Alexandra Park Primary Science

Intent: Through science at Alexandra Park Primary, we aim for all children to foster a curiosity about the world around them whilst acquiring specific skills and knowledge to help them think and work scientifically. Through our teaching and learning, our children will gain an understanding of scientific processes and start to make connections within science as well as with other areas of the curriculum.

It is important for children to have an understanding of how science has changed our lives and how it is vital for our future prosperity and sustainability.

Alongside teaching our children skills and knowledge we are also developing the following types of scientific enquiry: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.

Science -Early Years

In the EYFS, learning and exploring through play both indoors and outdoors will support the children's understanding of the natural world around them. Children will investigate, explore, and ask questions about how things work. They will talk about the changing seasons and explore the natural world around them such as watering and caring for plants. The children will observe the life cycles of caterpillars and chicks and discuss different stages in the life cycle. Through problem solving activities, children will investigate natural processes such as ice melting, floating, and sinking. Children will be introduced to and encouraged to use new vocabulary and ask questions about how things work.

Communication and Language	• **Learn new vocabulary.** • **Ask questions to find out more and to check what has been said to them.** • **Articulate their ideas and thoughts in well-formed sentences.** • **Describe events in some detail.** • **Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.** • **Use new vocabulary in different contexts.**
Personal, Social and Emotional Development	• **Know and talk about the different factors that support their overall health and wellbeing: -regular physical activity - healthy eating -tooth brushing - sensible amounts of 'screen time' - having a good sleep routine - being a safe pedestrian.**
Understanding the World	• **Explore the natural world around them.** • **Describe what they see, hear and feel while they are outside.** • **Recognise some environments that are different to the one in which they live.** • **Understand the effect of changing seasons on the natural world around them.**

Year 1

Y1 Plants

1. identify and name a variety of common wild and garden plants, including deciduous and evergreen trees

identify and describe the basic structure of a variety of common flowering plants, including trees

Y1 Animals including humans

1. identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense
2. identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
3. identify and name a variety of common animals that are carnivores, herbivores and omnivores
4. describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)

Y1 Everyday materials

1. distinguish between an object and the material from which it is made
2. identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
3. describe the simple physical properties of a variety of everyday materials
4. compare and group together a variety of everyday materials on the basis of their simple physical properties

Y1 Seasonal Change

1. observe changes across the four seasons
2. observe and describe weather associated with the seasons and how day length varies

Topic 1 Animals including humans	Topic 2 Materials	Topic 3 Seasonal change	Topic 4 Plants	Note: Seasonal change is covered throughout the year.
I can name each of the animal groups (mammals, fish, amphibians, birds and reptiles) describe the key features of these named animal groups sort and classify animals based on similarities and difference. **Working scientifically** **Are all animals the same?** **Grouping and classification** **Make first hand close observations of parts of the body e.g. hands, eyes** **Compare two people** **Take measurements of parts of their body** **Compare parts of their own body** **Look for patterns between people e.g. Do people with big hands have big feet?** **Pattern seeking** **Investigate human senses**	**I can** Identify and name different materials. describe the properties of different materials sort objects and materials using a range of properties Can use their test evidence to answer the questions about properties e.g. Which cloth is the most absorbent? **Working scientifically** **Classify objects made of one material in different ways e.g. a group of object made of metal** **Classify in different ways one type of object made from a range of materials e.g. a collection of spoons made of different materials** **Classify materials based on their properties** **Grouping and classification** **Which material is best to make Teddy Bear's umbrella?**	**I can** name the four seasons and identify when in the year they occur. describe weather in different seasons over a year. describe days as being longer (in time) in the summer and shorter in the winter. describe other features that change through the year **Working scientifically** **Collect information, regularly throughout the year, of features that change with the seasons e.g. plants, animals, humans** **Pattern seeking** **Observing over time** **Gather data about day length regularly throughout the year and present this to compare the seasons** **Observing over time**	**I can** name trees and other plants that they see regularly Can describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom Can point out trees which lost their leaves and those that kept them the whole year Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green **Working scientifically** **Make close observations of leaves, seeds, flowers etc.** **Compare two leaves, seeds, flowers** **Pattern seeking** **Observing over time** Classify leaves, seeds, flowers etc. using a range of characteristics Identify plants by matching them to named images	

e.g. Which part of my body is good for feeling, which is not? Which food/flavours can I identify by taste? Which smells can I match? **Comparative test-**	**Comparative test- waterproof material** Which material would be best to patch a hole in the roof? **Comparative test-**		**Grouping and classification** Make observations of how plants change over a period of time **Observing over time**	

Year 2

Y2 Living things and their habitat

1. explore and compare the differences between things that are living, dead, and things that have never been alive
2. 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
3. identify and name a variety of plants and animals in their habitats, including micro-habitats
4. 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

Y2 Uses of everyday materials

1. identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
2. find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

Y2 Animals including humans

1. notice that animals, including humans, have offspring which grow into adults
2. find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
3. describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Y2 Plants

1. observe and describe how seeds and bulbs grow into mature plants
2. find out and describe how plants need water, light and a suitable temperature to grow and stay healthy

Topic 1 Living things and their habitats	Topic 2 Materials	Topic 3 Animals including Humans	Topic 4 Animals including Humans	Topic 5 Plants	
I can identify items that are living, dead and never lived. talk about the features of a habitat. (shelter, protection, food and water) name range of animals and plants that live in a habitat and micro-habitats and talk about why they are suitable. construct a food chain that starts with a producer (plant) and includes consumers. **Working Scientifically** **Why do most birds nest in trees?** **Pattern seeking**	**I can** name an object, say what material it is made from. identify a material's properties and make a link between the properties and a particular use. identify what properties a suitable material needs to have for a given object. use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot **Working Scientifically** **There's a hole in my bucket, Eliza!** **Comparative test- waterproof material**	**I can** state the basic needs of animals, including humans, for survival (water, food and air) state the importance for humans of exercise, eating the right amounts of different types of food and hygiene. name foods in each section of the Eatwell guide. **Working Scientifically** **Sorting and grouping different food types** **Grouping and classification**	**I can** describe how animals including humans have offspring which grow into adults. describe, including using diagrams, the life cycle of some animals, including humans. measure/observe how animals, including humans, grow. *show what they know about looking after a baby/animal by creating a parenting/pet owners' guide* **Working Scientifically** **Living Eggs!** **Observing our chicks grow.** **Observing over time**	**I can** describe how plants that I have grown from seeds and bulbs have developed over time. identify plants that grew well in different conditions **Working Scientifically** **Which seeds will germinate first?** **Compare sunflower and cress.** What do seeds need to germinate?	**I can** describe how plants that they have grown from seeds and bulbs have developed over time identify plants that grew well in different conditions **Working Scientifically** How long do seeds take to germinate? Comparing different pea and sunflower seeds. **Observe overtime** **Comparative test**

Matching animals to their habitats **Grouping and classification** **Becoming micro-habitat explorers** **Grouping and classification**	Egg Rescue! **Comparative /build test** **The Smartest Giant in Town Needs New Tights** **Comparative test – flexible/stretchy material** **Best bouncy ball** **Comparative test**	**Desert Mission! Needs for survival** **Research** **What is Year 2's favourite exercise?** **Pattern seeking** **Our Amazing Bodies! Measuring wrist to elbow and foot.** **Pattern seeking**		Leaving seeds in different conditions. **Observe overtime** **Comparative test**	**What do our plants need?** **Growing plants in different conditions and observe e.g measuring height or number of leaves.** **Observe over time** **Comparative test** Which part of the plant do we eat? **Grouping and classification**

Year 3

Y3 Plants

1. identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
2. 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
3. investigate the way in which water is transported within plants
4. explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Y3 Animals including humans

1. 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
2. identify that humans and some other animals have skeletons and muscles for support, protection and movement

Y3 Rocks

1. compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
2. describe in simple terms how fossils are formed when things that have lived are trapped within rock
3. recognise that soils are made from rocks and organic matter

Y3 Light

1. recognise that they need light in order to see things and that dark is the absence of light
2. notice that light is reflected from surfaces
3. recognise that light from the sun can be dangerous and that there are ways to protect their eyes
4. recognise that shadows are formed when the light from a light source is blocked by an opaque object

find patterns in the way that the size of shadows change

Y3 Forces and magnets

1. compare how things move on different surfaces
2. notice that some forces need contact between two objects, but magnetic forces can act at a distance
3. observe how magnets attract or repel each other and attract some materials and not others
4. 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

5. describe magnets as having two poles
6. predict whether two magnets will attract or repel each other, depending on which poles are facing

Topic 1 Rocks	Topic 2 Light	Topic 3 Animals including humans	Topic 4 Forces and magnets	Topic 5 Plants
I can … name some types of rock and give physical features of each explain how a fossil is formed explain that soils are made from rocks and also contain living/dead matter **Working scientifically** Igneous, sedimentary or metamorphic? Rock Detectives! Sorting rocks based on their characteristics **Grouping/classifying** Fossil detectives! Work as archaeologists to find out how fossils are formed and where we might find them. **Research** Act it out – children learn actions to recount how fossils are formed	Can describe how we see objects in light and can describe dark as the absence of light Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses Can define transparent, translucent and opaque Can describe how shadows are formed by objects blocking light. **Working scientifically** It's dark in here! Investigate seeing objects in light and no light. **Observing over time** Brilliant Bag Company: Which material is the most reflective? **Comparative test**	Can name the nutrients found in food Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients Can name some bones that make up their skeleton giving examples that support, help them move or provide protection Can describe how muscles and joints help them to move **Working scientifically** What's in your favourite foods? Investigating the main nutrients and their function. Children create a healthy meal plan. **Research**	Can give examples of forces in everyday life Can give examples of objects moving differently on different surfaces Can use their results to describe how objects move on different surfaces Can use their results to make predictions for further tests Can name a range of types of magnets and show how the poles attract and repel **Working scientifically** Why is the car not moving? Investigating pushes and pulls from everyday life **Grouping/classifying** Which materials creates the most friction? Testing out different materials for a toy car on a landing ramp.	Can explain the function of the parts of a flowering plant Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination Can give different methods of pollination and seed dispersal, including examples **Working scientifically** What do plants need to thrive? Providing different conditions for plants and observing the effects. **Observing over time** Where do new plants come from? Children learn the life cycle of a flowering plant and observe it through

What's the point of dirt? Investigating different soils, how soil is made and its purpose **Comparative tests**	Which fabric is best for the nursery curtains? Investigating materials and the shadows they make. **Comparative test**	Do animals need the same nutrients as humans? **Research** Why do we have bones? Children 'build' a skeleton and sort (label) bones into support, movement and protection **Grouping/classifying**	**Comparative test** Which magnet is the strongest? **Comparative test**	growing peas and sunflowers. Live seed dispersal! Children prepare and perform simple role-plays to demonstrate the different methods of seed dispersal. **Grouping/classifying**

Year 4

Y4 Living things and their habitats

1. recognise that living things can be grouped in a variety of ways
2. explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
3. recognise that environments can change and that this can sometimes pose dangers to living things

Y4 Animals including humans

1. describe the simple functions of the basic parts of the digestive system in humans
2. identify the different types of teeth in humans and their simple functions
3. construct and interpret a variety of food chains, identifying producers, predators and prey

Y4 States of matter

1. compare and group materials together, according to whether they are solids, liquids or gases
2. 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)
3. identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

Y4 Sound

1. identify how sounds are made, associating some of them with something vibrating
2. recognise that vibrations from sounds travel through a medium to the ear
3. find patterns between the pitch of a sound and features of the object that produced it
4. find patterns between the volume of a sound and the strength of the vibrations that produced it
5. recognise that sounds get fainter as the distance from the sound source increases

Y4 Electricity

1. identify common appliances that run on electricity
2. construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
3. 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
4. recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
5. recognise some common conductors and insulators, and associate metals with being good conductors

Topic 1 Animals including humans	Topic 2 electricity	Topic 3 Sound	Topic 4 States of matter	Topic 5 Living things and their habitat
Can sequence the main parts of the digestive system Can draw the main parts of the digestive system onto a human outline Can describe what happens in each part of the digestive system Can point to the three different types of teeth in their mouth and talk about their shape and what they are used for Can name producers, predators and prey within a habitat Can construct food chains **Working scientifically**	Can name the components in a circuit Can make electric circuits Can control a circuit using a switch Can name some metals that are conductors Can name materials that are insulators **Working scientifically** What is the power source? Sorting items into mains, battery or mixed power supply. **Grouping/classifying** Will the bulb light? Building circuits to test different components.	Can name sound sources and state that sounds are produced by the vibration of the object. Can state that sounds travel through different mediums such as air, water, metal Can give examples to demonstrate how the pitch of a sound are linked to the features of the object that produced it Can give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases	Can name properties of solids, liquids and gases give examples of solids, liquids and gases explain how a state of matter can change from one to another Can give everyday examples of melting and freezing using data, can explain what affects how quickly a solid melts Can give everyday examples of evaporation and condensation Can describe the water cycle (Covered in geography and link to science) **Working scientifically**	Can name living things living in a range of habitats, giving the key features that helped them to identify them Can give examples of how an environment may change both naturally and due to human impact **Working scientifically**

	Conductor or insulator? Placing materials into a circuit to test. **Grouping/classifying** Does the length of the wire affect the brightness of the bulb? **Fair test**	**Working scientifically** How does sound travel? Children explore a range of instruments to show that sound is made by vibrations. Can sound travel through solids? Children create a test to find out if sound is different through solids to air. **Comparative test** How do our ears work? **Research** How does the length of the key affect the pitch? Children test out different instruments to understand the link between shape and pitch. **Fair test**	What are solids, liquids and gases? Stimulus of 3 balloons. Group everyday items into solids, liquids or gas. **Grouping/classifying** Which chocolate will melt first? **Comparative test** Which cup of ice will melt last? Testing out different thermal insulators **Comparative test**	

Year 5

Y5 Living things and their habitats

1. describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
2. describe the life process of reproduction in some plants and animals

Y5 Properties and changes of materials

1. 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
2. know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
3. use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
4. give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
5. demonstrate that dissolving, mixing and changes of state are reversible changes
6. 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

Y5 Earth and space

1. describe the movement of the Earth, and other planets, relative to the Sun in the solar system
2. describe the movement of the Moon relative to the Earth
3. describe the Sun, Earth and Moon as approximately spherical bodies
4. use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

Y5 Forces

1. explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
2. identify the effects of air resistance, water resistance and friction, that act between moving surfaces
3. recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect

Topic 1 Earth and Space	Topic 2 Forces	Topic 3 Materials	Topic 4 Living things and their habitats	Topic 5 Animals including Humans
Can show using diagrams the movement of the Earth and Moon Can explain the movement of the Earth and Moon Can show using diagrams the rotation of the Earth and how this causes day and night Can explain what causes day and night **Working scientifically** How do we know the earth is spherical? **Research** How are the planets in our solar system different? Research key features and compare to earth. **Research** How big is earth compared to the Sun and	Can demonstrate the effect of gravity acting on an unsupported object Can give examples of friction, water resistance and air resistance Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance **Working scientifically** How do we measure force? Your own investigations with newton meters **Comparative/fair tests** Does the size of the parachute affect the time it takes to land? **Comparative/fair tests**	Can use understanding of properties to explain everyday uses of materials. For example, how bricks, wood, glass and metals are used in buildings Can explain what dissolving means, giving examples Can name equipment used for filtering and sieving Can use knowledge of liquids, gases and solids to suggest how materials can be recovered from solutions or mixtures by evaporation, filtering or sieving Can describe some simple reversible and non-reversible changes to materials, giving examples **Working scientifically**	Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways **Working scientifically** How do the life cycles of different animals differ? Choose two to compare and give a presentation **Research** Living caterpillars! Caterpillars in a protective net in the classroom to observe metamorphosis **Observing over time**	This topic is covered in our PSHE curriculum

moon? Modelling the sizes and distances with fruits and string How does the time taken to orbit the sun compare for each plant? What are the average temperatures of the planets? **Pattern seeking**	What are the best features to provide the least air resistance for a new track bike? **Research** How does the shape of the boat affect water resistance? **Comparative/fair tests**	Kitchen mess! How do we separate these materials? **Grouping/classifying** If we can't see it, is it still there? Testing out which substances dissolve and which do not. **Grouping/classifying** Can we always separate a mixture? Which material is best to keep the drink warm? **Comparative/fair tests**	How do different plants reproduce? Grow bulbs, spider plants and peas to observe the differences **Observing over time**	

Year 6

Y6 Living things and their habitats

1. 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
2. give reasons for classifying plants and animals based on specific characteristics

Y6 Animals including humans

1. identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
2. recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
3. describe the ways in which nutrients and water are transported within animals, including humans

Y6 Evolution and inheritance

1. recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
2. recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
3. identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Y6 Light

1. recognise that light appears to travel in straight lines
2. 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
3. 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
4. use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Y6 Electricity

1. associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
2. 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

3. use recognised symbols when representing a simple circuit in a diagram

Topic 1 Light	Topic 2 Electricity	Topic 3 Animals including humans	Topic 4 Living things and their habitat	Topic 5 Evolution
Can describe with diagrams or models as appropriate how light travels in straight lines either from sources or reflected from other objects into our eyes.	Can make electric circuits and demonstrate how variation in the working of particular components, such as the brightness of bulbs can be changed by increasing or decreasing the number of cells or using	Can draw a diagram of the circulatory system and label the parts and annotate it to show what the parts do explain the job description of the heart	Can give examples of animals in the five vertebrate groups and some of the invertebrate groups Can give the key characteristics of the five vertebrate groups	Can explain the process of evolution Can give examples of how plants and animals are suited to an environment Can give examples of how an animal or plant has

Can describe with diagrams or models as appropriate how light travels in straight lines past translucent or opaque objects to form a shadow of the same shape. **Working Scientifically** How does light travel? **Observe over time** How shadows change? **Observe over time** Investigating light and prisms. **Observe over time**	cells of different voltages Can draw circuit diagrams of a range of simple series circuits using recognised symbols **Working Scientifically** **INTRUDER!** Designing and making an intruder alarm, using a switch. **Practical challenge** Does the length of the wire effect the brightness of the bulb? Comparative Test **FLOOD WARNING!** Designing and making a flood warning system for villages in Nepal. **Practical challenge**	**Working Scientifically** Modelling how the heart works Research How does exercise affect our heart rate? Comparative Test How does diet and exercise affect our body? Using reliable secondary resources Research	and some invertebrate groups Can compare the characteristics of animals in different groups Can give examples of flowering and non-flowering plants **Working Scientifically** Vertebrate or Invertebrate Grouping and classifying	evolved over time e.g. penguin, peppered moth Give examples of living things that lived millions of years ago and the fossil evidence we have to support this Can give examples of fossil evidence that can be used to support the theory of evolution **Working Scientifically** **Which beak is best?** Children look at how bird's beaks have evolved. They investigate which type of beak is best suited to pick up different types of food. Comparative Test **Fossil Facts** Children to find research and evidence to support the theory of evolution Research