Science

Progression of Skills & Knowledge

Standard

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How is the Science scheme of work organised?

Progression of Skills & knowledge

Scientific knowledge and understanding

EYFS (Reception)

Knowledge

- To know the names of familiar animals (e.g. farm animals, pets and animals seen in storybooks.)
- To know the main body parts of common animals (number of legs, wings, fur, tail).
- To know that animals, including humans use their senses to explore the world.
- To know that animals need food.
- To know that animals and plants move, grow and feed.
- To know the difference between things that are living and things that are non-living.
- To know that plants and animals live in a range of different places (land, sea, air).
- To name some different places where animals live on the school site.

- To know that objects float or sink.
- To know that some objects move when pushed or pulled.
- To know that some objects freeze or melt.
- To recognise differences in sounds.
- To know that day is light because the sun is in the sky.
- To know that night is dark because the sun is not in the sky.
- To know that shadows are created when something blocks the light.

- To know that some objects found in nature are natural, e.g. plants and animals.
- To know the name for the basic plant parts (leaves, flowers, stem and roots.)
- To know the names of some familiar flowering plants (e.g. daisy, rose, sunflower, daffodil).
- To know that plants and animals live in a range of different places.
- To name some different places where animals live on the school site.
- To know plants are alive.
- To know that seeds need water to grow.
- To know that seeds grow into plants if taken care of.
- To know that animals and plants move, grow and feed.
- To know the difference between things that are living and things that are non-living
- To know how to help care for the planet.

- To know that some animals hibernate or store food in winter.
- To know that some trees change in the four seasons.
- To know some signs of each season (leaves on the ground, cold weather, daffodils growing and sunny weather).
- To know that the weather changes throughout the year.
- To know and compare weather types (rain, sun, snow, wind).

Year 1

Knowledge

- To know the name and order of the four seasons; spring, summer, autumn and winter.
- To know that it is unsafe to look directly at the Sun.
- To know weather associated with the four seasons and how it changes (in the UK).
- To understand that day length varies across the four seasons, with fewer daylight hours in the winter and more in the summer.

- To know that objects are items or things.
- To know that a material is what an object is made from.
- To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.
- To know that property refers to how a material can be described.
- To describe the physical properties of a variety of everyday materials.
- To understand that materials can be grouped based on their physical properties.

- To know key parts of the human body (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth).
- To know the five main senses: sight, smell, hearing, taste and touch.
- To know that eyes are used for sight, the nose is used for smell, ears are used for hearing, the tongue and mouth are used for taste and the skin is used for touch.

- To know the main body parts of common animals (arms, legs, wings, tails, fins, head, trunk, horns/tusks, shell).
- To know a variety of common animals (including fish, amphibians, reptiles, birds and mammals).
- To know that a carnivore is an animal that eats other animals and give some examples.
- To know that a herbivore is an animal that eats only plants and give some examples.
- To know that an omnivore is an animal that eats both animals and plants, and give some examples.

- To know a variety of common plants, and how they differ.
- To know that deciduous trees lose their leaves seasonally, but evergreen trees do not.
- To know the basic structure (including leaves, flowers (blossom), fruit, roots, bulb, seed, trunk, branches, stem) of a variety of common plants, including flowering plants and trees.
- To begin to understand how plants grow and change over time.

National curriculum - end of KS1

asking simple questions and recognising that they can be answered in different ways

observing closely, using simple equipment

performing simple tests

identifying and classifying

using their observations and ideas to suggest answers to questions

gathering and recording data to help in answering questions

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)

identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

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.

observe changes across the four seasons

observe and describe weather associated with the seasons and how day length varies.

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.

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.

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 the right amounts of different types of food, and hygiene.

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.

Progression of Skills & knowledge

Scientific knowledge and understanding
Year 2

Knowledge

- To know a variety of plants and animals and describe some differences.
- To know that a habitat is the environment where an animal or plant lives/grows, because it provides what they need to survive.
- To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter).
- To know that living things depend upon each other (e.g. for food, shelter.)
- To begin to understand some of the life processes, including movement, reproduction, sensitivity, growth, excretion and nutrition.
- To know the difference between things that are living, dead, and things that have never been alive, using some of the life processes.
- To name a variety of habitats, including woodland, ocean, rainforest and coastal.
- To understand that a food chain can be used to show how animals obtain food from eating either plants and/or other animals.

- To know a variety of plants and animals and describe some differences.
- To know that a habitat is the environment where an animal or plant lives/grows, because it provides what they need to survive.
- To know that a micro-habitat is a very small habitat (e.g. stones, logs and leaf litter).
- To know that living things depend upon each other (e.g. for food, shelter.)

- To know why objects are made from particular materials and to give examples of their suitability.
- To know that one material can be used for a range of purposes (and to give examples.)
- To know that different materials can be used for the same purpose (and to give examples.)
- To know why certain materials are unsuitable for particular objects.
- To know that a push or pull must be applied to change the shape of a solid object.
- To know that solid objects can be squashed, bent, twisted or stretched.
- To know that different solid objects may take a different amount of force to change shape.

- To understand how living things change, and that animals have offspring that grow into adults.
- To know which offspring comes from which parent animal.
- To know the stages in some animal life cycles.
- To know that animals, including humans, need water, food and air to survive.
- To understand the importance of exercise, a balanced diet and hygiene for humans.

- To know that seeds and bulbs grow into seedlings by producing roots and shoots.
- To know that seedlings grow into mature plants by developing parts such as roots, stems, leaves and flowers.
- To know that seeds need water and warmth to germinate.
- To know that plants need water, light and a suitable temperature for growth and health.

Year 3

Knowledge

- To know that animals can be grouped based on the presence of a skeleton.
- To know that the skeleton in humans and some animals is used for movement, protection and support.
- To know that the muscular system in humans and some animals works with the skeleton for movement.
- To know the main bones in the body.
- To know that animals, including humans, need the right types and amount of nutrition.
- To understand that humans cannot make their own food and therefore eat to get the nutrition needed.
- To know the main food groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions.
- To know that a balanced diet should include all food groups.
- To describe the diets of different animals.

- To know some examples of contact and non-contact forces.
- To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism).
- To know the North and South poles of a magnet.
- To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other.
- To know some different examples of magnets, including bar, horseshoe, button and ring,
- To know some uses of magnets.
- To know that friction is a contact force that acts between two surfaces to slow an object down.
- To know that magnetism is a non-contact force that affects objects containing magnetic metal.
- To understand that the opposite poles of a magnet attract one another and like poles repel one another.
- To know that rougher surfaces have more friction between them than smoother surfaces.
- To understand that the strength of different magnets may vary.

- To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.)
- To know that rocks may contain grains, crystals or fossils.
- To know that grains and crystals appear differently and can be used to classify rocks.
- To know that soils are made from rocks and dead matter.
- To understand the relationship between the properties of rocks and their uses.
- To know that fossils can form from the remains of living things.
- To know that rocks can change over time (e.g. erosion, weathering).

- To know that light travels from a source (e.g. the Sun, light bulbs and torches).
- To know that light is needed to see things and that dark is the absence of light.
- To know that light from the Sun can be dangerous and how to protect their eyes.

- To know that materials reflect light.
- To know that shadows are formed when the light from a light source is blocked by an opaque object.
- To know that shadows change as a result of different factors: - Changing the position of the light source. - Changing the distances between the light source, object and surface.
- To know that shadows change position and length throughout the day as the Sun changes position in the sky.

- To understand the functions of the basic parts of a plant and the relationship between structure and function.
- To know that water is transported within a plant from the root, through the stem, to the leaves.
- To know that plants need water, light, air, nutrients/fertilizer and a suitable temperature for growth and health.
- To understand that the needs for growth and health vary from plant to plant.
- To know the life cycle of a plant from seed to mature plant.
- To know that flowers are the reproductive organ of a plant.
- To know that the process of pollination is the transfer of pollen to the female (part of the) flower.
- To know that the process of seed formation is the growth of a seed after pollination/fertilisation.
- To know some different methods of seed dispersal and the benefits of each.

National curriculum - end of KS2

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments.

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.

describe the changes as humans develop to old age.

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.

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.

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 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 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.

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 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.

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

Progression of Skills & knowledge

Scientific knowledge and understanding

Year 4

Knowledge

- To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions.
- To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.
- To know that teeth can be damaged, including the effect of sugary and acidic food.
- To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly.
- To describe the teeth of carnivores and herbivores, and understand why they are different.
- To know that predators hunt for their food and prey are the animals being hunted.
- To know that producers make their own food.
- To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on.

- To know that all electrical appliances need a power source, including batteries or mains electricity.
- To know that an electrical circuit needs a complete path for the electric charge to flow through.
- To know the main components in a simple series circuit.
- To know the precautions for working safely with electricity.
- To know that some materials allow electric charge to pass through them easily and these are known as electrical conductors (e.g. metals).
- To know that some materials do not allow electric charge to pass through them and these are known as electrical insulators (e.g wood and plastic).
- To know that metals are used for cables and wires because they are good conductors of electricity.
- To know that plastic is used to cover cables and wires because it is a good insulator.
- To understand that an open switch breaks a series circuit so the components will be off.
- To understand that a closed switch completes a series circuit so the components will be on.
- To understand the relationship between bulb brightness and the number of cells in a circuit.

- To know that all substances around us can exist as solids, liquids and gases
- To know that a property of a solid is that it keeps its shape unless a force is applied to it.
- To know that a property of a liquid can flow freely and take on the shape of a container.
- To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.

- To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating).
- To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing).
- To know that water can exist as a solid, a liquid or a gas.
- To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius.
- To know that water flows around the world in a continuous process called the water cycle.
- To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour.
- To know that in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation.
- To know that the rate of evaporation increases as temperature rises.

- To understand that sound is a result of vibrations.
- To know that vibrations from sounds travel through mediums to the ear.
- To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds.
- To know that different materials provide different amounts of insulation against sound.
- To know a variety of ways to change the pitch or volume of a sound.
- To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds.
- To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds.
- To know that sounds get fainter as the distance from the sound source increases.

- To know that living things can be grouped in different ways.
- To know that a classification key can be used to group and identify plants and animals.
- To know that vertebrates are animals which have a backbone and invertebrates are animals which do not have a backbone.
- To know that plants can be grouped into flowering or non-flowering varieties.
- To know that flowering plants include grasses and non-flowering plants includes ferns and mosses.
- To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish.
- To know that invertebrate groups include snails, slugs, worms, spiders and insects.
- To know that habitats can change throughout the year and this can be dangerous for living things.
- To know that humans can have both a positive and negative impact on the environment.

Year 5

Knowledge

- To know that some substances will dissolve in a liquid to form a solution.
- To know the factors that affect the rate of dissolving, including temperature and stirring.

- To know that some liquids and solids can be separated using sieving, filtering and evaporation and to describe these processes.

- To describe a broader range of materials and their properties, including hardness, solubility, transparency, conductivity and response to magnets.
- To understand that dissolving, mixing and changes of state are reversible changes.
- To understand that some changes result in the formation of new materials and that these are usually irreversible. (e.g. burning, rusting, the action of acid on bicarbonate of soda.)

- To know that the Sun is a star at the centre of our solar system.
- To know that the Sun, Earth and Moon are approximately spherical bodies.
- To know the names, order and relative positions of the planets and other main celestial bodies.
- To know that a moon is a celestial body that orbits a planet and give examples of moons that orbit other planets.
- To know that the Earth and other planets orbit around the Sun.
- To know that the tilt of the Earth and its orbit around the Sun causes the seasons.
- To know that the Moon orbits around the Earth.
- To understand how the Earthâ€™s rotation causes day and night and the apparent movement of the Sun across the sky.

- To know that a life cycle shows the changes an animal or plant goes through until the reproduction of a new generation when the cycle starts again.
- To know that all living things must reproduce for the species to survive.
- To know that sexual reproduction requires two parents, whereas asexual reproduction only requires one parent.
- To know that there are different processes plants and animals use to reproduce (asexual and sexual reproduction).

- To know that gravity is a non-contact force that pulls objects together.
- To know that air resistance and water resistance are both types of friction.
- To know that unsupported objects fall towards the Earth because of gravity.
- To know that friction, air resistance and water resistance act in the opposite direction to a moving object.
- To know that when forces are imbalanced, the speed, shape or direction of an object changes.
- To know that when forces are balanced the speed, shape or direction of an object stays the same.
- To know that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect.
- To know that rougher surfaces have more friction between them than smoother surfaces and how that may affect movement.
- To know that the larger the surface area of an object the greater the air or water resistance it creates.

- To describe the human life cycle, including the stages of growth and development (baby, toddler, child, teenager, adult, elderly).
- To describe changes that occur during puberty (in boys and girls).
- To know that gestation periods vary across mammals.

National curriculum - end of KS2

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments.

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.

describe the changes as humans develop to old age.

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.

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.

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 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 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.

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 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.

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

Progression of Skills & knowledge

Scientific knowledge and understanding

Year 6

Knowledge

- To know that â€˜organismâ€™ is a term used to refer to an individual living thing.
- To know that micro-organisms are organisms that are incredibly small and cannot usually be seen by the naked eye.
- To know the characteristics of the different groups of vertebrate and commonly found invertebrates.

- To know that light travels in a straight line from a light source.
- To understand that luminous objects are seen as a result of light directly entering the eye, whereas non-luminous objects reflect light into the eye.
- To know that shiny surfaces reflect light uniformly.
- To know that when light is reflected off a surface, its direction changes.
- To know that mirrors and periscopes work using reflection of light on smooth surfaces.
- To understand why shadows have the same shape as the objects that cast them as a result of light travelling in straight lines.
- To understand relationships between light sources, objects and shadows.
- To understand how and why the distance between the object and the screen affects the size of the shadow.
- To understand how the angle of a reflected ray is affected by the angle of the incoming ray, when reflected from a plane surface.

- To know that living things have changed over time.
- To know that fossils provide us with information about living things that inhabited the Earth millions of years ago.
- To know that characteristics are passed from parents to their offspring, but that all offspring vary from their parents.
- To know that over time, variation in offspring can affect animalsâ€™ chances of survival in particular environments.
- To know that animals and plants have adapted to suit their environment over many millions of years and that this process can be called evolution.

- To know a wider variety of components in a series circuit (including buzzer and motor).
- To know the conventions used to draw circuit diagrams, including the recognised symbols for common components and using straight lines.
- To know that the voltage of a circuit can be changed and how this affects bulb brightness (or buzzer volume).

- To know the main parts of the human circulatory system (heart, blood vessels and blood).

- To know that the heart pumps blood around the body.
- To know that the blood vessels transport blood around the body.
- To know that the blood transports vital substances around the body, including oxygen and nutrients.
- To understand the relationships between different organ systems.
- To understand the impact of diet, exercise, drugs and lifestyle on the way a body functions.
- To know that the heart rate is the number of beats per minute.
- To know that exercise increases heart rate.

National curriculum - end of KS2

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments.

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.

describe the changes as humans develop to old age.

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.

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.

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

identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood

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use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

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

Progression of Skills & knowledge

Working scientifically
EYFS

Skills

Posing questions

- Asking questions about the natural world, with support.

Planning

- Beginning to share ideas and suggestions about what to do, when working practically.

Predicting

- Beginning to make guesses about what might happen.

Observing (qualitative data)

- Commenting on what they see and hear in the natural world.

Researching

- Recognising that information can be found online and in books.

Recording (diagrams)

- Drawing and labelling pictures of plants and animals.

Recording (tables)

- Recognising that tables can be used to record information.

Grouping and classifying

- Grouping objects, plants and animals, with support.

Analysing and drawing conclusions

- Describing their discoveries when working practically

Year 1

Skills

Posing questions

- Exploring the world around them and raising their own simple questions.
- Recognising there are different types of enquiry (ways to answer a question).
- Responding to suggestions on how to answer questions.

Planning

- Beginning to recognise whether a planned test is fair.
- With support, deciding if suggested observations are suitable.
- Ordering a simple method.

Predicting

- Suggesting what might happen, often justifying with personal experience.

Observing (qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Measuring (quantitative data)

- Using non-standard units to measure and compare.
- Beginning to use standard units and read simple scales to measure and compare.
- Beginning to use simple measuring equipment to make approximate measurements.

Researching

- Gathering specific information from one simplified, specified source.

Recording (diagrams)

- Drawing and labelling simple diagrams.

Recording (tables)

- Using a prepared table to record results including: â— Numbers. â— Simple observations. â— Tally frequency.

Grouping and classifying

- Grouping based on visible characteristics.

Graphing

- Representing data using pictograms and block graphs.

Analysing and drawing conclusions.

- Using their results to answer simple questions.
- Beginning to recognise when results or observations do not match their predictions.

National curriculum - end of KS1

asking simple questions and recognising that they can be answered in different ways

observing closely, using simple equipment

performing simple tests

identifying and classifying

using their observations and ideas to suggest answers to questions

gathering and recording data to help in answering questions

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)

identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

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.

observe changes across the four seasons

observe and describe weather associated with the seasons and how day length varies.

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.

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.

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 the right amounts of different types of food, and hygiene.

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.

Progression of Skills & knowledge

Working scientifically

Year 2

Skills

Posing questions

- Exploring the world around them and raising their own simple questions.
- Recognising there are different types of enquiry (ways to answer a question).
- Responding to suggestions on how to answer questions.

Planning

- Beginning to recognise whether a planned test is fair.
- With support, deciding if suggested observations are suitable.
- Ordering a simple method.

Predicting

- Suggesting what might happen, often justifying with personal experience.

Observing (Qualitative data)

- Using their senses to describe, in simple terms, what they notice or what has changed.

Measuring (quantitative data)

- Using non-standard units to measure and compare.
- Beginning to use standard units and read simple scales to measure and compare.
- Beginning to use simple measuring equipment to make approximate measurements.

Researching

- Gathering specific information from one simplified, specified source.

Recording (diagrams)

- Drawing and labelling simple diagrams.

Analysing and drawing conclusions.

- Using their results to answer simple questions.
- Beginning to recognise when results or observations do not match their predictions.

Year 3

Skills

Posing questions

- Beginning to raise further questions during the enquiry process.
- Considering what makes a testable question.
- Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.
- Beginning to make suggestions about how different questions could be answered

Planning

- Beginning to select from options which variables will be changed, measured and controlled.
- Beginning to suggest what observations to make and how long to make them for.
- Planning a simple method, verbally and in writing.
- Beginning to write a simple method in numbered steps.
- Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.

Predicting

- Using scientific knowledge and/or personal experience to explain their prediction (becauseâ€¦)
- Beginning to consider cause and effect when making predictions, where appropriate.
- Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)

Observing (qualitative data)

- Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.

Measuring (quantitative data)

- Using standard units to measure and compare.
- Using measuring equipment with increasing accuracy.
- Reading scales with unmarked intervals between numbers.

Researching

- Gathering specific information from a variety of sources.

Recording (diagrams)

- Beginning to draw more scientific diagrams by: â— Using some standard symbols. â— Drawing in 2D to produce simple line diagrams. â — Labelling with more scientific vocabulary.

Recording (tables)

- Using a prepared table to record results including more detailed observations.
- Using tables with more than two columns.
- Identifying and adding headings to tables.
- Beginning to design simple results tables.

Grouping and classifying

- Grouping based on visible characteristics and measurable properties.

Graphing

- Representing data using bar charts.
- Drawing bars with greater accuracy.
- Reading the value of bars with greater accuracy.

Analysing and drawing conclusions.

- Writing a conclusion to summarise findings using simple scientific vocabulary.
- Beginning to suggest how one variable may have affected another.
- Beginning to quote results as evidence of relationships.
- Identifying data that does not fit a pattern (anomalous data).
- Recognising when results or observations do not match their predictions.

- Beginning to use identified patterns to predict new values or trends.

Evaluating

- Beginning to identify steps in the method that need changing and suggest improvements.
- Identifying which variables were difficult to control and suggesting how to better control them.
- Commenting on the degree of trust by reflecting on: â— Results that do not fit a pattern (anomalies). â— The quality of results (accurate measurements and maintaining control variables).
- Beginning to identify new questions that would further the enquiry.

National curriculum - end of KS2

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments.

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.

describe the changes as humans develop to old age.

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.

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.

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 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 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.

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 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.

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

Progression of Skills & knowledge

Working scientifically

Year 4

Skills

Posing questions

- Beginning to raise further questions during the enquiry process.
- Considering what makes a testable question.
- Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.
- Beginning to make suggestions about how different questions could be answered

Planning

- Beginning to select from options which variables will be changed, measured and controlled.
- Planning a simple method, verbally and in writing.
- Beginning to write a simple method in numbered steps.
- Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.

Predicting

- Making predictions about what they think will happen by: â— Using scientific knowledge and/or personal experience to explain their prediction (becauseâ€¦) â— Beginning to consider cause and effect when making predictions, where appropriate. â— Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)

Observing (qualitative data)

- Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.

Measuring (quantitative data)

- Using standard units to measure and compare.
- Using measuring equipment with increasing accuracy.

- Reading scales with unmarked intervals between numbers.

Researching

- Gathering specific information from a variety of sources.

Recording (diagrams)

- Beginning to draw more scientific diagrams by: â— Using some standard symbols. â— Drawing in 2D to produce simple line diagrams. â — Labelling with more scientific vocabulary.

Recording (tables)

- Using a prepared table to record results including more detailed observations.
- Using tables with more than two columns.
- Identifying and adding headings to tables.
- Beginning to design simple results tables.

Classification keys

- Grouping based on visible characteristics and measurable properties.
- Populating a pre-prepared branching and number key.
- Choosing appropriate questions for classification keys.

Graphing

- Representing data using bar charts.
- Drawing bars with greater accuracy.
- Reading the value of bars with greater accuracy.

Analysing and drawing conclusions.

- Writing a conclusion to summarise findings using simple scientific vocabulary.
- Beginning to suggest how one variable may have affected another.
- Beginning to quote results as evidence of relationships.
- Identifying data that does not fit a pattern (anomalous data).
- Recognising when results or observations do not match their predictions.
- Beginning to use identified patterns to predict new values or trends.

Evaluating

- Beginning to identify steps in the method that need changing and suggest improvements.
- Beginning to identify which variables were difficult to control and suggesting how to better control them.
- Commenting on the degree of trust by reflecting on: â— Results that do not fit a pattern (anomalies). â— The quality of results (accurate measurements and maintaining control variables).
- Beginning to identify new questions that would further the enquiry.

Year 5

Skills

Posing questions

- Raising questions throughout the enquiry process.
- Identifying testable questions.
- Selecting the most appropriate enquiry method to answer questions and give justification.

Planning

- Suggesting which variables will be changed, measured and controlled.
- Making and explaining decisions about what observations to make and how long to make them for.
- Writing a method including detail about how to ensure control variables are kept the same.
- Writing a method that considers reliability by planning repeated readings.
- Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.

Predicting

- Making increasingly scientific predictions by: â— Using previous scientific knowledge and evidence to inform their predictions. â— Using scientific language to describe a potential outcome or explain why they think something will happen. â— Making links between topics to evidence a prediction.

Observing (qualitative data)

- Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.

Measuring (quantitative data)

- Using standard units to measure and compare with increasing precision (decimals).

- Reading a wider variety of scales with unmarked intervals between numbers.

Researching

- Gathering answers to open-ended questions from a variety of sources.

Recording (diagrams)

- Drawing scientific diagrams by: â— Using a wider range of standard symbols. â— Drawing with increasing accuracy. â— Labelling with a broader range of scientific vocabulary. â— Annotating diagrams to explain concepts and convey opinions.

Recording (tables)

- Using tables with columns that allow for repeat readings.
- Suggesting headings to tables, including units.
- Designing results tables with increasing independence with consideration of variables where applicable.
- Calculating the mean average.

Graphing

- Representing data by using line graphs and scatter graphs.
- Plotting points with greater accuracy
- Reading the value of plotted points with greater accuracy.

Analysing and drawing conclusions

- Writing a conclusion to summarise findings using increasingly complex scientific vocabulary.
- Suggesting with increasing independence how one variable may have affected another.
- Quoting relevant data as evidence of relationships.
- Identifying anomalies in repeat data and excluding results where appropriate.
- Comparing individual, class and/or model data to the prediction and recognising when they do not match.
- Using identified patterns to predict new values or trends.

Evaluating

- Identifying steps in the method that need changing and suggesting improvements.
- Identifying which variables were difficult to control and suggesting how to better control them.
- Commenting on the degree of trust by also reflecting on: â— Accuracy (human error with equipment). â— Reliability (repeating results). â— Sources of information (e.g. websites, books).

- Deciding what data to collect to further test direct relationships.

National curriculum - end of KS2

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments.

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.

describe the changes as humans develop to old age.

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.

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.

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 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 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.

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 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.

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

Progression of Skills & knowledge

Working scientifically

Year 6

Skills

Posing questions

- Raising questions throughout the enquiry process.
- Identifying testable questions.
- Selecting the most appropriate enquiry method to answer questions and give justification.

Planning

- Suggesting which variables will be changed, measured and controlled.
- Making and explaining decisions about what observations to make and how long to make them for.
- Writing a method including detail about how to ensure control variables are kept the same.
- Writing a method that considers reliability by planning repeated readings.
- Suggesting the most appropriate equipment to make observations and measurements and justifying their choices.

Predicting

- Making increasingly scientific predictions by: â— Using previous scientific knowledge and evidence to inform their predictions. â— Using scientific language to describe a potential outcome or explain why they think something will happen. â— Making links between topics to evidence a prediction.

Observing (qualitative data)

- Using their senses to describe, in detail and with a broader range of scientific vocabulary, what they notice or what has changed.

Measuring (quantitative data)

- Using standard units to measure and compare with increasing precision (decimals).
- Reading a wider variety of scales with unmarked intervals between numbers.

Researching

- Gathering answers to open-ended questions from a variety of sources.

Recording (diagrams)

- Drawing scientific diagrams by: â— Using a wider range of standard symbols. â— Drawing with increasing accuracy. â— Labelling with a broader range of scientific vocabulary. â— Annotating diagrams to explain concepts and convey opinions.

Recording (tables)

- Using tables with columns that allow for repeat readings.
- Suggesting headings to tables, including units.
- Designing results tables with increasing independence with consideration of variables where applicable.
- Calculating the mean average.

Grouping and classifying

- Grouping in a broader range of contexts.
- Organising the layout of number and branching keys.
- Formulating appropriate questions for classification keys.

Graphing

- Representing data by using line graphs and scatter graphs.
- Plotting points with greater accuracy.
- Reading the value of plotted points with greater accuracy.

Analysing and drawing conclusions.

- Recognise the following across a broader range of contexts and in more complexity: â— Naturally occurring patterns and relationships. â— Making comparisons to group and classify. â— Changes over time. â— Relevant secondary data.
- Writing a conclusion to summarise findings using increasingly complex scientific vocabulary.
- Suggesting with increasing independence how one variable may have affected another.
- Quoting relevant data as evidence of relationships.
- Identifying anomalies in repeat data and excluding results where appropriate.
- Comparing individual, class and/or model data to the prediction and recognising when they do not match.
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Evaluating

- Identifying steps in the method that need changing and suggesting improvements.
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use recognised symbols when representing a simple circuit in a diagram

Progression of Skills & knowledge

Science in action

EYFS

Skills

- To know some different job roles.

Year 1

Skills

- Learning about the role of a weather reporter and how information about the weather is useful in everyday life.
- Learning about visual impairment and the importance of continued research in this area. Recognising how firefighters use the senses when doing their job.
- Learning about Jane Goodallâ€™s key findings when studying chimpanzees in the wild.
- Recognising the benefits of scientific research into plants and learning about the work of Dr. Percy Julian who discovered how to make plant-based medicines.
- Learning how a zoologist closely observes animal tracks in the wild to understand their behaviour.

Knowledge

- To know about famous scientists throughout history.
- To know about a range of jobs and careers that use scientific knowledge and methods.
- To know about the work of modern-day scientists.
- To know there are spiritual, moral, social and cultural links with Science.
- Learning about the role of a weather reporter and how information about the weather is useful in everyday life.
- Learning about visual impairment and the importance of continued research in this area. Recognising how firefighters use the senses when doing their job.
- Learning about Jane Goodallâ€™s key findings when studying chimpanzees in the wild.
- Learning how a zoologist closely observes animal tracks in the wild to understand their behaviour.

National curriculum - end of KS1

asking simple questions and recognising that they can be answered in different ways

observing closely, using simple equipment

performing simple tests

identifying and classifying

using their observations and ideas to suggest answers to questions

gathering and recording data to help in answering questions

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)

identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

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.

observe changes across the four seasons

observe and describe weather associated with the seasons and how day length varies.

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.

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.

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 the right amounts of different types of food, and hygiene.

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.

Progression of Skills & knowledge

Science in action	
Year 2	
Skills • Learning about the role of a botanist including the importance of identification and classification when studying plants. • Learning about the harmful effects of certain materials and how to take responsibility for protecting the environment. • Learning how to look after personal hygiene by washing themselves and their clothes. Investigating the benefits of exercise on health and wellbeing • Recognising that certain job roles rely on understanding healthy plant growth. Exploring the impact of humans on plants in the environment. • Learning about the material Kevlar, invented by American chemist, Stephanie Kwolek. Recognising that certain job roles, such as engineers and builders, require an understanding of materials and their properties.	Knowledge • To know about famous scientists throughout history. • To know about a range of jobs and careers that use scientific knowledge and methods. • To know about the work of modern day scientists. • To know about science in the news and recent discoveries. • To know there are spiritual, moral, social and cultural links with Science. • Learning about the role of a botanist including the importance of identification and classification when studying plants. • Learning about the harmful effects of certain materials and how to take responsibility for protecting the environment. • Learning how to look after personal hygiene by washing themselves and their clothes. Investigating the benefits of exercise on health and wellbeing. • Learning about the material Kevlar, invented by American chemist, Stephanie Kwolek. Recognising that certain job roles, such as engineers and builders, require an understanding ofmaterials and their properties.
Year 3	

Skills	Knowledge
• Exploring scientific advances and how research has contributed to changes in prosthetics. • Exploring the uses of friction and magnets in everyday life and industry • Exploring the work of Mary Anning and modern day palaeontologists. Using the fossil record to make suggestions about the past. • Looking at how different scientists formed conclusions about light and that collaborative work can either support or refute these ideas. • Exploring different jobs that consider light and shade and how light and shadows are used for entertainment in the arts. • Looking at how different materials are used to design gloves for different purposes depending on the amount of friction required.	• To know about famous scientists throughout history. • To know about a range of jobs and careers that use scientific knowledge and methods. • To know about the work of modern-day scientists. • To know about science in the news and recent discoveries. • To know there are spiritual, moral, social and cultural links with Science. • To know about the methods and equipment used by scientists throughout history and how these have led to modern methods. • To know how scientific knowledge has changed over time, leading to the current understanding of Science. • To know about current scientific research and what it aims to achieve in the future. • To know that collaboration and peer reviewing are essential for effective scientific progress. • Learning about different jobs that make use of scientific research.

National curriculum - end of KS2

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

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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

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Progression of Skills & knowledge

Science in action

Year 4

Skills

- Observing human anatomy in the past and ethical dilemmas.
- Exploring real observation methods by scientists and evidence collected.
- Determining why scientists need to work collaboratively and evaluate experiments
- Exploring the work of naturalists and the evidence they use to study animals.
- Exploring how multiple scientists have contributed to an invention.
- Suggesting why new inventions will change safety advice.
- Researching how climate change affects the water cycle and the work of climate change scientists.
- Researching how whales and dolphins communicate underwater to prove that sound travels faster and father in liquids than gases
- Exploring the safe decibel range and jobs that require ear protection or sound proofing.
- Researching how conservation issues are affecting the planet and what can be done to address them.
- Exploring the role of taxonomists and how they create classification keys.
- Looking at the work of pharmacologists in designing medicines and how viscosity affects how quickly they can be absorbed into the blood.

Knowledge

- To know about famous scientists throughout history.
- To know about a range of jobs and careers that use scientific knowledge and methods.
- To know about the work of modern day scientists.
- To know about science in the news and recent discoveries.
- To know there are spiritual, moral, social and cultural links with Science.
- To know about the methods and equipment used by scientists throughout history and how these have led to modern methods.
- To know how scientific knowledge has changed over time, leading to the current understanding of Science.
- To know about current scientific research and what it aims to achieve in the future.
- To know that collaboration and peer reviewing is essential for effective scientific progress.
- Discovering the importance of conservationists like Greta Thumberg and scientific communicators like Sir David Attenborough.

Year 5

Skills	Knowledge
• Identifying real world examples of mixtures and how and why separation techniques are used to separate them, including some jobs that may use them. • Linking the properties of materials to their real world uses. • Using properties of materials to inform product design. • Linking the conditions that cause rusting to methods of prevention. • Considering the evidence used by Ptolemy and Copernicus in developing the geocentric and heliocentric models of the Solar System respectively. • Using satellite data on climate change to make predictions about future temperature changes. • Exploring the problems with space junk and designing a device to clear it. • Looking at the work of biologists studying amphibians and how they are affected by climate change. Using their work to develop their own experiments. • Discovering how gardeners and farmers use asexual reproduction in plants to their advantage to propagate their best plants. • Exploring the evidence used by Galileo and Newton that contributed towards the theory of gravity. • Considering how air and water resistance inform aerodynamic design. • Discovering how friction applies to braking systems. • Looking at how plotted data can help medical professionals to determine healthy growth. • Looking at the work of NASA scientists in recreating the conditions of the asteroid that wiped out the dinosaurs. • Exploring the race to mine asteroids for precious metals.	• To know about famous scientists throughout history. • To know about a range of jobs and careers that use scientific knowledge and methods. • To know about the work of modern day scientists. • To know about science in the news and recent discoveries. • To know about the methods and equipment used by scientists throughout history and how these have led to modern methods. • To know how scientific knowledge has changed over time, leading to the current understanding of Science. • To know about current scientific research and what it aims to achieve in the future. • To know that collaboration and peer reviewing is essential for effective scientific progress. • To know how scientific evidence is used to support or refute ideas or arguments. • To know that mistakes can lead to new discoveries.

National curriculum - end of KS2

asking relevant questions and using different types of scientific enquiries to answer them

setting up simple practical enquiries, comparative and fair tests

making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

identifying differences, similarities or changes related to simple scientific ideas and processes

using straightforward scientific evidence to answer questions or to support their findings.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

using test results to make predictions to set up further comparative and fair tests

reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

identifying scientific evidence that has been used to support or refute ideas or arguments.

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.

describe the changes as humans develop to old age.

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.

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.

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 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 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.

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 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.

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

Progression of Skills & knowledge

Science in action

Year 6

Skills

- Describing the work of Carl Linnaeus in developing the Linnaean and binomial systems.
- Understanding that modern science has added to and refined the Linnaean system.
- Considering evidence that can be used to argue scientifically about a theory.
- Discussing the purpose and ethics of historical experiments and the conclusions drawn from the results.
- Discovering how scientific principles can be used for artwork, communication or decoration.
- Exploring different jobs and inventions that depend on reflection.
- Considering evidence that can be used to argue scientifically about a theory
- Exploring different kinds of evidence that can lead to the same conclusion.
- Understanding the role of peer review and choices in sources to improve the degree of trust in a conclusion
- Exploring different jobs that look at changes to species over time, including naturalists like Darwin or Wallace and palaeontologists like Anning.
- Considering the importance of using standardised symbols by those working with electricity, such as electricians
- Explaining how electrical switches can be used to protect users of hazardous electrical appliances
- Using scientific knowledge to devise an appliance to solve a problem.
- Considering how health advice has changed over time and how

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- Understanding that modern science has added to and refined the Linnaean system.

some of the health information we have now requires further research (e.g. vaping).
- Exploring what modern stethoscopes are used for and how the design has evolved.
- Considering how understanding of the circulatory system has changed by looking at changing opinions of scientists and collaborative evidence is fundamental to our current knowledge and understanding.
- Looking at how scientific enquiries can provide the data to support advertising claims.
- Considering how using different methods and collaborating data can provide a greater degree of trust in results.

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