



Year group: 6 Topic: Light

**What should I already know?**

In Year 3 pupils learned that light can be reflected from surfaces, that shadows are formed when the light is blocked by a solid object and that there are patterns in the way that the size of shadows change.

**What will I know by the end of the unit? (Substantive Knowledge)**

understand 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, and to predict the size of shadows when the position of the light source changes.

**Common misconceptions**

Some children think of seeing as an active process, i.e. that we see objects because light comes out of our eyes rather than enters them (Superman films have not helped here). This leads to problems interpreting the light arrows in diagrams.

Children sometimes confuse shadows and reflections. It is important to clarify that children understand that reflection occurs when a light beam changes direction on hitting a surface. A shadow is formed when a light beam is blocked by an opaque object

**Key Vocabulary**

light	special effect
ray	filter
beam	dark
light source	reflection
data logger	surface
light sensor	periscope
Lux	pupil
opaque	iris
transparent	lens
translucent	eyelid
object	cornea
shadow	optic nerve
reflection	retina
mirror	glasses
eye	contact lenses
source	eye test
distance	colour blind
image	sunlight
screen	visible light
anomalous	protection
graph	repeat
Relationship	measurement
screen	sunburn
distance	prediction
Focus	results
Puppet	chart
theatre	conclusion
size	recommendations
image	

**Working Scientifically  
(Disciplinary Knowledge)**

planning different types of scientific enquiries to answer questions, recognise and control variables where necessary

taking measurements, using a range of scientific equipment, increasing accuracy and precision, taking repeat readings.

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 degree of trust in results, in oral and written forms such as displays and other presentations



**What should I already know?**

Pupils will not have had any formal teaching about evolution prior to this unit but will have studied classification and will be aware of the variety of life on Earth. They will have learned about fossil formation in Year 3 and should know that fossils are the imprint of a living animal or

**What will I know by the end of the unit? (Substantive Knowledge)**

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.

**Common misconceptions**

Some children believe that humans are responsible for the extinction of the dinosaurs. They also often think that early humans and dinosaurs co-existed.  
 Children sometimes think that fossils are actual preserved animals or plant parts.

**Key Vocabulary**

Biography	Theory
Variation	Survival
Inherited	Camouflage
Natural selection	Predator
Survival	Prey
Naturalist	deterrent
Voyage	Characteristics
Specimen	Evidence
Adaptation	Fossilisation
Evolution	Characteristic
Hypothesis	Organism
Disadvantage	Imprint
Mutation	Trait
DNA	generation
Offspring	

**Working Scientifically (Disciplinary Knowledge)**

Identifying scientific evidence that has been used to support or refute ideas or arguments.



Year group: 6 Topic: Living Things

### What should I already know?

In Year 4 pupils learned that living things can be grouped in a variety of ways and basic groupings for animals and plants. They made and used classification keys to help identify living things.

They discussed the way environments can change and that this can sometimes pose dangers to living things.

### What will I know by the end of the unit? (Substantive Knowledge)

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

### Working Scientifically (Disciplinary Knowledge)

planning different types of scientific enquiries to answer questions

using classification keys

reporting and presenting findings from enquiries, including conclusions, causal relationships and 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

classification	environment
kingdom	threat
<i>phylum</i>	habitat
<i>order</i>	identify
plants	timber industry
flowering plants	farming
conifers	plant
ferns	animal
mosses	pollution
algae	climate change
animals	population
vertebrates	extinct
invertebrates	microorganism
mammals	virus
reptiles	bacteria
amphibians	algae
arthropods	protozoa
insects	fungi
arachnids	decay
myriapods	single-celled
crustaceans	multi-celled
sponges	characteristic
annelids	disease
flatworms	Recycling
Cnidarians	yeast
nematodes	microbe
echinoderms	food sugar
Molluscs	conditions
characteristic	growth
species	rise
biodiversity	carbon dioxide
Variety	bubble
species	

### Common misconceptions

Children sometimes think that habitat and behaviour are criteria for classification



### What should I already know?

Describe the simple functions of the basic parts of the digestive system in humans.

Children should be able to name the organs.

### What will I know by the end of the unit? (Substantive Knowledge)

Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood

Describe the ways in which nutrients and water are transported within animals, including humans.

Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function—**also covered in PSHE so teach along side.**

### Common misconceptions

Children are sometimes confused about the pathway blood takes to a specific body part, believing that the blood travels round the body before reaching that part rather than taking a branch of the arterial system.

### Key Vocabulary

Blood	Vena cava
Circulate	Pulmonary artery
Heart	Pulmonary vein
Red cells	Oxygenated blood
White cells	Deoxygenated blood
Plasma	Lung
Platelets	Inhale
Nutrients	Exhale
Oxygen	Bronchus
Transfusion	Trachea
Carbon dioxide	Bronchioles
Clotting	Diaphragm
Infection	Alveolus
Haemoglobin	Muscles
Right ventricle	Vein
Left ventricle	Capillary
Right atrium	Artery
Left atrium	

### Working Scientifically (Disciplinary Knowledge)

Taking measurements of pulse rate before and after exercise.

Recording data and results using tables and line graphs to show pulse and breathing rates.

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations and degree of trust in results with heart rate and breathing rate.



Year group: 6 Topic: Electricity

**What should I already know?**

In year 4 pupils built simple circuits with different components. They tested materials for electrical conductivity and began to design their own simple circuits.

**What will I know by the end of the unit? (Substantive Knowledge)**

Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit

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

Use recognised symbols when representing a simple circuit in a diagram.

**Common misconceptions**

Batteries have electricity inside them.

**Key Vocabulary**

Plug	Short circuit
Mains electricity	Parallel
Battery	Dim
Switch	Anomalous
Bulb	Ammeter
Motor	Resistance
Crocodile clips	Loop
Complete circuit	Path
Conductor	Branch
Insulator	Fan
Buzzer	Bright

**Working Scientifically  
(Disciplinary Knowledge)**

To plan an investigation to see how the number of cells in a circuit affect the other components, taking into account the need for fair testing

To take measurements, using a range of scientific equipment, with increasing accuracy and precision when investigation the impact of too many cells.

To plan a fair test to investigate the effect of length and thickness on the flow of electricity in a circuit and to review the findings of this.