Autumn

Spring

Summer

SCIENCE

EYFS

Knowledge, Skills and Understanding breakdown for Science

The relevant statements for science are taken from the following areas of learning:

- Communication and Language
- Personal, Social and Emotional Development
- Understanding the World

Early Learning Goals:

Communication and Language (Listening, Attention and Understanding)

Children make comments about what they have heard and ask questions to clarify their understanding. They describe what they see, hear and feel whilst outside. They make observations and communicate their findings by drawing pictures of animals and plants, including those found in the natural environment around the school. (leaf patterns / autumn leaves / spring observational drawings / minibeasts)

Through stories and sharing non-fiction materials, children learn new vocabulary and have opportunities to ask questions, to find out more and to check what has been said to them. They have opportunities to articulate their ideas and thoughts in well-formed sentences, to use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.

Personal, Social and Emotional Development (Managing Self)

Children begin to see the need to manage their own basic hygiene and personal needs from an increasingly scientific viewpoint, such as dressing (the need to stay warm in a range of conditions), going to the toilet (a developing awareness that nutrition/excretion are a characteristic of living organisms) and understanding the importance of healthy food choices.

Children learn about the different factors that support their overall health and wellbeing, such as regular physical activity, healthy eating, tooth-brushing, the importance of sleep and how to keeping safe in and out of school (internet safety/road safety).

Understanding the World (The Natural World)

Children have opportunities to explore the natural world around them.

They use the schools grounds to explore their immediate, local environment and they learn to recognise that there are some environments that are different to the one in which they live.

They learn to name and describe some common plants and animals, including mini-beasts. (leaf patterns / autumn leaves / spring observational drawings / minibeasts)

They have opportunities to share their understanding of other environments by talking about their experiences of travel, and by sharing non-fiction books and stories. By drawing on their experiences and what has been read in class, they learn about some similarities and differences between the natural world around them and contrasting environments.

The school grounds provide opportunities to learn about some important processes and changes in the natural world around them, including learning about the seasons and changing states of matter. Children are introduced to the language of scientific enquiry by conducting simple experiments, such as exploring which objects float or sink, or investigating what happens when ice melts.

Challenge

Year EYFS	Children are able to accurately describe the natural world using relevant scientific vocabulary, drawing on knowledge gained through their own experiences and from their own research using sources such as books, the internet and other media.	Children are able to name a common plants and animals from their local and wider environment, e.g identifying an oak or a magpie, rather then just describing them as a tree or bird.	Children confidently make accurate comparisons of animals and plants, highlighting details such as the number of legs and use this as a basis to classify them (i.e. being able to distinguish between an arachnid and an insect or a conifer and deciduous tree)

Elmlea Junior School

SCIENCE

Autumn

Spring

Summer

Year 1

Knowledge, Skills and Understanding breakdown for Science

Working Scientifically	Biology	Materials
During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills: • Asking simple questions and recognising that they can be answered in different ways. • Performing simple tests by gathering and recording data to help in answering questions • Using their observations and ideas to suggest answers to questions • Observing closely, using simple equipment. • Identifying similarities and differences between different materials, or between different plants and animals, and use these as a basis for suggesting ways to classify or group them.	Seasonal Change • Observe and describe weather associated with the seasons and how day length varies. (seasons) Animals, including humans • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals (animal classification and sorting) • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) (Aquarium trip animal classification and sorting) • Identify and name a variety of common animals that are carnivores, herbivores and omnivores (Dinosaurs / animal classification and sorting) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Human body) Plants • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (plants & planting seeds / observing trees during each season) • Identify and describe the basic structure of a variety of common flowering plants, including trees. (plants & planting seeds / observing trees during each season)	Everyday Materials • Distinguish between an object and the material from which it is made (materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock (materials) • Describe the simple physical properties of a variety of everyday materials (materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties (materials)

Challenge

Year 1	Demonstrate an ability to work methodically and carefully when conducting an experiment. Begin to recognise what makes a fair test.	• Know that the climate and seasons are experienced differently around the world and that the location can also impact on daylength. Children may relate this to what they know about the Earth's tilt and rotation.	• Identify plants and animals in their own local environment and contrast these with plants and animals found in other parts of the world.	• Understand that the properties of a materials can be dependent on shape and form (e.g. that a block of aluminium with behave differently to a sheet of foil)

Elmlea Junior School

SCIENCE

Autumn

Spring

Summer

Year 2

Working Scientifically	Biology	Materials
During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills: • Asking simple questions and recognising that they can be answered in different ways. • Performing simple tests by gathering and recording data to help in answering questions • Using their observations and ideas to suggest answers to questions • Observing closely, using simple equipment. • Identifying similarities and differences between different materials, or between different plants and animals, and use these as a basis for suggesting ways to classify or group them.	<u>Habitats</u> • 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 • Identify and name a variety of plants and animals in their habitats, including micro- habitats • 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 • Explore and compare the differences between things that are living, dead, and things that have never been alive. <u>Animals, including humans</u> • Notice that animals, including humans, have offspring which grow into adults • 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 and eating the right amounts of different types of food, and hygiene. <u>Plants</u> • Observe and describe how seeds and bulbs grow into mature plants • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	<u>Everyday Materials</u> • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Challenge

Year 2	Evaluate the design of an experiment and make suggestions for how it could be improved. Identify when an experiment is a fair test, or suggest a way to redesign an experiment to make it a fair test.	Confidently link an animal's physiology to it's lifestyle, diet and habitat, using relevant scientific vocabulary to explain their thinking and compare different species living in different habitats.	Recognise that plants are not limited in form to that of a stereotypical tree or flower, and that plants are found in a wide range of habitats.	• Understand that objects can be made from a mixture of different elements or materials • Recognise that matter can exist in different states (liquid, gas, solid) and apply these terms to materials that they know about (water, glass, rock etc)

Elmlea Junior School

SCIENCE

Autumn

Spring

Summer

Year 3

Knowledge, Skills and Understanding breakdown for Science

Working Scientifically	Biology	Chemistry	Physics
Ask relevant questions and use different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Identify differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings	**Plants** Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. 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 explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **Animals, including humans** 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. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	**Rocks** 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 soils are made from rocks and organic matter.	**Light** Recognise that they need light in order to see things and that dark is the absence of light. Notice that light is reflected from surfaces. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. 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 **Forces and magnets** Compare how things move on different surfaces Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance 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 magnets as having 2 poles Predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Challenge

Year 3		Name the xylem and phloem. Describe the process of photosynthesis. Explain how muscles work in pairs. Name some of their muscles. Investigate the different methods of seed dispersal in greater depth.	Study the rock cycle and the formation of igneous, sedimentary and metamorphic rocks.	Explain how light travels in straight lines and reflects off objects into our eyes so we can see them. Compare shadows made over the course of the day (summer) and explain how this is caused by the Earth's rotation. Understand that a compass uses the Earth's magnetism. Find out how the eye works.

Elmlea Junior School

SCIENCE

Autumn

Spring

Summer

Year 4

Knowledge, Skills and Understanding breakdown for Science

Working Scientifically	Biology	Chemistry	Physics
Ask relevant questions and use different types of scientific enquiries to answer them setting up simple practical enquiries, comparative and fair tests Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gather, record, classify and present data in a variety of ways to help in answering questions Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Identify differences, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings	**Animals, including humans** 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. Construct and interpret a variety of food chains, identifying producers, predators and prey. **Living things and their habitats** Recognise that living things can be grouped in a variety of ways. Explore and use classification keys to help group, identify and 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	**States of matter** Compare and group materials together, according to whether they are solids, liquids or gases. 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). Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Sound** Identify how sounds are made, associating some of them with something vibrating. 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. 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. **Electricity** Identify common appliances that run on 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.

Challenge

Year 4		Compare human teeth with different animal's teeth, considering the effect of diet.	Study colloids, e.g toothpaste, shaving foam, gel etc. Investigate how cornflour and water mixture can change between being a solid and a liquid.	Compare the auditory range of humans and different animals. Study the ear and describe the function of the different parts which allow us to hear. Use standard symbols to draw circuit diagrams.

Elmlea Junior School

SCIENCE

Autumn

Spring

Summer

Year 5

Knowledge, Skills and Understanding breakdown for Science

Working Scientifically	Biology	Chemistry	Physics
Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identify scientific evidence that has been used to support or refute ideas or arguments	**Animals, including humans** Describe the changes as humans develop to old age. **Living things and their habitats** 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.	**Properties and changes of materials** Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. 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.	**Earth and space** Describe the movement of the Earth and other planets relative to the sun in the solar system. Describe the movement of the moon relative to the Earth describe the sun, Earth and moon as approximately spherical bodies. Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. **Forces** Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.

Challenge

Year 5			Understand that heating, mixing and burning can sometimes cause irreversible changes and that this means a new material has been formed which can not be changed back to the original material. Use the pH scale for measuring acidity/alkalinity.	Use force arrows in diagrams. Investigate balanced and unbalanced forces. Measure forces in Newtons. Understand how the seasons and day length at different times of year are created by the Earth's tilt in different hemispheres. Study our Sun as a star, other stars in our galaxy, other galaxies.

Elmlea Junior School

SCIENCE

Autumn

Spring

Summer

Year 6

Knowledge, Skills and Understanding breakdown for Science

Working Scientifically	Biology	Chemistry	Physics
Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Use test results to make predictions to set up further comparative and fair tests. Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. Identify scientific evidence that has been used to support or refute ideas or arguments	**Animals, including humans** Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Describe the ways in which nutrients and water are transported within animals, including humans. **Living things and their habitats** 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. **Evolution and inheritance** Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. 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.		**Light** Recognise that light appears to travel in straight lines. 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. 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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. **Electricity** 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 how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. Use recognised symbols when representing a simple circuit in a diagram.
Challenge			
Year 6	Describe the different parts of blood (red blood cells, white blood cells, platelets, plasma) and their functions. Understand that changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction.		Study the parts of the eye and understand the process of seeing from when light enters our eye to the brain receiving the message. Investigate static electricity.