

# VOCABULARY

**Anther:** the part of a stamen that produces and releases the pollen.

**Bulb:** a root shaped like an onion that grows into a flower or plant.

**Cell:** the smallest part of an animal or plant that is able to function independently.

**Dispersed:** scattered or spread through a large area.

**Dissect:** to carefully cut something up in order to examine it scientifically.

**Embryo:** an unborn animal or human being in the very early stages of development.

**Fertilisation:** male and female gametes meet to form an embryo or seed.

**Gamete:** the name for the two types of male and female cell that join together to make a new creature.

**Germination:** if a seed germinates or if it is germinated, it starts to grow.

**Metamorphosis:** a person or thing develops and changes into something completely different.

**Ovary:** a female organ which produces eggs.

**Ovule:** a small egg.

**Pollen:** a fine powder produced by flowers. It fertilises other flowers of the same species so that they produce seeds.

**Pollination:** to fertilise a plant/tree with pollen. This is often done by insects.

**Reproduction:** when an animal or plant produces one or more individual similar to itself.

**Stigma:** the top of the centre part of a flower which takes in pollen.



# SCIENCE KNOWLEDGE MAT –YEAR 5

## Living Things and Their Habitats

### MAIN IDEA

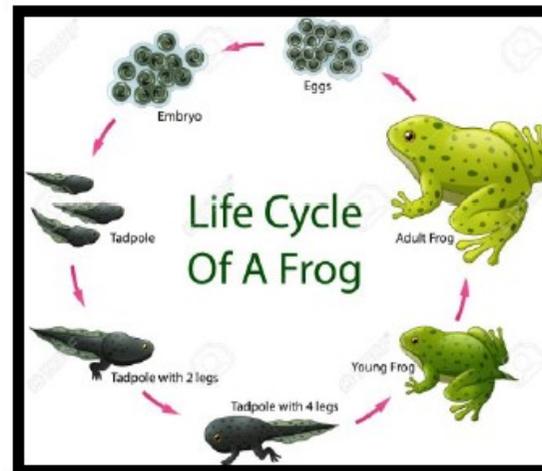
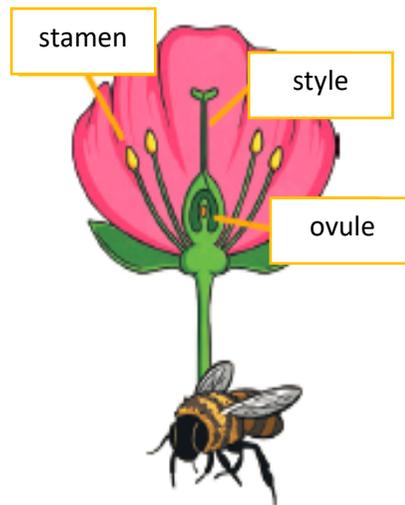
To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. Also, to describe the life process of reproduction in some plants and animals.

### WHAT CAME BEFORE

Year 4 – explore and use classification keys to group and name a variety of living things.

### WHAT COMES NEXT

Year 6 – to recognise common characteristics of plants and animals and recognise similarities/ differences.



### WHAT YOU SHOULD ALREADY KNOW

- Animals can be grouped into vertebrates and invertebrates.
- Vertebrates can be grouped into fish, reptiles, amphibians, birds and mammals.
- Reproduction is one of the seven life processes.
- Parts of a plant, their features and what their functions are.
- Some life cycles, including humans and plants.

# KEY LEARNING

- Reproduction is when an animal or plant produces one or more individuals similar to itself. This can be done through sexual reproduction (requires male and female gametes) or asexual reproduction (requires only one parent).
- Plants can also reproduce. Male gametes can be found in the pollen, and female gametes can be found in the ovary (ovules). Pollination occurs when pollen from the anther is transferred to the stigma by insects. The pollen then travels down and meets the ovule, seeds are then formed (fertilisation). Seeds are dispersed so that germination can begin again.
- Some plants, such as strawberry plants, potatoes, spider plants and daffodils, use asexual reproduction to create a new plant. They are identical to the parent plant.
- The life cycles of mammals, birds, amphibians and insects have similarities and differences. For example, amphibians and insects go through the process of metamorphosis.

### INVESTIGATE / QUESTIONS

- Dissect a flower and identify the different parts. Can you explain their functions?
- Observe life cycle changes in a variety of living things, for example a plant.
- Can you grow a plant from different parts of the parent plant? (e.g. seeds, stem and root cuttings)

## VOCABULARY

**Solution:** a mixture that contains two or more unlike substances combined evenly

**Soluble:** can be dissolved in liquid

**Insoluble:** cannot be dissolved in liquid

**Substance:** that of which something is made

**Evaporate:** to turn from liquid into gas; pass away in the form of vapour

**Dissolve:** to mix completely with liquid / to melt into liquid

**Filtration:** to pass through or subject to a filter

**Filtering:** to separate out by the use of a filter.

**Burning:** to be overheated or in flames

**Rusting:** an orange or reddish brown coating that forms on metal that has been exposed to air and water

**Sieve:** a tool used to separate solid from liquid or to separate smaller pieces of something from larger pieces

**Separate:** to divide into parts or break the connection between

**Conductivity:** the capacity for or property of conducting or transmitting heat, electricity, or sound

**Insulator:** a material or device that does not conduct electricity, such as an object of glass or porcelain, that is used to insulate and support electric wires



## SCIENCE KNOWLEDGE MAT –YEAR 5

### Properties & Changes of Materials

#### MAIN IDEA

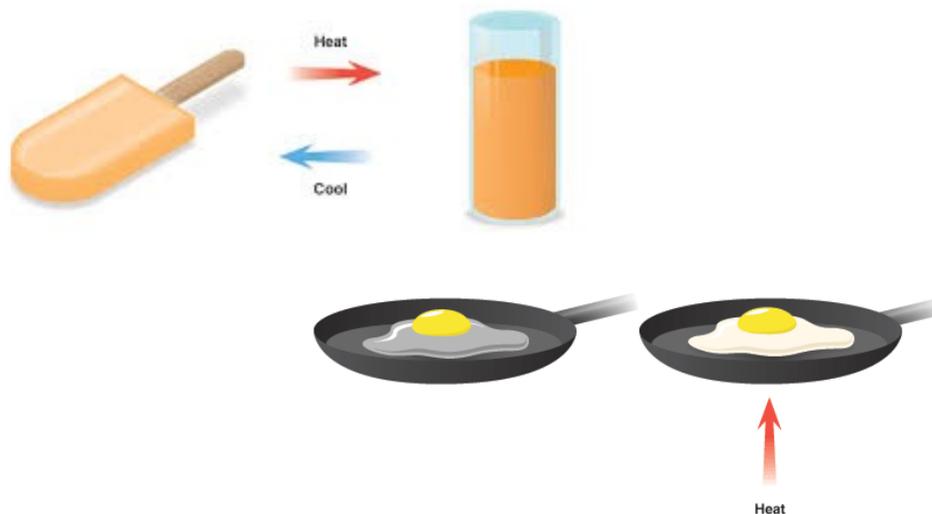
Pupils will learn to compare and group everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. They will use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.

#### WHAT CAME BEFORE

Compare and group materials according to whether they are solids, liquids or gases. Begin to think about reversible and irreversible changes in materials. Are heated or cooled.

#### WHAT COMES NEXT

KS3 Chemistry: The particulate nature of matter, the properties of the different states of matter in terms of the particle model, including gas pressure, changes of state in terms of the particle model.



#### WHAT YOU SHOULD ALREADY KNOW

Pupils can compare and group materials according to whether they are solids, liquids or gases. They can observe that some materials change state when they are heated or cooled. Pupils can link evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

## KEY LEARNING

Pupils will build on their previous learning to compare and group everyday materials. They will learn that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. They will give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. Pupils will demonstrate that dissolving, mixing and changes of state are reversible changes and explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible.

### INVESTIGATE / QUESTIONS

Which materials can be changed? Are these changes reversible or irreversible?

Try a cooking activity, such as baking. Which changes can you identify that are reversible / irreversible?

Can you think of a material that is soluble / insoluble? Try them out!

Which different ways can you make water change states? What happens to make these changes occur?

# VOCABULARY

**Adolescence:** the period of your life in which you develop from being a child into being an adult.

**Adulthood:** the state of being an adult.

**Development:** the gradual growth or formation of something.

**Fertilisation:** the process of the male and female sex cells fusing together.

**Foetus:** an animal or human being in its later stages of development before it is born.

**Genitals:** the reproductive organs.

**Gestation:** the process in which babies grow inside their mother's body before they are born.

**Hormones:** a chemical, usually occurring naturally in your body, that makes an organ of your body do something.

**Infancy:** the period of your life when you are very young.

**Life Cycle:** the series of changes that an animal or plant passes through from the beginning of its life until its death.

**Life Processes:** there are seven processes that tell us that living things are alive.

**Menopause:** the time during which a woman gradually stops menstruating, usually when she is about fifty years old.

**Menstruation:** the approximately monthly discharge of blood by women from puberty to menopause.

**Puberty:** the stage in someone's life when their body starts to become physically mature.

**Reproduction:** when an animal or plant produces one or more individuals similar to itself.



# SCIENCE KNOWLEDGE MAT –YEAR 5

## Animals Including Humans

### MAIN IDEA

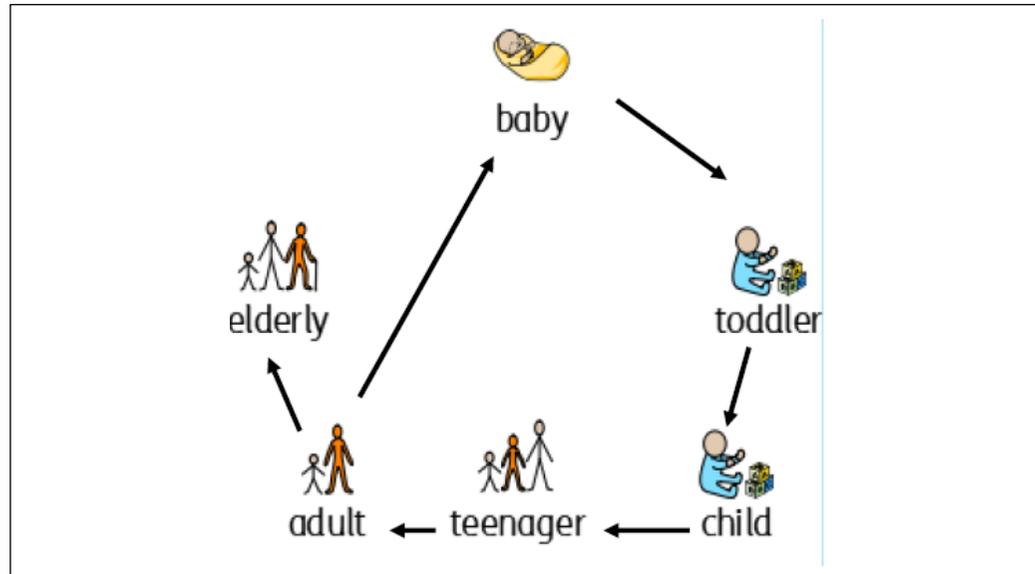
Children will be able to recognise that we grow and mature into adults. They will be able to describe the key changes humans go through as they develop to old age.

### WHAT CAME BEFORE

Year 4: describe the function of the digestive system and the different types of human teeth.

### WHAT COMES NEXT

Year 6: identify the main parts of the human circulatory system and the way nutrients are transported.



### WHAT YOU SHOULD ALREADY KNOW

- Animals can be grouped into vertebrates, and then further into fish, reptiles, amphibians, birds and mammals.
- Reproduction and growth are two of the seven life processes.
- How to live a healthy lifestyle.

# KEY LEARNING

The main stages of the human lifecycle:

- 1) *Foetus*—an unborn human being in the very early stages of development.
- 2) *Newborn*—this is a baby that has just been born.
- 3) *Infancy*—many toddlers learn to walk and talk at this stage. Growth and development happens rapidly.
- 4) *Childhood*—children learn new things as they grow and become more independent.
- 5) *Adolescence*—the body starts to change and prepare for adulthood. Hormonal changes take place over a few years, also known as puberty. Some changes include growth in height, more sweat, hair growth on arms and legs, under the armpits and on genitals, and growth in parts of the body such as male genitals and breasts. Females begin to menstruate.
- 6) *Early Adulthood*—humans are usually at

### INVESTIGATE / QUESTIONS

- Can you compare the growth pattern of humans to other animals?
- Why do humans take so long to learn to walk in comparison to other animals?
- Can you create a Venn diagram to show the similarities and differences between children, adolescents and adults?

## VOCABULARY

**Sun:** the star in the middle of our solar system. The earth and other planets rotate around it and receive heat and light from it.

**Moon:** the earth's natural satellite. The moon does not give off light. Instead, its shine comes from the light it reflects from the sun.

**Planets:** a large body in outer space that circles around the sun or another star.

**Star:** giant spheres of superhot gas made up mostly of hydrogen and helium.

**Solar System:** our Sun, its eight planets and their moons, and all other bodies that travel around the Sun.

**Orbit:** the curved path in which a planet, satellite, or spacecraft moves in a circle around another body.

**Mercury:** the planet of the solar system that is nearest to the sun.

**Venus:** the sixth largest planet in the solar system and second in distance from the sun.

**Earth:** the fifth largest planet in our solar system and the third in distance from the sun.

**Mars:** the seventh largest planet in the solar system and fourth in distance from the sun.

**Jupiter:** the largest planet in the solar system and fifth in distance from the sun.

**Saturn:** the second largest planet in the solar system and sixth in distance from the sun.

**Uranus:** the third largest planet in the solar system and seventh in distance from the sun.

**Neptune:** the fourth largest planet in the solar system and eighth in distance from the sun.



## SCIENCE KNOWLEDGE MAT –YEAR 5

### Earth & Space

#### MAIN IDEA

Pupils will learn to describe the movement of the Earth, and other planets, relative to the Sun in the solar system. They will use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

#### WHAT CAME BEFORE

Children will have learnt about light, light sources, and how shadows are formed.

#### WHAT COMES NEXT

Exploring the way that light behaves, such as travelling in straight lines. Learn about light sources, reflection and shadows in more detail through investigations.



#### WHAT YOU SHOULD ALREADY KNOW

The difference between light sources and reflective surfaces and objects.

That shadows are an area of darkness produced by an object coming between rays of light and a surface.

That shadows change depending on the position of the light source.

## KEY LEARNING

Describe the movement of the Moon relative to the Earth

Describe the Sun, Earth and Moon as approximately spherical bodies

Use a model of the Sun and Earth that enables them to explain day and night.

The Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006).

Understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).

#### INVESTIGATE / QUESTIONS

Research the conditions on different planets - which planet is the most similar to Earth? Which could we potentially live on?

Learn the Planets Rap - this teaches the position of planets from the sun as well as some of their defining features.

<https://www.youtube.com/watch?v=ZHAqT4hXnMw>

How big are the planets in relation to each other, and the sun?

# VOCABULARY

Accelerate: increase in speed (getting faster)

Decelerate: decrease in speed (slowing down)

Air resistance: a force that acts in the opposite direction of a moving object and is a type of friction

Friction: the resistance of motion when one object rubs against another

Gear: mechanical parts with cut teeth designed to fit with teeth on another part so as to transmit or receive force and motion

Fulcrum: the support on which a lever turns in lifting something. The place where a lever pivots.

Lever: a long, sturdy body that rests on a support called a fulcrum

Gravity: a force of attraction that pulls together all matter (anything you can physically touch)

Mass: the amount of matter or substance that makes up an object.

Mechanism: the moving parts by which a machine operates. Eg. the mechanism of a watch

Water resistance: a force that tries to slow things down that are moving through water. It is a type of friction



# SCIENCE KNOWLEDGE MAT –YEAR 5

## Y5 Forces

### MAIN IDEA

Unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. Air resistance, water resistance and friction act between moving surfaces and slow forces down. Some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

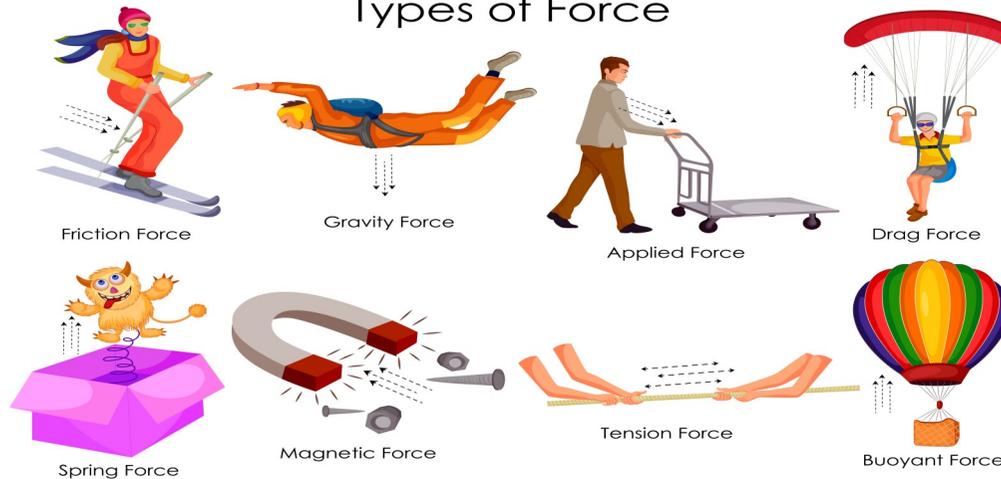
### WHAT CAME BEFORE

Y3 - Magnets attract or repel each other and attract some materials and not others. Magnetic forces can act without direct contact, unlike most forces.

### WHAT COMES NEXT

KS3 - Different types of forces. Describing motion: speed and the quantitative relationship between average speed, distance and time. Representation of a journey on a distance-time graph.

## Types of Force



### WHAT YOU SHOULD ALREADY KNOW

Some materials are attracted to magnets (magnetic), others are not.

Magnets have North and South poles and that the opposite attracts, same poles repel each other and will not stick together.

Magnets are useful in our everyday lives, such as keeping cupboard doors closed.

# KEY LEARNING

- explore falling objects and raise questions about the effects of air resistance.
- explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.
- experience forces that make things begin to move, get faster or slow down.
- explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel.
- explore the effects of levers, pulleys and simple machines on movement.
- find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

## INVESTIGATE / QUESTIONS

Drop a variety of unbreakable objects from a height, such as cupcake cases and bouncy balls. Do they fall in the same way, and at the same speed? What affects this?

Can you make a plasticine / playdough boat? How can you make it float?

Roll a toy car down a variety of surfaces. Does it move at the same speed each time? What do you notice about surfaces and how they affect the way an object moves across them?