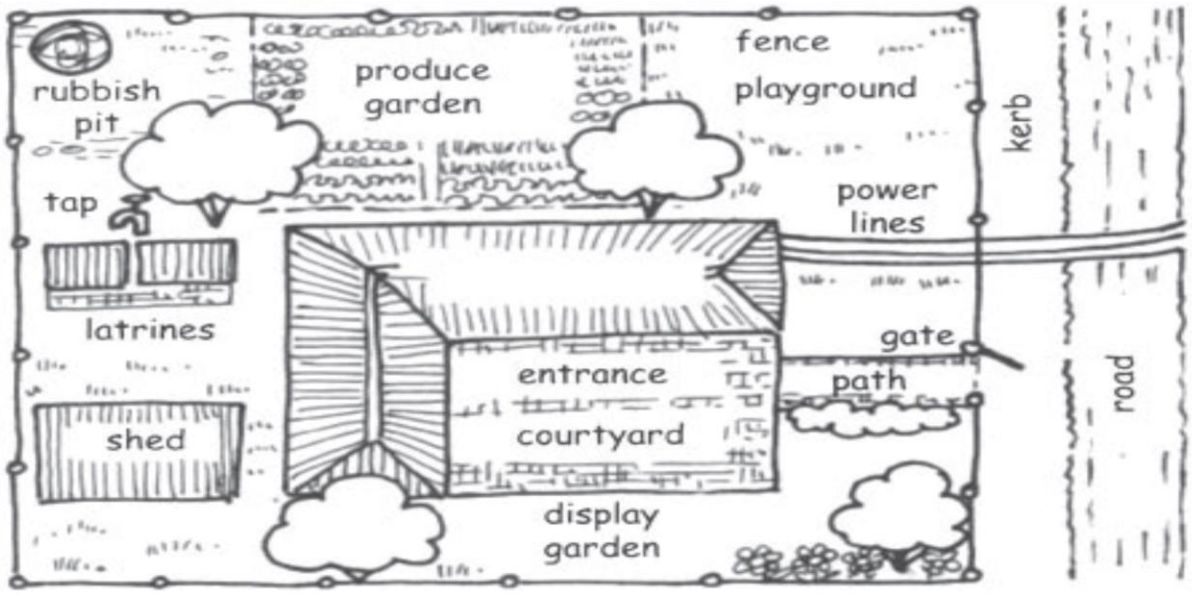
S.1 BIOLOGY

GROUPS OF CELLS (LEVELS OF ORGANISATION)

- People in a group can perform more complex tasks than one person alone.
- Consider what happens in a school system *Just like a body*.
- *a school carries out different activities.*
- *In order for a school to function properly, there have to be lots of different types of people performing different functions.*

SCHOOL MAP



QUESTION

- *List 8 different types of people and their roles that are needed for proper functioning of a school.*

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Like people, similar cells in our bodies are organized into groups to make them work, **more effectively.**

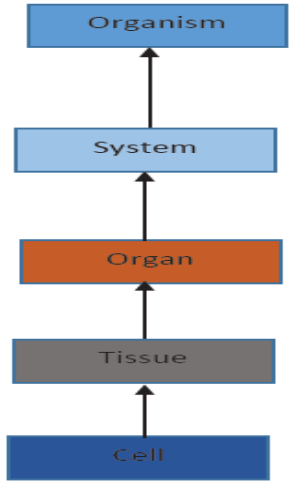
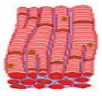
LEVELS OF ORGANISATION IN ORGANISMS

This is the building plan of an organism's body from the simplest to a more complex structure called an organism. The starting or smallest unit of life is the cell. The organization is as follows:

Cell ⟶ tissue ⟶ organ ⟶ organ system⟶organism.

- Cell organization at various levels carries out specific functions and key life processes in the body. This ensures efficient functioning of the body for the survival of the organism. For example, the reproductive cells (sperm and egg) fuse to develop into an organism that has tissues, organs and systems.

LEVELS OF ORGANISATION IN ORGANISMS

Level of cell Organisation	Description	Example
	*A group of **different organ systems** form an **organism.***	 Human
	*A group of **different organs** form an **organ system** to perform a particular function e.g. circulatory system.*	 Circulatory system
	*A group of **different tissues** form an **organ** to perform a particular function.*	 The heart  Muscle tissue
	*A group of **similar cells** performing a particular function is a **tissue***	 Muscle cells
	The basic unit of a living thing	

LEVELS OF ORGANISATION IN ORGANISMS

Level of organization	Definition	Examples and functions
1. Cell	Smallest basic unit of life	Red blood cell, root hair cell, cheek cells.
2. Tissue	A tissue is a group of similar cells linked together to perform a particular function. A tissue may be made up of single type of cell or may comprise of different types of cells.	i) Blood tissue made up of red blood cells, white blood cells and platelets. Blood transports materials in the body and offers protection. ii) Nervous tissue made up of nerve cells. It transmits impulses in the body. iii) Muscular tissue made up of muscle cells which cause movement of body parts iv) Photosynthetic tissue made of palisade cells for photosynthesis.
3. Organ	An organ is a collection of tissues specialized in carrying out a specific function. An organ is made up of different types of cells grouped together as a unit	i) Eye for sight ii) Heart for pumping blood iii) Ear for hearing iv) Kidney for purifying blood v) Leaves for photosynthesis vi) Roots for absorbing water and mineral salts
4. Organ system	An organ system is a collection of different organs performing a specific function(s)	i) Nervous system (Brain, Spinal cord and nerves), ii) Circulatory system (Heart, Lungs and Blood vessels), iii) Digestive system (gullet, stomach, small intestines). iv) Shoot system (leaves stems. flowers) v) Root system (roots)
5. Organism	This is a collection of organ systems working together efficiently as a unit.	man, cow, banana plant

Activity 2.2a: Identifying the tissues in your arm

- What is under the skin in your arm?
- Make a sketch of your arm.
- Try to name the parts of the arm.
- Discuss with your neighbour the use of each part.

Compare your drawing with the figure below and suggest the importance of each tissue labelled.

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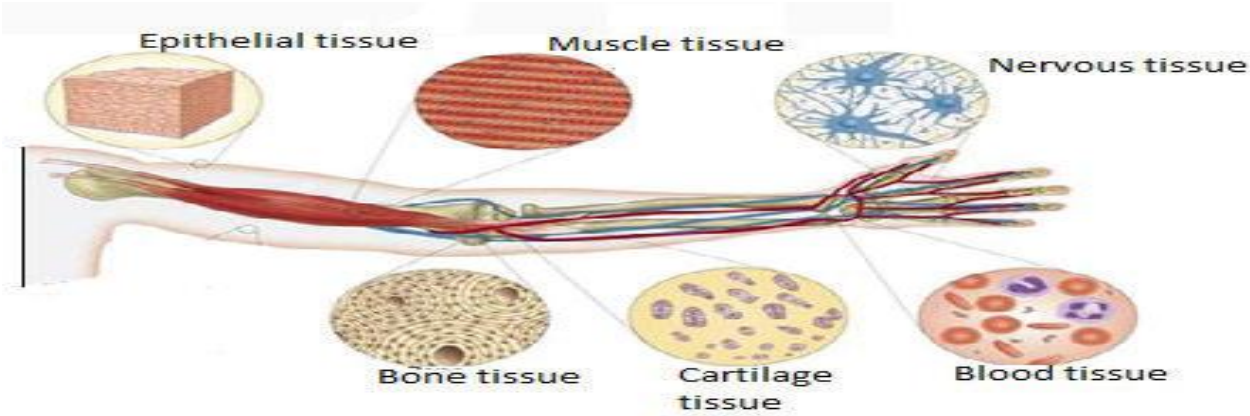
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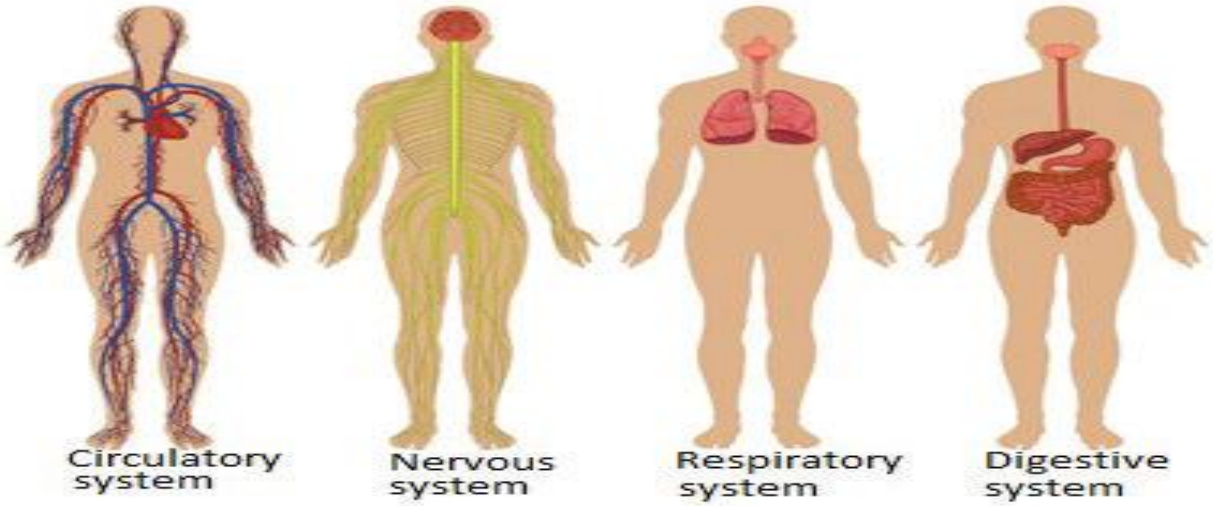
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Identify the organs in the systems shown in each figure and state the function of each.



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Following is a list of some functions of systems in your body. Match the functions to the corresponding system.

Transports materials around the body		Lymphatic system
Breaks down food substances for absorption		Circulatory system
Exchanges gases between the body and the surrounding		Urinary system
Produces gametes		Digestive system
Filters waste from the blood		Respiratory system
Defends the body against disease		Reproductive system

Tissues, Organs and Systems in Plants

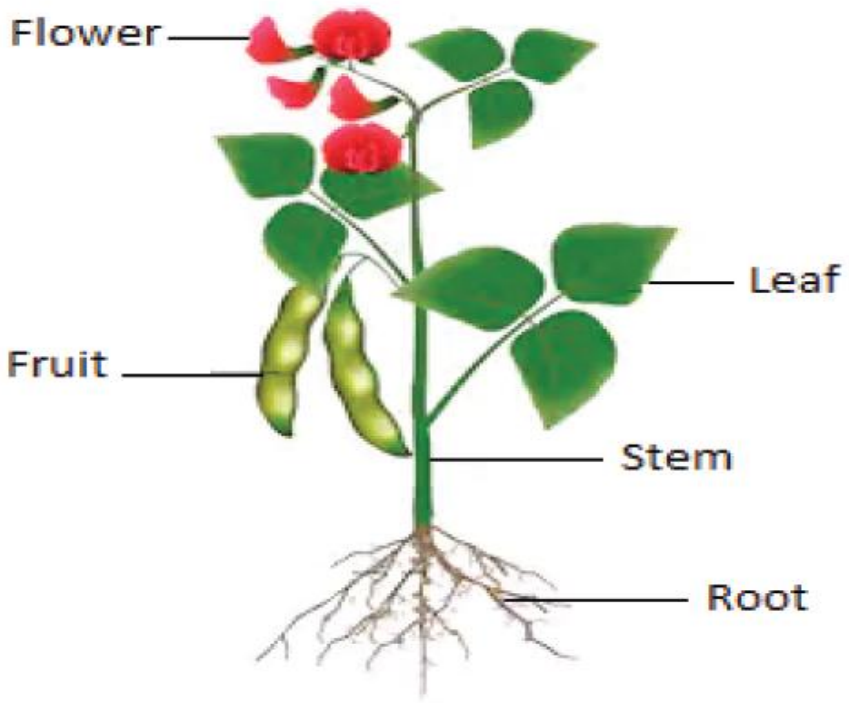
- A plant, like an animal is composed of tissues.

Examples of plant tissues and their functions

Tissue	Function
Vascular tissues (forming vessels) i) xylem	Transports water and minerals
ii) phloem	Transports food materials

Tissues, Organs and Systems in Plants

- Since plants have tissues then they too have organs. Have a look at the picture below.



Tissues, Organs and Systems in Plants

The organs in plants are: stem, leaf, root, flower and fruit.

- i) Several leaves form a food making system for the plant.
- ii) Flowers make up the reproductive system of a flowering plant.
- iii) After fertilization, the flower changes into a fruit which is a

food storage organ. The fruit bears seed that can grow into

new plants.

Tissues, Organs and Systems in Plants

- iv) The stem is the organ consisting of vessels which transport water and mineral salts from the ground to the upper parts of the plant. The stem also transports food from the leaves to other parts of the plant.
- *v)* The root is an organ for absorption of water and mineral salts from the soil into the plant. Some roots e.g. the carrot and sweet potato store food nutrients.
- There are two systems in plants i.e. the **root** and **shoot** systems.

Specialized Cells

- Most of the cells in the body of an organism carryout general functions like respiration, growth and excretion.
- However, some cells are modified in structure to perform specific functions.

Activity 2.2b: Relating the structure of specialised cells to their function

- **Key questions**
- 1. What are the specialized cells in your body, and in a plant?
- 2. How are they adapted to their functions?

What you need

i) Notebook

ii) Pencil

iii) Four sets of cards:

- a. The first set is of pictures of five types of specialised cells
- b. The second set has the special features of each specializedcell
- c. The third set gives the functions of each specialised cell
- d. The fourth set has the names of each of the specialised cells

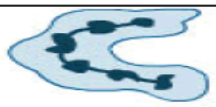
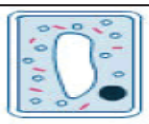
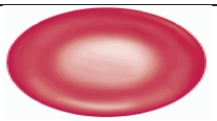
The Four sets of cards:

Set one: Specialised cells	**Set two: Feature/ structure of a specialized cell.** - Has a tail - Can change its shape - Has a regular shape with many chloroplasts - It is narrow and long providing a large surface area - Flat biconcave shape and no nucleus
Set three: Functions of a particular specialized cell. - **To** trap much sunlight to enable the cell carryout Photosynthesis. - **To** penetrate soil and absorb water and mineral salts. **- To** provide a large surface area to absorb and carry oxygen from the lungs to respiring cells. - **To** engulf foreign particles and destroy them in order to defend the body. - **To** propel/swim to the egg cell and fertilise it.	**Set four: Name of the cell** - Sperm cell - Palisade cell - Red blood cell - Root hair cell - White blood cell

What to do

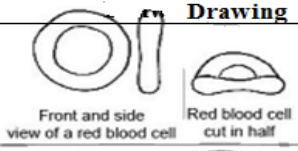
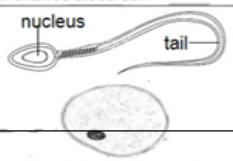
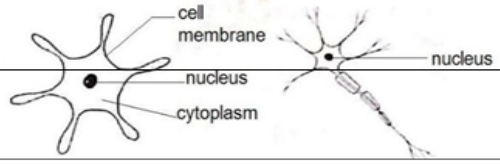
- 1. In pairs, study the cards carefully.
- 2. Observe each specialized cell, match it with the correct statement on the card of the specialised feature and the card with the particular function.
- 3. Select from the list of names, the one you think matches a particular specialised cell.
- 4. Record your work in the table below. Present your work to the rest of the class.

Record your work in the table below

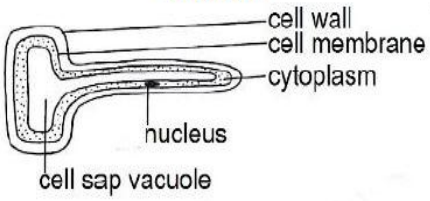
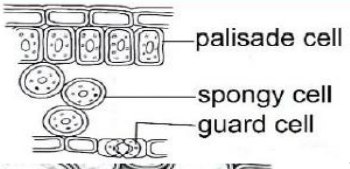
Specialised cell	Adaptation		Name
	Feature/Structure	Function	
			
			
			
			
			

Summary of specialized animal cells.

These are individual cells modified to perform a perticular function

Specialized animal cell	Drawing	Function
Red blood cells		These transport oxygen in our bodies.
Sperm cells		These fuses with the ovum to form a zygote during fertilization
ovum or egg cell		This is the female reproductive cell that fuses with a sperm to form a zygote.
White blood cells		This defends the body against infections and diseases
Nerve cells		They transmit impulses.

Summary of specialized plant cells

Specialized plant cell	Structure	Function
Root hair cells		They are found in plant roots They absorb water and mineral salts from the soil
Palisade cells		These are found in leaves of green plants. They carry out the process of photosynthesis
Guard cells		They control the opening and closing of stomata in leaves
Parenchyma cells		Support in herbaceous plants Storage of starch.

What you should know

• A cell is the basic unit where most life processes take place.

• All living organisms are made up of cells.

• Cells have different shapes, sizes and structures to carryout specialized functions.

• In multicellular organisms, cells combine to form tissues that join together to form organs which group to form organ/body systems.

END