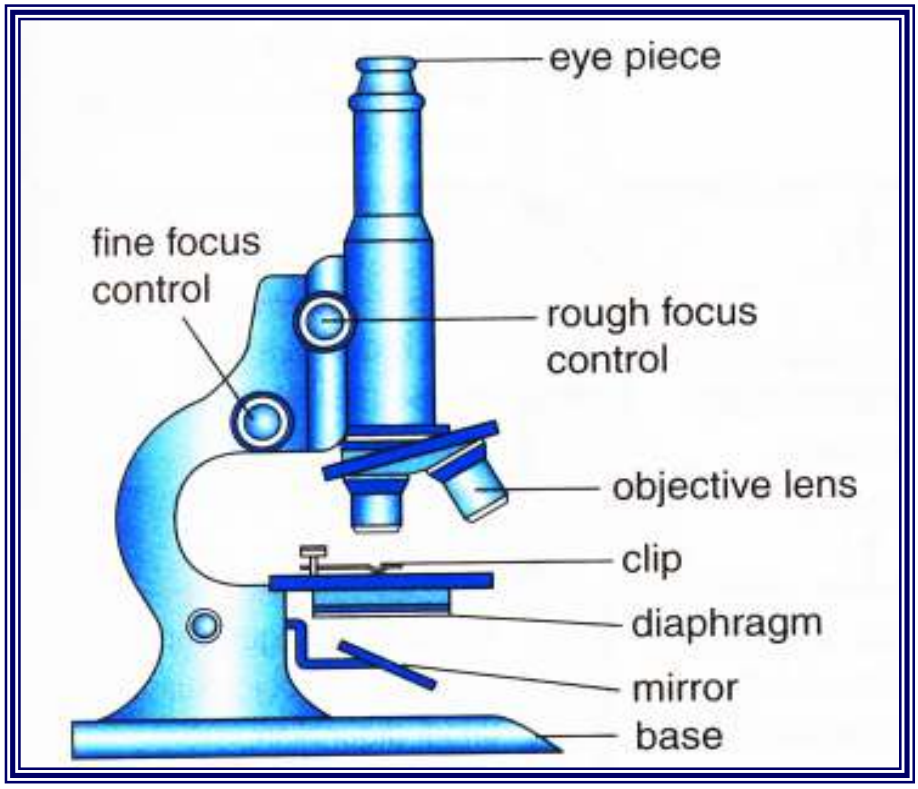
CHAPTER 2 : CELL AS THE BASIC UNIT OF LIFE

MICROSCOPE

- An instrument that magnifies minute objects so they can be seen easily.
- It is one of the most important tools of science.
- Physicians and biologists use microscopes to examine bacteria and blood cells.



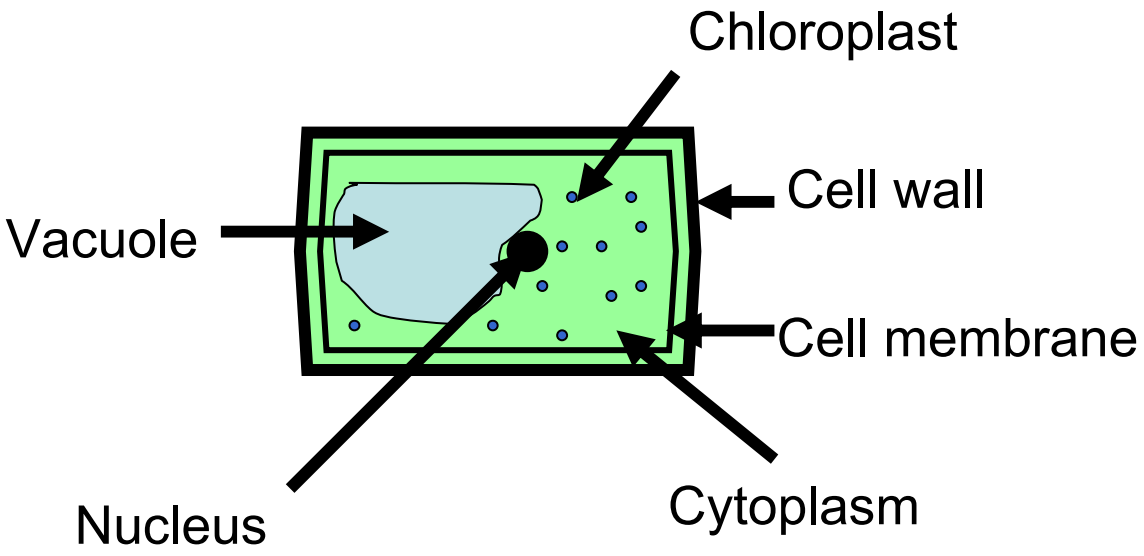
There are four basic kinds of microscopes :

- ☑ Optical or light microscope
- ☑ Electron microscope
- ☑ Scanning probe microscope
- ☑ Ion microscope

Parts of microscope :

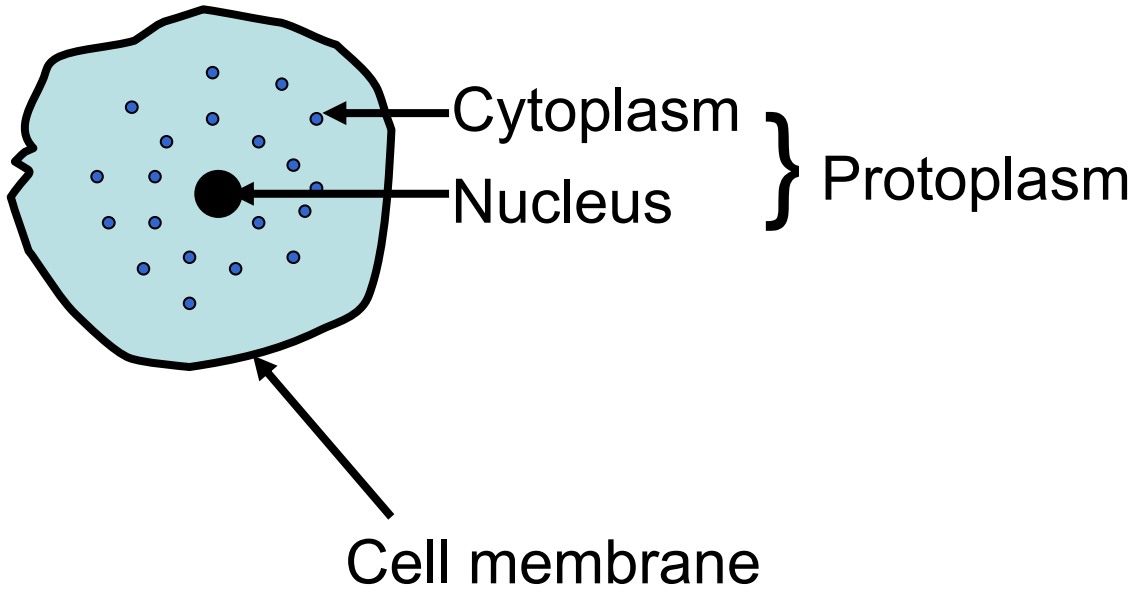
- Eyepiece
  Magnify the specimen by 10x.
- Rough focus knob
  Change the position of the objective lens when focusing with low-powered objective lens.
- Fine focus knob
  Change the position of the objective lens slightly for fine focusing. Used with high-powered objective lens.
- Objective lens
  Magnify the size of a specimen by 4x, 10x or 40x.
- Stage
  Place the glass slide.
- Clip
  Hold the slide on the stage.
- Diaphragm
  Control the amount of light entering objective lens.
- Mirror
  Reflects light up through an opening un the stage to illuminate the specimen.
- Base
  Stabilize the microscope.

PLANT CELL



Structure of cell	Function
Nucleus	Control all activities of the cell
Vacuoles	Stores salt and sugar solutions, hold waste substances
Chromosomes	Determines how an organism behaves (genetic information)
Cytoplasm	A place where all chemical reactions take place
Cell membrane	Control the movement of substances into or out of the cell
Cell wall	Support and gives the cell a regular shape
Chloroplasts	A place where plants make food by photosynthesis. Contain chlorophyll which is used to trap sunlight for photosynthesis.

ANIMAL CELL



Structure of the cell	Function
Nucleus	Controls all the activities of the cell
Cytoplasm	A place where all chemical reaction take place. Stores dissolves material
Cell membrane	Controls the movement of material in and out of the cell

Comparing Animal Cell and Plant Cell

Similarities

Both have **nucleus**, **cytoplasm** and **cell membrane**.

Differences between plant cells and animal cells

Plant cell		**Animal cell**
Regular shape	shape	Irregular shape
With chloroplasts	chloroplasts	Without chloroplasts
With a cell wall (cellulose)	cell wall	Without cell wall
Large vacuoles	vacuoles	Has no vacuole except in unicellular

Review 1 : <u>Animal Cell and Plant Cell</u>

1. What is the basic unit of living things?

   _____

2. What makes up the protoplasm of a cell?

   _____

3. What can be found in plant cells but not in animal cells?

   _____

4. State the substances that builds up the cell wall of plants cells.

   _____

5. Draw an animal cell and plant cell.

Animal cell	Plant cell

UNICELLULAR AND MULTICELLULAR ORGANISMS

Made up of **one cell** only. **"Uni"** means **one.**

A **simple** organism

Mostly are aquatic living things (in ponds, drains and the sea).

Carry out life processes inside the cell.

UNICELLULAR ORGANISM

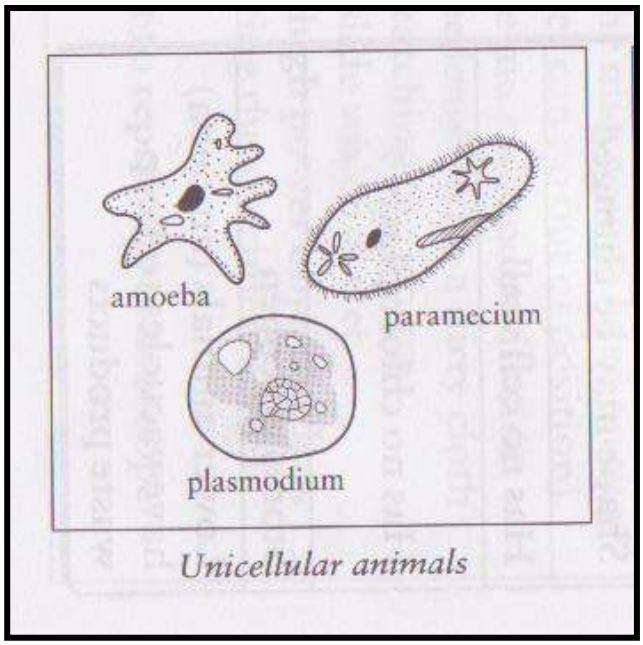
Do not have circulatory system.

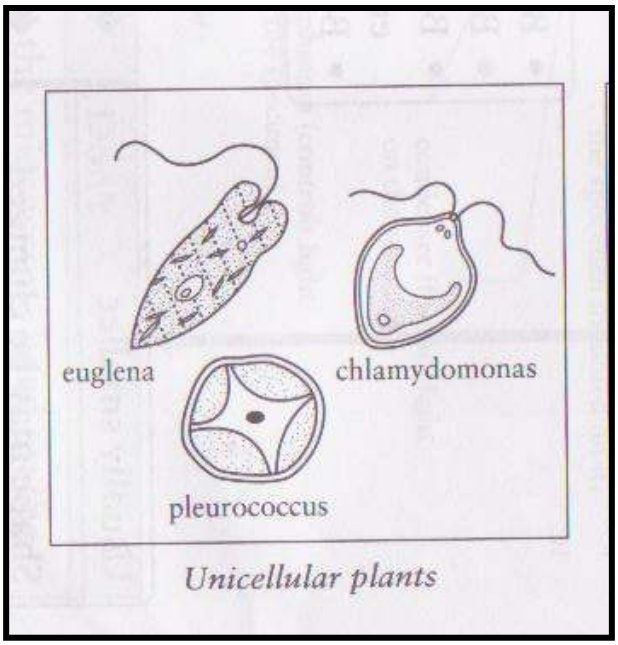
Absorbs nutrients, expel wastes and exchange gas with their environment.

Also known as microorganism (microbe)

Examples : *Paramecium*, *Amoeba*, yeast, Pleurococcus, Chlamydomonas.

Asexual reproduction (Fission)





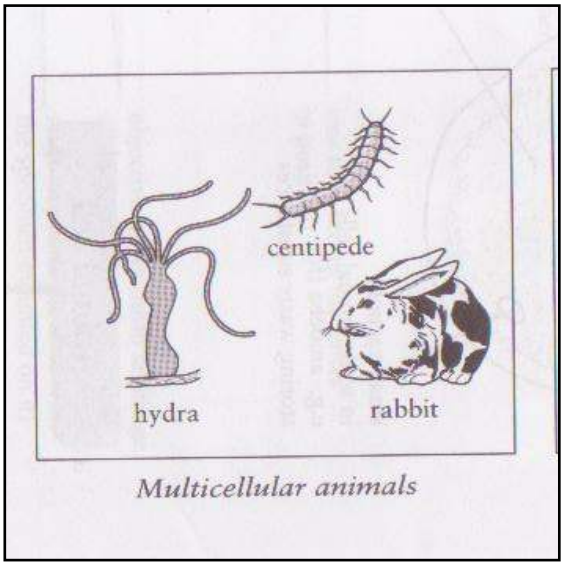
Made up of **many cell**.
"Multi" means **many**.

MULTICELLULAR ORGANISM

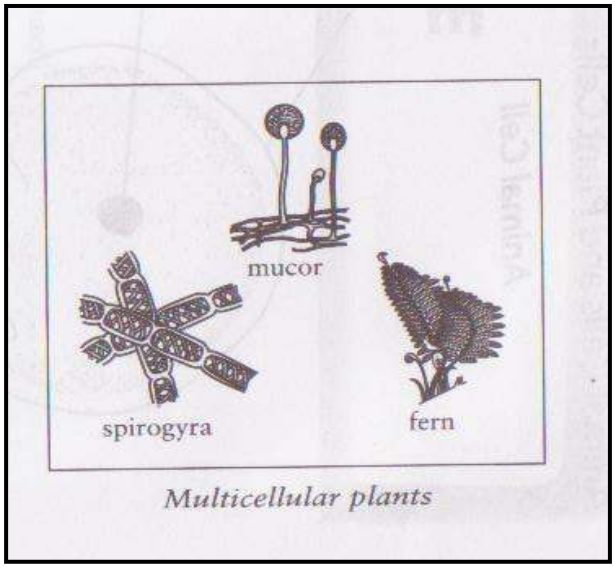
Examples :
Human beings, birds, fish *Hydra*, Spirogyra, moss, earthworm, *Mucor.*

More complex than unicellular organism

Life process are more complex. Various types of cell work together to perform a specific task



Multicellular animals



Multicellular plants

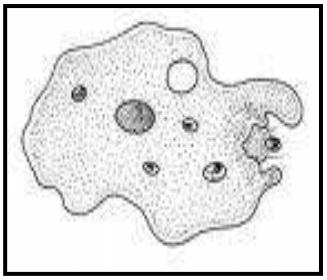
Review 2 : Unicellular Cell and Multicellular Cell

1. What is unicellular organism?
   _____
2. What is multicellular organism?
   _____
3. Give two examples of unicellular organism.
   (a) _____
   (b) _____
4. Give two example of multicellular organism.
   (a) _____
   (b) _____
5. Why is human being classified as multicellular organism?
   _____
6. Identify unicellular organisms and multicellular organisms given below.

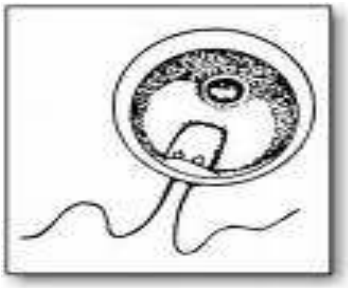
Euglena	Paramecium	Spirogyra	Chlamydomonas
Hydra	Mosquito	Amoeba	Moss
Scorpion	Cockroach		

Unicellular Organisms	**Multiicellular Organisms**

7. Name the organism below.



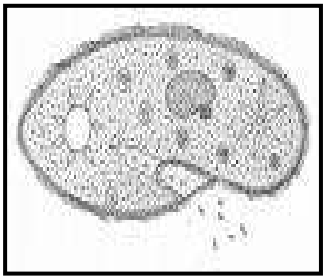
(a) _____



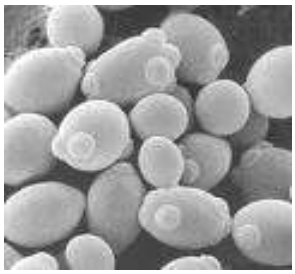
(b) _____

(c) _____

(d) _____



(e) _____



(f) _____

ORGANISATION OF CELL IN THE HUMAN BODY

Cell organization is the grouping of simple cell into more complex structures.

CELL → TISSUE → ORGAN → SYSTEM → ORGANISM

Basic unit of life

The smallest structures capable of basic life processes

CELL

Examples :
- ☑ Epithelium cell
- ☑ Red blood cell
- ☑ White blood cell
- ☑ Cardiac muscle cell
- ☑ Bone cell
- ☑ Nerve cell
- ☑ Reproductive cell

☑ **A group of similar cells that work together to perform a particular function.**

TISSUE

☑ Four main types :
- Epithelial tissue
- Muscle tissue
- Connective tissue
- Nervous tissue

ORGAN

☑ An organ consists of two or more kinds of tissues joined into one structure that has a certain task.

☑ Examples :
- The heart
- The kidney
- The lungs
- The stomach
- The liver
- The brain

SYSTEM

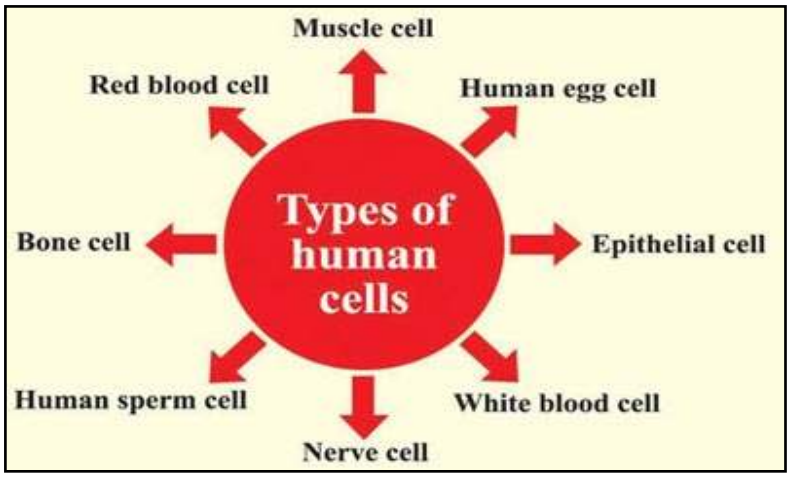
☑ Groups of organs form organ systems

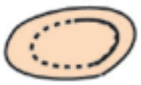
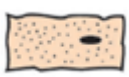
☑ Each organ system carries out a major activity in the body.

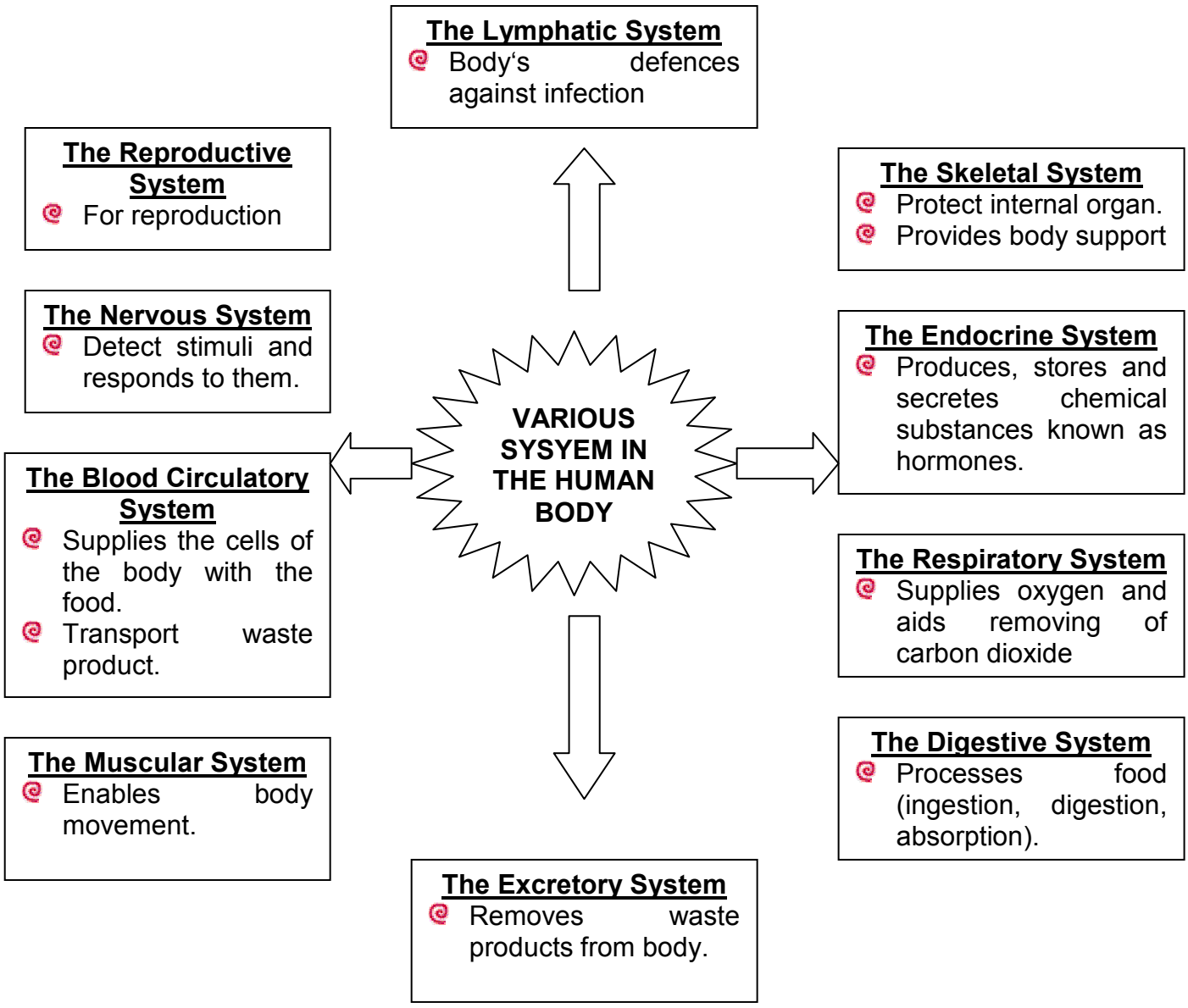
☑ Examples :
- Reproductive system
- Blood circulatory system
- Digestive system
- Excretory system
- Respiratory system
- Muscular system

ORGANISM

All system in the body function in a coordinated manner to form a multicellular organism.



Type of human cell	**Structure**	**Respective function**
Red blood cell		Transports vital food and oxygen to all parts of the body.
Nerve cell		Carries messages in the form of electrical impulses around the body.
White blood cell		Protects the body from damage by invaders
Human sperm cell		Takes part in fertilisation to produce young ones.
Bone cell		Form bones to support the body and protect organs.
Human egg cell		If the egg is fertilised it will develop into an embryo.
Epithelial cell		It protects the internal and external parts of the body.
Muscle cell		Contracts and relaxes to move parts of the body.

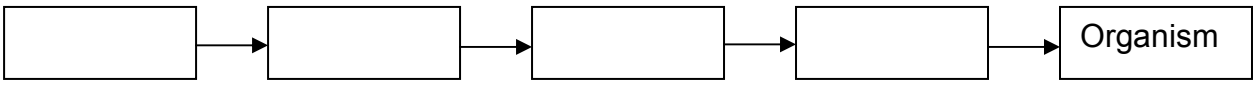

VARIOUS SYSYEM IN THE HUMAN BODY
The Lymphatic System
Body's defences against infection
The Reproductive System
For reproduction
The Skeletal System
Protect internal organ.
Provides body support
The Nervous System
Detect stimuli and responds to them.
The Endocrine System
Produces, stores and secretes chemical substances known as hormones.
The Blood Circulatory System
Supplies the cells of the body with the food.
Transport waste product.
The Respiratory System
Supplies oxygen and aids removing of carbon dioxide
The Muscular System
Enables body movement.
The Digestive System
Processes food (ingestion, digestion, absorption).
The Excretory System
Removes waste products from body.

Review 3 : Organisation of Cell

1. State the following structures as ‘cell’, ‘tissue’, ‘organ’ or ‘system’.

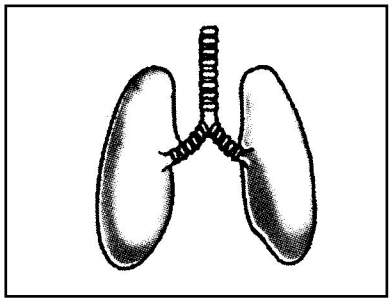
   (a) Sperm - _____
   (b) Stomach - _____
   (c) Ovum - _____
   (d) Brain - _____
   (e) Digestive - _____
   (f) eardrum - _____

2. Complete the cell organization below.



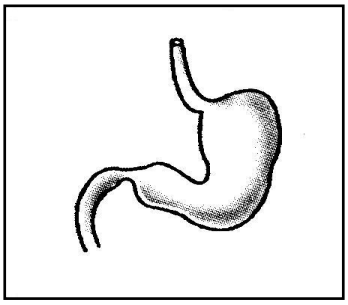
3. State the name of each organ shown below and the system it belongs to .

(a)



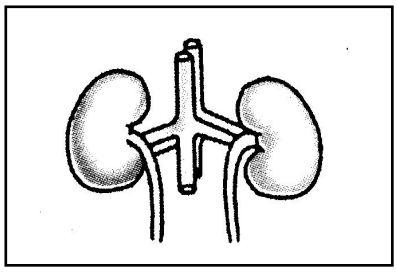
Organ : _____
System : _____

(b)



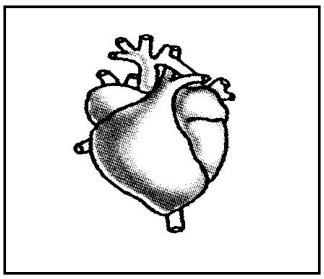
Organ : _____
System : _____

(c)



Organ : _____
System : _____

(d)



Organ : _____
System : _____