

# Cells, tissues, organs and systems

## Life Processes

### What must a 'thing' be able to do in order for it to be considered a 'living thing' or organism?

It must be able to carry out the following life processes:

- Move
- Grow
- Need nutrition
- Reproduce
- Respire
- Sense things
- Excrete waste

### What is movement and sensitivity?

- Movement:  
All living things can either move from place to place or move parts of the selves.
- Sensitivity:  
Organisms sense and react to the things around them.

### What is nutrition and respiration?

- Nutrition:  
Living things require various substances to help them carry out other life processes.
- Respiration:  
Living things use a respiration to release energy for them to use.

### What is reproduction and growth?

- Reproduction:  
Organisms can make more living things like themselves.
- Growth:  
Living things can increase in size.

### What is excretion?

Organisms produce waste materials. When they get rid of these materials, we say that they excrete them.

## Tissues

### What is the function of the heart and why is it so important?

Its function is to pump blood around the body. The blood carries oxygen and nutrients (from food) for all the different parts of the body to use. Damage to it often causes death.

### What is a tissue?

Fat and muscle in organs and in your body are known as tissues. Organs are made up of different tissues, with each type having a specific function.

### Give examples of plant tissue and their function.

- Root hair tissue helps to take the water out of the soil quickly.
- Xylem tissue carries water up from the roots, through the stem of the plant and into the rest of the plant.



B | a human heart

## Organs

### What are organs?

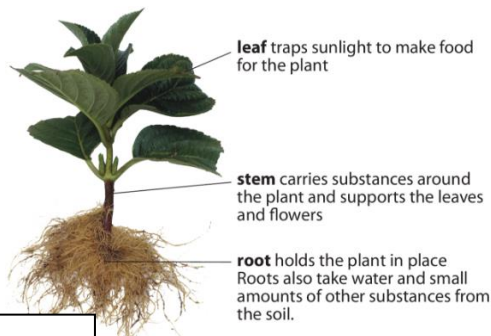
Organs are parts of the body with very important functions, e.g. the brain controls the whole body. The heart, stomach, intestines, lungs and liver are also examples of organs.

### What is photosynthesis?

Plants use photosynthesis to make their own food. This process occurs in the leaves and needs carbon dioxide, water and light. The food made can then be stored in storage organs.

### Give examples of three plant organs and explain their function.

- Leaf:  
Traps sunlight to make food for the plant.
- Stem:  
The stem carries substances around the plant and supports the leaves and flowers.
- Root:  
Roots hold the plant in place. Roots also take water and small amounts of other substances from the soil.



## Microscopes

### What is the general method for using a microscope?

- Use the smallest objective lens (lowest magnification).
- Place slide (containing the specimen) you want to view) under the clips on the stage.
- Adjust the light and look through the eyepiece lens.
- To get a bigger image use the next objective lens.
- Use the fine focusing wheel to get the image in focus.

### Why do doctors and scientists use microscopes?

Some tests involve taking a small piece of tissue (biopsy) from an organ and looking at it under a microscope to see what the illness is at the cellular level.

### How do we calculate the total magnification?

Both lenses in a microscope magnify the image, the total magnification:  
Magnification of eyepiece lens x magnification of objective lens

## 7Ad – Cells

### Who was the first person to study tissues with a microscope?

Robert Hooke was the first person to study tissues with a microscope in 1665. He examined a bark of cork oak and saw little box shapes which he named cells.

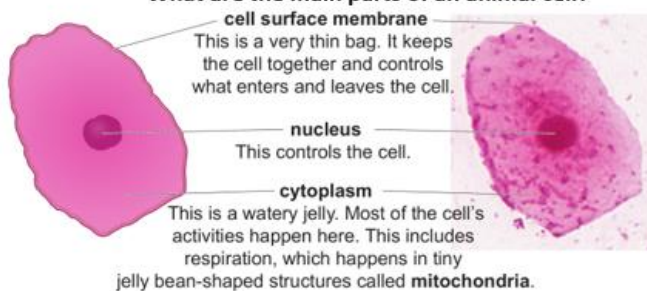
### What are cells?

Cells are the basic units from which all tissues and all living things are made. A tissue is a group of cells of the same type working together.

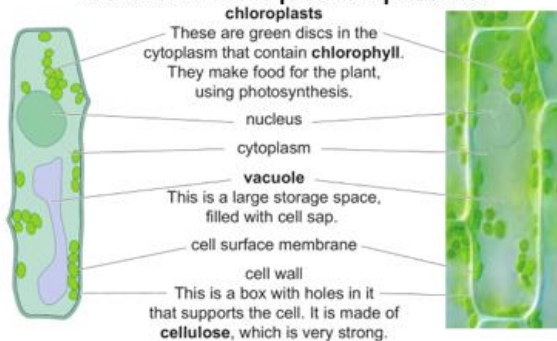
### What are specialised cells?

All animal cells have the same basic parts, but cells from different tissues have different sizes, shapes and functions to help them do their jobs (specialised to do their job).

### What are the main parts of an animal cell?



### What are the main parts of a plant cell?



## 7Aei – Organ systems

### What is an organ system?

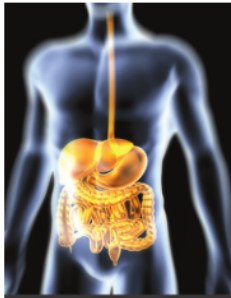
An organ system is a group of organs that work together to carry out an important body function. Examples of organ systems in humans include the locomotor (muscles and bones), digestive, urinary, breathing and nervous system.

### What is the function of the circulatory system?

The blood vessels that are spread all around the body work with the heart to form an organ system called the circulatory system.

### What is the function of the urinary and the nervous system?

- The urinary system gets rid of waste materials produced by the body.
- The nervous system allows you to sense things.



**C** | The digestive system breaks down food and takes nutrients from it into the blood.

### Give an example of an organ system and its function in plants.

The water transport system takes water from the ground up to the leaves. Water is always flowing through this organ system because leaves constantly lose water (by evaporation).

**Blood vessel:** A tube that carries blood around the body.

**Brain:** The organ that controls the body. It is part of the nervous system.

**Cell surface membrane:** The membrane that controls what goes into and out of a cell.

**Cell wall:** The tough wall around all plant cells. Helps to support the cell.

**Cell:** A basic unit of all life. All organisms are made up of cells.

**Cellulose:** A strong plant material used to make cell walls.

**Chloroplast:** A green disc containing chlorophyll. Found in plant cells. Where the plant makes food, using photosynthesis.

**Circulatory system:** An organ system that carries oxygen and food around the body.

**Coarse focussing wheel:** The wheel on a microscope that moves parts of the microscope a large amount to get the image into focus.

**Conclusion:** An explanation of how or why something happens, which is backed up by evidence. You use evidence to 'draw' a conclusion.

**Conventions:** A standard way of doing something or representing something, so that everyone understands what is meant.

**Coverslip:** A thin piece of glass used to hold a specimen in place on a slide. It also keeps the specimen flat and stops it drying out.

**Cytoplasm:** The watery jelly inside a cell where the cell's activities take place.

**Diagnosis:** A conclusion made by a doctor about what is wrong with someone who is ill.

**Digestive system:** An organ system that breaks down food.

**Evaporation:** When a liquid changes into a gas.

**Evidence:** Data used to support an idea or show that it is wrong.

**Excretion:** To get rid of waste. All organisms excrete.

**Fine Focussing wheel:** The wheel on a microscope that moves parts of the microscope a small amount to bring the image into focus.

**Function:** The job or role something has.

**Grow:** To increase in size. All organisms grow.

**Heart:** The organ that pumps blood.

**Life process:** A process that something does in order for it to be alive. The life processes that happen in all living things are movement, reproduction, sensitivity, growth, respiration, excretion and a need for nutrition.

**Magnification:** How much bigger something appears compared with its actual size.

**Medicine:** A drug that helps the body to ease the symptoms of a disease or cure the disease.

**Mitochondria:** Small structures in the cytoplasm of all cells, where respiration occurs.

**Move:** To go from place to place. All organisms can move themselves or parts of themselves.

**Nervous system:** An organ system that contains your brain, spinal cord and all your nerves and carries signals around the body.

**Nucleus:** The control centre of a cell.

**Nutrition:** Substances that help organisms respire and grow. All organisms need nutrition.

**Objective lens:** The part of the microscope that is closest to the specimen.

**Organ system:** A collection of organs working together to do an important job.

**Organ transplant:** Taking an organ from one person to put into another.

**Organ:** A large part of a plant or animal that does an important job. Organs are made up of different tissues working together.

**Organism:** A living thing.

**Photosynthesis:** A process that plants use to make their own food. It needs light to work.

**Prescriptions:** An order for some medicines that a doctor writes.

**Reproduce:** When organisms reproduce, they make more organisms like themselves.

**Respiration:** A process in which energy is released from a substance so it can be used by an organism. All organisms respire.

**Root hair tissue:** Tissue that helps roots, get water out of the ground quickly. This tissue is made out of root hair cells.

**Sense:** To detect things in the surroundings. All organisms can sense certain changes in their surroundings.

**Slide:** A glass sheet that a specimen is put on.

**Specialised:** If something has features, that allow it to do a particular job it is said to be specialised.

**Specimen:** The object you look at using a microscope.

**Stage:** Part of a microscope. You put a slide on it.

**Stain:** A dye used to colour parts of a cell to make them easier to see.

**Storage organ:** An organ used by plants to store materials.

**Symptom:** Changes in the way the body works, which help a doctor to work out what is wrong with you.

**Tissue:** A part of an organ that does an important job. Each tissue is made up of a group of the same type of cells all doing the same job.

**Urinary system:** An organ system that cleans the blood and removes wastes in urine.

**Vacuole:** Storage space in cells.

**Xylem tissue:** Tissue that carries water in plants. It is found in stems and roots and is made of xylem cells.

