

Science Milestones

Plants

- [] explore plants with senses
- [] know that plants grow
- [] know that some plants are edible
- [] know that plants are alive
- [] know what plants need to grow and stay healthy.
- [] know some differences and similarities between plants and animals
- [] identify leaf, stem, roots, flower
- [] know where plants fit into food chains
- [] explain how water is transported within plants
- [] name 2 parts of a flower
- [] explain different methods of pollination (e.g. wind, insect)
- [] know that plants reproduce
- [] describe some ways that seeds can be dispersed
- [] classify plants based on characteristics.
- [] identify how plants are adapted to suit their environment and that adaptation may lead to evolution.
- [] use the term 'photosynthesis' correctly
- [] know one input and one output for photosynthesis
- [] stain and examine plant cells with a microscope
- [] compare plant and animal cells
- [] explain the carbon cycle in simple terms
- [] state a link between plants and climate change
- [] know what genetic engineering means in simple terms.
- [] give one reason for and against genetic engineering for food.

Animals including humans

- [] experience animal life cycles, e.g., observe caterpillar, butterfly
- [] show a reaction to a sensory input, e.g., taste, sound
- [] show knowledge of body parts, e.g., lifts leg on request

- [] Know that humans have human children

- [] knows that some plants and some animals are edible
- [] Knows that animals have different homes

- [] can order the life cycle of at least one animal.

- [] can correctly link 2 sense organs to senses

- [] can identify limbs, head on self and others.

- [] shows understanding that biological males and females have different bodies

- [] knows mammals give birth to live young, birds lay hard shelled eggs

- [] describe at least 2 changes in at least 2 animals as they get older.

- [] understand that most animals need a male and female to produce young

- [] describe/indicate where a human baby grows

- [] know at least 2 animals that live in 2 extreme climates
- [] Order life cycle of a human
- [] describe 2 changes that occur during puberty.
- [] describe in simple terms how mammalian babies are conceived and born.
- [] know that some animals eat plants, some eat animals, and some eat both.

- [] correctly link all 5 senses to the correct input organs

- [] Know the basic needs of animals for survival (water, food and air)

- [] Know 1 benefit of exercise

- [] know 2 components of a balanced diet

- [] know 2 ways you can care for your teeth

- [] know the function of 2 different types of teeth

- [] identify and name a variety of common animals

- [] correctly use the terms carnivores, herbivores and omnivores

- [] describe some differences between 2 of the following: bird, fish, cat, frog, snake

- [] know that living things can be grouped

- [] use simple keys to group, identify and name a variety of living things

--[] know that environments can change and that this can sometimes pose dangers to living things.

--[] know what the skeleton is made from

--[] know that muscles move bones

--[] know 1 function of the skeleton

--[] indicate where the heart is

--[] know the heart pumps blood around our body, and that exercise makes your heart pump faster

--[] Name parts of the body including genitalia

--[] indicate on self the location of teeth, food pipe, stomach, intestines

--[] know in simple terms the function of teeth, food pipe, stomach, intestines in digestion

--[] interpret 3 organism food chains

--[] describe the differences in the life cycles of a human and a frog

--[] describe the life process of reproduction in one non-mammal.

--[] give an example of mammal, reptile, bird, fish, amphibian

--[] give 2 characteristics of each mammal, an amphibian, an insect and a bird

--[] name the main parts of the human circulatory system

--[] describe the functions of the heart, blood vessels and blood

--[] know 4 things that have a negative impact on human health

--[] know the role of the diaphragm in breathing.

--[] know the impact of exercise, asthma and smoking on the human lungs

--[] know the content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed

--[] explain some consequences of imbalances in the diet, including obesity, starvation and deficiency diseases

--[] stain and examine animal cells under a microscope

--[] know 2 differences between plant and animal cells.

--[] know that fossils provide information about living things that inhabited the Earth millions of years ago

--[] know that living things change over time

--[] Know that normally offspring vary and are not identical to their parents

- [] give 2 examples of how living things are adapted to suit their environment
- [] understand how adaptation may lead to evolution.

Materials

- [] sensory exploration of materials
- [] experience changing states of matter – ice / water
- [] choose clothing in different seasons
- [] observe mixing
- [] choosing materials for homes with simple reasons for choice
- [] understand that cooking is not reversible
- [] distinguish between an object and the material from which it is made
- [] identify and name a variety of everyday materials wood, plastic, glass, paper
- [] describe the simple physical properties of wood, plastic, glass, paper
- [] compare and group together a variety of everyday materials on the basis of physical properties.
- [] correctly use the terms melt and freeze
- [] correctly use the term reversible change with an example
- [] correctly use the term irreversible change with an example
- [] choose materials to make a boat and give 2 reasons for choices.
- [] identify a solid, a liquid, and a gas
- [] use the terms melting, freezing, evaporating, condensing
- [] identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
- [] recall the freezing point of water
- [] draw or otherwise show the simple particle model for states of matter
- [] explain the relative closeness and speed of movement of particles
- [] show an understanding of gas pressure in simple terms
- [] explain the concept of a pure substance

- [] explain the concept of mixtures
- [] explain dissolving in terms of particles
- [] explain diffusion in terms of the particle model
- [] describe some techniques for separating mixtures: filtration, evaporation & chromatography
- [] classify materials based on a wider range of characteristics, e.g., 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 solute from a solution
- [] know that temperature affects solubility
- [] Give 2 examples of irreversible change
- [] write word equations for 2 irreversible changes
- [] understand the difference between an element and a compound
- [] know the pH scale in terms of 'very acidic, neutral, very alkaline'
- [] give examples of items with low/neutral/high pH and link to properties
- []-understand that scientists use symbols to represent elements and compounds
- [] recognise the periodic table as a way of organising elements
- [] understand that metals have similar properties to each other
- [] construct atomic diagrams for the first 20 elements
- [] use a given atomic structure to place an element in a group on the periodic table
- [] use a given atomic structure to predict reactivity.
- [] know that elements bond together in fixed ways
- [] know some structures that carbon forms
- [] explain why carbon is 'special'
- [] know the origins of hydrocarbon fuels
- [] understand how distillation works when separating mixtures
- [] know the word equation for combustion
- [] link combustion of fuels to the carbon cycle and climate issues
- [] explain conservation of mass in chemical reactions
- [] balance given chemical equations

--[] explain the anomaly of ice-water transition

Rocks

--[] group similar looking rocks

--[] describe in simple terms how fossils are formed

--[] know what soil is made from

--[] explain how igneous and sedimentary rocks are formed

--[] explain how metamorphic rocks are formed

--[] know there is a rock cycle

--[] explain the rock cycle

--[] know the internal structure of the earth

--[] know that the Earth is a source of limited resources

--[] know some ways we can preserve resources

--[] know that recycling has limited efficiency.

Seasonal change

--[] explore different weather

--[] link appropriate clothing to weather and seasons

--[] Identify and contrast different seasons

--[] name seasons and predict weather from observations

--[] describe the changes in day length as the seasons change

--[] know the sun is a source of light and heat

--[] recognise that shadows are formed when the light from a light source is blocked by a solid object

--[] find patterns in the way that the size of shadows change.

--[] 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

--[] use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

- [] understand and explain the phases of the moon
- [] explain how the moon impacts tidal patterns on earth

Light and sight

- [] experience light, dark and colour
- [] name colours
- [] experiment with colour mixing
- [] 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 a solid object
- [] find patterns in the way that the size of shadows change.
- [] 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 transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface
- [] use a ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative)
- [] describe that basic operation of the human eye
- [] explain how we see colour
- [] use a prism correctly and link to rainbows
- [] explain that not all light is visible to the human eye
- [] show basic understanding of the electromagnetic spectrum
- [] give some examples of UV and IR light
- [] describe the effect of colour on absorption/reflection of heat

Sound

- [] experience different sounds, including making sound
- [] experience vibration linked to sound with a resonance board/vibration bench other sensory equipment.
- [] notices cause and effect with sound
- [] name the sense organ associated with hearing
- [] identify how sounds are made, associating some of them with something vibrating
- [] recognise that sounds get fainter as the distance from the sound source increases
- [] associate bigger vibration with louder sounds
- [] know what vibrates to produce sound on 3 musical instruments
- [] 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
- [] sound needs a medium to travel, the speed of sound in air, in water, in solids
- [] auditory range of humans and animals.

Forces

- [] Experience pushes and pulls with toys and play equipment
- [] find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching
- [] name some simple forces – e.g. push, pull, squash
- [] compare how things move on different surfaces
- [] 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
- [] explain floating and sinking in terms of up thrust and balanced forces
- [] explain that pressure is greater over a smaller area
- [] know that force is needed to cause objects to stop or start moving, or to change their speed or direction
- [] forces as pushes or pulls, arising from the interaction between two objects
- [] use force arrows in diagrams moment as the turning effect of a force
- [] force is measured in newtons
- [] force-extension linear relation; Hooke's Law as an example
- [] non-contact forces: gravity forces acting at a distance on Earth and in space, forces between magnets and forces due to static electricity.

Magnetism

- [] 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 the poles
 - [] know that magnetic field exist
 - [] know that the earth has magnetic field and this can be used for navigation
 - [] observe the magnetic effect of a current
 - [] know that electromagnets can be switched on and off, and some uses for this

Electricity

- [] Experience battery operated toys.
- [] Use toys with switches.
- [] Understand on/off
- [] What uses mains or battery
- [] give examples of how to use electricity safely
- [] construct a simple series electrical circuit
- [] identify parts of a circuit, including cells, wires, bulbs, switches and buzzers
- [] identify whether or not a lamp will light in a simple series circuit
- [] 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.
- [] associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- [] use recognised symbols when representing a simple circuit in a diagram.