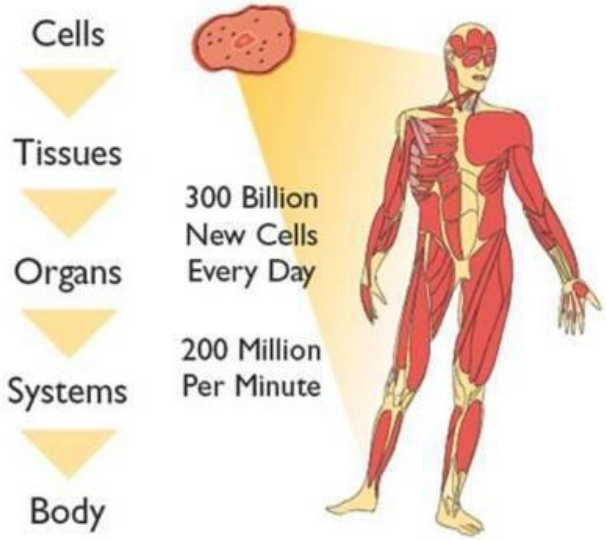
UNIT 1 - THE HUMAN BODY

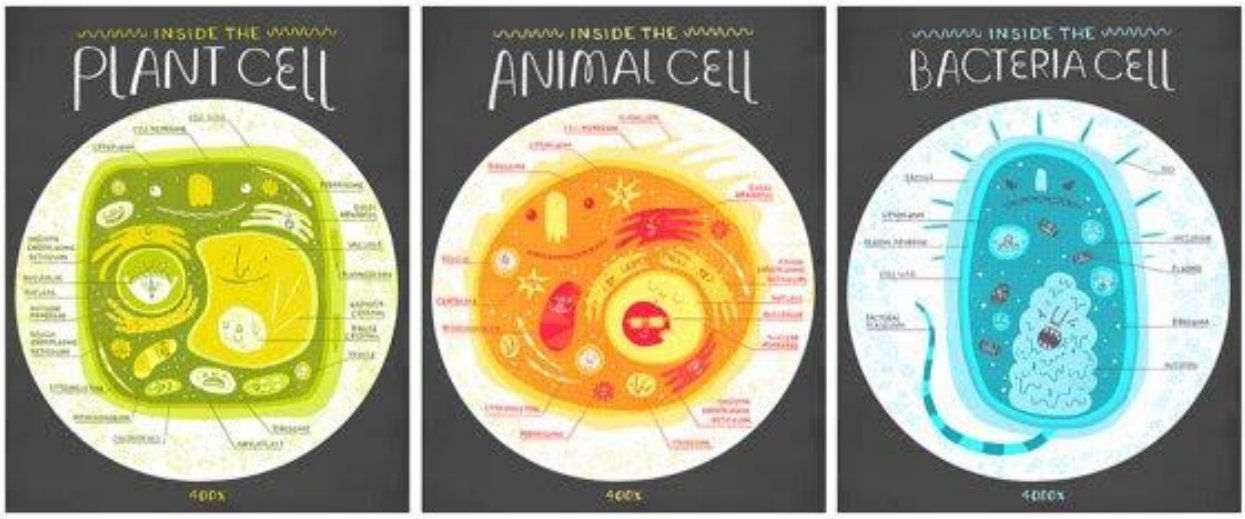
THE CELL

All living things have something in common. We are made up of cells.



The **cell is the smallest part of a living thing and has a life of its own**. The cell's main characteristic is that it is alive. Despite its microscopic size, the cells help perform **3 vital functions**:

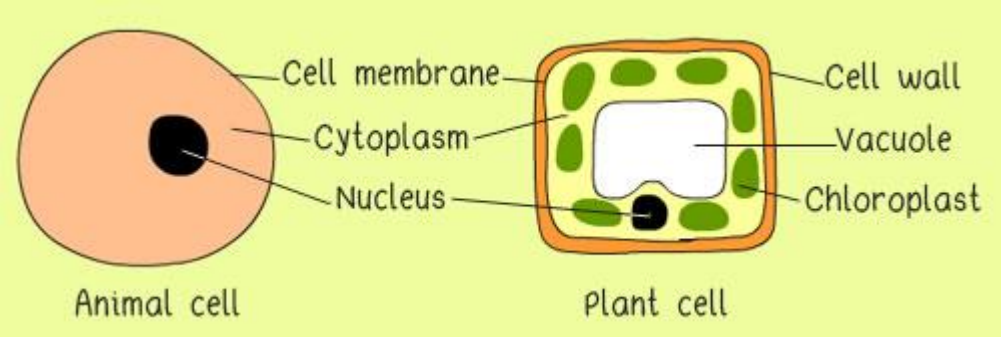
- **Nutrition**: They obtain from their environment the substances needed to feed themselves. For example, our body's cells get these substances from the blood.
- **Relationship**: They receive information about their environment and react to it. For example, the cells that make up muscle tissue can contract when they receive a signal from the nervous system.
- **Reproduction**: Create cells identical to them. When we get a wound, the skin cells reproduce and repair the damage.



There are different kinds of cells, with a variety of different shapes. Their sizes are also very different, although the vast majority cannot be seen by the naked eye. In one millimeter, fifty to one hundred of our cells can be found.

The **cells of animals** have various forms. Some are spherical, like the cells that accumulate fat. Others, for example, are flat, like those that make up the skin.

The **cells of plants** are usually polygonal because their rigid cell wall allows cells to fit in similar to bricks in a wall.

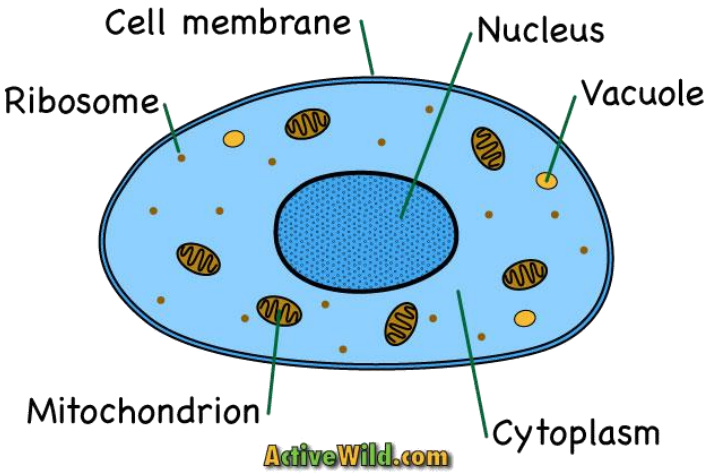


Cells are differentiated from others by their shape, their size, and by the activities they perform. For example, skin cells are different from bone cells.

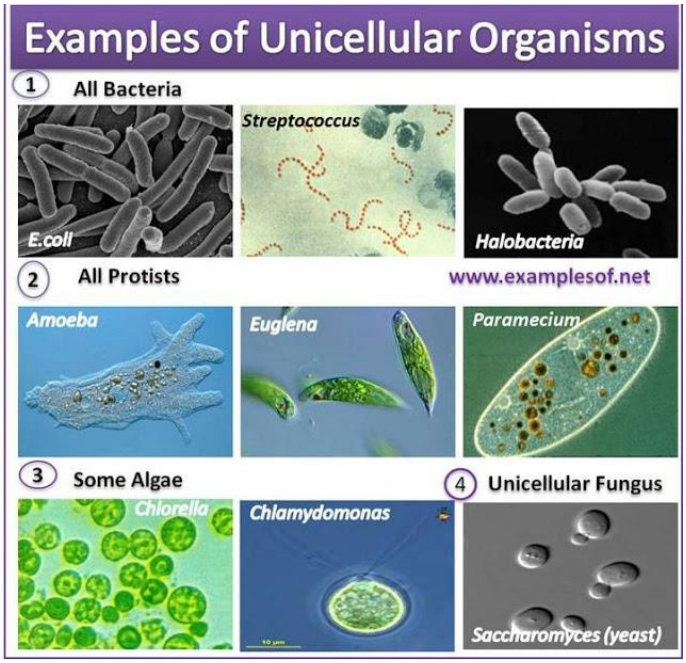
To observe cells, it is necessary to use a device called a microscope, which serves to enlarge images. The microscope is like a magnifying glass, but much more powerful.

PARTS OF A CELL

- **Membrane**: It forms the external structure of the cell. It is a thin layer of tissue which surrounds the cell and protects the cell from the surrounding environment.
- **Cytoplasm**: It is the water-like substance which fills a cell. It contains the organelles and the nucleus.
- **Organelles**: They are responsible for certain cell functions, such as making substances, producing movements or digesting nutrients (ribosome, mitochondrion, vacuole…)
- **Nucleus**: The most important part of a cell. Directs all cell activities and contains the cell's genetic material.

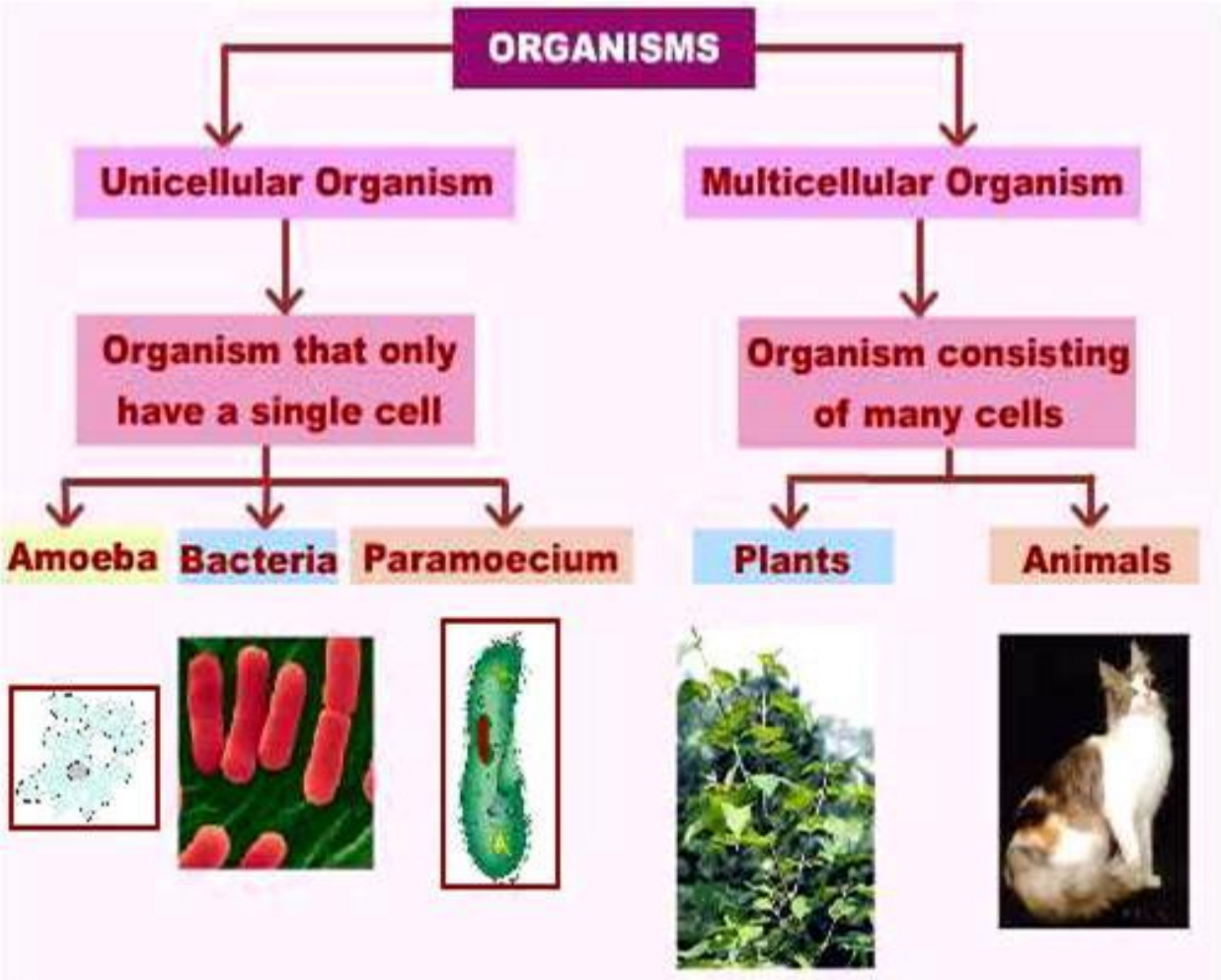


UNICELLULAR AND PLURICELLULAR



Some living things are formed by a single cell. They are called unicellular organisms and can only be seen under a microscope. They are everywhere; in the water, in the soil, in the air, in our bodies ... An example of a unicellular organism is bacteria.

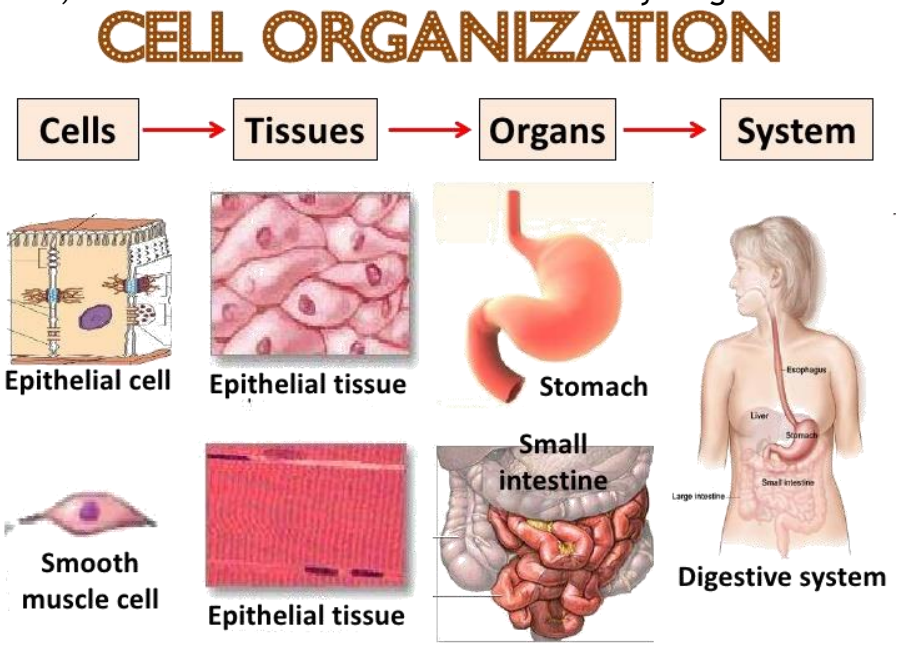
Other living things, such as animals and plants, are formed by many cells and are called multicellular. In this case, the cells are organized and coordinated among themselves so that the living being can perform its vital functions.



CELLS, TISSUES, ORGANS, AND SYSTEMS

The cells of multicellular organisms are very small and, unlike the cells that make up unicellular organisms, they live interconnected to one another. They organize and unite themselves in a certain way, similar to pieces of a machine.

Cells are not all the same: those that form the skin are flat, those that form muscles are elongated and thick, and those that form the nerves are very long.



- **Cells form tissues.** Cells that are of the same type and perform the same function are grouped into tissues. For example, muscle tissue is formed by the union of numerous muscle cells.
  In the plants there are also tissues. For example, the epidermis is the tissue that covers the leaves.

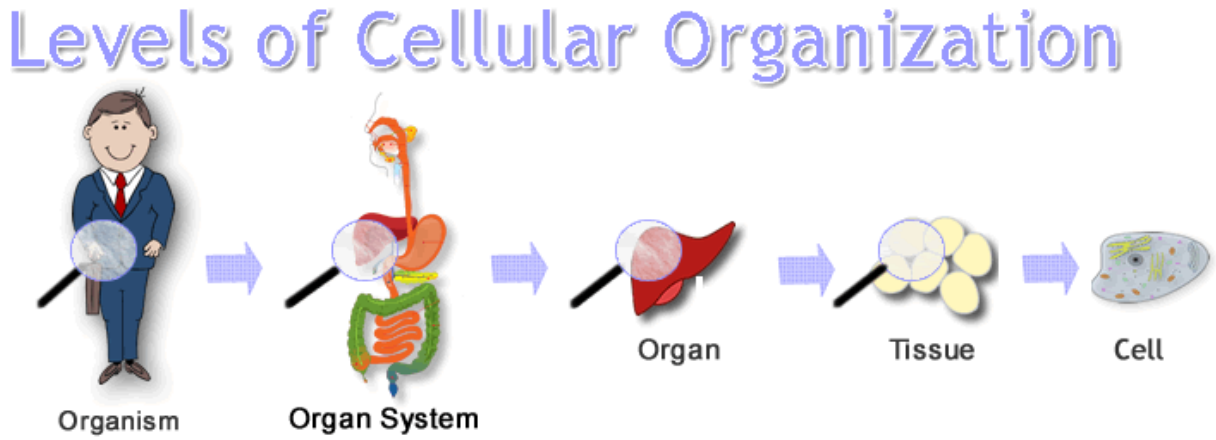
- **The tissues form organs**. Organs are made up of several tissues that work together to perform a function. For example, the muscles, bones, stomach, heart, lungs or the leaf of a plant, are organs.
  Example: The stomach is an organ that is composed of different types of tissues, such as the epithelial tissue that covers it, the muscle tissue which performs the movements of food mixing with gastric juices, and nervous system tissues which receive and send information.

- **The organs form systems**. Several organs that jointly perform a function form an apparatus or system, such as the digestive system, which performs the digestion of food, and which is formed by the mouth, esophagus, stomach, and intestine.

- **System**: It is a set of organs that perform the same function and are mainly formed by similar types of tissues. For example, the muscular system intervenes in movement. Other systems are the skeletal, nervous, and circulatory.

- **Apparatus**: Set of organs that perform the same function and do not have predominance over any tissue, such as the digestive system. For example, the skeletal system and the muscular system constitute the locomotor system.

- **The union of all systems gives rise to an organism**. An organism is a complete living being. All systems of the organism have to work together so that the living being is healthy.



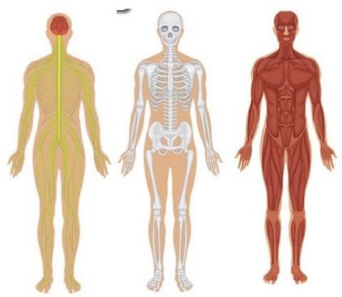
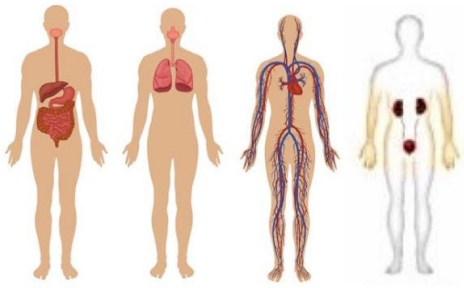
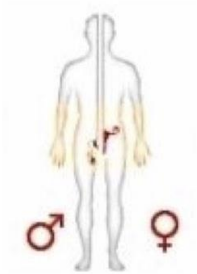
SYSTEMS PERFORM FUNCTIONS

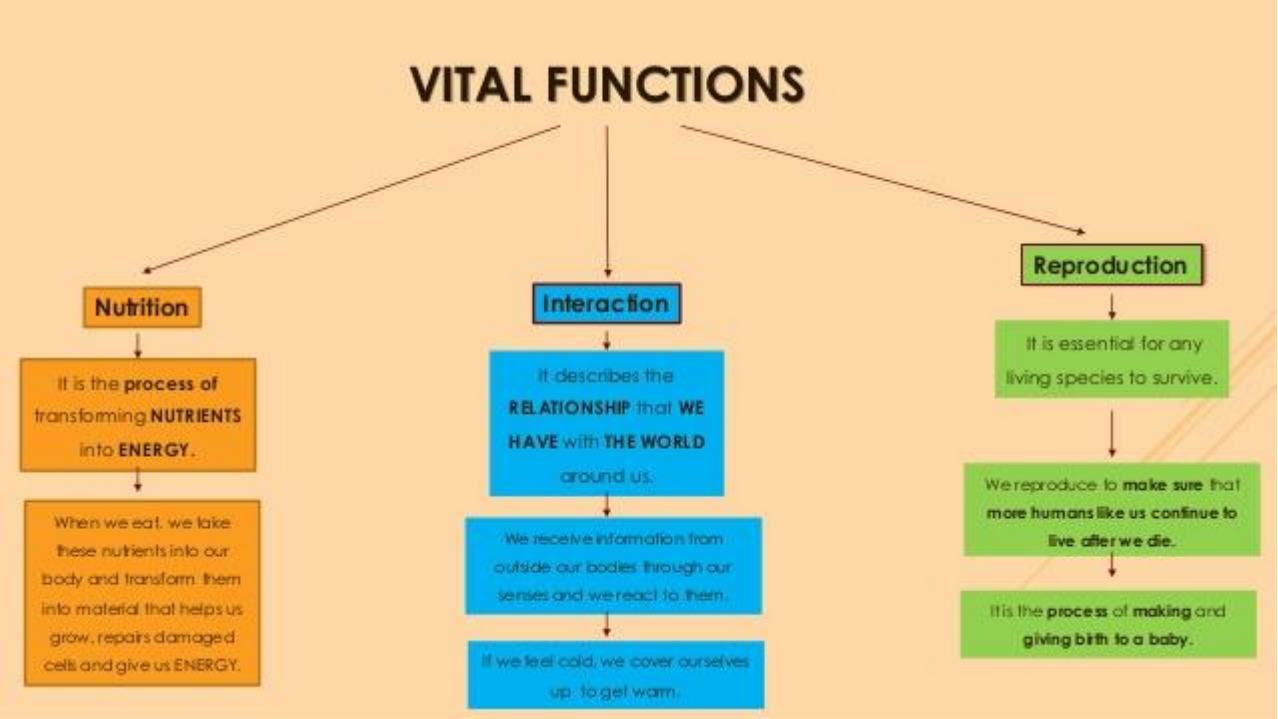
Multicellular living beings possess systems that allow us to perform the 3 vital functions:

In the **Nutrition Function**, the digestive system, the respiratory system, the circulatory system, and the excretory system are involved.

In the **Interaction Function**, the organs of the senses that collect information from the outside intervene; the nervous system, which receives information from the sense organs, stores that information and produces a response; The locomotor system carries out that response.

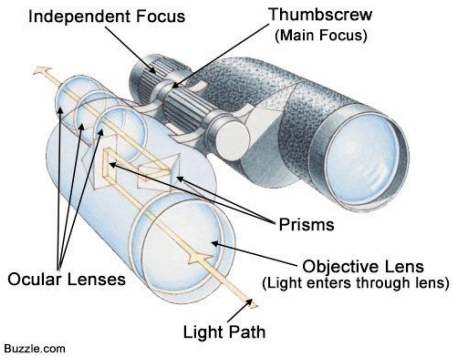
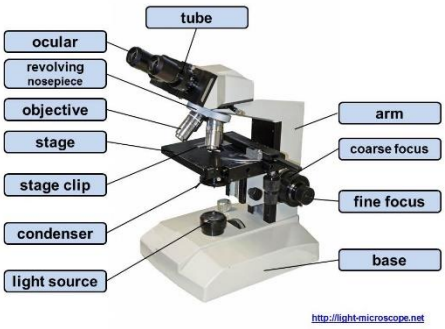
The male reproductive system and the female reproductive system are involved in the **Reproductive Function**.

VITAL FUNCTIONS		
INTERACTION	NUTRITION	REPRODUCTION
		



TECHNOLOGICAL MEANS FOR THE STUDY OF LIVING BEINGS

Depending on the characteristics of the living being that we wish to observe, we must use certain resources.

First, we must look at the size of the living being. Some are visible to the naked eye and direct observation suffices. For others, we must choose the most appropriate instrument among the following:

- With **binoculars** we will see living beings that are far away.
- With the **magnifying glass** we will appreciate the details of small living beings.
- The **microscope** will allow us to see the tiny organisms, invisible to the human eye. Different types of microscopes include:
  - **Optical**: It uses a combination of lenses which enlarge the images of small objects. The optical microscopes are older but are simple to use and manufacture.
  - **Digital**: It has a camera and is connected to a screen. A digital microscope does not have an eyepiece to see objects directly.
  - **Electronic**: It uses electrons to illuminate the smallest particles and observe their characteristics. They are the most powerful type of microscope.