

Grade 10 – Science

Unit 6-Structure and Functions of plant and animal cells

Basic structural and functional unit of an organism is the cell. In 1665 a scientist called Robert Hooke observed a part of a cork from his microscope.

Observations:

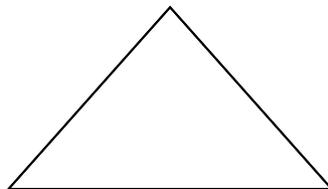
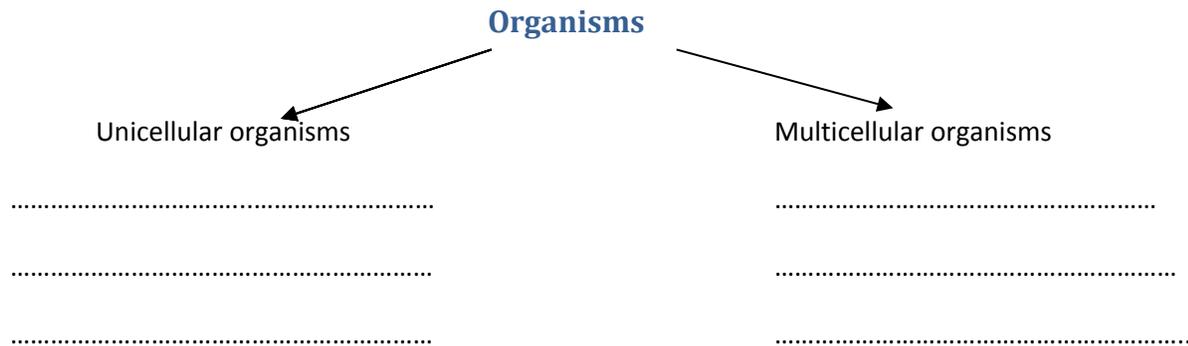
- Structures like chambers in a beehive, was observed.
- They were named as cells.

Cell Theory:

- M.J.Schleiden
- Theodar Schwann
- Radolf Virchow

Ideas about cell that put forward in 1839 is considered as cell theory. Write those ideas in the given space.

-
-
-



Q. Show that the cell is the basic structural and functional unit of the organisms using examples.

As functional unit

-
-
-

As structural unit

-
-
-

Cells are different in

Size

Structure

Function

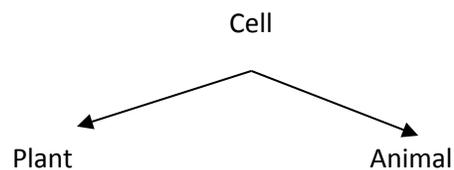
- Normally a cell cannot be observed by a naked eye. But there are cells that can be seen under naked eye.

Eg: Unfertilized hen's egg

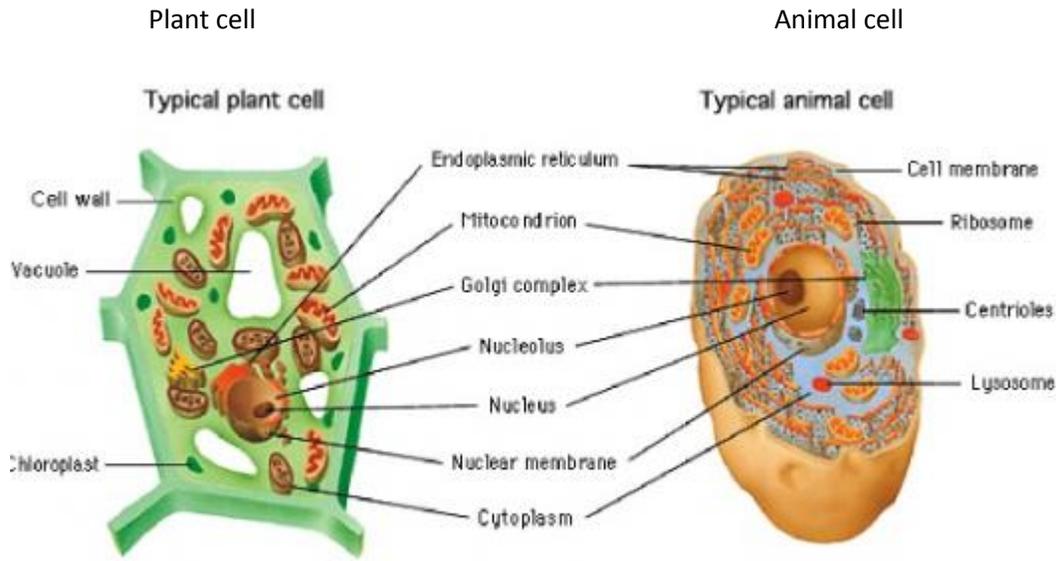
Typical cell

Cell

Draw the Light Microscope view of plant and animal cells.



Electron microscope view of typical plant and animal cell.



Plant cell

Eg : Observation of onion peel after cleaning an onion.

-
-
-

Animal cell

Eg : Observing cheek cells.

-
-
-

Write the similarities and differences in a plant and animal cell.

Similarities

1. Presence of nucleus.
2. Presence of mitochondria.
3. Presence of Golgi body.
4. Presence of ribosome.
5. Presence of cytoplasm.

Plant Cell	Animal Cell

Cell organelle in a cell performs a specific function. So cell shows division of labour.

Organelle	Nature	Function
Cell Wall (Structure that connect cytoplasm of adjacent cells.)	<ul style="list-style-type: none"> • Non Living • Fully permeable • Composed of Cellulase other than that hemicellulose and pectin is present. 	
Cell membrane (plasma membrane)	Living composed of phospholipids and proteins. Semi permeable(selectively permeable_	
Cytoplasm	Living jelly like medium organic and inorganic substances are present.	
Nucleus	Living structure with double membrane. Contain nucleolus and chromatin network (chromosome)	
Mitochondrra	Living Rod shaped, spherical or oval shaped. Structure with double membrane.	
Golgi complex	Living Composed of flat discs and vesicles.	Producing secretory substances and storing them and secreting.
Ribosomes	Living No membrane Found in large number of cells. Found in cytoplasm. Freely and connected with endoplasmic reticulum.	Protein synthesis
Endoplasmic reticulum	Living Consists of flat tubular discs When ribosomes are present they are called endoplasmic reticulum.	

Chloroplast	Double membraneous structure. Contain chlorofil pigment	Photosynthesis.
Vacuole	Unicellular organisms have contractile vacuoles(release water inside the cells out)	

Cell growth and Division

During the growth of a cell,

Immature cell $\xrightarrow{\text{Growth}}$ Mature cell \longrightarrow Cell division

So a cell has the ability to,

1. Grow
2. Divide

Cell division of an eukaryotic cell

1. Nucleus divide first.
2. Cytoplasm divide first

Draw the nature of chromosomes containing genetic materials, before nuclear division.

Number of chromosomes in somatic cells is constant for a species. It is a unique feature of that species.

Eg: Humans – 46 chromosomes – 23 pairs

- A pair of chromosomes which contains some hereditary information are known as homologous chromosomes.
- Here one chromosome is from the mother and other is from father.

Chorosomes	Mother	Father	
Number	23	23	n= haploid
Person	n	n	2n= diploid

Two ways of dividing the nucleus are,

1. Mitosis
2. Meiosis

Mitosis	Meiosis

Importance of mitosis

1. For the development of organism starting from zygote.
 Nucleus of ovum nucleus of sperm
 ↘ ↙
 Zygote
 ↓
 Child
2. Wound healing and cell replacement
3. To produce new organisms during asexual reproduction
 Eg. Yeast

Importance of meiosis

- 1.....
- 2.....

Unit 08 – Characteristics of organisms

1. Write the features that can be used to identify living from non-living

.....

.....

.....

.....

.....

2. Write the instances where living and non-living cannot be separated by clear line

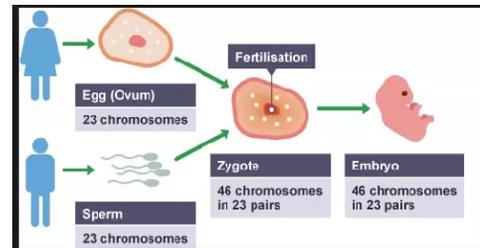
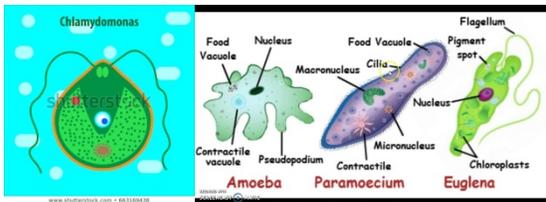
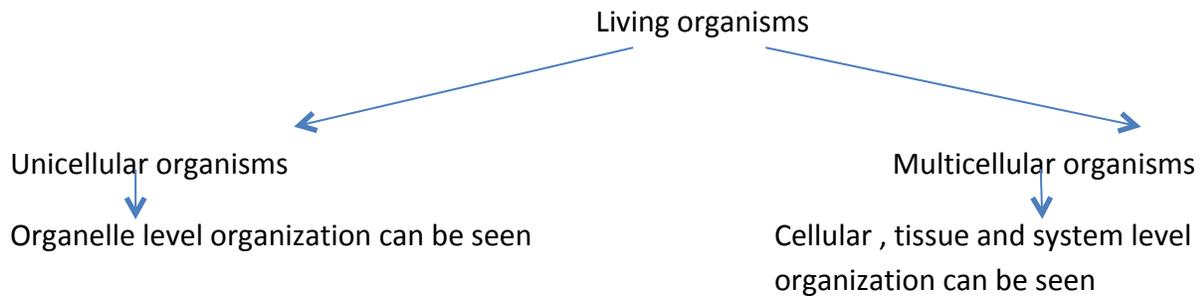
.....

.....

.....

Common characteristics of living organisms

1. Cellular Organization



Draw arrangement of cells in plant body

Draw arrangement of cells in animal body

Smallest structural and functional unit of living being is cell,

Cell- Smallest structural and functional unit



Tissue-group of cells modified to perform a specific function



Organ- collection of tissues



System –collection of organs

2. Nutrition

Nutrition is.....

Why energy is required to the body?

1.....

2,.....

How energy is obtained?.....

Organisms are divided into two groups according to the method of obtaining their nutrition.



Autotrophic organisms

Heterotrophic organisms

.....

.....

.....

.....

.....

.....

Eg.....

Eg.....

1. What is photosynthesis?.....
2. Write equations for photosynthesis
Using words.....
Using chemical formulae.....
3. What is a food web?.....
4. Prepare a food web by your self

3. Respiration

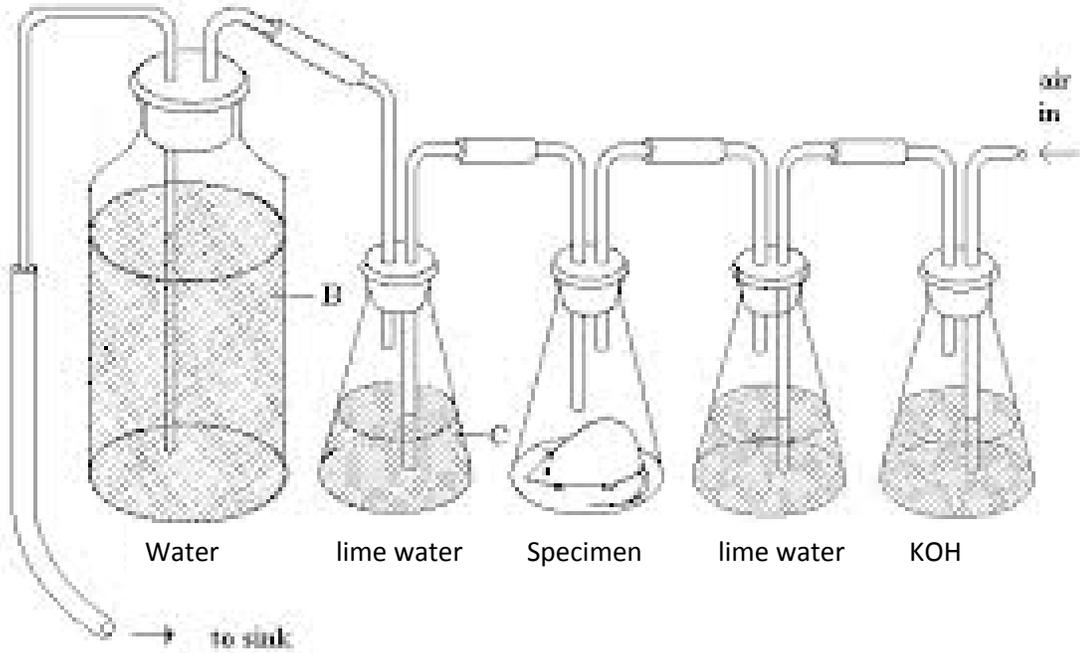
Cellular respiration is.....

.....

Inspiration is.....

Expiration is.....

Experiment to show that CO₂ is released during respiration



Experiment to show the absorption of oxygen during respiration

1. Write observations.....
.....
2. Explain the reason to the difference in above.....
.....
3. Write the conclusion of the experiment.....
.....
4. State two assumptions you made here.
.....

4.Irritability and coordination

- Stimulus is known as.....
.....
- Stimuli are detected by.....
- Name some stimuli.....
.....
- Responses
Eg.....
- Irritability is.....
.....
- Coordination is.....
.....
What is important in coordination?

5. Excretion

- What is meant by metabolic activities?.....
.....
- Define excretion.....
.....
- What are the main excretory materials of organisms.....
.....
- What is the main organ system responsible for nitrogenous excretion of human body?.....
- Mention excretory materials and the responsible organs in plants.....
.....

6. Movement

- Why organisms need movement?.....
.....
- Write the locomotory organs of following organisms

Paramecium-

Amoeba-

Chlamydomonas-

Multicellular organisms-

- Write plant movements as a response to stimuli with examples

.....
.....
.....

7. Reproduction

Define reproduction.....

.....

Compare two types of reproduction

Asexual reproduction	Sexual reproduction

8. Growth and development

Growth	Development

Write 3 steps in growth and development

1.
2.
3.

Draw the diagram of auxanometer

What is auxanometer?.....

What is the importance of using indicator?.....

.....

Write a short note on viruses

What is the living feature found in viruses.....