The senses

What sense organs do you use when you watch a film?

Our sense organs let us interact with the world around us. They detect information and send electrical signals to the brain. The brain interprets the signals and then decides how to react to the stimulus.

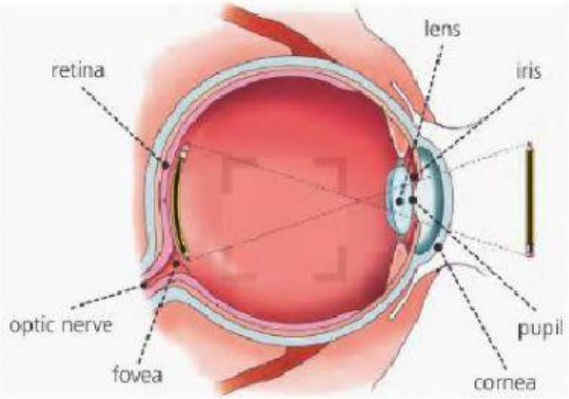
Sight

1 Light passes through the **cornea** and enters the eye through the **pupil**.

2 The coloured part of the eye is the **iris**. It controls the size of the pupil and the amount of light that enters the eye.

3 The **lens** focuses the light on the **retina** at the back of the eye.

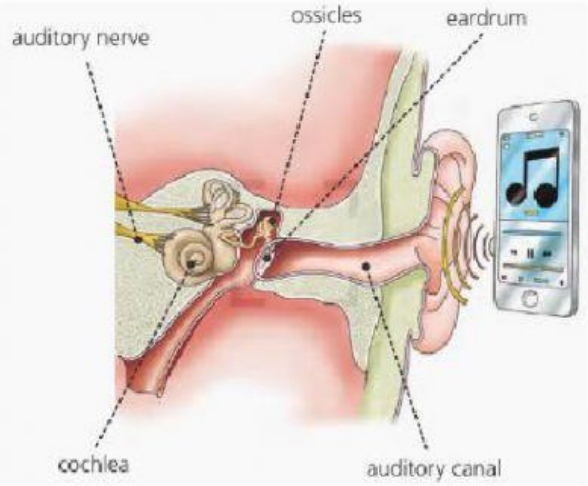
5 The **fovea** is where the optic nerve meets the retina. The fovea is a blind spot because it cannot detect light.



4 Nerve receptors in the retina detect light and send electrical signals to the **optic nerve**. From there, the signals are carried to the brain.

Hearing

1 Sound waves enter the **outer ear**. They go into the **auditory canal** and they make the **eardrum** vibrate.



2 The **ossicles** are three small bones in the **middle ear**. They vibrate when the eardrum vibrates.

3 The **cochlea** is in the **inner ear**. It detects sound vibrations in the ossicles and it produces electrical signals.

4 The **auditory nerve** carries the electrical signals to the brain.

LIVEWORKSHEETS

Smell

Chemical particles in the air enter the nose through the **nostrils**.

The chemical particles are detected by **nerve receptors** inside the nose.

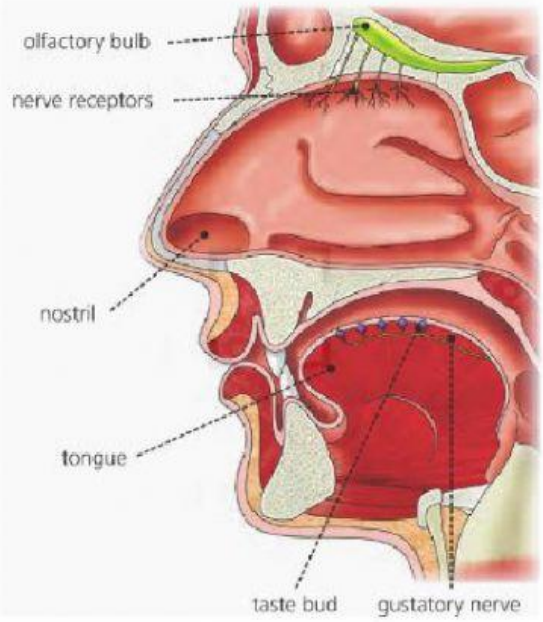
The nerve receptors send electrical signals to the **olfactory bulb** in the brain.

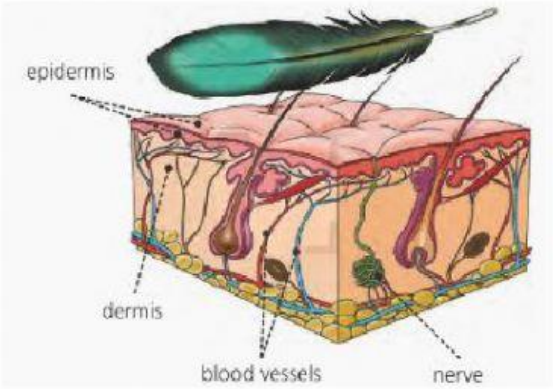
Taste

Food touches the **tongue**, which is covered with **taste buds**.

The taste buds have **receptor cells** that detect tastes: sweet, sour, bitter, salty and umami.

Electrical signals are carried to the brain by **gustatory nerves**.





Touch

Your **skin** covers and protects your body. The top layer is the **epidermis** and the middle layer is the **dermis**.

The dermis contains many **blood vessels** and **nerves**. These nerves can detect sensations, such as heat, pressure and texture.

The nerves in your skin send electrical signals to the brain.

1 Which sense organs detect these things?

air freshener • light • birds singing
soft skin • sweet food

2 Listen to the information about the senses. Are the statements true or false? Answer in your notebook.

3 What parts of our sense organs produce electrical signals? How do they get to the brain? Discuss with a partner.

4 Find out how these things protect our sense organs: safety goggles, earplugs, dust mask and oven gloves. Share your findings with the class.

LIVEWORKSHEETS

Processing information

What are voluntary actions?
And involuntary actions?

The nervous system

Cells are the smallest living parts of living **organisms**. Cells that have the same function join together and form **tissues**. These tissues form **organs** that work together in **systems**.

The **nervous system** carries messages between the **brain** and other systems of the body, such as the digestive system, the respiratory system and the locomotor system. When our senses detect stimuli, the locomotor system lets us react and move.

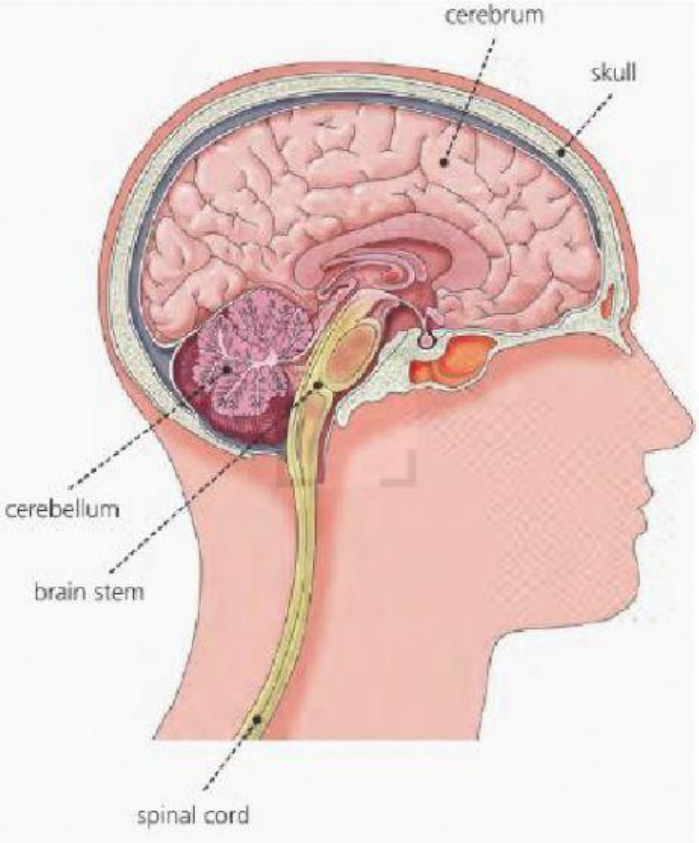
The brain

The brain controls the rest of the nervous system. It is protected by the **skull** and it has three main parts:

- The **cerebrum** is the biggest part of the brain. It processes information from the senses. Thinking, or cognition, also happens in the cerebrum, for example, when we study, take decisions or play games. These actions are **voluntary**.
- The **cerebellum** controls movement, balance and coordination.
- The **brain stem** connects the rest of the brain to the spinal cord. It controls **involuntary actions**, such as sleeping, breathing and our heartbeat.

The spinal cord

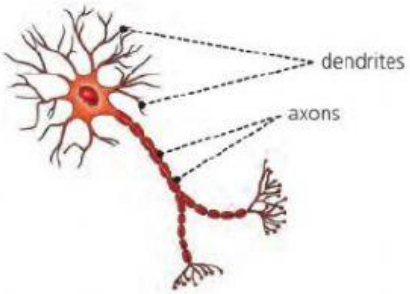
The spinal cord is made up of nerve tissue. It runs down the spine and it is protected by bones, called vertebrae. The spinal cord controls our **reflex actions**, such as blinking when something is moving quickly towards our eyes.

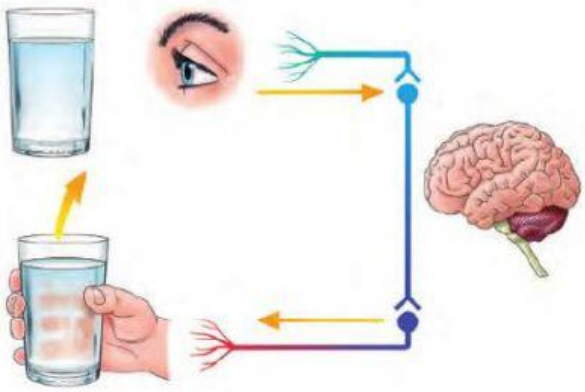


LIVEWORKSHEETS

The peripheral nervous system

The **peripheral nervous system** is made up of nerves. These nerves are made up of tiny cells called **neurons** that transmit electrical signals. Neurons have **dendrites** that receive signals and **axons** that transmit signals to other neurons.





Different neurons perform different tasks.

1. **Sensory neurons** carry signals from the sense organs to the brain. The eye sees the glass of water, and sends signals to the brain.
2. The **brain** interprets the information and responds by producing signals.
3. **Motor neurons** carry those signals to the locomotor system. The brain tells the hand to hold and move the glass of water.

1 With a partner, decide which parts of the central nervous system these sentences refer to:

- a It controls our heartbeat.
- b It processes information.
- c It is protected by vertebrae.
- d It helps us think and study.
- e It goes down the spine.
- f It controls our coordination.

2 Listen to a neuroscientist explaining how your brain interprets a stimulus. Summarise the steps in your notebook.

3 Why is the skull important? When should we wear a helmet? Why?

4 Search online about reflex actions. Are they voluntary? Why are they important?

Useful language

The skull is important because it …

Without the skull, …

We should wear a helmet when …

Wearing a helmet (*prevents / protects*) …

LIVEWORKSHEETS

Our responses

Look at the skeleton on this page. Which bones are flat?

The locomotor system

Our body responds to signals that come from the brain. The signals travel through the nervous system to our muscles, which **contract** and **relax**. The muscles move our bones and joints, so we can do things like hold objects or play sports. All of these parts together form the **locomotor system**.

The skeleton

An adult human skeleton has 206 **bones** that are connected by **joints**.

Bones

There are three types of bones:

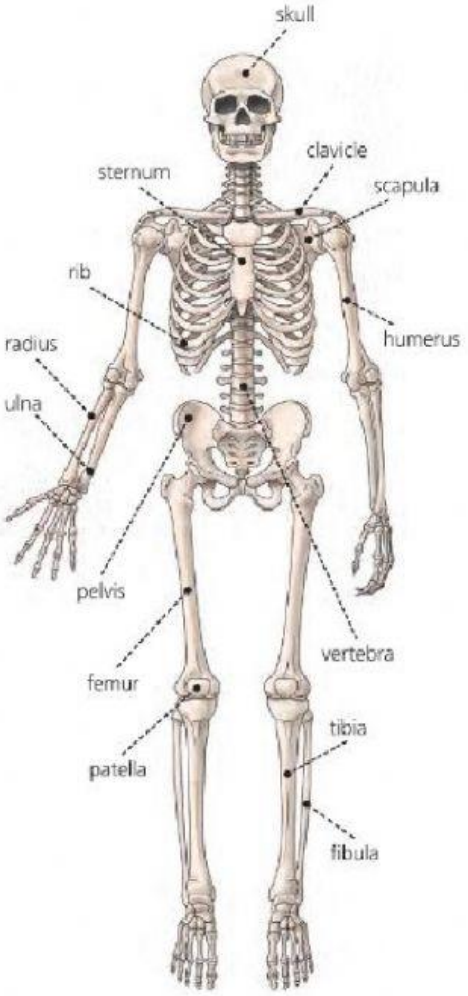
- **Short bones** provide stability and support. For example, vertebrae are short bones that also protect the spinal cord.
- **Flat bones**, such as the sternum and the ribs, protect our internal organs.
- **Long bones** are found in the arms and legs. The femur is the longest bone in the human body.

Joints

Our bones are connected by **joints**. Our joints are held together by strong elastic tissues called **ligaments**. The ends of our bones are protected by strong, flexible tissue called **cartilage**.

There are three types of joints:

- **Fixed joints** do not move. The skull has many bones that are connected by fixed joints.
- **Semi-flexible joints**, such as the vertebrae, allow some movement.
- **Flexible joints** allow much more movement. Our shoulders and knees are flexible joints.



1. Which bones protect the respiratory system? Which bones protect the brain?
2. What types of bones are these?

tibia • finger bones • pelvis • feet bones • scapula • radius

Useful language

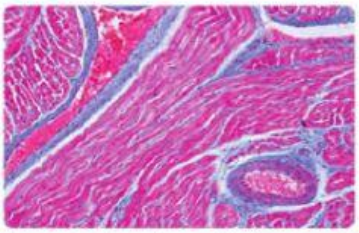
I think … is / are …
The … (*is / are*) probably …

LIVEWORKSHEETS

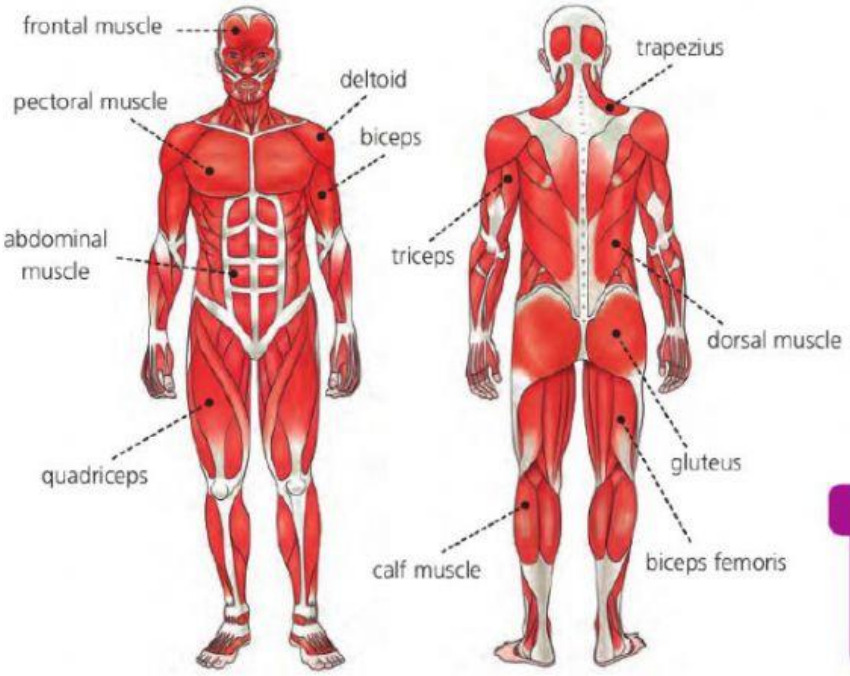
Muscles

The human body has more than 600 muscles. The nervous system controls these muscles by making them **contract** and **relax**. There are three types of muscles:

- **Skeletal muscles** are joined to bones by **tendons.** They are **voluntary muscles**, so we can control and move them when we want.
- **Smooth muscles** are found in organs like the stomach and the intestines. Smooth muscles are **involuntary muscles** because they work automatically. We cannot control them.
- **Cardiac muscle** makes the heart move and beat. It is an involuntary muscle.



Heart muscle under a microscope



Project tips

What is the difference between a broken ankle and a sprained ankle?

3 Listen to the clues and answer in your notebook. What are they describing?

4 Which muscles do we use to pick up a book? Which ones do we use to kick a ball?

5 Search online about joints. Which joints are the most flexible? How can you prevent injuries to your joints? Tell the class.

LIVEWORKSHEETS