Year 6: Science

Block 1 – Physics
Light and Perception

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 6, pupils should be taught to recognise that light appears to travel in straight lines and to use this idea to explain that objects are seen because they give out or reflect light into the eye. They should also be taught to 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 and to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Pupils will learn: • **Light travels in straight lines.** • **Objects are seen because they give out or reflect light into the eye.** - Light sources give out light. The light bounces off objects and into our eyes so that we can see them. • **We see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.** - When light bounces off an object and changes direction it is called reflection. - Light changes speed and direction when it travels through transparent materials. This is called refraction. - Light is made up of different colours. - Light pollution is caused by the use of too much artificial light. • **As light travels in straight lines shadows have the same shape as the objects that cast them.** - Shadows are formed when light is blocked by an object.	• DC1: Ask relevant questions and use different types of scientific enquiries to answer them. • DC2: Plan simple scientific enquiries. • DC3: Use a range of equipment. • DC4: Make careful observations. • DC5: Record findings using simple scientific language, drawings, and labelled diagrams. • DC7: Report on findings from enquiries, including oral and written explanations. Use results to draw simple conclusions and make predictions. Identify differences and similarities related to simple scientific ideas.

Sequence:
This is the second time pupils will have studied light itself. Knowledge from the Year 3 'Light' unit plus knowledge of other types of energy (such as sound from Year 4) will support pupils in accessing the content in this unit. Pupils also studied solids, liquids, and gases in Year 4 and Earth and Space in Year 5, and the knowledge gained in those units will also support them in their understanding.

Block 2- Biology
Living Things and their Habitats – Classification of Species

Scientist Focus: Carl Linnaeus

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 6, pupils should be taught to describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences. It states	Pupils will learn: • **Living things are classified into broad groups according to common observable characteristics and based on similarities and**	• DC1: Ask relevant questions and use different types of scientific enquiries to answer them. • DC4: Make careful observations. • DC6: Present data as a bar chart.

that this classification should include microorganisms, plants and animals and that pupils should give reasons for classifying plants and animals based on specific characteristics.	**differences, including micro-organisms, plants, and animals.** - Organisms can be arranged into smaller groups that share the same physical characteristics. - Arranging organisms into groups based on physical characteristics is called classification. - A vertebrate is an animal with a backbone. - An invertebrate is an animal without a backbone. - Flowering plants produce flowers and reproduce using seeds - Microorganisms are organisms that can only be seen under a microscope.	• DC7: Report on findings from enquiries, including oral and written explanations.

Sequence:

This unit is designed to expand pupil's knowledge of living things and their habitats by exploring classification in detail. Pupils build on their knowledge from Year 4 and will begin the unit by learning about the significance of Carl Linnaeus' pioneering work in classification. This will outline the rest of the unit as the pupils explore vertebrates (fish, amphibians, reptiles, birds and mammals), invertebrates (such as insects, spiders, snails and worms) and plants by classifying them using the Linnaean System.

Block 3 and 4 – Biology
Evolution and Inheritance

Scientist Focus: Mary Anning, Charles Darwin, Alfred Wallace

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 6, pupils should be taught to recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. They should also be taught to recognise that living things produce offspring of the same kind, but normally	Pupils will learn: • **Living things have changed over time.** • **Fossils provide information about living things that inhabited Earth millions of years ago.** - Fossils are the preserved remains or traces of plants	• DC1: Ask relevant questions and use different types of scientific enquiries to answer them. • DC2: Plan simple scientific enquiries. • DC3: Use a range of equipment. • DC4: Make careful observations. • DC5: Record findings using simple scientific language.

offspring vary and are not identical to their parents In addition, pupils should be taught to identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	and animals that lived millions of years ago. • **Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.** - Variation is the differences in characteristics of organisms of the same species. - Inheritance is the passing on of characteristics from parents to their offspring. • **Animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.** - An adaptation is a special feature or characteristic that helps an organism survive in its habitat. - Animals have a range of adaptations, for example to survive seasonal changes, to find food and to escape predators. - Natural selection means that organisms that are better adapted to their environments are more likely to survive and reproduce. - The theory of evolution describes how living things have developed from earlier forms over the history of the Earth. - Living things evolve through the process of natural selection. - Living things can become extinct if they are not adapted to their environment. - Endangered animals are those at threat of becoming extinct.	• DC6: Present data as a bar chart • DC7: Report on findings from enquiries, including oral and written explanations.

<u>Sequence:</u>

Prior to this unit, pupils studied rocks and fossils in Year 3. Their knowledge of fossils as prehistoric organisms will support them accessing the content in this unit. Pupils also know, from across Key Stage 1 and 2, that reproduction is a characteristic of life and that organisms produce offspring that resemble the parents and then grow into adults.

Block 5 – Physics
Electricity and Circuits

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 6, pupils should be taught to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. They should also be taught to 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 change. In addition, pupils should be taught to use recognised symbols when representing a simple circuit in a diagram.	Pupils will learn: • **The brightness of a lamp or the volume of a buzzer is associated with the number and voltage of cells used in the circuit.** - Changing the number of cells in a circuit affects the brightness of a light or the volume of a buzzer. • **Switches can be used to turn components on and off in a circuit.** - A series circuit is a circuit where electricity flows along one pathway through every component one after another. - When a switch is on, the circuit is complete, so electricity will flow and light up the bulb. • **Circuit symbols are used when representing a simple circuit in a diagram.** - Series circuits can be drawn using circuit diagrams; each component of the circuit is represented with a different symbol. • *Electricity (electrical current) flows through wires and is used to make devices and appliances work.* • *Electricity is generated from renewable resources such as wind and sunlight and non-renewable resources such as coal and oil.*	• DC1**:** Ask relevant questions and use different types of scientific enquiries to answer them. • DC2: Plan simple scientific enquiries. • DC3: Use a range of equipment. • DC4: Make careful observations. • DC5: Record findings using simple scientific language, drawings, and labelled diagrams. • DC7: Use results to draw simple conclusions and make predictions.

<u>Sequence:</u>

Prior to this unit, pupils studied electricity in Year 4. Pupils know some of the ways that electricity can be produced and can describe some of the appliances in our homes (and schools) that require electricity to function. Pupils understand the dangers presented by electricity and how we can stay safe. They also know how to construct a simple circuit and have investigated different components.

Block 6 – Biology
Animals including Humans – Circulation and Lifestyle

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
In Year 6, pupils are taught to identify and name the main parts of the human circulatory system, and to describe the functions of the heart, blood vessels and blood. They are also taught to recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function and to describe the ways in which nutrients and water are transported within animals, including humans.	Pupils will learn: • **The main parts of the human circulatory system include the heart, blood vessels, and blood.** - The heart pumps blood around the body. - The blood carries oxygen, nutrients, water, and waste products around the body and protects the body from infection. - Blood vessels are tubes that carry blood around the body. • **Nutrients and water are transported within animals, including humans, in the blood.** • **Diet, exercise, drugs, and lifestyle can all affect the way our bodies function.** - When a person exercises their heart rate increases as their heart beats faster to pump more oxygen around the body in the blood. - Drugs are chemicals that affect how the body works; some can be helpful, while others can cause harm.	• DC2: Plan simple scientific enquiries. • DC3: Use a range of equipment. • DC4: Make careful observations. • DC5: Record findings using simple scientific language, drawings, and labelled diagrams. • DC6: Present data as a bar chart. • DC7: Report on findings from enquiries including oral and written explanations. • DC8: Use models to represent a scientific concept or process.

Sequence:

This unit builds on pupils' knowledge of the human body and its processes and functions. Prior to this unit, pupils have studied the skeletal, muscular and digestive systems. Pupils know that nutrients from food are absorbed into the bloodstream as part of the digestive process and they also know the importance of a healthy lifestyle for the human body in terms of nutrition, exercise and hygiene.