Progression of Skills, Understanding and Knowledge in Science: Life processes and organisation

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
Explore and compare the differences between things that are living, dead, and things that have never been alive. 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. 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 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		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. Describe reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal .		Describe the process of reproduction in humans. Describe the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases Describe the effects of recreational drugs (including substance misuse) on behaviour, health and life processes Describe the structure and functions of the gas exchange system in humans, including adaptations to function Outline and explain the mechanism of breathing to move air in and out of the lungs Outline and explain the impact of exercise, asthma and smoking on the human gas exchange system

Central Ideas

Things are alive because they carry out a number of different processes – these processes are the difference between living things and things which are no longer living, or have never lived.

Living things are organized to be able to carry out these processes effectively.

Living things and the structures within them are adapted to carry out particular functions

Progression of Skills, Understanding and Knowledge in Science: Living things in their environment

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EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
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. Identify and describe the basic structure of a variety of common flow 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. 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. 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.		Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Recognise that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey 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. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.		Understand that changes in the environment which 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 Recognise the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops Understand the importance of plant reproduction through insect pollination in human food security Describe how organisms affect, and are affected by, their environment, including the accumulation of toxic materials

Central Ideas

We put things into groups based on their characteristics, in order to help us make sense of the world

Living things occupy a place in a connected community of living things, affected by and affecting them, and also affected by and affecting the non-living habitat

Progression of Skills, Understanding and Knowledge in Science: Inheritance and Evolution

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
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. Notice that animals, including humans, have offspring which grow into adults. Describe in simple terms how fossils are formed when things that have lived are trapped within rock.		Recognise that environments can change and that this can sometimes pose dangers to living things 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.		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.		Describe how the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. Explain extinction in terms of changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce

Central Ideas

Living things change over time. This can happen over a long timescale, or over a shorter timescale.

Living things are adapted to their habitats. Changes to either will affect survival, which in the long term can lead to new species (link to Living things in their environment)

Progression of Skills, Understanding and Knowledge in Science: Material and Matter

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EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
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 Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. 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.		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 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		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. Recognise some common conductors and insulators, and associate metals with being good conductors. 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.		Explain the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure . Explain changes of state in terms of the particle model.

Central Ideas

We put things into groups depending on their characteristics, in order to help us make sense of the world

Materials are made of particles. The properties of materials depend on how the particles are arranged and how they interact with other particles. Materials can change. Some changes are reversible, and some are irreversible. This depends on what is happening to the particles in the material.

Progression of Skills, Understanding and Knowledge in Science: Forces

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching		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.		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.		Describe forces as pushes or pulls, arising from the interaction between two objects. Use force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. Identify forces associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water.		Sketch a magnetic field around a bar magnet Know that forces are measured in Newtons 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. Describe processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels. Identify different energy stores Identify fuels as energy resources. Describe processes that produce carbon dioxide by human activity and the impact on climate.

Central Ideas

The motion or shape of an object can be explained or predicted if you know the sizes and directions of all the forces that act on it.

Understanding forces helps us to predict and control the physical world around us.

When forces make things change, they transfer energy between different energy stores

Progression of Skills, Understanding and Knowledge in Science: Electricity and Magnetism

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EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
		Identify common appliances that use 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.		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.		Know that electric current is measured in amperes Describe how in circuits, series and parallel circuits, currents add where branches meet Describe current as flow of charge. Describe Potential difference, measured in volts Describe resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. Describe differences in resistance between conducting and insulating components (quantitative). Describe magnetic field around a bar magnet Describe uses of electromagnets Outline the difference between a permanent magnet and an electromagnet

Central Ideas

The familiar everyday world we live in is largely a consequence of the properties and behaviour of electric charge.

Understanding electricity and magnetism helps us to develop our technology and find applications that can transform our everyday lives.

Progression of Skills, Understanding and Knowledge in Science: Sound, Light and Waves

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EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
Recognise that light is needed 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.		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.		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.		Describe echoes, reflections and absorption of sound. Know that sound needs a medium to travel. Compare the speed of sound in air, in water and in solids. Know that frequencies of sound waves are measured in hertz, and compare the auditory range of humans and animals Identify similarities and differences between light waves and waves in matter Use the ray model to explain imaging in mirrors, the pinhole camera, refraction of light and the action of a convex lens in focusing. Investigate colour and relate to the different frequencies of light.

Central Ideas

Energy can be transferred from one object to another object by radiation, even when the objects are not touching.
Waves carry information that can be detected by humans or manufactured detectors.
Understanding waves helps us to communicate, explore the universe, and transfer energy to where we want it.

Progression of Skills, Understanding and Knowledge in Science: The Earth In Space

EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Stage 1		Stage 2		Stage 3		Stage 4		Stage 5
		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.		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.		Be able to describe the structure and composition of the Earth. Outline the rock cycle and describe the formation of igneous, sedimentary and metamorphic rocks. Use the formula weight = mass x gravitational field strength (g), on Earth g=10 N/kg, different on other planets and stars Desctibe gravity forces between Earth and Moon, and between Earth and Sun. Desctibe the relationship between the seasons and the Earth's tilt, nd day length at different times of year in different hemispheres.

Central Ideas

The Earth occupies a position in Space, and moves relative to other bodies. This movement is what gives rise to observable phenomena such as day and night and seasons.

We put things into groups depending on their characteristics, in order to help us make sense of the world