Chapter: 01

Introduction to Biology

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Objective

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1. The scientific study of living things is called:

Ⓐ Chemistry Ⓑ Botany Ⓒ Biotechnology **Ⓓ Biology**

2. The branch of Biology dealing with insects is:

Ⓐ Zoology Ⓑ Botany **Ⓒ Entomology** Ⓓ Cell Biology

3. The branch of Biology which deals with classification is called:

Ⓐ Flistology Ⓑ Physiology Ⓒ Anatomy **Ⓓ Taxonomy**

4. Study of drugs and their effects on human body is called:

Ⓐ Parasitology Ⓑ Entomology **Ⓒ Pharmacology** Ⓓ Socio-biology

5. The study of fossils is called:

Ⓐ parasitology Ⓑ immunology Ⓒ pharmacology **Ⓓ paleontology**

6. The word biology has been derived from two words:

Ⓐ French Ⓑ Latin **Ⓒ Greek** Ⓓ English

7. The study of internal structures is called:

Ⓐ Embryology **Ⓑ Anatomy** Ⓒ Physiology Ⓓ Genetics

8. Entomology is the study of:

Ⓐ Insects Ⓑ Bacteria Ⓒ Organelles Ⓓ Tissues

9. Meaning of "Logos" is:

Ⓐ Structure Ⓑ Function Ⓒ Activity **Ⓓ Thinking**

10. Which branch of biology deals with the study of forms and structure of living organisms?

Ⓐ Physiology Ⓑ Histology **Ⓒ Morphology** Ⓓ Anatomy

11. The branch of biology which deals with study of nucleic acid is called:

Ⓐ Taxonomy **Ⓑ Molecular biology** Ⓒ Socio-biology Ⓓ Embryology

12. The microscopic study of tissues is called:

Ⓐ Cell Biology **Ⓑ Histology** Ⓒ Morphology Ⓓ Physiology

13. The study of the functions of different parts of living organisms is called:

Ⓐ Physiology Ⓑ Morphology Ⓒ Anatomy Ⓓ Histology

14. Scientific study of animals is called:

Ⓐ Zoology Ⓑ Botany Ⓒ Microbiology Ⓓ Biology

15. Study of genes and their role in inheritance is called:

Ⓐ Anatomy Ⓑ Physiology Ⓒ Histology **Ⓓ Genetics**

16. Entomology is the study of which organisms:

Ⓐ Mammals Ⓑ Birds **Ⓒ Insects** Ⓓ Fish

17. This division of biology deals with the study of plants:

(A) Morphology (B) Botany (C) Microbiology (D) Zoology

18. Which Surah of the Holy Quran verifies the classification?

(A) AI-Noor (B) Al-Quresh (C) Yasin (D) Al-Baqra

19. "Scientific knowledge is the common heritage of mankind" is saying of:

(A) Dr. Atta ur Rehman (B) Dr. Abdul Salam
(C) Dr. Samar Mubarak Mand (D) R. Abdul Qadeer Khan

20. The study of the molecules of life is called:

(A) physiology (B) molecular biology (C) immunology (D) anatomy

21. Remains of extinct organisms are called:

(A) Fossils (B) Endangered (C) Corals reef (D) Corals

22. Transplantation of kidneys is example of:

(A) Medicine (B) Physiology (C) Surgery (D) Morphology

23. Liver transplantation belongs to:

(A) farming (B) surgery (C) animal husbandry (D) biotechnology

24. Which is the latest profession related to biology:

(A) Farming (B) Horticulture (C) Forestry (D) Biotechnology

25. The career related with gardening is:

(A) Forestry (B) Farming (C) Horticulture (D) Medicine

26. Which microorganism is used for preparation of insulin?

(A) Algae (B) Bacteria (C) Fungi (D) Virus

27. Breeding of cow belongs to:

(A) Animal husbandry (B) Genetics (C) Farming (D) Morphology

28. Horticulture deals with the art of:

(A) Domestic animals (B) Farming (C) Forestry (D) Gardening

29. The founder of medicine is:

(A) Al-Beruni (B) Bu Ali Sina (C) Abdul Malik (D) Jabir bin Hayan

30. Abdul-Malik Asmai was born in:

(A) 740 AD (B) 780 AD (C) 980 AD (D) 1080 AD

31. Famous book of Jabir-Bin-Hayan is:

(A) AI-Nabatat (B) Al-Kheil (C) Al-Wahoosh (D) Al-Abil

32. We make every living thing from:

(A) Fire (B) Air (C) Soil (D) Water

33. Jabir Bin Hayan was borm in:

(A) Iran (B) Pakistan (C) England (D) Iraq

34. The author of Al-Qanoon fil-Tib is:

Ⓐ Ali-lbne-Eisa Ⓑ Abdul Malik Asma Ⓒ Jabir bin Hayyan **Ⓓ Bu-Ali-Sina**

35. The book "A-Nabatat" belongs to the Muslim scientist:

Ⓐ Bu-Ali-Sina Ⓑ Ibn-Al-Nafees **Ⓒ Jabir bin Hayan** Ⓓ Abdul Malik Asmai

36. Name of the famous book of Bu Ali Sina is:

Ⓐ Al-Abil Ⓑ Al-Khail Ⓒ Al-Nabatat **Ⓓ Al-Qanun-fil-Tib**

37. The first Muslim Scientist who studied Animals in detail:

Ⓐ Alrazi Ⓑ Bu Ali Sina **Ⓒ Abdul Malik Asmai** Ⓓ Jabir bin Hyan

38. Famous book "Al-Abil" was written by:

Ⓐ Bu Ali Sina **Ⓑ Abdul Malik Asmai** Ⓒ Ibn e Nafees Ⓓ Jabir bin Hyan

39. Percentage of carbon in protoplasm of living organisms is:

Ⓐ 65 % Ⓑ 10 % Ⓒ 5 % **Ⓓ 18 %**

40. Bio element is:

Ⓐ Cobalt Ⓑ Aluminium **Ⓒ Carbon** Ⓓ Bromine

41. The number of Bio elements is:

Ⓐ 16 Ⓑ 17 Ⓒ 18 Ⓓ 19

42. The example of micro molecule is:

Ⓐ proteins Ⓑ lipids Ⓒ starch **Ⓓ glucose**

43. The element that makes 03% of the total mass of living organism is:

Ⓐ oxygen Ⓑ hydrogen **Ⓒ nitrogen** Ⓓ carbon

44. Which of these major bio elements is in the highest percentage in protoplasm?

Ⓐ Hydrogen **Ⓑ Oxygen** Ⓒ Nitrogen Ⓓ Carbon

45. How many elements make 99 % of the total mass?

Ⓐ 12 Ⓑ 10 Ⓒ 8 **Ⓓ 6**

46. The Number of elements found in nature are:

Ⓐ 88 Ⓑ 90 **Ⓒ 92** Ⓓ 94

47. Which bio element makes most of the composition of organism's body?

Ⓐ nitrogen **Ⓑ oxygen** Ⓒ carbon Ⓓ hydrogen

48. ..... water makes composition of the protoplasm of all living things.

Ⓐ 60- 70 % Ⓑ 70 - 80% Ⓒ 80 -90% Ⓓ 90 - 100 %

49. Percentage composition of hydrogen in protoplasm of living organisms is:

Ⓐ 65 % Ⓑ 18 % **Ⓒ 10 %** Ⓓ 5 %

50. Biomolecules are divided into how many groups:

Ⓐ 4 **Ⓑ 2** Ⓒ 6 Ⓓ 8

51. An example of macromolecule is:

Ⓐ Protein Ⓑ Sodium chloride Ⓒ Glucose Ⓓ Water

52. In 2010 population of Pakistan was ..... million.

Ⓐ 180.5 Ⓑ 173.5 Ⓒ 170.5 Ⓓ 160.5

53. Similar cells performing same function organize into group that is called:

Ⓐ Tissue Ⓑ Organ Ⓒ Organ-system Ⓓ Organelle

54. Organelles assemble to form:

Ⓐ Cells Ⓑ Organ Ⓒ Systems Ⓓ Tissues

55. The highest level of biological organization is:

Ⓐ tissue Ⓑ ecosystem Ⓒ biosphere Ⓓ species

56. Same species living in the same place at the same time make a:

Ⓐ biosphere Ⓑ population Ⓒ habitat Ⓓ community

57. The part of earth where communities of living organisms exist is called:

Ⓐ Biosphere Ⓑ Population Ⓒ Sphere Ⓓ Atmosphere

58. Area of the environment, where an organism lives is called:

Ⓐ ecosystem Ⓑ population Ⓒ biosphere Ⓓ habitat

59. The areas where living organisms interact with non-living components of the environment are called:

Ⓐ community Ⓑ species Ⓒ ecosystem Ⓓ population

60. The level of organization that is less definite in plant is:

Ⓐ Individual level Ⓑ Organ System level Ⓒ Tissue level Ⓓ Organ level

61. What is true about "Volvox"?

Ⓐ Unicellular eukaryote Ⓑ Unicellular prokaryote
Ⓒ Multicellular eukaryote Ⓓ Colonial eukaryote

62. Mustard plant is sown in:

Ⓐ In Autumn Ⓑ In Spring Ⓒ In Summer Ⓓ In Winter

63. Which of the following Organisms has Colonial Organization:

Ⓐ Frog Ⓑ Mustard Plant Ⓒ Volvox Ⓓ Amoeba

64. Frog has two eyes, each of which has:

Ⓐ No eyelid Ⓑ Three eyelids Ⓒ Two eyelids Ⓓ One eyelid

65. Volvox is example of:

Ⓐ Green alga Ⓑ Blue green alga Ⓒ Brown alga Ⓓ Red alga

66. Brassica compestris is the scientific name of the plant:

Ⓐ potato Ⓑ tomato Ⓒ mango Ⓓ mustard

67. Scientific name of mustard plant is:

Ⓐ Allium cepa Ⓑ Homo sapiens Ⓒ Brassica compestris Ⓓ Pisum sativum

68. Reproductive organ of plant is:

Ⓐ Stem Ⓑ Flower Ⓒ Leaf Ⓓ Root

Chapter : 01 Introduction to Biology

Subjective

Q1: ***What is meant by science?***

Ans: *Science:*

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: ***Define biology.***

Ans: *Biology:*

The scientific study of life is called biology. The word "biology" has been derived from two Greek words. "Bios" meaning 'life' and "Logs" meaning thought or reasoning.

Q3: ***Define histology.***

Ans: *Histology:*

The microscopic study of tissues is called histology.

Q4: ***Differentiate between zoology and botany.***

Ans: *The difference between zoology and botany is:*

Zoology	Botany
This division of biology deals with the study of animals.	*This division of biology deals with the study of plants.*

Q5: ***Differentiate between molecular biology and microbiology.***

Ans: *The difference between molecular biology and microbiology is:*

Molecular Biology	Microbiology
Molecular Biology (Biochemistry) deals with the study of molecules of life; e.g. water, proteins, carbohydrates, lipids and nucleic acids.	*Microbiology is division of biology deals with the study of microorganisms such as bacteria etc.*

Q6: ***Differentiate between biochemistry and morphology.***

Ans: *The difference between biochemistry and morphology is:*

Biochemistry	Morphology
It deals with the study of the chemistry of different compounds and processes occurring in living organisms.	*This branch deals with the study of from and structure of living organisms.*

Q7: ***What are parasites? Define parasitology.***

Ans: *Parasites:*

Parasites are the organisms that take food and shelter from living hosts and in return, harm them e.g. viruses, bacteria and parasitic worms.

Parasitology:

This branch deals with the study of parasites.

Q8: ***Differentiate between environmental biology and cell biology.***

Ans: *The difference between environmental biology and cell biology is:*

Environmental biology	Cell biology
It deals with the study of the interactions between the organisms and their environment.	The study of the structures and functions of cells and cell organelles is called cell biology. This branch also deals with the study of cell division.

Q9: **Entomology, pharmacology and immunology.**

Ans: The difference between oxidation and reduction is:

Entomology:

It is the study of insects.

Pharmacology:

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

Immunology:

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

Q10: **Define anatomy and embryology.**

Ans: Anatomy:

The study of internal structures is called anatomy.

Embryology:

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

Q11: **Differentiate between physiology and taxonomy.**

Ans: The difference between physiology and taxonomy is:

Physiology	Taxonomy
This branch deals with the study of the functions of different parts of living organisms.	The branch of biology which deals with the study of scientific naming and the classification of organisms into groups and subgroups is called taxonomy.

Q12: **What is meant by genetics and fossils?**

Ans: Genetics:

The study of genes and their roles in inheritance is called genetics. Inheritance means the transmission of characters from one generation to the other.

Fossils:

Fossils are the remains of extinct organisms.

Q13: **What are major biological issues now days?**

Ans: Human population growth, infectious diseases, addictive drugs and the pollution are the major biological issues today.

Q14: **What is Biotechnology? Elaborate its usefulness.**

Ans: Biotechnology:

It is the latest profession in the field of biology. The experts of biotechnology study and work for the production of useful products through microorganisms.

Usefulness:

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

This diagram is just for information.

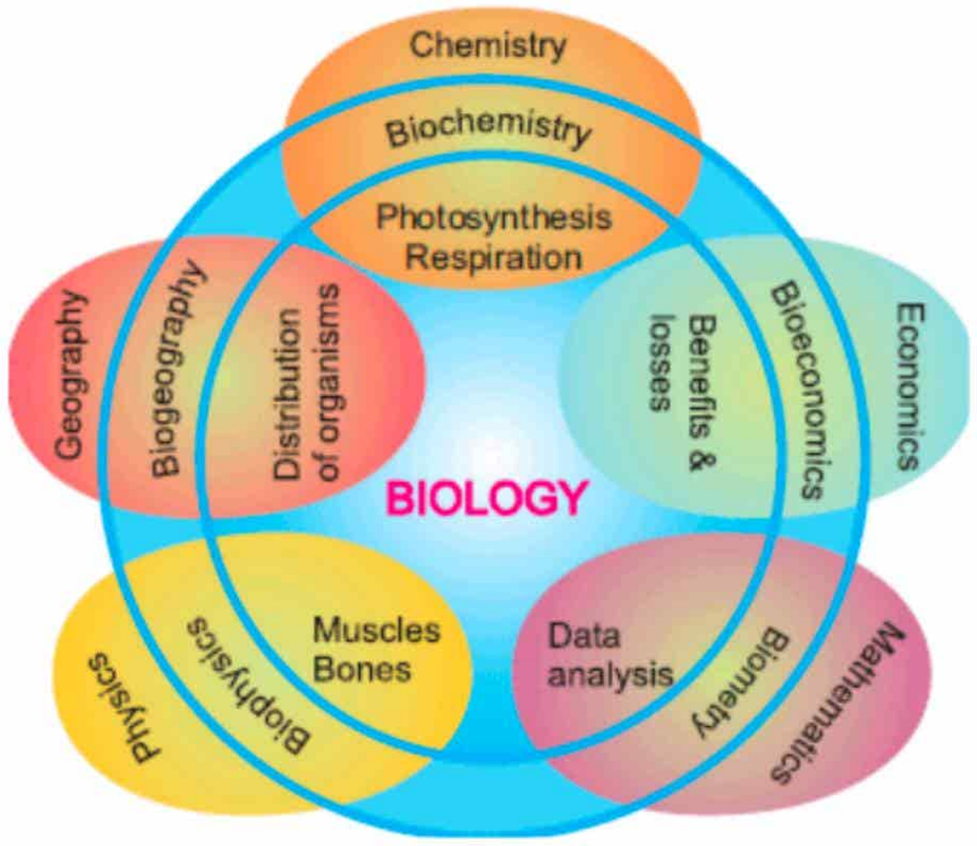


Figure Relationship of biology with other sciences

Q15: ***Define biophysics.***

Ans: *Biophysics:*

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

Example:

Similarity between the working principles of lever in physics and limbs of animals in biology.

Q16: ***What is meant by biogeography?***

Ans: *It deals with study of the 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.

Q17: ***Define biometry and bio economics.***

Ans: *Biomathematics / Biometry:*

It deals with the study of biological processes 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.

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.

Q18: ***What is farming?***

Ans: *It deals with the development and maintenance of different types of farm.*

For example in some farms animal breeding technologies are used for the production of animals which are better protein and milk source. In poultry farms chicken and eggs are produced. In fruit farms, different fruit yielding plants are grown.

This professional can be adopted after the course of agriculture, animal husbandry or fisheries.

Q19: ***Describe animal husbandry as career in biology.***

Ans: *It is the branch of agriculture concerned with the care and breeding of domestic animals (livestock) e.g. cattle, sheep etc.*

The Professional courses in animal husbandry can be adopted after the higher secondary education in biology.

Q20: ***What is horticulture? Describe its two applications in daily life.***

Ans: *It deals with the 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.

Q21: ***Write few uses of surgery.***

Ans: *The profession of medicine deals with the diagnosis and treatment of diseases in humans. In surgery the defective parts of the body may be repaired, replaced or removed.*

Some examples of surgery are given below:

- *The removal of stones by renal surgery.*
- *Transplantation of kidney.*
- *Transplantation of liver.*

The professions of medicines and surgery are studied in MBBS. After MBBS the students can go for specializations. The students can adopt this Medicine Field after F.sc.

Q22: ***What do you mean by Zone of Life?***

Ans: *The part of the Earth inhabited by communities of organisms is called biosphere. It consists of all ecosystems. This biosphere is also called the zone of life on Earth.*

Q23: ***Define Tissue.***

Ans: *The group of similar cells performing the similar function is called tissue. e.g. xylem tissue and phloeum tissue.*

Q24: ***The Holy Quran supports the modern concept of classification. Justify with a verse.***

Ans: *The Holy Quran has given us the concept of classification which is clear from the following verse of the Holy Quran:*

"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)

Q25: ***Name famous books of Jabar Bin Hayan and Abdul Malik Asmai.***

Ans: *Jabar Bin Hayan:*

AI-Nabatat, Al-Haywan.

Abdul Malik Asmai:

Al-Abil(Camel), AlI-Khail (Horse), Al-Wahoosh (Animal) and Khalq-al-Ansan.

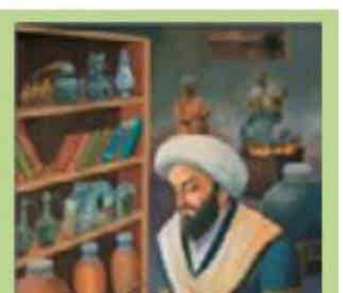
Q26: ***Write the contributions of Bu-Ali-Sina.***

Ans: *He is honored as the founder of medicine. Bu Ali Sina is called as Avicenna in the West. He was a physician, philosopher, astronomer and poet. One of his books "Al-Qanun -fi al-Tib" is known as the canon of medicine in West.*

Q27: ***Write a note on Jabir Bin Hayan.***

Ans: *He was born in Iran and practiced medicine in Iran. He introduced experimental investigation in chemistry and also wrote a number of books on plants and animals. His famous books are "Al-Nabatat" and "Al-Haywan".*

Bu Ali Sina



Jabir Bin Hyan

Q28: ***Write down names of bio-molecules groups.***

Ans: *Micromolecules:*

The biomolecules with low molecular weight are called micromolecules.

For example glucose, water etc.

Macromolecules:

The bio- molecules with high molecular weight are called macromolecules.

For example starch, proteins, lipids etc.

Q29: ***Differentiate between population and community.***

Ans: *The difference between population and community is:*

Population	Community
"A group of organisms of the same species located at the same place, in the same time is called population".	*"A group of different populations interacting with one another within the same environment is called community".*

Q30: ***Write down the levels of organization in sequence.***

Ans: *Levels of Biological Organization:*

The study of biology at different levels is called biological organization.

Biological organization from simple to complex one is as under:

- *Subatomic and atomic level*
- *Organelle and cell level*
- *Organ and organ system level*
- *Population level*
- *Biosphere level*
- *Molecular level*
- *Tissue level*
- *Individual level*
- *Community level*

Q31: ***What is tissue level, also give examples?***

Ans: *In multicellular organisms, similar cells (performing similar functions) are organized into groups, called tissues. We can define a tissue as a group of similar cells specialized for the performance of a common function. Each cell in a tissue carries on its own life processes (like cellular respiration, protein synthesis), but it also carries on some special processes related to the function of the tissue.*

Plant Tissues:

There are different types of plant tissues e.g. epidermal tissue, ground tissue, etc.

Q32: ***Differentiate between species and habitat.***

Ans: *The difference between species and habitat is:*

Species	Habitat
A species is a group of organisms which can interbreed and have ability to reproduce new organisms called species.	*It is a part of environment where organisms live.*

Q33: ***The organ system level is less complex in plants as compared to animals, why?***

Ans: *The levels of biological organization is less complex in plants as compared to animals because in an organ system each organs performs its specific function and the functions of all organs appear as the function of organ system. In plants organ system is not complicated as compared to animals. Animals have to perform too many functions and activities at a time.*

Q34: ***What is meant by bio elements? What is their number? Give examples also.***

Ans: *The elements which make the body mass of living organisms are called bio-elements.*

Out of the 92 *elements,* 16 *elements are bio elements. 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.*

Q35: ***Write the names of six important bio elements.***

Ans: *The names of six important bio elements are:*

- *Carbon (C)*
- *Hydrogen (H)*
- *Oxygen (O)*
- *Nitrogen (N)*
- *Calcium (Ca)*
- *Phosphorous (P)*

Q36: ***What is community level? Give example.***

Ans: *A community is an assemblage of different populations, interacting with one another with in the same environment.*

Example:

A forest may be considered as a community. It includes different plant, micro-organisms, fungi and animal species.

Q37: ***What do you know about simple and complex communities?***

Ans: *Simple communities:*

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.

Complex communities:

Some communities are complex. They include forest and pond community.

Q38: ***Define highest level in levels of organization.***

Ans: *The highest level in levels of organization is called biosphere.*

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

Q39: ***What is unicellular organization? Name any four unicellular organisms.***

Ans: *In unicellular organisms only one cell makes the life of an organism. All the life activities are carried out by one cell only. Amoeba, Paramecium, Euglena and Chlamydomonas are examples of unicellular organisms.*

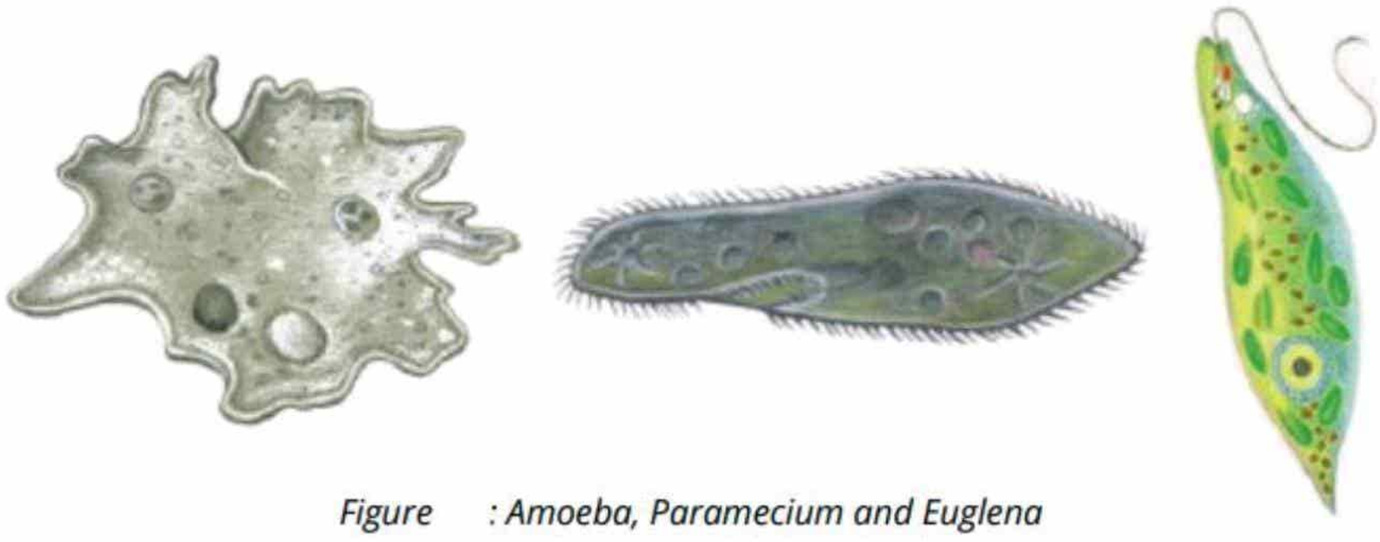


Figure : Amoeba, Paramecium and Euglena

Q40: ***What is meant by colonial and multicellular type of organization?***

Ans: *Colonial type of 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.

For example, volvox is a green alga found in water that shows colonial organization.

Multicellular type of organization:

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

For example, in mustard plant and frog multicellular organization is found.

Q41: ***Define vegetative and reproductive parts of plant.***

Ans: *Vegetative Parts:*

Vegetative Parts are those parts which do not take part in sexual reproduction. It includes roots, stems branches and leaves.

Reproductive Parts:

Reproductive Parts are those parts which take part sexual reproduction and produce fruits and seeds. Flowers are reproductive parts of plants.

Q42: ***Write the scientific name of mustard plant and Frog. And also write uses of Mustard plant.***

Ans: *Scientific name of mustard plant is Brassica campestris and scientific name of frog is Rana tigrina.*

Uses of Mustard plant:

- *The plant body of Brassica is used as vegetable.*
- *Its seeds are used for extracting oil.*

Figure Frog

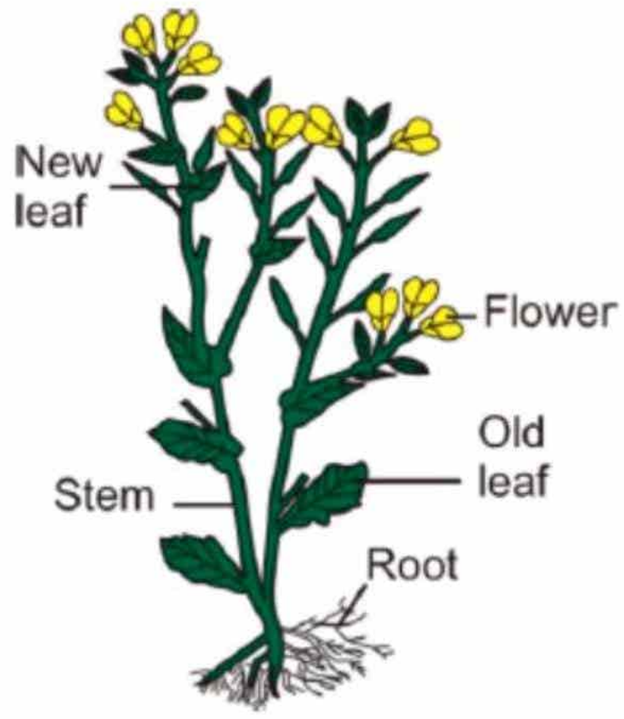


Figure Mustard

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Long Questions

Q1: *Define the terms science and biology also describe its three major divisions.* *OR*

Biology is divided into different branches. Explain any five.

Q2: *How Biology is related to other Sciences?* *OR*

Give points to advocate that Biology is linked with Physics, Chemistry, Mathematics , Economics and geography.

Q3: *What professions can be adopted after Biological Study? Explain any five.*

Q4: *Describe careers in biology including medicine, agriculture, farming and horticulture.*

Q5: Write the role of Muslim Scientists in the field of science. OR

Write down the contribution of Jabir Bin Hayyan and Bu Ali Sina in the Science.

Q6: Explain molecular level and tissue level in organisms.

Q7: Write a note on organization at organ and organ system level.

Q8: Explain the population level and community level. OR

Explain atomic and molecular level. OR

Describe Explain organism level and community level.

Q9: Describe organelle and cell level.

Q10: Write a note on cellular organizations. Explain its three types. OR

Write a note on Multicellular organization. Explain it with two Examples.

Q11: Write a note on frog.

Q12: Write a note on mustard plant.

Solved important long questions

Q1: **Describe any eight branches of biology.**

Ans: Biology:

The scientific study of life is called biology. The word "biology" has been derived from two Greek words. "Bios" meaning 'life' and "Logs" meaning thought or reasoning.

Branches of biology are:

Morphology:

The branch of biology that deals with the study of form and structures of living organisms is called morphology.

Anatomy:

The study of internal structures is called anatomy.

Histology:

The microscopic study of tissues is called histology.

Cell biology:

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

Physiology:

It is the study of the functions of different parts of living organisms.

Embryology:

The study of the development of an embryo to new individual is called embryology.

Taxonomy:

The study of naming and classification of organisms into groups and subgroups is called taxonomy.

Environmental biology:

The study of relationship of organisms to their environment environmental biology. It is also called ecology.

Q2: ***Describe molecular level of biological organization.***

Ans: *Molecular Level:*

"The smallest part of a compound that retains the properties of that compound is called molecule". OR

"The stable particle formed by bonding between different atoms of elements is called molecule or biomolecule". An organism is formed by large number of biomolecules of different types.

There are two groups of biomolecules:

- *Micromolcules*
- *Macromolecules*

Micromolecules:

The biomolecules with low molecular weight are called micromolecules.

For example, glucose, water etc.

Macromolecules:

The biomolecules with high molecular weight are called macromolecules.

For example starch, proteins, lipids etc.

Q3: ***Describe population community and biosphere level.***

Ans: *Population Level:*

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

Habitat:

Habitat is the area of the environment in which an organism lives.

Examples of population are given below:

- *Human population in Pakistan in 2010 was 173.5 million individuals.*
- *The number of students in biology class in any year.*

Community level:

"A group of different populations interacting with one another within the same environment is called community".

Example:

A forest is a community. It includes different species of plants, microorganisms, fungi and animals. In a community, one population may increase and others may decrease.

Types of Communities:

Simple community:

An isolated community is called simple community.

For example a fallen log with various populations under it.

Complex community:

Interrelated communities form a complex community.

For example forest, pond etc.

Biosphere Level:

The part of the Earth inhabited by communities of organisms is called biosphere. It consists of all ecosystems. Biosphere is also called the zone of life on Earth.

Q4: ***Explain Relationship of Biology to other Sciences.***

Ans: *The interrelationship among different branches of science cannot be denied. Biology includes information on various aspects of living things but this information relate to the other branches of science as well. Each branch of science has relationship with all other branches.*

Biophysics:

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

For example there is a similarity between the working principles of lever in physics and limbs of animals in biology.

Biochemistry:

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

For example the study of basic metabolism of photosynthesis and respiration involves the knowledge of chemistry.

Biomathematics / Biometry:

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

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

Biogeography:

It deals with study of the occurrence and distribution of different species of living organisms in different geographical regions of the world. It applies the knowledge of the characteristics of particular, geographical regions to determine the characteristics of living organisms found there.

Bio economics:

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

For example the cost value and profit value of the yield of wheat can be calculated through bio economics and benefits or losses can be determined

Q5: ***Explain any four careers in Biology.***

Ans: *Medicine / energy:*

The profession of medicine deals with the diagnosis and treatment of diseases in human. In surgery the parts of the body may be repaired, replaced or removed, for example the removal of stones through renal surgery, transplantation of kidney, liver etc. Both these professions are studied in the same basic course (MBBS) and then students go for specializations.

Fisheries:

Fisheries are the professional study of fish production. There are departments in Pakistan where professionals of fisheries are employed. They serve for enhancing the quality and quantity of fish production. In Pakistan, this profession can be adopted after the bachelor or masters level study of zoology and fisheries.

Agriculture:

This profession deals with the food crops and animals which are the source of food. An agriculturist works for the betterment of crops like wheat, rice, corn etc and animals like buffalo cow etc from which we get food. In Pakistan there are many universities which offer professional courses on agriculture after the higher secondary education in biology.

Animal husbandry:

It is the branch of agriculture concerned with the care and breeding of domestic animals (livestock) e.g. cattle, sheep etc. Professional courses in animal husbandry can be adopted after the higher secondary education in biology.

Horticulture:

It deals with the 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. Biology students can adopt this profession after their higher secondary education.

Q6: ***Explain molecular level and tissues level.***

Ans: *Molecular level:*

In organisms, bio elements 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 or biomolecule.

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. Biomolecules are classified as micro-molecules and macromolecules. Micro-molecules are with low molecular weight e.g. glucose, water etc. and macromolecules are with high molecular weights e.g. starch, proteins, lipids etc.

Tissue level:

In multicellular organisms, similar cells (performing similar functions) are organized into groups called tissues.

We can define a tissue as a group of similar cells specialized for the performance of a common function. Each cell in a tissue carries on its own life processes (like cellular respiration, protein synthesis), but it also carries on some special processes related to the function of the tissue. There are different types of plant tissues e.g. epidermal tissue, ground tissue, etc. Animal tissues are also of different types e.g. nervous tissue, muscular tissues etc.

Q7: ***Explain the contribution of Muslim Scientists in Biology.***

Ans: *Jabir Bin Hayan* (721-815 AD):

He was born in lran and practiced medicine in Iraq. He introduced experimental investigation in chemistry and also wrote a number of books on plants and animals. His famous books are "Al-Nabatat" and "AI-Haywan".

Abdul Malik Asmai (740-828 AD):

He is considered the first Muslim scientist who studied animals in detail. His famous writings include "Al-Abil (camel)", "Al-Khail (horse)", "Al-Wahoosh (animal)", and "Kalq al-ansan".

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 books "Al-Qanun-fi al-Tib" is known as the canon of medicine in West.

Q8: ***Describe the organ and organ system level with examples.***

Ans: *In higher multicellular organism's more than one type of tissue having related functions are organized together and make a unit, called organ. Different tissues of an organ perform their specific functions and these functions collectively become the functions of that organ.*

For example stomach is an organ specialized for the digestion of proteins and for storing food.

Two major types of tissue are present in its structure. Epithelial (glandular) tissue secretes gastric juice for the digestion of proteins. Muscular tissue performs contractions of stomach walls for grinding of food and moving food to posterior end.

So two tissues perform their specific functions, which collectively become the function of stomach.

The next level of organization in multicellular organisms is the organ system level. Different organs performing related functions are organized together in the form of an organ system. In an organ system, each organ carries out its specific function and the functions of all organs appear as the function of the organ system.

For example, digestive system is an organ system that carries out the process of digestion.

Major organs in its framework are oral cavity, stomach, small intestine, large intestine, liver, and pancreas. All these organs help in the process of digestion. The organ system level is less complex in plants (e.g. root system) as compared to animals. This is due to a greater range of functions and activities in animals than in plants.