The organisation of human beings

Are cells living things? Why?

Read and think

1. Read and find out.

a) What are the smallest units that make up the human body?

b) What type of tissue helps us move?

c) What do organs and tissues form?

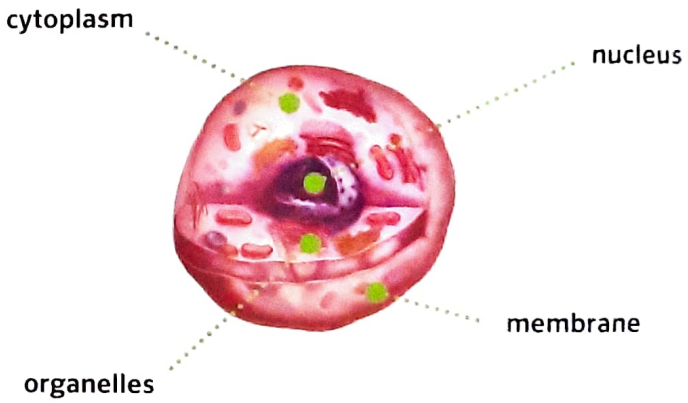
d) What are the three basic life processes we all carry out?

Our bodies are made of **cells**. Many cells together form **tissues** and **organs**. Tissues and organs make up **systems.**

Cells

Like all animals, human beings are made up of animal cells. Animal cells have three main parts: the **membrane,** the **cytoplasm** and the **nucleus.** Cells also have organelles, which are specialised structures that perform a specific function, such as storing food or giving the cell energy.

The shape of the cell depends on its function. For example, nerve cells are long and have branches so that they can transmit nerve impulses from one part of the body to another.



Tissues

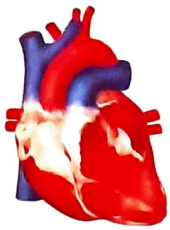
Similar cells can work together and form tissues. Different tissues perform specific functions in the body:

- **Skin tissue** covers the outside of the body.
- **Fat tissue** stores fats for energy.
- **Bone tissue** forms bones and supports the body.
- **Muscle tissue** moves the different body parts.
- **Nervous tissue** **transmits** information around the body and **coordinates** the body's functions.

Organs

Tissues can work together and form organs. The brain, heart, stomach and liver are important organs in the human body. Each organ performs a different function.

brain



heart

stomach

liver

Systems

A system is a group of organs and tissues that work together to carry out a specific function. For example, the digestive system includes the esophagus, the stomach and the intestines. Its function is to **break down** the food we eat and extract **nutrients**. Systems work together to carry out the basic life processes of **nutrition**, **interaction** and **reproduction**.

Activities

2. **Match to make sentences in your notebook.**

a) Cells have...	1. ... different functions in our bodies.
b) Tissues perform...	2. ... three main parts.
c) Organs are...	3. ... made up of tissues.

3. 3 **Listen and write the function of these organs.**

lungs heart brain liver stomach

4. **Use Search and discover! or the Internet to answer the questions.**

a) What is the function of the nucleus in a cell?

b) What is the function of the membrane?

The function of the ... is to...

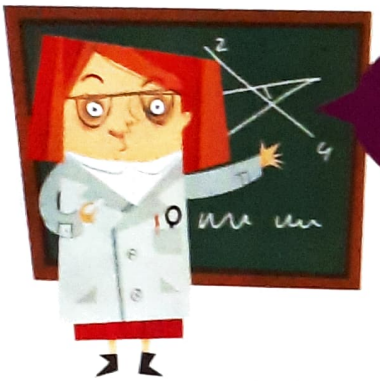
5. Create **Make a model of a cell.**

a) Use plasticine to make your model.

b) Label the parts of your model.

6. 4 QUIZ **Check your learning.**

Life processes in human beings



How do our organs and systems help us live and grow?

Read and think

1. **Read and find out.**
   a) How many systems are involved in the processes of nutrition?
   b) What system produces substances that help us interact with the world?

Different organs form **systems** to perform the **basic life processes** of nutrition, interaction and reproduction.

Nutrition

Some of our systems take in, use and transform the substances that we need to live and grow.

Digestive system

Respiratory system

Circulatory system

Excretory system

The **digestive system** breaks down the food we eat to absorb **nutrients** from it. The substances that are not absorbed in the intestines are expelled in the form of **faeces**. The **respiratory system** absorbs **oxygen** from the air we breathe. The nutrients and oxygen pass into our **blood**. The **circulatory system** transports the nutrients and oxygen in our blood around our body. All **waste** products need to be expelled from our bodies. For example, **carbon dioxide** is expelled from our bodies using the respiratory system when we exhale. Other waste products are expelled from our body by the **excretory system** in the form of **urine** and **sweat**.

Reproduction

Our **reproductive system** allows us to reproduce by having **children**. During puberty the reproductive system develops. As a result, we can reproduce. The female reproductive system produces an **egg cell** or **ovum**. The male reproductive system produces **spermatozoids**. When a spermatozoon and an ovum combine, **fertilisation** takes place. The fertilised egg cell then develops into a **fetus** in the uterus. After about nine months, the fetus is fully developed and the baby is born.

Female reproductive system

Male reproductive system

Interaction

Some of our systems detect information about the world and help us react to that information.

Nervous system

Muscular system

Skeletal system

Locomotor system

Endocrine system

We detect information about the world around us through our **sense organs**. This information is sent to the **brain** by the **nervous system**. The skeletal system and the muscular system form part of the **locomotor system**; the system we use to move around. The brain processes the information and sends signals to the locomotor system to move. The **endocrine system** produces substances called **hormones**, for example, adrenaline, which tell our brain how to react in specific situations. The substances can make us feel scared, nervous, happy or relaxed.

Activities

2. **Copy the true sentences and correct the false ones in your notebook.**

a) Systems are made up of organs.

b) Our digestive system detects the world around us.

c) Our reproductive system takes in nutrients that we need to grow.

d) Our skeletal system and our muscular system help us interact.

3. 5 **Listen and complete the sentences.**

a) Our ... is an organ that helps us receive information.

b) Our brain is the organ that receives the information and tells our ... to react.

c) We use the ... and the ... to interact with the world.

d) The ... system sends messages to our brain.

4. Collaborate **Demonstrate a system.**

a) In small groups, choose one system from the nutrition process.

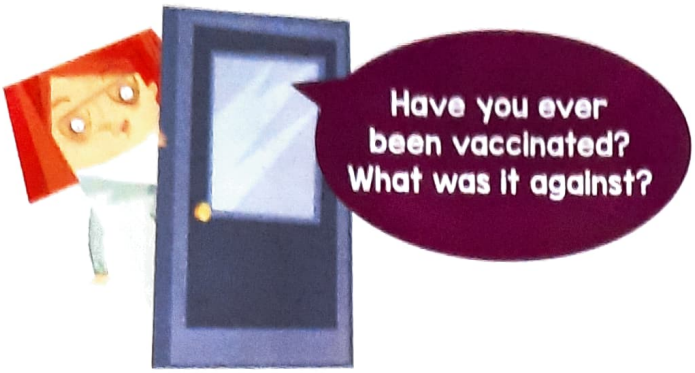
b) Use Search and discover! or the Internet to find out the key information.

c) Make a poster to show how the system works.

d) Present your poster to the class.

5. 6 QUIZ **Check your learning.**

Advances in medicine



Read and think

1. **Read and find out.**
   a) Why are vaccines important?
   b) Which machines help us see inside our bodies?
   c) Which machines protect babies who are born too early?

Machines and technology

An important advance in medicine has been new **machines** that help doctors discover the cause of an **illness** or **injury**, help to treat it and help people recover after treatment.

X-ray machines

X-ray radiation was discovered by **Wilhelm Roentgen** in 1895. An X-ray machine uses this type of radiation to create an image of the bones inside the body. It's used to **diagnose** broken bones or to find out where objects, such as bullets, are before removing them. It became an essential medical machine during the First World War. However, the radiation from an X-ray machine can be harmful if the machine is used often.

Scanners

Today many different techniques are used to produce images of the internal parts of the body. Ultrasound machines are used to **monitor** fetuses while they are inside the uterus. **MRI** and **PET** scans are used to create images of the internal organs and systems, including the brain. These machines help doctors diagnose illnesses without having to do surgery.

Dialysis machines

A dialysis machine can extract and clean a patient's blood as it travels around the circulatory system. The blood is extracted through a tube. Then it passes through a machine, which filters any waste products. The cleaned blood is then pumped back into the body through another tube. This machine is used when a patient's kidneys are not working.

Incubators

An incubator is a machine that protects a baby that has been born early. Sometimes, for different reasons, a baby is born before it has completely developed. An incubator creates a warm, clean and safe environment for the baby to continue to develop until it's able to survive without help. Incubators copy the conditions of the mother's uterus so that the baby can continue to grow.

Vaccines

The first vaccination was developed to control smallpox. It was developed in 1796 by **Edward Jenner**. Smallpox was a dangerous, infectious disease that caused death in 80% of the children who suffered from it. After Jenner proved that his vaccination was effective in preventing smallpox, **Louis Pasteur** began to study vaccines. He developed vaccines to prevent other dangerous diseases, such as cholera, anthrax and rabies.

Nowadays all children are vaccinated against certain diseases at different stages of their lives. Babies are vaccinated against diseases like measles, mumps, rubella, polio and meningitis. Older children have injections to stop them getting tetanus and diphtheria. Some of the diseases we are vaccinated against today cause many problems, including physical disabilities. These diseases are also very **contagious**. This means that they easily pass from one person to another.

Vaccines give our bodies **immunity** from contagious diseases.

Activities

2. **Copy and complete the sentences in your notebook.**

a) Vaccines were first invented by ... in...

b) During the First World War, X-rays were used to...

c) A dialysis machine is used to...

d) Ultrasound machines and incubators are both used to...

3. **Use Search and discover! or the Internet to find out more about a medical advance. Answer the questions with a classmate.**

a) What types of technology have been used to create prosthetic limbs in recent years?

b) Why is a LEGO © prosthetic limb special?

4. Think, pair, share! **Discuss the following question with a classmate.**

Which medical advances do you think are most important? Why?

I think ... is an important medical advance because...

I agree/disagree with you because...

5. 7 QUIZ **Check your learning.**

Let's revise!

1. Nutrition, interaction or reproduction? Make a table and classify the systems.

respiratory system skeletal system digestive system male reproductive system
circulatory system locomotor system female reproductive system nervous system

2. Complete the table to show the parts and functions of the human body. Give an example of each part.

Part of the body	It's made up of...	Example
Cell		
Tissue		
Organ		
System		