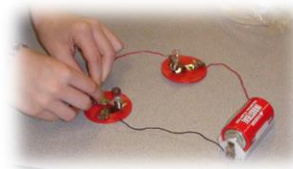


# UKS2

## Year A

### Electricity



#### Pupils should be taught to (Y6)

- ↪ 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.

**TAF:** The pupil can use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams.

#### Prior learning

- Identify common appliances that run on electricity. (Y4 - Electricity)
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. (Y4 - Electricity)
- 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. (Y4 - Electricity)
- Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (Y4 - Electricity)
- Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4 - Electricity)

#### Future learning

- Electric current, measured in amperes, in circuits, series and parallel circuits, currents add where branches meet and current as flow of charge. (KS3)
- Potential difference, measured in volts, battery and bulb ratings; resistance, measured in ohms, as the ratio of potential difference (p.d.) to current. (KS3)
- Differences in resistance between conducting and insulating components (quantitative). (KS3)
- Static electricity. (KS3)

#### Vocabulary

Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage N.B. Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words “cells” and “batteries” are now used interchangeably.

#### Common Misconceptions

Some children may think:

- larger-sized batteries make bulbs brighter
- a complete circuit uses up electricity
- components in a circuit that are closer to the battery get more electricity.

#### Scientists

Alessandro Volta- Electrical Battery  
Nikola Tesla- Alternating Currents  
Edith Clarke -Electrical engineer

#### **National Curriculum additional Notes Y6**

Building on their work in **year 4**, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.

Note: Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity.

Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

UKS2  
Year A  
Light (Y6)



Pupils should be taught to (Y6)

- ↪ 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.

**TAF:** The pupil can use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects, and the formation, shape and size of shadows.

**Prior learning**

- Recognise that they need light in order to see things and that dark is the absence of light. (Y3 - Light)
- Notice that light is reflected from surfaces. (Y3 - Light)
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3 - Light)
- Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3 - Light)
- Find patterns in the way that the size of shadows change. (Y3 - Light)
- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (Y5 - Properties and changes of materials)

**Future learning**

- The similarities and differences between light waves and waves in matter. (KS3)
- Light waves travelling through a vacuum; speed of light. (KS3)
- The transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface. (KS3)
- 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. (KS3)
- Light transferring energy from source to absorber leading to chemical and electrical effects; photo-sensitive material in the retina and in cameras. (KS3)
- Colours and the different frequencies of light, white light and prisms (qualitative only); differential colour effects in absorption and diffuse reflection. (KS3)

**Vocabulary**

Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, straight lines, light rays

**Common Misconceptions**

Some children may think:

- we see objects because light travels from our eyes to the object.

**Scientists**

Thomas Edison -Invented electric light bulb  
Patricia Bath (BP website)- saving sight  
Thomas Young (Wave Theory of Light)

Ibn al-Haytham -Light and our Eyes  
Percy Shaw - The Cats Eye

**National Curriculum Additional Notes Y6**

Pupils should build on the work on light in **year 3**, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions.

Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

UKS2  
Year A  
Forces (Y5)



**Pupils should be taught to (Y5)**

- ↳ explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- ↳ identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- ↳ recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

**TAF:**

- The pupil can describe the effects of simple forces that involve contact (air and water resistance, friction), and others that act at a distance (magnetic forces, including those between like and unlike magnetic poles; and gravity).
- The pupil can identify simple mechanisms, including levers, gears and pulleys that increase the effect of a force

**Prior learning**

- Compare how things move on different surfaces. (Y3 - Forces and magnets)
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)
- Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets)
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. (Y3 - Forces and magnets)
- Describe magnets as having two poles. (Y3 - Forces and magnets)
- Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)

**Future learning**

- Forces as pushes or pulls, arising from the interaction between two objects. (KS3)
- Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3)
- Moment as the turning effect of a force. (KS3)
- Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water. (KS3)
- Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3)

**Vocabulary**

Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines,

**Common Misconceptions**

Some children may think:

- the heavier the object the faster it falls, because it has more gravity acting on it
- forces always act in pairs which are equal and opposite
- smooth surfaces have no friction
- objects always travel better on smooth surfaces

levers, pulleys,  
gears

- a moving object has a force which is pushing it forwards and it stops when the pushing force wears out
- a non-moving object has no forces acting on it
- heavy objects sink and light objects float.

### **Scientists**

Isaac Newton- Gravity

Albert Einstein- The Theory Of relativity

Galileo Galilei - Gravity and Acceleration

Archimedes of Syracuse- Levers

### **National Curriculum Additional Notes Y5**

Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.

UKS2

Year A



Life cycles - animals (Y5)

**Pupils should be taught to (Y5)**

- ↳ describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- ↳ describe the life process of reproduction in some plants and animals.
- ↳ describe the changes as humans develop to old age.

This needs to be taught alongside PSHE. The new statutory requirements for relationships and health education can be found below:

<https://www.gov.uk/government/publications/relationships-education-relationships-and-sex-education-rse-and-health-education/physical-health-and-mental-wellbeing-primary-and-secondary>

Other useful guidance includes:

<https://www.pshe-association.org.uk/news/joint-briefing-teaching-about-puberty-key-stage-2>

<https://pshe-association.org.uk/curriculum-and-resources/resources/briefing-human-development-and-reproduction>

**TAF:**

The pupil can name, locate and describe the functions of the main parts of the digestive, musculoskeletal, and circulatory systems, and can describe and compare different reproductive processes and life cycles, in animals.

<p><b><u>Prior learning</u></b></p> <ul style="list-style-type: none"> <li>• Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)</li> </ul>	<p><b><u>Future learning</u></b></p> <ul style="list-style-type: none"> <li>• Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. (KS3)</li> </ul>
<ul style="list-style-type: none"> <li>• Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)</li> </ul>	<ul style="list-style-type: none"> <li>• Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. (KS3)</li> </ul>
<p><b><u>Vocabulary</u></b> Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual</p>	<p><b><u>Common Misconceptions</u></b> Some children may think: • only birds lay eggs.</p>
<p>Puberty – the vocabulary to describe sexual characteristics</p>	<p>Some children may think:</p> <ul style="list-style-type: none"> <li>• a baby grows in a mother’s tummy</li> <li>• a baby is “made”.</li> </ul>
<p><b><u>Scientists</u></b> Eva Crane -Reproduction in Bees Virginia Apgar- obstetrical anaesthesiologist Sir David Attenborough- Animal Behaviourist Jane Goodall- naturalist</p>	

### **National Curriculum Additional Notes Y5**

Pupils should study and raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.

Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals.

Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.

Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty.

Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.



UKS2

Year A

Animals in the environment (Y5)



**Pupils should be taught to (Y5)**

- ↳ describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, animals (recap LKS2)
- ↳ give reasons for classifying animals (recap LKS2) based on specific characteristics.
- ↳ *construct and interpret a variety of food chains, identifying producers, predators and prey. (Revise from Y4)*

**TAF:**

- The pupil can use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or in other ways.
- The pupil can name, locate and describe the functions of the main parts of plants, including those involved in reproduction and transporting water and nutrients.
- The pupil can construct and interpret food chains.
- The pupil can explain how environmental changes may have an impact on living things.

**Prior learning**

- Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats)
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats)
- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats)
- Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)
- *Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans)*
- *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. (Y3 - Animals, including humans)*

**Future learning**

- Differences between species. (KS3)

**Vocabulary**

Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms,

**Common Misconceptions**

Some children may think:  

- all micro-organisms are harmful
- mushrooms are plants.

*herbivore, carnivore, omnivore, producer, predator, prey, food chain*

*Some children may think:*

- *arrows in a food chains mean 'eats'*
- *the death of one of the parts of a food chain or web has no, or limited, consequences on the rest of the chain*
- *there is always plenty of food for wild animals*

### **Scientists**

Carl Linneus - Classification

Libby Hyman - Classification Invertebrates

*Cindy Looy-Environmental Change and Extinction*

### **National Curriculum Additional Notes Y5**

Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another.

Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.

Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.