

UKS2

Year B



## Humans – Health and circulation (Y6)

Pupils should be taught to (Y6)

- ↪ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- ↪ recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- ↪ describe the ways in which nutrients and water are transported within animals, including humans.

### 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**

- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - 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)
  - 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)
- This content is also included in **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>

### **Future learning**

- The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. (KS3)
- The effects of recreational drugs (including substance misuse) on behaviour, health and life processes. (KS3)
- The structure and functions of the gas exchange system in humans, including adaptations to function. (KS3)
- The mechanism of breathing to move air in and out of the lungs. (KS3)
- The impact of exercise, asthma and smoking on the human gas exchange system. (KS3)

### **Vocabulary**

Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water,

### **Common Misconceptions**

- Some children may think:
- your heart is on the left side of your chest
  - the heart makes blood
  - the blood travels in one loop from the heart to the lungs and around the body
  - when we exercise, our heart beats faster to work the muscles more
  - some blood in our bodies is blue and some blood is red

muscles, cycle,  
circulatory  
system, diet,  
exercise, drugs,  
lifestyle

- we just eat food for energy
- all fat is bad for you
- all dairy is good for you
- protein is good for you, so you can eat as much as you want
- foods only contain fat if you can see it
- all drugs are bad for you.

### **Scientists**

Leonardo Da Vinci- anatomy

Santorio Santorio-Anatomist

Dr. Katherine Dibb – Expert in Cardiovascular Sciences

Justus von Liebig- Theories of Nutrition and Metabolism

Sir Richard Doll- Linking Smoking and Health Problems

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

Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function.

Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

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Year B



Sound (especially pitch) (Y4)

**This is a short revision unit recapping year 4 with the addition of pitch**

Pupils should be taught to (Y6)

- ↳ identify how sounds are made, associating some of them with something vibrating
- ↳ recognise that vibrations from sounds travel through a medium to the ear
- ↳ find patterns between the pitch of a sound and features of the object that produced it
- ↳ find patterns between the volume of a sound and the strength of the vibrations that produced it
- ↳ recognise that sounds get fainter as the distance from the sound source increases.

**TAF:**

- The pupil can use the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard.
- The pupil can describe the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source

**Prior learning (YEAR 4)**

- Identify how sounds are made, associating some of them with something vibrating.
- Recognise that vibrations from sounds travel through a medium to the ear.
- Find patterns between the volume of a sound and the strength of the vibrations that produced it.
- Recognise that sounds get fainter as the distance from the sound source increases.

**Future learning**

- Waves on water as undulations which travel through water with transverse motion; these waves can be reflected, and add or cancel – superposition. (KS3)
- Frequencies of sound waves, measured in Hertz (Hz); echoes, reflection and absorption of sound. (KS3)
- Sound needs a medium to travel, the speed of sound in air, in water, in solids. (KS3)
- Sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal. (KS3)
- Auditory range of humans and animals. (KS3)
- Pressure waves transferring energy; use for cleaning and physiotherapy by ultra-sound. (KS3)
- Waves transferring information for conversion to electrical signals by microphone. (KS3)

**Vocabulary**

Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

**Common Misconceptions**

Pitch and volume are frequently confused, as both can be described as high or low.

Some children may think:

- sound is only heard by the listener
- sound only travels in one direction from the source
- sound can't travel through solids and liquids

• high sounds are loud and low sounds are quiet.

### **Scientists**

Aristotle - Sound Waves

Galileo Galilei - Frequency and Pitch of Sound Waves

### **National Curriculum additional Notes Y4**

Should recap knowledge from year four and address any misconceptions

Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways.

Pupils might work scientifically by: finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.

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Year B

Earth in Space (Y5)



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

- ↳ describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- ↳ describe the movement of the Moon relative to the Earth
- ↳ describe the Sun, Earth and Moon as approximately spherical bodies
- ↳ use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

**TAF:**

- The pupil can describe the shapes and relative movements of the sun, moon, earth and other planets in the solar system; and explain the apparent movement of the sun across the sky in terms of the earth's rotation and that this results in day and night.

**Prior learning**

- Explore the natural world around them. (Reception – Earth and space)
- Describe what they see, hear and feel whilst outside. (Reception – Earth and space)
- Observe changes across the four seasons. (Y1 - Seasonal changes)
- Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes)

**Future learning**

- Gravity force, weight = mass x gravitational field strength (g), on Earth  $g=10 \text{ N/kg}$ , different on other planets and stars; gravity forces between Earth and Moon, and between Earth and Sun (qualitative only). (KS3)
- Our Sun as a star, other stars in our galaxy, other galaxies. (KS3)
- The seasons and the Earth's tilt, day length at different times of year, in different hemispheres. (KS3)
- The light year as a unit of astronomical distance. (KS3)

**Vocabulary**

Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets

**Common Misconceptions**

Some children may think:

- the Earth is flat
- the Sun is a planet
- the Sun rotates around the Earth
- the Sun moves across the sky during the day
- the Sun rises in the morning and sets in the evening
- the Moon appears only at night
- night is caused by the Moon getting in the way of the Sun or the Sun moving further away from the Earth.

**Scientists**

Margaret Hamilton- Computer scientist (Moon Landings)  
Stephen Hawking- Black Holes  
Mae Jemison – Astronaut  
Claudius Ptolemy and Nicolaus Copernicus - Heliocentric vs Geocentric Universe  
Neil Armstrong- First man on the Moon

Helen Sharman- GB astronaut  
Caroline Herschel- First to find a comet  
Valentina Tereshkova-Cosmonaut

**National Curriculum additional Notes Y5**

Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).

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

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Year B

## Materials (Y5)



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

- ↻ 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
- ↻ know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- ↻ use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- ↻ give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- ↻ demonstrate that dissolving, mixing and changes of state are reversible changes
- ↻ explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

#### **TAF:**

- The pupil can group and identify materials, including rocks, in different ways according to their properties, based on first-hand observation; and justify the use of different everyday materials for different uses, based on their properties.
- The pupil can describe the characteristics of different states of matter and group materials on this basis; and can describe how materials change state at different temperatures, using this to explain everyday phenomena, including the water cycle.
- The pupil can identify, and describe what happens when dissolving occurs in everyday situations; and describe how to separate mixtures and solutions into their components.
- The pupil can identify, with reasons, whether changes in materials are reversible or not.

#### **Prior learning**

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)
- 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)
- 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)
- Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - States of matter)
- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at

#### **Future learning**

- Chemical reactions as the rearrangement of atoms. (KS3)
- Representing chemical reactions using formulae and using equations. (KS3)
- Combustion, thermal decomposition, oxidation and displacement reactions. (KS3)
- Defining acids and alkalis in terms of neutralisation reactions. (KS3)

which this happens in degrees Celsius (°C). (Y4 - States of matter)  
• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4 - States of matter)

• The pH scale for measuring acidity/alkalinity; and indicators. (KS3)

#### **Vocabulary**

Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

#### **Common Misconceptions**

Lots of misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes. They do not correlate simply. Chemical changes result in a new material being formed. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has been changed.

Some children may think:

- thermal insulators keep cold in or out
- thermal insulators warm things up
- solids dissolved in liquids have vanished and so you cannot get them back
- lit candles only melt, which is a reversible change.

#### **Scientists**

Sir Humphrey Davy- Separating gases

Jamie Garcia (BP website)- Invention of a new plastic

Becky Schroeder - fluorescence material

Spencer Silver, Arthur Fry and Alan Amron - Post-It Notes

Ruth Benerito - Wrinkle-Free Cotton

#### **National Curriculum additional Notes Y5**

Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.

Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials.

Pupils might work scientifically by: carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.



UKS2

Year B



Plants (Y6) Plant reproduction (Y5)

**Pupils should be taught to (Y6/5)**

- ↳ describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, plants
- ↳ give reasons for classifying plants based on specific characteristics.
- ↳ describe the life process of reproduction in some plants (and animals) Y5

**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

**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)

**Future learning**

- Differences between species. (KS3)

- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)

- Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3)

**Vocabulary**

flowering, non-flowering  
Life cycle, reproduce,  
plantlets, runners, bulbs,  
cuttings

**Common Misconceptions**

Some children may think:

- mushrooms are plants.
- all plants start out as seeds
- all plants have flowers
- plants that grow from bulbs do not have seeds

**Scientists**

Carl Linneus - Classification  
Sir David Attenborough  
Ruth Patrick

**National Curriculum additional Notes Y6**

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.

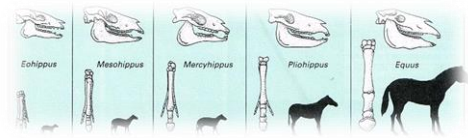
Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.

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.

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

Pupils might work scientifically by: observing and comparing the life cycles of plants in their local environment with other plants 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.

UKS2  
Year A/B



Evolution and Inheritance (Y6)

**Pupils should be taught to Y6**

- ↳ 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.

**TAF:**

- The pupil can use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved; and describe how fossils are formed and provide evidence for evolution.

**Prior learning**

- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. (Y2 - Living things and their habitats)
- Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks)
- Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)
- Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)

**Future learning**

- Heredity as the process by which genetic information is transmitted from one generation to the next. (KS3)
- A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. (KS3)
- The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. (KS3)
- Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. (KS3)

**Vocabulary**

Offspring, sexual reproduction, vary, characteristics, suited, adapted,

**Common Misconceptions**

Some children may think:

- adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life
- offspring most resemble their parents of the same sex, so that sons look like fathers

environment,  
inherited,  
species, fossils

- all characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited
- cavemen and dinosaurs were alive at the same time.

### **Scientists**

Rosalind Franklin – DNA

Nettie Stevens – Geneticist

Professor Alice Roberts - Evolutionary biologist

Charles Darwin- Evolution -Standing on The Shoulders of Giants PSTT resource

Alfred Russell Wallace – naturalist

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

Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Note: At this stage, pupils are not expected to understand how genes and chromosomes work.

Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.