

What would a journey through your body look like? **BIOLOGY**

Term: Autumn 1

Statutory NC Objectives: <ul style="list-style-type: none"> Y6 PoS: Animals including humans 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 			Working scientifically <p>During Years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:</p> <ul style="list-style-type: none"> 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 results, 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.
Key Vocabulary			Knowledge Overview
ANCHOR WORDS <p>Carbon Dioxide – a gas that is made up of Carbon and Oxygen.</p> <p>Oxygen – a gas with no colour or smell. Most living things need oxygen to survive.</p>	GOLDBLOCKS WORDS <p>Arteries – carry oxygenated blood away from the heart.</p> <p>Capillaries – the smallest blood vessels where there is an exchange of water, nutrients, oxygen and carbon dioxide.</p>	STEP ON WORDS <p>Valves – parts of the heart that open and close to let blood flow.</p> <p>Plasma – the liquid part of blood that contains water and protein.</p>	<p><u>By the end of this unit, the pupils should know that:</u></p> <ul style="list-style-type: none"> Mammals have hearts with four chambers. The heart pumps blood in blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The chemical symbol for Oxygen is O. The chemical symbol for Carbon Dioxide is CO₂. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the

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	<p>Circulatory system – a system which includes the heart, veins, arteries and blood transporting substances around the body.</p> <p>Blood vessels – tubes in the body that blood travels through. Veins, arteries and capillaries are blood vessels.</p> <p>Veins – carry deoxygenated blood towards the heart.</p>		<p>cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.</p> <ul style="list-style-type: none">• Blood transports: gases, nutrients, waste products.• The liquid part of the blood is called plasma.• Blood coming from the body is deoxygenated.• Blood that has come from the lungs is oxygenated.• Diet, exercise, drugs and lifestyle have an impact on the way our bodies function.• Drugs, alcohol and smoking have negative effects on the body.• A healthy diet involves eating the right types of nutrients in the right amounts.• Diet, exercise and lifestyle can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think and generally how fit and well we feel.• Some conditions are caused by deficiencies in our diet e.g. lack of vitamins. <p>ESSENTIAL KNOWLEDGE</p>
<p>“Bridging Back” (previous years/cross-curricular content)</p> <p>Y3 PoS : Animals including humans – <i>How can Usain Bolt move so quickly?</i></p> <ul style="list-style-type: none">- 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.- Humans need: carbohydrates including sugars, protein, vitamins, minerals, fibre, fat, sugars and water in order to be healthy.- It is important to eat a balanced diet.- Muscles help us to move by contracting and relaxing.			<p>“Bridging Forward” (future years/cross curricular content)</p> <p>KS3 Biology</p> <p>Gas exchange systems:</p> <ul style="list-style-type: none">- the structure and functions of the gas exchange system in humans, including<ul style="list-style-type: none">o adaptations to function- the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume- the impact of exercise, asthma and smoking on the human gas exchange system

How can you light up your life? **PHYSICS**

Term: Autumn 2

Statutory NC Objectives:

- Yr 6 PoS: **Light**
- 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

Key Vocabulary			Knowledge Overview
ANCHOR WORDS	GOLDILOCKS WORDS	STEP ON WORDS	By the end of this unit, the pupils should know that:
<p>Light source – an object that makes its own light.</p> <p>Opaque – objects that do not let any light pass through them. The area behind these objects then causes a shadow to form.</p> <p>Translucent – objects that let some light through them, but scatter the light so we cannot see through them properly.</p> <p>Transparent – objects that let light travel through them easily so we can see through them.</p> <p>Shadow – an area of darkness where light has been blocked.</p>	<p>Outline – a line or shape showing the outside edge of an object.</p> <p>Reflection – when light bounces off a surface and changes direction.</p> <p>Incident ray – a ray of light that hits a surface.</p> <p>Light ray – light waves travel from the source in straight lines – these lines are often called rays.</p>	<p>Law of reflection – the law states that the angle of the incident ray is equal to the angle of the reflected ray.</p> <p>Refraction – when light bends as it passes from one medium to another, e.g. – light bends when it moves from air into water.</p> <p>Prism – a solid 3D shape with flat sides. A transparent prism separates our visible light into all the colours of the spectrum.</p>	<p>By the end of this unit, the pupils should know that:</p> <ul style="list-style-type: none"> • Light travels in straight lines. • We see objects when light from a light source is reflected from the object into our eyes. • Natural light sources include the sun, stars and fire. • Man-made light sources include electric lamps, torches and bulbs. • Light can travel through a vacuum because light waves do not need a medium to travel through. • Objects that block light (are not fully transparent) will cause shadows. • The opaqueness of an object will affect the quality (darkness) of the shadow formed. • Because light travels in straight lines, the shapes of the shadow will be the same as the outline shape of the object. • Shadows can be made longer or shorter depending on the angle of the light source. • Light bends when it moves from air to water. • Sir Isaac Newton shone a light through a transparent prism, separating out light into the colours of the rainbow. <p>ESSENTIAL KNOWLEDGE</p>
“Bridging Back” (previous years/cross-curricular content)			“Bridging Forward” (future years/cross curricular content)
Y3 PoS: Light - How far can you throw your shadow? <ul style="list-style-type: none"> - Recognise that they need light in order to see things and that dark is the 			KS3 Physics Light waves

Y6 Science

<p>absence of light;</p> <ul style="list-style-type: none">- 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.- Light travels in straight lines.- When light hits an object, it is reflected – if it hits our eyes, we can see it.- Some objects/materials don't let any light through – these are opaque. They block light rays.- Opaque or translucent objects create shadows because the light is blocked.- The size of a shadow depends on the position of the source, object and surface.	<ul style="list-style-type: none">- the similarities and differences between light waves and waves in matter- light waves travelling through a vacuum; speed of light- the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface Science – key stage 3 12- use of ray model to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing (qualitative); the human eye- light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras- colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection
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Can you be an electrician's apprentice? **PHYSICS**

Term: Spring 1 and 2

Statutory NC Objectives:

- Y6 PoS: **Electricity**
- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- Compare/give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers, the on/off position of switches
- Use recognised symbols when representing a simple circuit in a diagram

Key Vocabulary			Knowledge Overview
ANCHOR WORDS	GOLDBLOCKS WORDS	STEP ON WORDS	<u>By the end of this unit, the pupils should know that:</u> <ul style="list-style-type: none">• Circuit symbols are used to draw simple circuit diagrams.• Turning a switch off (open switch) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulb motor or buzzers will then turn off as well.• When a circuit doesn't contain essential components it becomes broken.• Adding more cells to a complete circuit will make the bulb brighter, motor spin faster or a buzzer make a louder sound.• Having fewer batteries or a lower voltage gives less power to a circuit and hence the bulbs will be dimmer, buzzers quieter.• Shortening the wires in a circuit means the electrons have less resistance to flow through.• Adding more bulbs (resistor) to a circuit will make each bulb less bright.• Using more motors or buzzers (resistors), will make each motor spin more slowly and each buzzer will be quieter.• Series circuits are circuits that only have one route for the current take.• If just one part of a series circuit breaks, the circuit breaks and the flow of current stops.• In parallel circuits, different components are connected on different branches of the wire. <div>ESSENTIAL KNOWLEDGE</div>
<p>Circuit – a path that an electrical current can flow around.</p> <p>Circuit diagram – a diagram showing the electrical circuit using symbols for different components.</p> <p>Bulb – an object made from rounded glass that uses electricity to create light.</p> <p>Battery – more than one cell.</p>	<p>Cell– a device that stores energy as a chemical until it is needed.</p> <p>Push switch – a switch that completes an electrical circuit when it is pressed.</p> <p>Current – the flow of electrons, measured in amps.</p> <p>Component – the different parts of a circuit, e.g. – bulb, lamp...</p> <p>Voltage – the force that makes the electric current move through the wires.</p> <p>Broken circuit – a circuit that has a break or gap in it, meaning the current cannot flow.</p> <p>Complete circuit – a circuit that is fully complete (joined) and the current can flow around to all components.</p>	<p>Resistance – the difficulty that the electric current has when flowing around a circuit.</p> <p>Resistor – a part of a circuit that provides resistance to the electrical current.</p>	

Y6 Science

“Bridging Back” (previous years/cross-curricular content)

Y4 PoS : Electricity - *How could we cope without electricity for one day?*

- 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.
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- An electrical circuit consists of a cell or battery connected to a component using wires.
 - Metals are good conductors which is why they are used as wires in a circuit.
 - All circuits require a power source (battery/mains)

“Bridging Forward” (future years/cross curricular content)

KS3 Physics

Current electricity

- electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge
- potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current
- differences in resistance between conducting and insulating components (quantitative).

Static electricity

- separation of positive or negative charges when objects are rubbed together: transfer of electrons, forces between charged objects
- the idea of electric field, forces acting across the space between objects not in contact.

Could Spiderman really exist? **BIOLOGY**

Term: Summer 1

Statutory NC Objectives:

- Y6 Pos: **Living things and their habitats.**
- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics

Key Vocabulary			Knowledge Overview
ANCHOR WORDS	GOLDILOCKS WORDS	STEP ON WORDS	By the end of this unit, the pupils should know that:
<p>Classification – where plants or animals are placed into groups based on their similarities.</p> <p>Classification key – a diagram used to help group, identify and name a variety of living things.</p> <p>Characteristics – the features or qualities that are specific to a particular species.</p> <p>Vertebrates – living things that have a backbone.</p> <p>Invertebrates – living things without a backbone.</p>	<p>Amphibians – an animal that lives on land as a baby and on land as they grow older. They have permeable skin.</p> <p>Reptiles – reptiles breathe air and have scales.</p> <p>Microorganism – an organism that can only be seen using a microscope, e.g. – bacteria.</p> <p>Bacteria – a single-celled microorganism that can be helpful and harmful.</p> <p>Microscope – a piece of equipment that is used to view very tiny things.</p>	<p>Taxonomist – a scientist who classifies different living things into categories.</p>	<p><u>By the end of this unit, the pupils should know that:</u></p> <ul style="list-style-type: none"> • in 1735, Swedish Scientist Carl Linnaeus first published a system for classifying all living things. This later became, The Linnaeus System • The Linnaeus System is still used today. • The Linnaeus System classifies living things into 8 levels: Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species. • Living things can be formally grouped according to characteristics. • Scientists called Taxonomists sort and group living things according to their similarities and differences. • Plants and animals can be sorted into 2 main groups but there are other living things that do not fit into these groups e.g. microorganisms such as bacteria and yeast and toadstools and mushrooms. • Plants can make their own food whereas animals cannot. • Animals can be divided into 2 main groups – vertebrates and invertebrates. • Animals that have a backbone are called vertebrates. • Animals that do not have a back bone are called invertebrates. • Vertebrates can be divided into 5 small groups- fish, amphibians, reptiles, birds and mammals. Each group has common characteristics. • Invertebrates can be divided into a number of groups including, insects, spiders, snails and worms. • Plants can be divided broadly into 2 main groups- flowering plants and non-flowering plants. • Microorganisms are very tiny living things that can only be seen using a microscope. • There are 2 types of microbes, helpful and harmful. For example – bacteria can be helpful to make cheese but also harmful in the form of salmonella. <p>ESSENTIAL KNOWLEDGE</p>

Y6 Science

“Bridging Back” (previous years/cross-curricular content)

Y4 PoS : Living things and their habitats - *Which animals and plants thrive in your locality?*

- 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.
- Habitats can change naturally, e.g. – through flooding, fires, earthquakes etc. This has an impact on the things living there.

Y1 PoS : Animals including humans - *Why are humans not like tigers?*

- 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.
- Animals can have different skin coverings, e.g. – scales, feathers, hair etc.
- Animals can be sorted in to 5 groups (mammals, fish, reptiles, birds, amphibians)

“Bridging Forward” (future years/cross curricular content)

KS3 Biology

Interactions and interdependencies Relationships in an ecosystem

- the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops
- the importance of plant reproduction through insect pollination in human food security
- how organisms affect, and are affected by, their environment, including the accumulation of toxic materials

Have we always looked like this? **BIOLOGY**

Term: Summer 2

Statutory NC Objectives:

- Y6 PoS: **Evolution and inheritance**
- 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

Key Vocabulary			Knowledge Overview
ANCHOR WORDS	GOLDILOCKS WORDS	STEP ON WORDS	By the end of this unit, the pupils should know that:
<p>Characteristics – the distinguishing features or qualities that are specific to a species.</p> <p>Habitat – a specific area of place in what particular animals and plants can live.</p> <p>Environment – the area surrounding a living thing.</p> <p>Fossil – the preserved remains or traces of a dead organism.</p> <p>Species – a group of living things that share similar traits.</p>	<p>Offspring – the young animal or plant that is produced by the reproduction of that species.</p> <p>Inheritance – this is when characteristics are passed on to offspring from their parents.</p> <p>Variation – the differences between individuals within a species.</p> <p>Evolution – adaptation over a very long time.</p> <p>Adaptation – a trait that changes to increase a living thing's chances of survival.</p>	<p>Natural selection – the process where organisms that are better adapted to their environment tend to survive.</p> <p>Adaptive traits – genetic features that help a living thing to survive.</p> <p>Inherited traits – traits you get from your parents.</p>	<p>By the end of this unit, the pupils should know that:</p> <ul style="list-style-type: none"> • All living things have offspring of the same kind. • Features in the offspring are inherited from the parents. • Due to sexual reproduction, the offspring are not identical to their parents (but are similar) and vary from each other. • Humans inherit traits from their parents. • Plants and animals have characteristics that make them suited (adapted) to their environment. • If the environment changes rapidly, some variations of species may not suit the new environment and will die. • If the environment changes slowly, animals and plants with variations are the best suited to survive in greater numbers to reproduce and pass on their characteristics to their young. • Over time, inherited characteristics become more dominate within the population. • Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution. • Fossils give us evidence of what lived on Earth millions of years ago and provide evidence to support the theory of evolution. • Scientists such as Darwin and Wallace observed how living things adapted to different environments to become distinct varieties with their own characteristics. <p>ESSENTIAL KNOWLEDGE</p>

Y6 Science

“Bridging Back” (previous years/cross-curricular content)

Y5 PoS : Animals including humans – *How different will you be when you are as old as your grandparents?*

Link back to reproduction and how babies inherit features from parents – e.g. – they may look like them.

“Bridging Forward” (future years/cross curricular content)

KS3 Biology

Genetics and evolution

Inheritance, chromosomes, DNA and genes

- heredity as the process by which genetic information is transmitted from one generation to the next
- a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model
- differences between species
- the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation
- the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection
- changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction
- the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material