, we encourage children to be inquisitive throughout their time at the school and beyond. The Science curriculum fosters a healthy curiosity in children about our universe and promotes respect for the living and non-living. We believe science encompasses the acquisition of knowledge, concepts, skills and positive attitudes.

Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. Topics are revisited and developed throughout their time at this school. This model allows pupils to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this knowledge into the long-term memory.

We ensure that the Working Scientifically skills are built-on and developed throughout the pupils' time at the school so they can apply their knowledge of Science when using equipment, conducting experiments, building arguments, explaining concepts confidently and continue to ask questions, whilst being curious about their surroundings.

	Reception	Y1	Y2	Y3	Y4	Y5	Y6
	Identify something as a plant Name some common plants, identify leaf, root, stem and flower Recognise that plants need water to grow Name some places plants live Identify the seeds in a fruit	Know that plants produce seeds Identify differences between plants Identify and describe the basic structure of a variety of common flowering plants, including trees Name some common plants Name some plants that live in the garden Name some plants that live in the wild Name some trees in the local environment Recognise that different plants live in the local environment Use simple identification guides to name plants in the local environment Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	Explore how plants from seeds and bulbs grow Describe what happens to bulbs during the plant cycle as they grow Describe what happens to a seed as it grows and develops Describe what they observe as new plants grow Observe and describe how seeds and bulbs grow into mature plants Suggest how to find out about what plants need in order to grow well Recognise that plants are living and need water, light and warmth to grow Describe differences between plants grown in the light and in the dark Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy	Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers Describe why healthy roots and a healthy stem are needed for plants to grow Recognise that the leaves of a plant are associated with healthy growth and more specifically nutrition Know that fertilisers contain minerals Understand that plants absorb minerals from the soil (Teacher Note: plants create their own food using sunlight, water and carbon dioxide, they do not absorb food from the soil) Describe how changes to light and fertiliser affect plant growth explore 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 Investigate the way in which water is transported within plants Describe how the stem has a role in support and nutrition (transport of water) Describe why plants need flowers Describe the role of bees and insects in pollination Describe how pollen and seeds are dispersed Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal			

	Identify something as an animal Name some places animals live Identify and locate parts of their body Identify and locate parts of animals bodies Use their observations to describe humans and other animals Name a very limited range of food Can identify types of exercise Name baby, child, adult and the young of some other animals	Identify and sort animals into different groups Name the different groups of animals Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals Recall and use the words: carnivore, herbivore and omnivore Identify and name a variety of common animals that are carnivores, herbivores and omnivores Identify the food of some common animals Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Compare differences in texture, sounds and smells name and locate the basic parts of the human body	Describe some differences they observe between babies and toddler Explain that adult animals no longer grow Make comparisons of the differences they observe between babies and toddlers 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 Identify some types of food that make up their diet and name some examples of each describe some of the types of food that they eat	Name the components of a healthy and varied diet Describe how their diet is balanced 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 Describe some observable characteristics of bones Describe the main functions of their skeletons State that movement depends on both skeleton and muscles State that when one muscle contracts another relaxes Identify that humans and some other animals have skeletons and muscles for support, protection and movement	Describe the role of each organ in the digestive system describe the simple functions of the basic parts of the digestive system in humans Describe the role of each type of teeth in digestion Identify the different types of teeth in humans and their simple functions Explain how they should look after their teeth and recognise why they need to do so State that animals have different diets and may have different kinds of teeth		Describe what the heart and blood vessels do Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood Discover that during exercise the heart beats faster to take blood more rapidly to the muscles Make careful measurements of pulse rate Describe the different functions of the blood (e.g. transporting and protecting) Know that the blood comes from the heart in arteries and returns to the heart in veins Know that blood carries oxygen and other essential materials around the body Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function describe the ways in which nutrients and water are

als including humans

		Draw and label a simple body outline					transported within animals, including humans Recognise that care needs to be taken with medicines and that they can be dangerous Give several reasons why it is sometimes necessary to take medicines Identify some harmful effects of drugs Name the major groups into which food is categorised and identify sources for each group describe the main function of organs of the human body

onal changes		Observe changes across the four seasons Identify what to observe Use descriptive words, photos and pictures to record changes Collect evidence of changes (e.g. leaves, seeds, flowers) Observe and describe weather associated with the seasons and how day length varies Identify what to measure about the weather Use prepared tables and charts to record data					

	Make observations of common objects Make very simplistic observations of materials Arrange materials into groups Identify when changes occur e.g. when food is cooked	Distinguish between an object and the material from which it is made Identify some naturally occurring materials: wood, rock, water Identify some man-made materials: glass, metal, plastic identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Identify some properties of materials (e.g. see through, waterproof, absorbent) 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 (both visible and non-visible)	Recognise that some materials will have more than one property which increases its suitability for its purpose (e.g. glass is transparent, rigid and weatherproof) Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Suggest several reasons why a material may or may not be suitable for a particular purpose Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching Describe changes in shapes as a result of the action of pushes, pulls and twists	Classify rocks from the evidence of investigations Explain that rocks are used for different purposes dependent on their physical properties Explain that different types of rock react differently to physical forces (e.g. water, rubbing) 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 Recognise that soil contains dead plants and animals Recognise that there is rock under all surfaces and that soils come from rocks Recognise that soils are made from rocks and organic matter	Recognise everyday substances as mixtures of solids, liquids and/or gases Recognise that air is a material and that it is one of a range of gases which have important uses Recognise that gases flow from place to place Know that gases can be easily compressed describe the differences between solids and liquids Compare simple solids and liquids (e.g. in terms of ease of squashing or pouring) Compare and group materials together, according to whether they are solids, liquids or gases Make clear distinctions between the properties of solids, liquids and gases Identify a wide range of contexts in which changes of state take place	Suggest why particular materials are used for different jobs depending on their properties 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 give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic Name some materials that will and some that will not dissolve in water Recognise that although it is not possible to see a dissolved solid, it remains in the solution Describe melting and dissolving and give everyday examples of each Identify and explore factors that affect the rate at which a solid dissolves	

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					Describe a few examples where these changes occur Recognise that for a substance to be detected by smell, some of it must be in the gas state 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) Describe how when ice melts it turns to liquid and how when water freezes it becomes ice Describe how these processes can be reversed Describe how liquids evaporate to form gases and how gases condense to form liquids Sequence the changes that happen in the water cycle Describe the water cycle in terms of these processes	Separate an undissolved solid from a liquid by filtering Recognise that an undissolved solid can be separated from liquid by filtering Recognise that a solid can be recovered from a solution by evaporation describe the properties of mixtures which can be separated by filtration Describe some methods that are used to separate simple mixtures Explain that when solids dissolve they break up so small they can pass through the holes in the filter paper Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution Use knowledge about how a specific mixture can be separated to suggest ways in which other similar mixtures might be separated	

					Explain the relationship between liquids and solids in terms of melting and freezing Explain the relationship between liquids and gases in terms of evaporation and condensation Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature Know that temperature can affect the rate of evaporation or condensation Describe the effect of temperature on evaporation Explain how changing conditions affects processes such as evaporation and condensation Identify a range of contexts in which changes take place (e.g. evaporation of puddles in the school playground or from clothes on the	Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating Recognise that some changes can be reversed and some cannot Demonstrate that dissolving, mixing and changes of state are reversible changes Observe and explore a variety of chemical changes (e.g. burning) Identify whether some changes are reversible or not Classify some changes as reversible (e.g. dissolving) and others as irreversible (e.g. burning) Recognise that irreversible changes often make new and useful materials Describe what happens when acid and bicarbonate of soda are mixed	

					washing line, condensation in the bathroom)	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 Explain that in some cases the new materials made are gases and identify some evidence for the production of gases (e.g. vigorous bubbling)	
g things and their habitats			With help, use keys to identify some animals and plants Recognise that different plants live in the local environment Describe the simple features of habitats Recognise a microhabitat as a small habitat (e.g. leaf litter, woodlice under stones) Describe some microhabitats Identify and name a variety of plants and		Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment Recognise that living things can be grouped in a variety of ways Describe some of the characteristics of the vertebrate (fish, mammals, amphibians, reptiles and birds) groups (e.g. warm-blooded, have fur, lay eggs) Group animals into vertebrate (fish, mammals, amphibians,	Recognise the similarities in the life cycles of plants, animals and humans Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird Describe the functions of some parts of a flower Describe the main functions of parts of a plant involved in reproduction Describe the processes of sexual and asexual reproduction in plants	Understand why classification is important 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 Recognise that there are useful micro-organisms

			animals in their habitats, including micro- habitats Recognise similarities and differences between plants and animals Explore and compare the differences between things that are living, dead, and things that have never been alive Explain differences between living and non-living things in terms of characteristics such as movement and growth Construct a simple food chain (e.g. grass, cow, human) 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 Suggest reasons why different plants and animals are found in the different environments Identify that most living things live in habitats to which they are suited and describe how		reptiles and birds) and invertebrates groups (snails, slugs, spiders, worms and insects) Recognise that green plants are the ultimate source of food for all animals Recognise that a food chain must always start with a green plant (a producer) Represent feeding relationships within a habitat with food chains beginning with a green plant which 'produces' food for the other organisms Use and understand the terms: producer, predator and prey Construct and interpret a variety of food chains, identifying producers, predators and prey (Teacher Note: statement moved from NC 'Animals including humans' to improve progression within topics) Know the function of some of the more	Describe the simple functions of parts of the human reproductive system Describe the life process of reproduction in some plants and animals Compare methods of seed dispersal Know that most animals reproduce by sexual reproduction describe the changes as humans develop to old age (Teacher note: statement taken from year 5 'Animals including humans' programme of study)	which can be used in food production Describe how micro-organisms feed, grow and reproduce like other organisms Describe evidence, from investigations, that yeast is living Explain how micro-organisms can move from one food source to another or from one animal to another 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 Explain how being well adapted to an environment means an organism is more likely to survive Recognise that living things have changed over

			different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other		complex features which aid survival in specific habitats (e.g. gills, blubber, camouflage) Describe why different animals and plants live in different habitats Recognise that environments can change and that this can sometimes pose dangers to living things Describe how humans can cause changes to environments Explain that different organisms are found in different habitats because of differences in environmental factors		time and that fossils provide information about living things that inhabited the Earth millions of years ago Explain why we do not have a complete fossil record

and Sound	Know that it is dangerous to look at the sun Relate their sense of sight to their eyes Relate their sense of hearing to their ears			Describe and compare some light sources State that light sources are seen when light from them enters the eyes Recognise that light from the sun can be dangerous and that there are ways to protect their eyes Recognise that they need light in order to see things and that dark is the absence of light Explain that places are dark because there is no light and a light source is needed to help us see in such places Notice that light is reflected from surfaces Demonstrate light travelling using a torch and record light bouncing off a mirror Identify suitable reflective clothing for travelling in the dark Explain that they cannot see shiny objects in the dark because there are no light sources	Identify how sounds are made, associating some of them with something vibrating Identify what is vibrating in a range of musical instruments Generalise that sounds are produced when objects vibrate Describe how sounds are generated by specific objects Suggest ways of producing sounds 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 Distinguish between pitch and volume (loudness) know that altering vibrations alters the pitch or volume Suggest how to change the loudness of the sounds produced by a		Understand that in order to be seen, all non-luminous objects must reflect light Recognise that light appears to travel in straight lines Diagrammatically represent light from sources and bouncing off reflective surface using arrows 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 Draw diagrams to illustrate how light is travelling from the source to the eye 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 describe a variety of ways of changing the size of the shadow produced by an object Describe the relationship between the size of a shadow and the distance

				Recognise that shadows are formed when the light from a light source is blocked by a solid object Recognise that shadows are similar in shape to the objects forming them Explain that shadows are formed when light from a source is blocked State that even transparent objects block some light and form shadows Describe the difference in shadows cast by opaque, translucent and transparent materials Explore how to make shadows of different shapes and sizes Find patterns in the way that the size of shadows change	range of musical instruments Explore how to vary the pitch and volume of sounds from a variety of objects or instruments Find patterns between the volume of a sound and the strength of the vibrations that produced it Recognise that sounds get fainter as the distance from the sound source increases describe what they observe when they move further away from the source of a sound		between the light source and an object Diagrammatically represent the formation of shadows using arrow convention Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Forces	Observe and describe movements they and objects make			Describe how to make a familiar object start moving by pushing or pulling Describe how to use pushes and pulls to make familiar objects speed up, slow down, change direction or shape Produce annotated drawings showing the direction of force needed to make an object move Describe some ways in which friction between solid surfaces can be increased or decreased compare how things 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 Describe the difference between a magnet and a magnetic material		Identify weight as a force Draw force diagrams with arrows showing the direction of forces acting on an object Observe and explore the effect of several forces on objects Identify the effects of air resistance, water resistance and friction, that act between moving surfaces Describe some situations in which there is more than once force acting on an object Describe and explain the motion of some familiar objects in terms of several forces acting on them Identify forces on an object as either balanced or unbalanced Use the terms 'balanced' and unbalanced' when describing several forces on an object Explain that balanced forces on an object cause	

				Describe what happens when some materials are put near a magnet Notice that some forces need contact between two objects, but magnetic forces can act at a distance Recall that magnets have a north and a south pole Describe magnets as having two poles describe the direction of forces between magnets Predict whether two magnets will attract or repel each other, depending on which poles are facing		it to remain stationary or travel at the same speed explain that unbalanced forces on an object cause it to speed up, change shape or slow down Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object understand that air resistance is the frictional force of air on objects moving through it Describe some of the factors that increase friction between solid surfaces and increase air and water resistance Describe situations in which frictional forces are helpful as well as those in which frictional forces are unhelpful Explore the effects of levers, pulleys and gears Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect	

						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 Recognise that the Earth, Sun and Moon are spherical and support this with some evidence Recognise that it is daylight in the part of the Earth facing the Sun Explore and describe how a shadow from the Sun changes over the course of a day Explain in terms of the rotation of the Earth why shadows change and the Sun appears to move across the sky during the course of the day Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	

						Explain why it is night time in Australia when it is day time in England	
	Know electricity can be dangerous Explore a range of battery powered devices				Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Make drawings of simple working circuits (pictorial only circuit symbols covered in year 6) Make circuits from drawings provided 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 Describe the effect of making and breaking one of the contacts on a circuit Explain why some circuits work and others do not Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp		Use recognised symbols when representing a simple circuit in a diagram Draw circuit diagrams and construct circuits from diagrams using conventional symbols Explore how to change the brightness of bulbs and the volume of a buzzer Recall what causes the brightness of bulbs or the volume of a buzzer to change Compare different circuits (e.g. for brightness of bulb) recall that the amount of electricity is measured in voltage associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in

icity

					lights in a simple series circuit Describe how switches work construct a home-made switch Construct simple circuits and use them to test whether materials are electrical conductors or insulators Recognise some common conductors and insulators, and associate metals with being good conductors		how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches