

# Long-term overview for Science

## YEAR 7

### Chemistry

- This links to the Y4 unit of learning on states of matter.

## Which materials can or cannot be changed back to their original form?

What does reversible and irreversible changes mean?

How can you set up an investigation to find which materials can and cannot be changed back to their original state?

How can mixtures be separated, including through filtering, sieving and evaporating?

How has the science related to reversible and irreversible changes helped with crime work?

### Science Knowledge

- Compare and group materials based on their properties (e.g. hardness, solubility, transparency, conductivity, [electrical & thermal], and response to magnets)
- Know and explain how a material dissolves to form a solution
- Know and show how to recover a substance from a solution
- Know and demonstrate how some materials can be separated (e.g. through filtering, sieving and evaporating)
- Know and demonstrate that some changes are reversible and some are not
- Know how some changes result in the formation of a new material and that this is usually irreversible

### Working Scientifically

#### Fair testing

- Factors that affect the speed a solute dissolves in water, e.g., temperature

#### Observation over time

- Observe over time the separation of a solute and solvent via evaporation

#### Grouping

- Classify/ group materials as either soluble or insoluble

# Science Year 7 Knowledge Organiser

## Main Learning: Reversible and irreversible changes

### Key knowledge

Know about materials that can or cannot be changed back to their original form once an action has been taken

Know what a reversible change means

Know what an irreversible change means

Give examples of reversible and irreversible changes

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

### Vocabulary

**dissolve**

To become broken up or absorbed by something or to disappear into something else

**solubility**

Is a chemical property referring to the ability for a given substance to dissolve in a solvent

**filtering**

To pass a substance through a device which is designed to remove certain particles contained within

**melting**

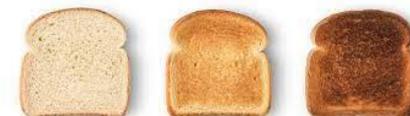
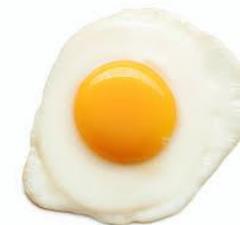
A physical process that results in the transition of a substance from a solid to a liquid

**separating**

Separate, part, and divide mean to break into parts or to keep apart

**thermal**

Something that is thermal is hot, retains heat, or has a warming effect



Prior Knowledge--

# Long-term overview for Science

## YEAR 7

### Biology: Animals, including Humans

- This links to life cycles of animals in previous units..
- However, it is also linked to the human body strand in Year 1.

## What do we know about the life cycles of humans and various animals?

What happens to us as we get older?

What do the terms puberty, gestation and reproduction mean?

What is the early life cycle of a human being?

What is the process of reproduction in plants?

What is the process of reproduction in animals?

### Science Knowledge

- Know the life cycle of different living things e.g. mammal, amphibian, insect and bird
- Know the differences between different life cycles
- Know the process of reproduction in plants
- Know the process of reproduction in animals
- Create a timeline to indicate stages of growth in humans

### Working Scientifically

#### Research

- Research changes in humans at different stages in our lives
- Research the life cycle of different animal groups

#### Grouping

- Classify/ group and animal based on its group and species

#### Pattern seeking

- Compare height with physical task e.g., distance a ball is thrown

# Long-term overview for Science

## YEAR 7

### Physics

- This is a stand alone unit although there are some links to the Y3 unit on light and dark.

## What do we know about the Sun, Earth, Moon and the Planets?

How can you explain the movement of the Earth and other planets relative to the Sun?

How can you explain the movement of the Moon relative to the Earth?

How can you demonstrate how night and day are created?

What do we know about the dimensions associated with the Sun, Earth and Moon?

What information do you know about the planets?

### Science Knowledge

- Know about and explain the movement of the Earth and other planets relative to the Sun
- Know about and explain the movement of the Moon relative to the Earth
- Know and demonstrate how night and day are created
- Describe the Sun, Earth and Moon (using the term spherical)

### Working Scientifically

#### Research

- Research the planets in our solar system, including length of orbit

#### Pattern seeking

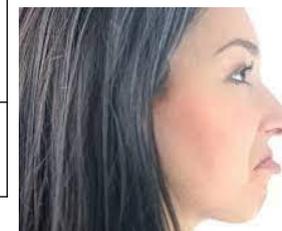
- Dimensions associated with the Sun, Earth and Moon

# Science Year 7 Knowledge Organiser

## Main Learning: Life cycle, including humans

Key knowledge
Know about the life cycles of humans and various animals
Know about the life cycle of a human being
Know what the terms puberty, gestation and reproduction mean
Know the life cycle of different living things, e.g. mammal, amphibian, insect and bird
Know about the process of reproduction in plants
Know about the process of reproduction in animals

Vocabulary	
puberty	Is the name for the time when your body begins to develop and change as you move from childhood to adulthood
gestation	Is the time between conception and birth, during which the embryo is developing in the uterus
reproduction	Is the way different plants and animals make new plants and animals. The reproduction system differs in plants and animals
embryo	Fertilisation happens when an egg cell meets with a sperm cell and joins with it. The fertilised egg divides to form a ball of cells called an embryo
obese	Obesity is the condition of being much too heavy for one's height so that one's health is affected
teenager	The age between thirteen and nineteen



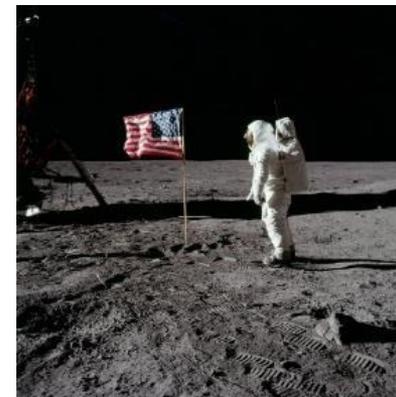
Prior Knowledge—



# Science Year 7 Knowledge Organiser

## Main Learning: Earth and Space

Key knowledge	Vocabulary	
Know about the Sun, Earth, moon and the plants	<b>solar system</b>	Is made of the eight planets that orbit our sun; it is also made of asteroids, moons, comets and lots more
Know about and explain the movement of the Earth and other planets relative to the Sun	<b>planet</b>	There are 8 planets in our solar system, they are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune
Know about and explain the movement of the Moon relative to the Earth	<b>spherical</b>	Something spherical is like a sphere in being round, or more or less round, in three dimensions
Know and demonstrate how night and day are created	<b>crescent moon</b>	It is a slither of the moon that is lit up and can be seen and is less than half the moon
Describe the Sun, Earth and Moon (using the term spherical)	<b>gibbous moon</b>	A gibbous moon occurs when the moon is three-quarters lit up
Know information about the planets	<b>eclipse</b>	This occurs when an astronomical object is temporarily obscured. A lunar eclipse happens when the Earth moves between the Sun and the Moon and blocking the Sun's rays from striking the Moon



**Prior Knowledge–**



# Long-term overview for Science

## YEAR 7

### Physics

- This is a unit that has some links to the Y3 unit on forces.
  - It also has links to DT mechanisms aspect.

## What is a force and how does it impact on the way things move?

What is gravity and what is its impact on our lives?

What are pulleys and why are they important in our everyday life?

What is air resistance, what is the effect of air resistance?

What is friction and what effect does it have?

How do gears allow a smaller force to have a greater effect?

### Science Knowledge

- Know what gravity is and its impact on our lives
- Identify and know the effect of air and water resistance
- Identify and know the effect of friction
- Explain how levers, pulleys and gears allow a smaller force to have a greater effect

### Working Scientifically

#### Fair testing

- Shape of an object and the time it takes to travel through water

#### Pattern seeking

- Surface material on a ramp and note the distance/ speed it travels

# Science Year 7 Knowledge Organiser

## Main Learning: Forces

### Key knowledge

Know what a force is and how it impacts on the way things move

Know what gravity is and its impact on our lives

Identify and know the effect of air resistance

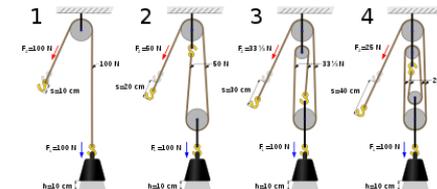
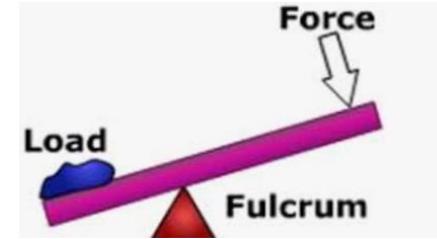
Identify and know the effect of water resistance

Identify and know the effect of friction

Explain how levers, pulleys and gears allow a smaller force to have a greater effect

### Vocabulary

friction	A force between two surfaces that are sliding, or trying to slide, across each other
gravity	A force which tries to pull two objects towards each other
air resistance	A type of friction between air and another material. For example, when an aeroplane flies through the air
water resistance	If you go swimming, there is friction between your skin and the water particles
levers	A long rigid body with a fulcrum along its length
pulleys	A simple machine and comprises of a wheel on a fixed axle, with a groove along the edges to guide a rope or cable



SCIENCE



Prior Knowledge—

# Science Year 8 Knowledge Organiser

## Main Learning: Electricity

Key knowledge
Understand how electricity works and how its power can vary
Know that the brightness of a bulb is associated with the voltage
Compare and give reasons for variations in how components function
Use recognised symbols when representing a simple circuit in a diagram
Construct simple series circuits
Be able to answer questions about what happens when they try different components, for example; switches, bulbs, buzzers and motors

Vocabulary	
series circuits	Is a circuit that has more than one resistor, but only one path through which the electricity (electrons) flows
cells	Is a device that is used to generate electricity, or one that is used to make chemical reactions possible by applying electricity
generator	A machine that converts energy into electricity
turbine	A machine that creates continuous power in which a wheel, or something similar, moves round and round by fast moving water, steam, gas or air
fuses	These are safety devices. They are strips of wire that melts and breaks an electric circuit if it goes over a safe level
socket	A safe device to plug your electrical items into at home. Almost every room at home will have at least one socket

Component	Symbol	Purpose
Cell (Battery)		Provides electrical energy
Power supply		Alternative to using cells
Wire		Allows current to travel
Bulb/light		Converts electrical energy into heat and light
Motor		Converts electrical energy into movement energy
Buzzer		Converts electrical energy into sound energy
Switch		Allows circuit to be opened or closed



	<p><b>Prior Knowledge–</b></p>
--	--------------------------------

# Long-term overview for Science

## YEAR 8

### Physics

- This is a unit that has direct links to the Y4 unit on electricity. This one is more focused on its power.

## How does electricity work and how does its power vary?

How does electrical energy vary?

What do we mean by electrical particles?

Which symbols are used to represent different parts of a simple circuit?

How can we construct simple series circuits?

How can we make use of our knowledge of circuits to create a simple game?

### Science Knowledge

- Compare and give reasons for why components work and do not work in a circuit
- Draw circuit diagrams using correct symbols
- Know how the number and voltage of cells in a circuit links to the brightness of a lamp or the volume of a buzzer

### Working Scientifically

#### Fair testing

- Effect of increasing voltage on the brightness of a bulb

#### Pattern seeking

- Compare brightness of bulb in series and parallel circuits

# Long-term overview for Science

## YEAR 8

### Biology: Light

- There are links to the Y3 unit on light and dark. There are also links with the human body strand when it comes to look at the working of the eye.

## How do our eyes help us see?

How does light travel?

How do we know that light travels in straight lines?

How do our eyes work?

What do we mean by concave and convex mirrors?

Why do shadows have the same shape as the objects that cast them?

### Science Knowledge

- Know how light travels
- Know and demonstrate how we see objects
- Know why shadows have the same shape as the object that casts them
- Know how simple optical instruments work e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

### Working Scientifically

#### Grouping and Classifying

- Group materials based on transparency

#### Pattern seeking

- Compare distance from light source and shadow

#### Experimenting and investigating

- Experiment to find out that light travels in straight lines

# Science Year 8 Knowledge Organiser

## Main Learning: Light

### Key knowledge

Know why we can see and the part our eyes have in helping us see

Know that light travels in straight lines

Understand that because light travels in straight lines objects are seen because they give out or reflect light into the eye

Know that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes

Know that light travels in straight lines and therefore shadows have the same shape as the objects that cast them

Know how our eyes work

### Vocabulary

**retina**

This is at the back of your eye and it has light-sensitive cells called rods and cones

**cornea**

This is thin, clear and covers your eye. It's important because it helps you see by focusing light as it enters the eye

**iris**

By opening and closing the pupil, the iris controls the amount of light that enters the eye

**pupil**

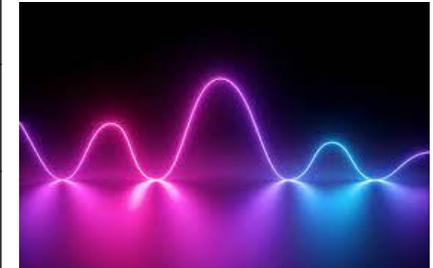
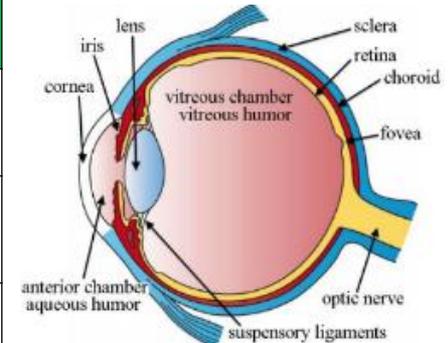
Can be compared with the shutter of a camera. It is surrounded by the iris which is the coloured part of the eye

**lens**

Is a curved piece of glass or plastic designed to refract light in a specific way

**light wave**

One of the characteristics of light is that it behaves like a wave. Light can be defined by its wavelength and frequency. The frequency is how fast the waves vibrate up and down



SCIENCE



Prior Knowledge—

# Long-term overview for Science

## YEAR 8

### Biology: Human Body

- There are links to the Y1 to Y5 human body strands.
- Many pupils find it useful to consider the link to Y4 digestive system.

## How does the heart work and why is it so important?

What part does the heart play in the human circulatory system?

What is the circulatory system and how does it work?

What is the impact of diet, exercise, drugs and lifestyle on health?

What is the relationship between your heartbeat and exercise?

Who was William Harvey and what was his contribution to science?

### Science Knowledge

- Identify and name the main parts of the human circulatory system
- Know the function of the heart, blood vessels and blood
- Know the impact of diet, exercise, drugs and lifestyle on health
- Know the ways in which nutrients and water are transported in animals, including humans

### Working Scientifically

#### Fair testing

- Impact of exercise on the heart rate

#### Research

- Research how drugs affect the body

#### Pattern seeking

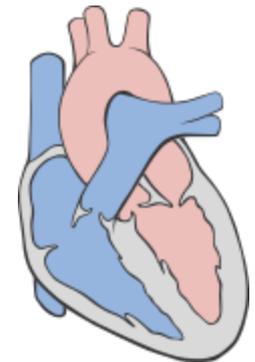
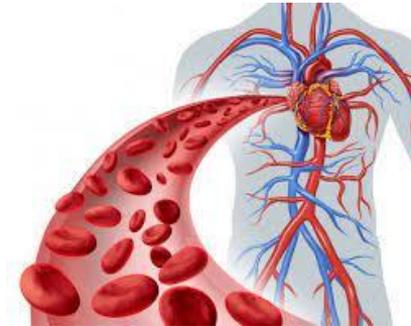
- Compare resting heart rate of different people

# Science Year 8 Knowledge Organiser

## Main Learning: Circulatory system

Key knowledge
Know about the function of the heart and the importance of blood in keeping us alive
Identify and name the main parts of the human circulatory system
Know the function of the heart, blood vessels and blood
Know the impact of diet, exercise, drugs and lifestyle on health
Know the ways in which nutrients and water are transported in animals, including humans
Know who William Harvey was

Vocabulary	
<b>atria</b>	The two uppermost chambers of the heart. Blood is pushed from the atria to the ventricles
<b>cardiovascular</b>	The blood circulatory system (cardiovascular system) delivers nutrients and oxygen to all cells in the body
<b>capillaries</b>	Are very thin blood vessels. They bring nutrients and oxygen to tissues and remove waste products
<b>pulse</b>	Your heart has to push so much blood through your body that you can feel a little thump in your arteries each time the heart beats
<b>ventricles</b>	The two lower chambers in the heart
<b>blood vessels</b>	A series of tubes inside your body. They move blood to and from your heart



**Prior Knowledge–**



# Long-term overview for Science

## YEAR 8

### Biology: Classifying

- There are links to the Y1 and Y4 units on animals including humans.
  - In Y1 the classification of animals and in Y4 grouping animals.

## How are living things grouped and classified?

What do we know about the five kingdoms: animals, plants, monera, protista and fungi?

What can you find out about the special attributes that some animals and plants have to help them survive?

What do we know about vertebrate and invertebrate animals?

Who was Carl Linnaeus?

### Science Knowledge

- Classify living things into broad groups according to observable characteristics and based on similarities and differences
- Know how living things have been classified
- Give reasons for classifying plants and animals in a specific way

### Working Scientifically

#### Observation over time

- Conditions needed for bread to go mouldy

#### Research

- Research the different types of micro-organisms

#### Pattern seeking

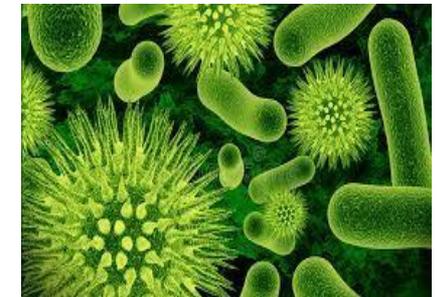
- Compare resting heart rate of different people

# Science Year 8 Knowledge Organiser

## Main Learning: Classification of all living things, including micro-organisms

Key knowledge
Understand how all living things are grouped and classified
Be able to classify living things into broad groups according to observable characteristics and based on similarities and differences
Know how living things have been classified
Give reasons for classifying plants and animals based on specific characteristics
Know about vertebrate and invertebrate animals
Know who Carl Linnaeus is

Vocabulary	
vertebrates	An animal that has a backbone
invertebrates	An animal that does not have a backbone and 97% of creatures belong to this group
species	This is the grouping together of similar types of plants, animals and other organisms that can reproduce with each other
fungi	A classification or group of living organisms. This means they are not animals, plants, or bacteria
bacteria	Are tiny little organisms that are everywhere around us
algae	A single or multi-cellular organism that has no roots, stems or leaves and is often found in water



	<p><b>Prior Knowledge–</b></p>
--	--------------------------------

# Long-term overview for Science

## YEAR 8

### **Biology:**

This is a stand-alone unit. However, there are links to some areas such as Y3 fossils and to a certain extent the Y5 changes as we grow.

## How have living things on Earth changed over time?

What do we mean by evolution and inheritance?

What part did fossils play in helping us understand more about living things that inhabited our Earth millions of years ago?

How do off-spring vary so that they are not normally identical to their parents?

Who was Charles Darwin and why does he remain a controversial figure?

How have animals and plants adapted to suit their environment in different ways and how may that adaptation lead to evolution?

### Science Knowledge

- Know how the Earth and living things have changed over time
- Know how fossils can be used to find out about the past
- Know about reproduction and offspring (recognising that offspring normally vary and are not identical to their parents)
- Know how animals and plants are adapted to suit their environment
- Link adaptation over time to evolution
- Know about evolution and can explain what it is

### Working Scientifically

#### **Research**

- Research Charles Darwin and his work

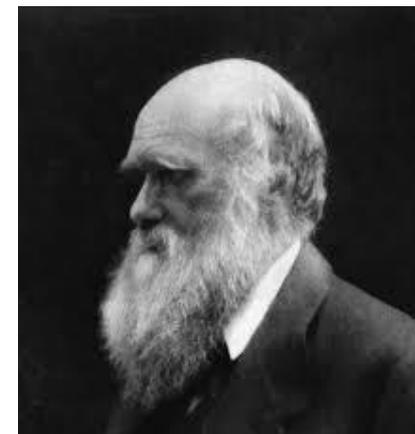
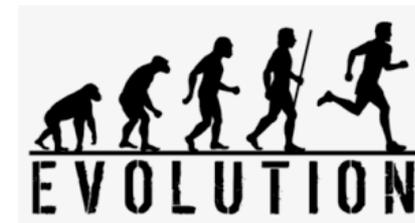
#### **Pattern seeking**

- Compare skulls/ body parts of animals as they have evolved

# Science Year 8 Knowledge Organiser

## Main Learning: Evolution and inheritance

Key knowledge	Vocabulary	
<b>Know how living things on Earth have changed over time</b>	<b>off-spring</b>	When living things reproduce they pass on characteristics to their offspring. All living things produce offspring of the same kind, but normally offspring are not identical to their parents
Know that living things have changed over time	<b>adaptation</b>	Is the process by which animals, plants and other living things have changed so that they better suit their habitat
Know the part fossils play in helping us understand more about living things that inhabited our Earth millions of years ago	<b>evolution</b>	Is the theory that all the kinds of living things that exist today developed from earlier types
Know that living things produce off-spring of the same kind	<b>inheritance</b>	When living things reproduce they pass on characteristics to their offspring. This is known as inheritance
Know that off-spring vary and are not normally identical to their parents	<b>palaeontologist</b>	A palaeontologist is someone studying the life of past geological periods, as known from fossil remains
Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	<b>genotype</b>	A genotype refers to a particular gene or set of genes carried by an individual



	<b>Prior Knowledge–</b>
--	-------------------------