

LKS2  
Year A  
Electricity (Y4)



**Pupils should be taught to (Y4)**

- ↻ 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.

**TAF: 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**

- Explore how things work. (Nursery - Electricity)

**Future learning**

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. (Y6 - Electricity)
- 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. (Y6 - Electricity)
- Use recognised symbols when representing a simple circuit in a diagram. (Y6 - Electricity)

**Vocabulary**

Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol

N.B. Children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.

**Common Misconceptions**

Some children may think:

- electricity flows to bulbs, not through them
- electricity flows out of both ends of a battery
- electricity works by simply coming out of one end of a battery into the component.

**Scientists**

Michael Faraday- Discovered relationship between magnets and electricity

Thomas Edison- Lightbulb

Joseph Swan- Incandescent Light Bulb

**National Curriculum additional Notes Y4**

Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and

motors, and including switches, and use their circuits to create simple devices. **Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6.**

**Note:** Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.

Pupils might work scientifically by: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

LKS2  
Year A  
Light (Y3)



Pupils should be taught to (Y3)

- ↪ recognise that they need light in order to see things and that dark is the absence of light
- ↪ 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.

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

**Prior learning**

- Explore how things work. (Nursery – Light)
- Talk about the differences in materials and changes they notice. (Nursery – Light)
- Describe what they see, hear and feel whilst outside. (Reception – Light)
- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)
- Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)

**Future learning**

- Recognise that light appears to travel in straight lines. (Y6 - Light)
- 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. (Y6 - Light)
- 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. (Y6 - Light)
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. (Y6 - Light)

**Vocabulary**

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

**Common Misconceptions**

Some children may think:

- we can still see even where there is an absence of any light
- our eyes 'get used to' the dark
- the moon and reflective surfaces are light sources
- a transparent object is a light source
- shadows contain details of the object, such as facial features on their own shadow
- shadows result from objects giving off darkness.

**Scientists**

Justus Von Liebig - Mirrors  
James Clerk Maxwell - (Visible and Invisible Waves of Light)

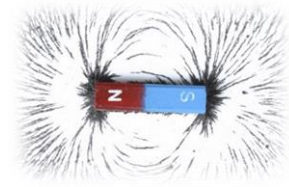
**National Curriculum Additional Notes Y3**

Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.

**Note:** Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.

Pupils might work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

LKS2  
Year A



Forces and Magnetism (Y3)

**Pupils should be taught to (Y3)**

- ↪ compare how things move on different surfaces
- ↪ notice that some forces need contact between two objects, but magnetic forces can act at a distance
- ↪ observe how magnets attract or repel each other and attract some materials and not others
- ↪ 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
- ↪ describe magnets as having two poles
- ↪ predict whether two magnets will attract or repel each other, depending on which poles are facing.

**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).**

**Prior learning**

- Explore how things work. (Nursery – Forces)
- Explore and talk about different forces they can feel. (Nursery – Forces)
- Talk about the differences between materials and changes they notice. (Nursery – Forces)
- Explore the natural world around them. (Reception – Forces)
- Describe what they see, hear and feel whilst outside. (Reception – Forces)
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)

**Future learning**

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 - Forces)
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. (Y5 - Forces)
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 - Forces)
- Magnetic fields by plotting with compass, representation by field lines. (KS3)
- Earth's magnetism, compass and navigation. (KS3)

**Vocabulary**

Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole

**Common Misconceptions**

- Some children may think:
- the bigger the magnet the stronger it is
  - all metals are magnetic.

## **Scientists**

Andre Marie Ampere - Electro-magnetism

The Wright Brothers -Airplanes

Henry Ford- Cars

### **National curriculum additional Notes Y3**

Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).

Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.



LKS2

Year A

Animals, including humans (Y3)

**Pupils should be taught to (Y3)**

- ☞ 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.

**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.
- The pupil can describe the effects of diet, exercise, drugs and lifestyle on how their bodies function.

**Prior learning**

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals, including humans)
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans)
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 - Animals, including humans)
- Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - Animals, including humans)
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)

**Future learning**

- Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans)
- Identify the different types of teeth in humans and their simple functions. (Y4 - Animals, including humans)
- Construct and interpret a variety of food chains, identifying producers, predators and prey. (Y4 - Animals, including humans)
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. (Y6 - Animals, including humans)

**Vocabulary**

Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine

**Common Misconceptions**

Some children may think:

- certain whole food groups like fats are 'bad' for you
- certain specific foods, like cheese are also 'bad' for you
- diet and fruit drinks are 'good' for you
- snakes are similar to worms, so they must also be invertebrates
- invertebrates have no form of skeleton.

**Scientists**

Marie Curie- Radiation  
Wilhelm Rontgen - X rays

**National curriculum additional Notes Y3**

Pupils should continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions.

Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out.



LKS2

Year A

Living things in their habitats (Y4)



**Pupils should be taught to (Y4)**

- ↻ 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.

**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 explain how environmental changes may have an impact on living things.

**Prior learning**

- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants)
- Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants)
- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans)
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans)
- Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)

**Future learning**

- 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)
- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals. (Y6 - Living things and their habitats)
- Give reasons for classifying plants and animals based on specific characteristics. (Y6 - Living things and their habitats)

**Vocabulary**

Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate

**Common Misconceptions**

Some children may think:

- 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
- animals are only land-living creatures
- animals and plants can adapt to their habitats, however they change
- all changes to habitats are negative.

**Scientists**

Jacques Cousteau -Marine Biology  
Cindy Looy-Environmental Change and Extinction  
Joan Beauchamp Procter Zoologist

**National Curriculum additional Notes Y4**

Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.

**Note:** Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.

Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.

Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.