

Crowan Primary School Science Milestones

By following the Cornerstones Curriculum 22, children at Crowan will have gained the following knowledge by these key milestones:

- End of Early Years Foundation Stage
- End of Key Stage 1 (Y2)
- End of Lower Key Stage 2 (Y4)
- End of Upper Key Stage 2 (Y6)

The second column outlines the key scientific knowledge the children will have learned by the end of each milestone. The third column outlines the national curriculum statements which will be throughout a child's time at Crowan in order for them to gain this scientific knowledge.

Milestone	What will they know?	National Curriculum Statements covered
EYFS	Early Learning Goal - The World	Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes .
End of KS1 (Y2)	Different materials are recognisable by their different properties. (Builds on ELG: similarities and differences in relation to objects and materials)	<ul style="list-style-type: none"> • distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • 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. • 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.
	Forces can push, pull or twist objects, making them change their shape. (Builds on ELG: similarities and differences in relation to objects and materials; talk about changes).	<ul style="list-style-type: none"> • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
	There is air all around the Earth's surface but there is less and less further away from the surface (higher in the sky). Weather is determined by the conditions and movement of the air. (Builds on ELG: features of their own environments; talks about changes; observes plants and animals)	<ul style="list-style-type: none"> • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies

<p>There are patterns in the position of the Sun seen at different times of the day and in the shape of the Moon from one night to another.</p> <p>(Builds on ELG: features of their own environments; talks about changes; observes plants and animals)</p>	<ul style="list-style-type: none"> • observe and describe weather associated with the seasons and how day length varies
<p>There is a wide variety of living things (organisms), including plants and animals. They are distinguished from non-living things by their ability to move, reproduce and react to certain stimuli. Animals need food that they can break down, which comes either directly by eating plants (herbivores) or by eating animals (carnivores) which have eaten plants or other animals.</p> <p>(Builds on ELG: observes plants and animals)</p>	<ul style="list-style-type: none"> • 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. • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • explore and compare the differences between things that are living, dead, and things that have never been alive
<p>To survive, living things need water, air, food, a way of getting rid of waste and an environment which stays within a particular range of temperature. All living things need food as their source of energy as well as air, water and certain temperature conditions.</p> <p>(Builds on ELG: observes plants and animals)</p>	<ul style="list-style-type: none"> • 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 microhabitats • 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. • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. • 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.
<p>Living things produce offspring of the same kind, but offspring are not identical with each other or with their parents.</p> <p>(Builds on ELG: observes plants and animals)</p>	<ul style="list-style-type: none"> • observe and describe how seeds and bulbs grow into mature plants • notice that animals, including humans, have offspring which grow into adults
<p>There are many different kinds of plants and animals in the world today and many kinds that once lived but are now extinct.</p>	<ul style="list-style-type: none"> • 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.

	<p>(Builds on ELG: observes plants and animals; talks about changes)</p>	<ul style="list-style-type: none"> • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) <p>explore and compare the differences between things that are living, dead, and things that have never been alive</p>
<p>End of LKS2 (Y4)</p>	<p>All the ‘stuff’ encountered in everyday life, including air, water and different kinds of solid substances, is called matter because it has mass, and therefore weight on Earth, and takes up space. Different materials are recognisable by their properties, some of which are used to classify them as being in the solid, liquid or gas state. At room temperature, some substances are in the solid state, some in the liquid state and some in the gas state. The state of many substances can be changed by heating or cooling them. The amount of matter does not change when a solid melts or a liquid evaporates.</p> <p>Objects can have an effect on other objects even when they are not in contact with them.</p> <p>Sound comes from things that vibrate and can be detected at a distance from the source because the air or other material around is made to vibrate. Sounds are heard when the vibrations in the air enter our ears.</p> <p>Other examples of objects affecting other objects without touching them are the interactions between magnets or electric charges.</p> <p>Forces act in particular directions. Equal forces acting in opposite directions in the same line cancel each other and are described as being in balance. The movement of objects is changed if the forces acting on them are not in balance.</p>	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • notice that some forces need contact between two objects, but magnetic forces can act at a distance • 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. <ul style="list-style-type: none"> • compare how things move on different surfaces • notice that some forces need contact between two 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 two poles • predict whether two magnets will attract or repel each other, depending on which poles are facing

	<p>There are various ways of causing an event or bringing about change in objects or materials. Objects can be made to change their movement by pushing or pulling. Heating can cause change, as in cooking, melting solids or changing water to vapour. Electricity can make light bulbs glow.</p>	<ul style="list-style-type: none"> • 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. • identify common appliances that run on electricity • 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
	<p>Much of the solid surface of the Earth is covered by soil, which is a mixture of pieces of rock of various sizes and the remains of organisms. Fertile soil also contains air, water, some chemicals from the decay of living things, particularly plants, and various living things such as insects, worms and bacteria. The solid material beneath the soil is rock. There are many different kinds of rock with different compositions and properties.</p>	<ul style="list-style-type: none"> • 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. • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
	<p>There is a wide variety of living things (organisms), including plants and animals. They are distinguished from non-living things by their ability to move, reproduce and react to certain stimuli. To survive they need water, air, food, a way of getting rid of waste and an environment which stays within a particular range of temperature.</p>	<ul style="list-style-type: none"> • 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.
	<p>Plants containing chlorophyll can use sunlight to make the food they need and can store food that they do not immediately use. Animals are ultimately dependent on plants for their survival. The relationships among organisms can be represented as food chains and food webs. Some animals are dependent on plants in other ways as well as for food, for example for shelter and, in the case of human beings, for clothing and fuel. Plants also depend on animals in various ways. For example, many flowering plants depend on insects for pollination and on other animals for dispersing their seeds.</p>	<ul style="list-style-type: none"> • 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. • recognise that environments can change and that this can sometimes pose dangers to living things.
	<p>Animals and plants are classified into groups and subgroups according to their similarities.</p>	<ul style="list-style-type: none"> • 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.

<p>End of Y6 (KS2)</p>	<p>When some substances are combined they form a new substance (or substances) with properties that are different from the original ones. Other substance simply mix without changing permanently and can often be separated again. At room temperature, some substances are in the solid state, some in the liquid state and some in the gas state. The state of many substances can be changed by heating or cooling them. The amount of matter does not change when a solid melts or a liquid evaporates.</p>	<ul style="list-style-type: none"> • 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 • demonstrate that dissolving, mixing and changes of state are reversible changes • 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.
	<p>Light, both from close sources such as light bulbs or flames and from the Sun and other stars very long distances away, is seen because it affects the objects it reaches, including our eyes. These sources give out light, which travels from them in various directions and is detected when it reaches and enters our eyes. Objects that are seen either give out or reflect light that human eyes can detect.</p> <p>The force of gravity acts on an object's mass to make things fall to earth.</p>	<ul style="list-style-type: none"> • 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. • 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
	<p>The speed of a moving object is a measure of how far it would travel in a certain time. How quickly an object's motion is changed depends on the force acting and the object's mass. The greater the mass of an object, the longer it takes to speed it up or slow it down, a property of mass described as inertia.</p> <p>The force of gravity acts on an object's mass to make things fall to earth.</p>	<ul style="list-style-type: none"> • 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.
	<p>In all these changes, energy is transferred from one object, which is an energy source or resource, to another. Fuels such as oil, gas, coal and wood are energy resources. Some energy resources are renewable, such as those produced by wind, waves, sunlight and tides, others are non-renewable such as from burning fossil fuels with oxygen.</p>	<ul style="list-style-type: none"> • explain that some changes (in materials) 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.

	<p>The Earth moves round the Sun taking about a year for one orbit. The Moon orbits the Earth taking about four weeks to complete an orbit. The Sun, at the centre of the solar system, is the only object in the solar system that is a source of visible light. The Moon reflects light from the Sun and as it moves round the Earth only those parts illuminated by the Sun are seen. The Earth rotates about an axis lying north to south and this motion makes it appear that the Sun, Moon and stars are moving round the Earth. This rotation causes day and night as parts of the Earth's surface turn to face towards or away from the Sun. It takes a year for the Earth to pass round the Sun. The Earth's axis is tilted relative to the plane of its orbit round the Sun so that the length of day varies with position on the Earth's surface and time of the year, giving rise to the seasons.</p>	<ul style="list-style-type: none"> • 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.
	<p>Although some organisms do not appear to be active, all will at some stage carry out the life processes of respiration, reproduction, feeding, excretion, growth and developments and all will eventually die.</p> <p>The circulatory system takes material needed by cells to all parts of the body and removes soluble waste to the urinary system.</p>	<ul style="list-style-type: none"> • describe the changes as humans develop to old age • 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. • 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
	<p>Plants and animals, including humans, resemble their parents in many features because information is passed from one generation to the next. Other features, such as skills and behaviour, are not passed on in the same way and have to be learned.</p> <p>When a cell divides, as in the process of growth or replacement of dead cells, genetic information is copied so that each new cell carries a replica of the parent cell. Sometimes an error occurs in replication, causing a mutation, which may or may not be damaging to the organism. Changes in genes can be caused by environmental conditions, such as radiation and chemicals. These changes can affect the individual but only affect the offspring if they occur in sperm or egg cells.</p>	<ul style="list-style-type: none"> • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics.
	<p>Although organisms of the same species are very similar they vary</p>	<ul style="list-style-type: none"> • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago

	<p>a little from each other. One of the results of sexual reproduction is that offspring are never exactly like their parents.</p> <p>Living things are found in certain environments because they have features that enable them to survive there. This adaptation to their environment has come about because of the small differences that occur during reproduction, resulting in some individuals being better suited to the environment than others. In the competition for materials and energy resources, those that are better adapted are more likely to survive and may pass on their adapted feature to their offspring. Those less suited to a particular environment are more likely to die before reproducing, so later generations will contain more of the better adapted individuals. This only applies to changes (mutations) in the reproductive cells; mutations in other cells are not passed on. Over time, these changes can accumulate to the point where the survivors have become a different species.</p>	<ul style="list-style-type: none">• 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.
--	---	--