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NATURAL SCIENCE

INTERACTION

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INTERACTION

In this unit we are going to learn about:

1. Interaction
2. Sense organs and senses
3. The nervous system
4. Locomotor system
5. Movement

MY VOCABULARY

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1. INTERACTION

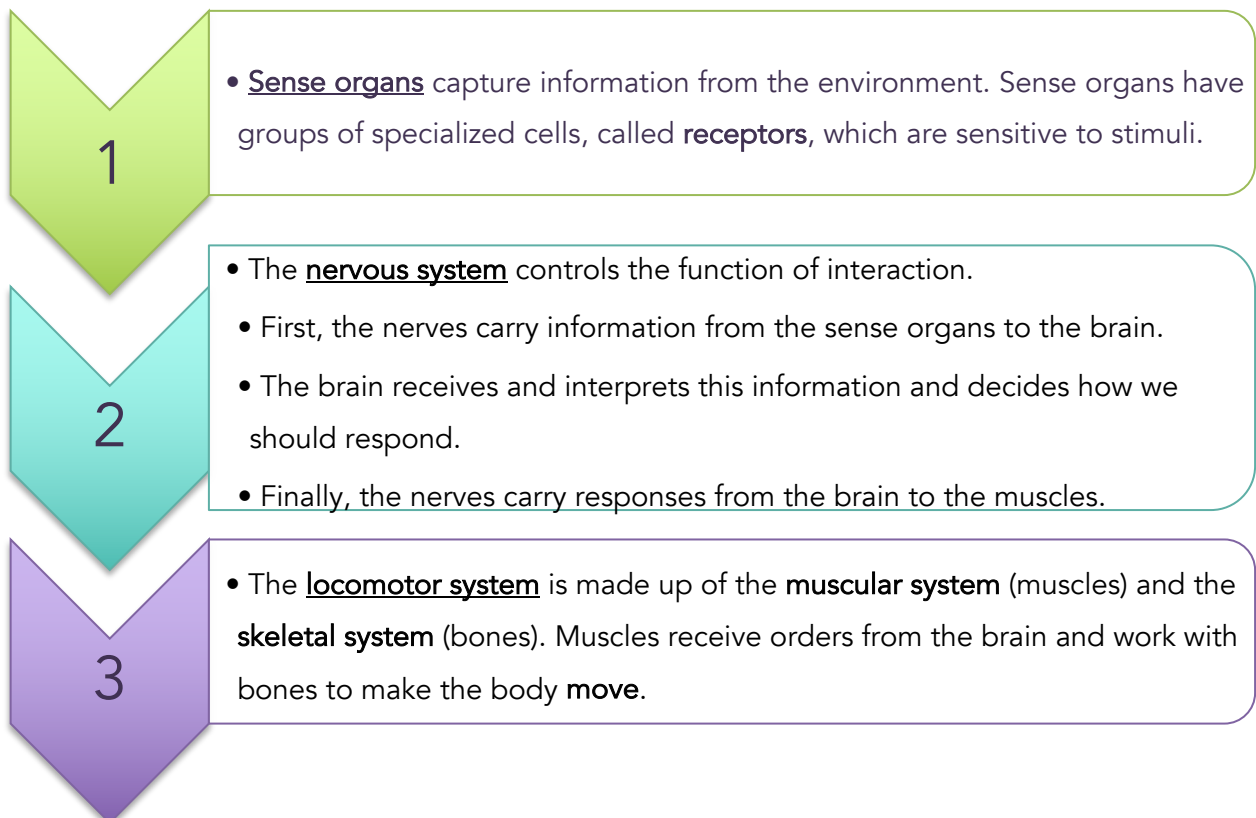
1. WHAT IS INTERACTION?

Through **interaction** we respond to changes in the external environment. These changes are called **stimuli**. For example, if the Sun is too bright, we respond by shading our eyes; if we see a large rock falling towards us, we respond by moving away.

We perceive the world through our senses. Sight, touch, smell, hearing and taste allow us to explore the environment around us. All the information received by our senses is processed by our most important organ, the brain. The brain is home to the conscious and unconscious mind, as well as our emotions and memory. It controls our involuntary actions, such as breathing, or digesting our food, as well as our thinking and decision making.

2. HOW DOES INTERACTION WORK?

If somebody throws a ball to us, we respond by trying to catch it. Various organs and systems are involved in this process.



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2. SENSE ORGANS AND SENSES

The sense organs obtain information from the external environment. Sense organs have special cells that can detect stimuli from the environment. Stimuli include light, sound and pressure. These cells are receptor cells and they send information to the brain through the nerves.

1. EYES AND SIGHT

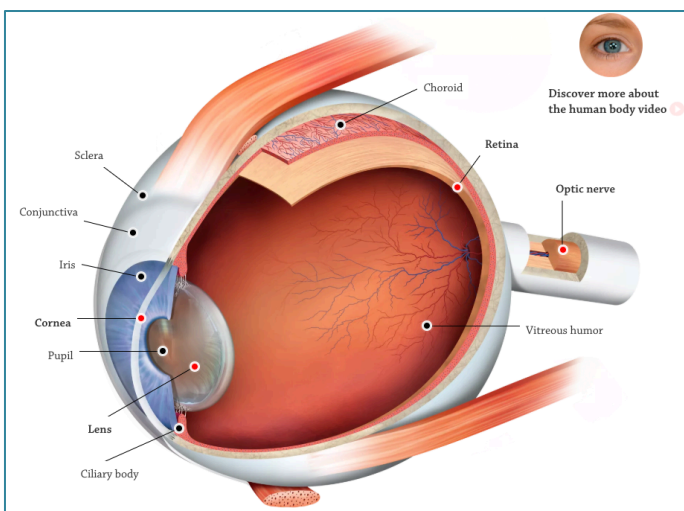
The eyes are the sense organs of **sight**. They detect light so we can see shapes and colour, and estimate distances.

1. Light reflected from an object enters our eye through the **cornea** and the **pupil**.

2. The **iris** controls the amount of light that can enter our eye. The iris is a muscle that can make the pupil bigger or smaller. It gives the eye its colour.

3. The **lens** bends the light so that it makes an image on the **retina** at the back of our eye.

4. Nerve receptors in the retina send this information along the **optic nerve** to our brain. The brain receives and interprets the information.



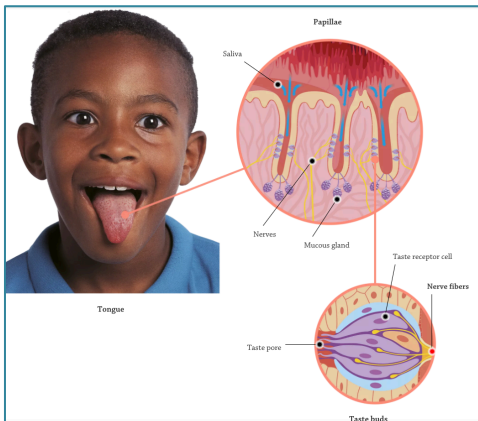
The place where the optic nerve leaves the eye is called **blind spot**. This area does not respond to light.

- **Cornea.** Transparent membrane that protects the eye and allows light to enter the eye.
- **Pupil.** Small hole that lets light into the eye.
- **Iris.** Coloured part. It's made up of very small muscles that open and close the pupil.
- **Lens.** Transparent oval-shaped structure that focuses the light onto the retina.
- **Retina.** It's made of nervous tissue arranged in thin layers of cells. It transmits the information to the brain.
- **Optic nerve.** It is connected to the brain and transmits the information from the retina.
- The **humours** are the liquids that fill the inner part of the eye. They maintain its shape and pressure.

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5. THE TONGUE AND TASTE



The tongue is the sense organ of **taste**. It detects different flavours.

The receptor cells for taste are on the tongue inside each taste bud. We have around ten thousand taste buds spread over the tongue. The nerve receptors in the taste buds can detect different chemicals in the things we eat and drink. The nerve receptors send this information through the **taste nerves** to our brain. The

brain receives and interprets this information.

3. THE NERVOUS SYSTEM

The nervous system carries out the function of **interaction**, also known as sensitivity or relation. The nervous system is in charge of three important tasks:

1. It receives and interprets the information from external and internal environments.
2. It gives the appropriate orders for our body to respond to stimuli.
3. It controls and coordinates all organs and systems in our body, such as the ears, the heart and the digestive system.

We can see these three tasks, for example, in a race: you see another runner pass you; you try to run faster; your heart rate increases.

The nervous system is made up of two parts: the **central nervous system** and the **peripheral nervous system**. It is formed by only one type of tissue: **nervous tissue**.

The **nervous system** receives and responds to information from the five sense organs. It controls the working of internal organs and body systems, such as the circulatory and respiratory systems. The nervous system also produces **reflex actions**, which are spontaneous reactions that protect our bodies from danger.

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2. THE CENTRAL NERVOUS SYSTEM: BRAIN AND SPINAL CORD

The central nervous system has two parts: the **brain (encephalon)** and the **spinal cord**.

THE BRAIN

- The **BRAIN** is the control center of the body. It is a very important organ and it is protected by the **cranium** (skull). The brain is divided into two halves that are called **right and left hemispheres**. It has three parts:
- The **CEREBRUM** is the largest and most complex part of the brain. It controls voluntary actions, like running and talking. It controls our intelligence, memory, personality, emotion, speech and the ability to feel and move. This is where we process the information from our senses.
- The **CEREBELLUM** is located at the back of the brain. It controls movement, coordination and balance.
- The **BRAIN STEM** controls internal organ activities that we do not need to think about (involuntary movements), for example, heart rate, breathing and swallowing. The brain stem connects the brain to the spinal cord. It coordinates all the messages going in and out of the brain to and from the spinal cord.

THE SPINAL CORD

- The spinal cord is a long, thin bundle of nervous tissue, protected by the spinal column. It extends from the base of the brain to the bottom of the spine, and connects the brain and the peripheral nervous system (nerves). The spinal cord produces involuntary responses (reflex actions), such as when we move our hand away from very hot objects.

The brain also controls our growth, energy levels and tells our cells when to do important things and how. It does all this through the **endocrine system** that produces **hormones**.

The **pituitary gland** is about the size of a pea in the centre of the brain: it produces the growth hormone that tells our body when to grow.

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5. MOVEMENT

Our body is capable of two different types of movement: voluntary movements and reflex or involuntary movements.

1. VOLUNTARY MOVEMENTS

We make voluntary movements in response to different stimuli. They are actions that we perform **consciously**. We are aware of them and can start and stop them as we wish. Some examples are walking, reading and chewing.

For these movements to happen the brain needs to send an order. Voluntary movements involve three main steps:

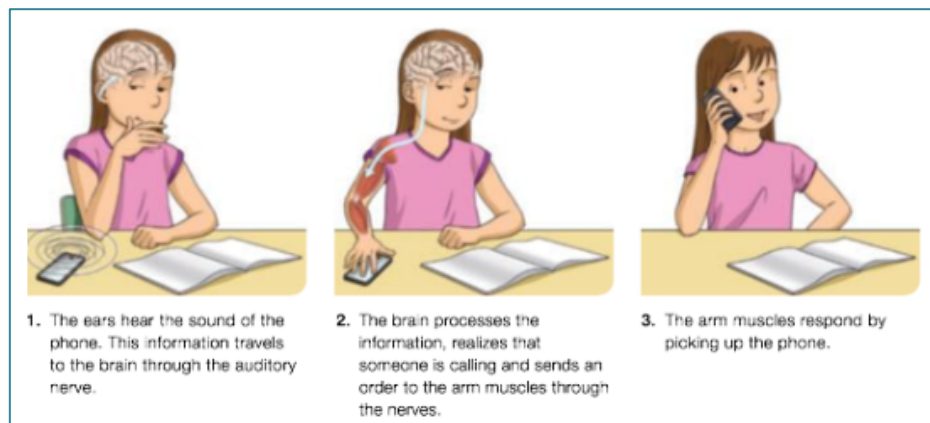
1st The sense organs capture a stimulus and send information to the cerebrum through sensory nerves.

2nd The cerebrum interprets the information and sends an order to the muscles through motor nerves.

3rd The muscles carry out the order by performing the corresponding movement.

Voluntary movements can be divided into two types:

1. **Gross motor** skills are large movements such as walking, sitting or waving your hand.
2. **Fine motor** skills are smaller, more precise movements, such as writing or picking up a phone.



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