



# Year 6: Science



## Autumn Term – 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	<ul style="list-style-type: none"> <li>that we see when light is reflected from an object into our eyes</li> <li>light travels (or appears to travel) in straight lines</li> <li>the parts of the human eye and how the eye works</li> <li>reflection is when light bounces off a surface and changes the direction of the ray of light</li> <li>the angle of incidence is always equal to the angle of reflection</li> <li>light is made of colours and the colours we see are known as the visible spectrum</li> <li>light waves can be absorbed, transmitted or reflected to create colour, white or black</li> <li>how shadows are formed and that they are the same shape as the object that cast them</li> <li>what light pollution is and its impact on both humans and animals</li> </ul>	<ul style="list-style-type: none"> <li>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate</li> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>using test results to make predictions to set up further comparative and fair tests</li> <li>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>

### 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.

## Autumn Term – 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	<ul style="list-style-type: none"> <li>who Carl Linnaeus was and how his work influenced the classification of living things</li> <li>how to use the Linnaean System of classification</li> </ul>	<ul style="list-style-type: none"> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables,</li> </ul>

<p>based on similarities and differences. It states that this classification should include microorganisms, plants and animals and that pupils should give reasons for classifying plants and animals based on specific characteristics.</p>	<ul style="list-style-type: none"> <li>• the six kingdoms used in classification are: kingdom archaea, Kingdom Bacteria, Kingdom Protista, Kingdom Fungi, Kingdom Plantae and Kingdom Animalia</li> <li>• how to classify vertebrates and invertebrates</li> <li>• how to classify plants – beginning with vascular and non-vascular</li> <li>• what microorganisms are and how they can be classified</li> <li>• the positive and negative impacts of microorganisms</li> <li>• how habitats are important for the conservation of species</li> </ul>	<p>scatter graphs, bar and line graphs</p> <ul style="list-style-type: none"> <li>• using test results to make predictions to set up further comparative and fair tests</li> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>• identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>
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**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.

**Spring Term – Biology  
Evolution and Inheritance**

**Scientist Focus: Mary Anning, Charles Darwin, Alfred Wallace**

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>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 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.</p>	<ul style="list-style-type: none"> <li>• why the information fossils give us is so important</li> <li>• who Mary Anning was and why her findings are significant</li> <li>• living things have adapted or changed over time to be able to survive in their environments</li> <li>• why animals need to adapt to their environments</li> <li>• natural selection is when living things are better adapted to their environments and have a greater chance of survival</li> <li>• evolution takes a very long time and animals do not simply choose to evolve</li> <li>• who Charles Darwin and Alfred Wallace were and why they are considered significant</li> <li>• why living things produce offspring of the same kind</li> <li>• why offspring vary and are not identical to their parents</li> </ul>	<ul style="list-style-type: none"> <li>• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>• using test results to make predictions to set up further comparative and fair tests</li> <li>• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> </ul>

		<ul style="list-style-type: none"> <li>identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>
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**Sequence:**

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.

### Summer Term – Physics Electricity and Circuits

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>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.</p>	<ul style="list-style-type: none"> <li>electricity is a type of energy produced when electrons move around very quickly and create a current</li> <li>electricity can be produced by generators which can be powered by renewable and non-renewable sources</li> <li>electrical components in a circuit can be represented by symbols</li> <li>the symbols for a bulb, cell, battery, buzzer, motor and switch (on and off)</li> <li>what happens to the components in a circuit if a component is added to the circuit or a component is changed</li> <li>the difference between a parallel and a series circuit</li> <li>we measure electricity in volts (V)</li> </ul>	<ul style="list-style-type: none"> <li>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> <li>recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs</li> <li>using test results to make predictions to set up further comparative and fair tests</li> <li>reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations</li> <li>identifying scientific evidence that has been used to support or refute ideas or arguments</li> </ul>

**Sequence:**

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.

### Summer Term – Biology Animals including Humans – Circulation and Lifestyle

Overview of unit:	Substantive Knowledge:	Disciplinary Knowledge:
<p>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.</p>	<ul style="list-style-type: none"> <li>the circulatory system consists of the heart, the lungs and the systemic system</li> <li>the role the heart play in the circulatory system</li> </ul>	<ul style="list-style-type: none"> <li>planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary</li> </ul>

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.

- the names of the different parts of the human heart
- human blood consists of plasma, white blood cells and platelets and red blood cells
- the role the lungs play in the circulatory system
- how heart rate differs before and after exercise
- how nutrients are moved around the body by the circulatory system after they are broken down by the digestive system
- how diet, exercise and lifestyle impact the heart and the body
- what drugs are (legal and illegal) and the impact of different drugs on the human body

- 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 of and a 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

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.