

Alhamd Educational system

Mcqs:

Review Questions

A. Multiple Choices Questions. (MCQ's).

Encircle the correct answer.

1. The study about the relation between organism and environment is called:
(a) Morphology (b) Anatomy
(c) Ecology (d) Embryology
2. *Brassica campestris* is the scientific name of:
(a) Corn (b) Mustard
(c) Wheat (d) Rice
3. The study of internal structures of living organisms is called:
(a) Anatomy (b) Histology
(c) Physiology (d) Morphology
4. The division of biology deals with the study of Plants is called:
(a) Zoology (b) Botany
(c) Microbiology (d) Genetics
5. The bioelement that has least percentage in the living organisms is:
(a) Nitrogen (b) Calcium
(c) Hydrogen (d) Phosphorous
6. The number of bioelements in living organisms is:
(a) 2 (b) 8
(c) 4 (d) 16
7. Al-Khil was first book of:
(a) Jaber Bin Hayan (b) Abdul Malik Asmai
(c) Bu Ali Sina (d) Ibne Nafees
8. The study of the structure, composition and chemical reactions of substance in living organisms is called:
(a) Biomathematics (b) Biogeography
(c) Biochemistry (d) Biophysics
9. The subject Biology is divided into:
(a) Three main divisions (b) Two main divisions

Cont....

(c) Four main divisions

(d) Five main divisions

10. The example of Prokaryote is:


(a) Paramecium

(b) Amoeba

(c) Volvox

(d) Bacteria

Answers:

1. Ecology
 2. mustard
 3. anatomy
 4. botany
 5. phosphorous
 6. 16
 7. Abdul Malik Asmai
 8. biochemistry
 9. three main division
 10. bacteria
- 

QB: Define the following terms

What we study in biology?

The study of biology helps us in studying the structures, functions and related aspects of living organisms. It also provides information and remedies to human problems regarding health, food, environment etc.

Major Divisions of Biology

Biology can be divided into three major divisions:-

(i) Zoology

This division of biology deals with the study of animals.

(ii) Botany

This division of biology deals with the study of plants.

(iii) Microbiology

This division of biology deals with the study of microorganisms. e.g. viruses, bacteria, etc.

(i) **Morphology**

This branch deals with the study of form and structure of living organisms.

(ii) **Anatomy:**

The study of internal structures is called anatomy.

(iii) **Histology**

The microscopic study of tissues is called histology.

(iv) **Cell biology**

The study of structures and functions of cells and cell organelles is called cell biology. This branch also deals with the study of cell division.

(v) **Physiology**

This branch deals with the study of the functions of different parts of living organisms.

(vi) **Embryology**

It is the study of the development of an embryo to a new individual.

(vii) **Taxonomy**

It is the study of the naming and classification of organisms into groups and subgroups.

(viii) **Genetics**

The study of genes and their role in inheritance is called genetics.

Inheritance means the transmission of characters from one generation to the other.

(ix) **Palaeontology**

It is the study of fossils, which are the remains of extinct organisms.

(x) Environmental Biology

It deals with the study of the interactions between the organisms and their environment.

(xi) Biotechnology

It deals with the practical application of living organisms to make substances for the welfare of mankind.

(xii) Socio-Biology

This branch deals with the study of social behaviour of animals that make societies.

(xiii) Parasitology

This branch deals with the study of parasites.

(xiv) Immunology

It is the study of immune system of animals, which defends the body against invading microbes.

(xv) Entomology

It is the study of insects.

(xvi) Pharmacology

It is the study of drugs and their effects on the systems of human body.

(xvii) Molecular Biology

It deals with the study of molecules of life; e.g. water, proteins, carbohydrates, lipids and nucleic acids. **OR** It deals with the structure of organisms, the cells and their organelles at molecular level.

(1) **Bio-physics**

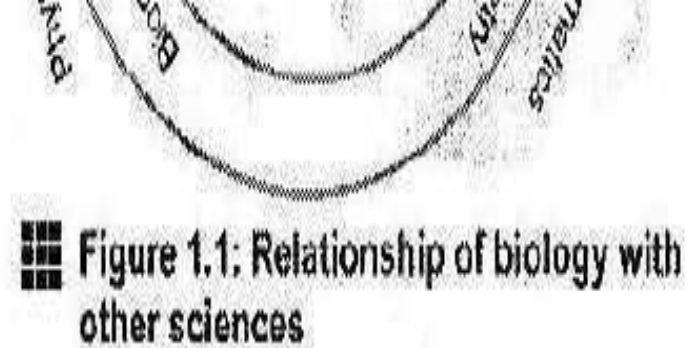
It deals with the study of the principles of physics, which are applicable to the biological phenomena.

Example Similarity between the working principles of lever in Physics and limbs of animals in Biology.

(ii) **Bio-chemistry**

It deals with the study of the Chemistry of different chemical compounds and processes occurring in living organisms.

Example The study of basic metabolism of photosynthesis and respiration involves the knowledge of Chemistry.





Bio-geography

It deals with the study of occurrence and distribution of different species of living organisms in different geographical regions of the world.

Horticulture

It deals with the study of art of gardening.

A horticulturist works for the betterment of existing varieties and for the production of new varieties of ornamental plants and fruit plants.

This professional course can be adopted after the higher secondary education in biology.

Bioelements

Out of the 92 elements, 16 elements take part in making the body mass of a living organism called bioelements.

Only six (O, C, H, N, Ca & P) make 99% of total mass. These are known as major elements.

Other ten (K, S, Cl, Na, Mg, Fe, Cu, Mn, Zn & I) collectively make 1% of the total mass. These are called trace elements.

- | | | |
|--------------------|-------------------|-----------------------|
| (i) Oxygen = 65% | (ii) Carbon = 18% | (iii) Hydrogen = 10% |
| (iv) Nitrogen = 3% | (v) Calcium = 2% | (vi) Phosphorous = 1% |
| (vii) Others = 1% | | |

(4) Tissue Level

(a) Definition

❖ A group of similar cells specialized for the performance of a common function.

(b) Explanation

❖ Each cell in a tissue carries on its own life processes (e.g. cellular respiration, protein synthesis) and also some special processes related to the function of the tissue.

(c) Examples

❖ There are different types of plant tissues, e.g. epidermal tissue, ground tissue etc. Animal tissues are also of different types e.g. nervous tissues, muscular tissues etc.

(5) Organ and Organ System Level

Organ Level

(a) Formation of Organ Level

- ❖ More than one type of tissue having related functions are organized together to form organ.
- ❖ Different tissue of an organ perform their specific functions and these functions collectively become the functions of that organ.

(b) Example

- ❖ For example, stomach is an organ specialized for the digestion of proteins & storing food.
- 

Organ System Level

(a) Formation of Organ System Level

- ❖ Different organs performing related functions are organized together in the form of an organ system.
- ❖ In organ system, each organ carries out its specific function and the functions of all organs appear as the function of the organ system.

(b) Example


Digestive system carries out process of digestion. It consists of oral cavity, stomach, small intestine, large intestine, liver and pancreas.

- ❖ The organ system level is less definite in plants as compared to animals.

C. Short Questions

Q1: what is science?

Ans. Science is the study in which observations are made, experiments are done and logical conclusions are drawn in order to understand the principles of nature.



Q2: what are the types of biological molecules on the basis of molecular weight?

Classification of Biomolecules

❖ Biomolecules may be classified as:

a) Micromolecules

These are molecules with low molecular weight e.g. glucose, water etc.

b) Macromolecules

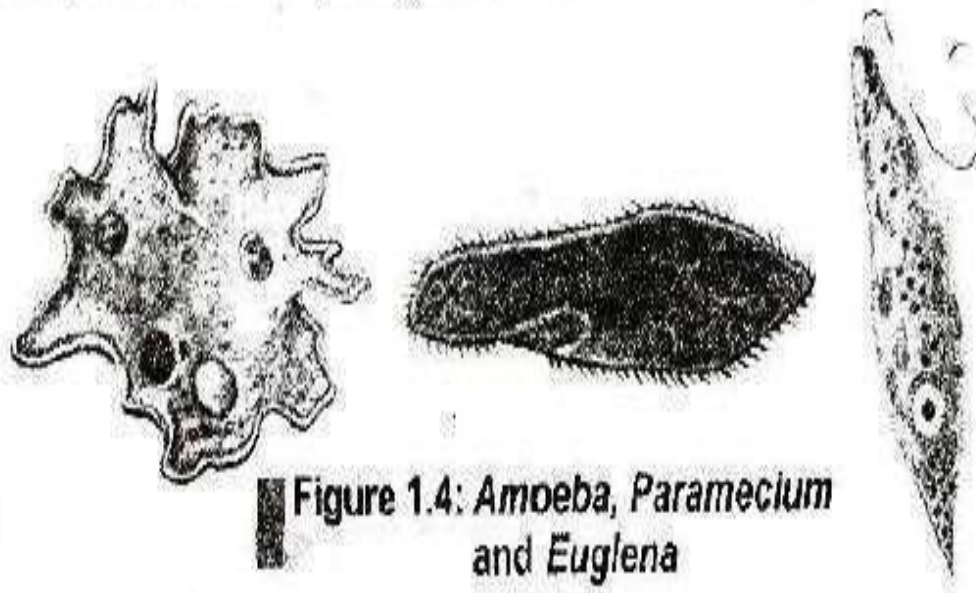
These are molecules with high molecular weight e.g. starch, proteins, lipids etc.

Q3: Briefly describe unicellular organization.

unicellular organization:-

- ❖ In unicellular organisms, only one cell makes the life of an organism.
- ❖ All the life activities are carried out by the only cell.

- ❖ Examples: Amoeba, Paramecium, Euglena etc.



b) Colonial Organization:

- ❖ In colonial type of cellular organization, many unicellular organisms live together but do not have any division of labour among them.
- ❖ Each unicellular organism in a colony lives its own life and does not depend on other cells for its vital requirements.
- ❖ Volvox is a green alga found in water is an example of colonial organization.
- ❖ Hundreds of volvox cells make a colony.

Q4: Differentiate between Biomathematics and Bioeconomics.



Bio-mathematics / Biometry.

It deals with the study of using mathematical techniques and tools in biological work.

Example

To analyze the data gathered after experimental work, biologists have to apply the rules of mathematics.

(v) **Bio-Economics**

It deals with the study of organisms from economical point of view.

Example

The cost value and profit value of wheat can be calculated through this branch and benefits or losses can be determined.

Q5: what is Biotechnology?

(viii) Biotechnology

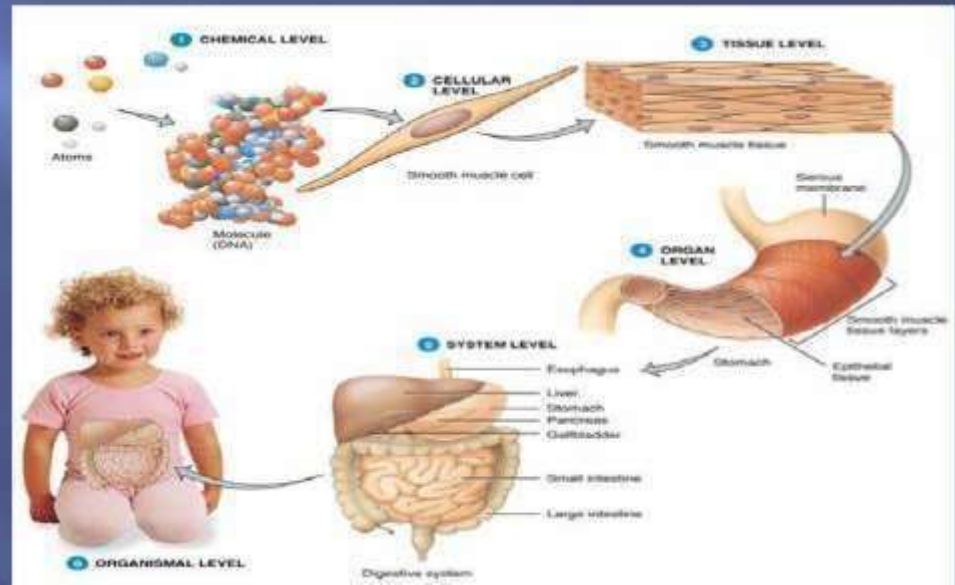
- (a) It deals with the study and work for the production of useful products through microorganisms.
- (b) This professional course can be adopted after the higher secondary education in biology or after bachelor level studies of zoology or botany.

Q6: what are the levels of organization?

Levels of Organization and Body Systems

▣ Six levels in human body:

- Chemical
- Cellular
- Tissue
- Organ
- System
- Organismal



Q7: Give two examples of cellular organization in organisms?

1. Unicellular organization
 2. Multicellular organization
- 

Q8: what is the importance of biology?

The importance of Biology

- Improved understanding on functions of organisms.
- Improved understanding on causes of disease.
- Finding treatment for diseases.
- Improved understanding on ecology.
- Better management on environment problems.
- Improved quality and production of food.

Q9: what are the contribution of Jabir Bin Hayan in biology?

(i) Jabir Bin Hayan (721-815 AD)

(a) He was born in Iran and practiced medicine in Iraq.

- (b) He introduced experimental investigations in chemistry and also wrote a number of books on plants and animals.
- (c) His famous books are “Al-Nabatat” and “Al-Haywan”.

Q10: write a note on the contributions of Bu Ali Sina in biology?

(d) Bu Ali Sina (980-1037 AD)



- ❖ He is honoured as the founder of medicine and called as Avicenna in the west.
- ❖ He was a physician, philosopher, astronomer and poet.
- ❖ One of his best books “Al-Qanun fial-Tib” is known as the canon of medicine in west.

D: Descriptive Questions.

Q1: what do you know about the relation of biology with other sciences?

Ans. Introduction

The interrelationship among different branches of science cannot be denied. Biological informations relate to the other branches of science as well. For example, when studying the process of movement in animals, the biologists have to refer to the laws of motion in Physics. This forms the basis of interdisciplinary sciences.

(1) Bio-physics

It deals with the study of the principles of physics, which are applicable to the biological phenomena.

Example Similarity between the working principles of lever in Physics and limbs of animals in Biology.

(ii) Bio-chemistry

It deals with the study of the Chemistry of different chemical compounds and processes occurring in living organisms.

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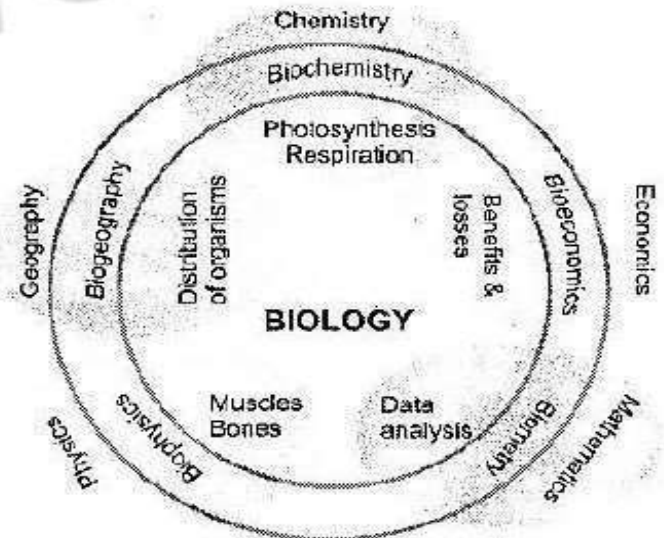


Figure 1.1: Relationship of biology with other sciences

(iii) **Bio-mathematics / Biometry.**

It deals with the study of using mathematical techniques and tools in biological work.

Example

To analyze the data gathered after experimental work, biologists have to apply the rules of mathematics.

(iv) **Bio-geography**

It deals with the study of occurrence and distribution of different species of living organisms in different geographical regions of the world.

Application of Biogeography

It applies the knowledge of the characteristics of particular geographical regions to determine the characteristics of living organisms found there.

(v) **Bio-Economics**

It deals with the study of organisms from economical point of view.

Example

The cost value and profit value of wheat can be calculated through this branch and benefits or losses can be determined.

Q2: Describe the verses of Holy Quran which stress upon the study of biology?

Ans. Allah hints about the origin and characteristics of living organisms at many places in the Holy Quran. Human beings have been instructed to expose the unknown aspects of life after getting the hints from the verses.

Verse No. 1

Creation of life from water

وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ ۝

“We made everything from water.” (Sura: Ambia, Verse: 30)

The above verse hints at the common origin of all living things in water and water makes 60-70% of the composition of protoplasm of all living things.

Verse No. 2

Creation of Life from Clay & Method of Development

خَلَقَ الْإِنْسَانَ مِنْ صَلْصَالٍ كَالْفَخَّارِ ۝

“He made man from clay like the potter.” (Sura: Rehman, Verse: 14)

Verse No.3

In another verse, God says:

ثُمَّ خَلَقْنَا النُّطْفَةَ عَلَقَةً فَخَلَقْنَا الْعَلَقَةَ مُضْغَةً

فَخَلَقْنَا الْمُضْغَةَ عِظْمًا فَكَسَوْنَا الْعِظْمَ لَحْمًا ۝

“Then fashioned we the drop a clot, then fashioned we the clot a little lump, then fashioned we the little lump bones, then clotted the bones with flesh.” (Sura: Al-Mominoon, Verse: 14)

In both above verses, we find the events that occurred in the creation of human beings and Allah also hints at the method of the development of animals including human beings.

Verse No. 4

Concepts of Classification

وَاللَّهُ خَلَقَ كُلَّ دَابَّةٍ مِنْ مَّاءٍ فَمِنْهُمْ مَنْ يَمْشِي عَلَى بَطْنٍ وَمِنْهُمْ مَنْ يَمْشِي عَلَى رِجْلَيْنِ

وَمِنْهُمْ مَنْ يَمْشِي عَلَى أَرْبَعٍ يَخْلُقُ اللَّهُ مَا يَشَاءُ إِنَّ اللَّهَ عَلَى كُلِّ شَيْءٍ قَدِيرٌ ۝

“Allah hath created every animal from water, then some of them creep up over their bellies, others walk on two legs and others on four. Allah creates what He pleases.”

(Sura: Al-Nur, Verse: 45)

This verse describes the common origin and modification of organisms and also supports the modern concepts of classification.

Q3: Write a note on the level of organization in organisms at organ and organ system level.

Ans. Biological organization at different levels

(1) Subatomic and Atomic level

(a) Atoms and Elements

- ❖ All types of matter are made up of elements.
- ❖ There are about 92 kinds of elements found in nature.
- ❖ Each element is made up of a single kind of atoms ('a': not, 'tom': cut).
- ❖ These atoms are actually the structures formed by many subatomic particles.
- ❖ The most stable subatomic particles are electrons, protons and neutrons.

(b) Bioelements

- ❖ Out of the 92 elements, 16 elements take part in making the body mass of a living organism called bioelements.
- ❖ Only six (O, C, H, N, Ca & P) make 99% of total mass. These are known as major elements.
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(2) Molecular Level

(a) Biomolecules

- ❖ In organisms, bioelements usually do not occur in isolated forms rather they combine through ionic or covalent bonding.
- ❖ The stable particle formed by such bonding is called as molecule, if occurring in the bodies of living organisms they are called biomolecules.
- ❖ An organism is formed by enormous number of biomolecules of hundreds of different types.
- ❖ These molecules are the building material and are themselves constructed in great variety and complexity due to specific bonding arrangements.

Classification of Biomolecules

- ❖ Biomolecules may be classified as:

a) Micromolecules

These are molecules with low molecular weight e.g. glucose, water etc.

b) Macromolecules

These are molecules with high molecular weight e.g. starch, proteins, lipids etc.

(3) Organelle and Cell Level (Lahore board 2011 G D) (short question)

(a) Organelle Formation

- ❖ Biomolecules assemble in a particular way and form organelles.

(b) Cell Formation

- ❖ The organelles are actually sub-cellular structures and when they assemble together, cells are formed.

(c) Division of Labour within the Cell

❖ Each type of organelle is specialized to perform a specific function e.g. mitochondria are specialized for cellular respiration and ribosomes are specialized for protein synthesis. In this way, functions of the cell are accomplished by these specialized structures. It is an example of the division of labour within the cell.

No. of Cells

- ❖ In the case of Prokaryotes and most protists, the entire organism consists of a single cell.
- ❖ In the case of most fungi, all animals and plants, the organism consists of upto trillions of cells.

(4) Tissue Level

(a) Definition

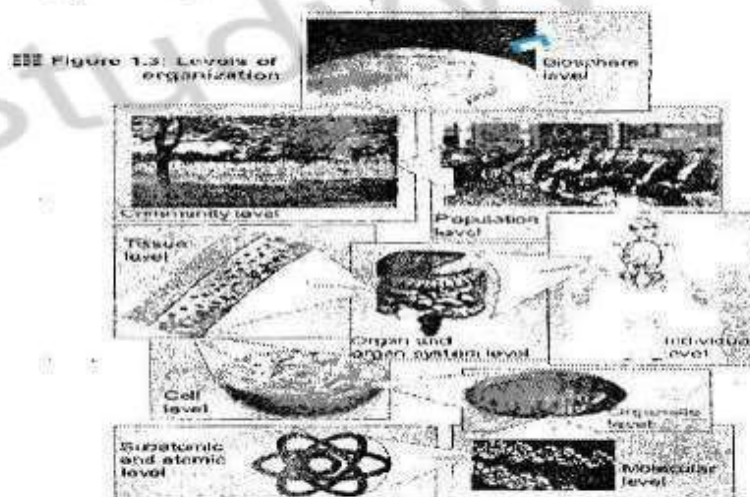
❖ A group of similar cells specialized for the performance of a common function.

(b) Explanation

❖ Each cell in a tissue carries on its own life processes (e.g. cellular respiration, protein synthesis) and also some special processes related to the function of the tissue.

(c) Examples

❖ There are different types of plant tissues, e.g. epidermal tissue, ground tissue etc. Animal tissues are also of different types e.g. nervous tissues, muscular tissues etc.



(5) Organ and Organ System Level

Organ Level

(a) Formation of Organ Level

❖ More than one type of tissue having related functions are organized together to form organ.

- ❖ Different tissue of an organ perform their specific functions and these functions collectively become the functions of that organ.

(b) Example

- ❖ For example, stomach is an organ specialized for the digestion of proteins & storing food.
- ❖ Stomach have:-
 - (i) Epithelial (glandular) tissues which secrete the gastric juice.
 - (ii) Muscular tissues perform contractions of stomach walls for grinding of food, mixing enzyme with food and moving food to posterior end. So two tissues perform their functions which collectively become the function of stomach.
 - (iii) Connective tissue which help to connect other tissues together
 - (iv) Nervous Tissue: The action of stomach is co-ordinated by this tissue.

Organ System Level

(a) Formation of Organ System Level

- ❖ Different organs performing related functions are organized together in the form of an organ system.
- ❖ In organ system, each organ carries out its specific function and the functions of all organs appear as the function of the organ system.

(b) Example

Digestive system carries out process of digestion. It consists of oral cavity, stomach, small intestine, large intestine, liver and pancreas.

- ❖ The organ system level is less definite in plants as compared to animals.

(6) Individual Level

(a) Formation of Individual Level

- ❖ Different organs and organ systems are organized together to form an individual (organism).
- ❖ In an organism, various organs and organ systems are organized in such a way that all the functions, processes and activities are coordinated.

(b) Example

- ❖ During continuous and hard exercise, rate of respiration and heart beat are increased and supplies more oxygen and food to muscles which is needed for continuous work.

What do you know about the organism level?

Individual Level

Formation of Individual Level

Different organs and organ systems are organized together to form an individual (organism).

In an organism, various organs and organ systems are organized in such a way that all the functions, processes and activities are coordinated.

Example

During continuous and hard exercise, rate of respiration and heart beat are increased and supplies more oxygen and food to muscles which is needed for continuous work.

Population Level

Formation of Population Level

A group of organisms of same species located at the same place, in the same time is called population.

Example

Human population in Pakistan in 2010 comprises of 173.5 million individuals.

Community Level

(a) Introduction

A community is an assemblage of different populations interacting with one another within the same environment.

(b) Example

- ❖ A forest may be considered as a community. It includes different plants, microorganisms, fungi and animal species.
- ❖ Communities are collections of organisms, in which one population may increase and others may decrease.
- ❖ Some communities are complex e.g. forest and pond community.
- ❖ Some communities are simple e.g. a fallen log with various populations under it.
- ❖ Simple communities have limited number and size and any change in biotic or abiotic factors may have drastic and long lasting effects.

Biosphere Level

The part of the earth inhabited by organisms' communities is known as biosphere. It constitutes all ecosystems (area where living organisms interact with non-living components of the environment) and is also zone of life on earth.

Q5: Describe multicellular organization with examples?

•) Multicellular Organization:

In multicellular organization, cells are organized in tissues, organs and organ systems.

Examples

Mustard Plant: Brassica Campestris:

(a) Sowing

- ❖ It is sown in winter and produces seed at the end of winter.

(b) Importance

- ❖ Its plant body is used as vegetable & its seeds are used for extracting oil.

(c) Body Parts

- ❖ Plant body consists of two parts:-

a) Vegetative Parts:

- ❖ It includes roots, stems, branches and leaves.
- ❖ These do not take part in sexual reproduction.

b) Reproductive Parts:

- ❖ Flowers are reproductive parts of plant because they take part in sexual reproduction and produce fruits and seeds.

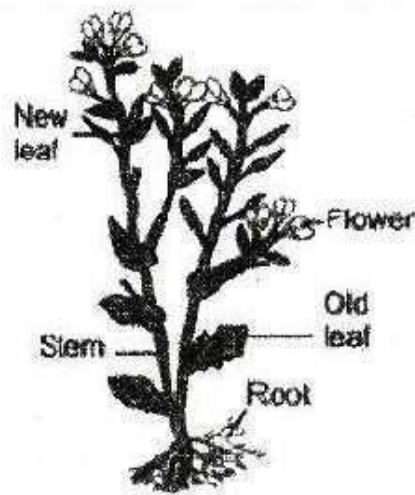


Figure 1.6: Mustard

Frog: *Rana tigrina*:

(a) Body

- ❖ The body of frog also shows multicellular organization.
- ❖ The body is made up of organ systems.
- ❖ Each organ system consists of related organs
- ❖ All the organs are made of specific tissues (epithelial, glandular, muscular, nervous etc.)

