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The Invisible Living World: Beyond Our Naked Eye

Fill in the Blanks

1. The basic unit of life is the _____.
2. Robert Hooke used a microscope to observe a thin slice of _____ in 1665.
3. Antonie van Leeuwenhoek is known as the _____ of Microbiology.
4. The three basic parts of a typical cell are the cell membrane, _____ and nucleus.
5. The _____ controls the activities of a cell and regulates its growth.
6. A group of similar cells forms a _____.
7. Bacteria and Amoeba are examples of _____ organisms.
8. The bacterium _____ lives in the root nodules of leguminous plants and helps in nitrogen fixation.
9. _____ is a microorganism used to make bread and cakes soft and fluffy.
10. During fermentation, yeast releases _____ gas, which makes dough rise.

Multiple Choice Questions

1. Who first used the word "cell" to describe the small compartments seen in cork?
 - a) Antonie van Leeuwenhoek
 - b) Robert Hooke
 - c) Louis Pasteur
 - d) Charles Darwin
2. Which part of the cell controls most of its activities?
 - a) Cell wall
 - b) Cytoplasm
 - c) Nucleus
 - d) Vacuole
3. Which structure is present in plant cells but absent in animal cells?
 - a) Cell membrane
 - b) Cytoplasm
 - c) Nucleus
 - d) Cell wall
4. Which of the following is a unicellular organism?
 - a) Human
 - b) Rose plant
 - c) Amoeba
 - d) Mushroom
5. Which instrument is used to observe microorganisms?
 - a) Telescope
 - b) Microscope
 - c) Thermometer
 - d) Barometer
6. Which microorganism helps in making curd?
 - a) Yeast
 - b) Lactobacillus
 - c) Rhizobium
 - d) Amoeba
7. Which microorganism helps in breaking down plant and animal waste?
 - a) Fungi and bacteria
 - b) Viruses only
 - c) Animals only
 - d) Plants only
8. Which microorganism lives in the root nodules of legumes?
 - a) Lactobacillus
 - b) Rhizobium
 - c) Yeast
 - d) Paramecium

9. Which gas is released by yeast during fermentation?
- | | |
|-------------------|-------------|
| a) Oxygen | b) Nitrogen |
| c) Carbon dioxide | d) Hydrogen |
10. Which of the following is a microalga?
- | | |
|--------------|------------------|
| a) Spirulina | b) Amoeba |
| c) Yeast | d) Lactobacillus |

Assertion – Reason Questions

Directions:

- (a) Both A and R are true and R is the correct explanation.
(b) Both A and R are true but R is not the correct explanation.
(c) A is true but R is false.
(d) A is false but R is true.

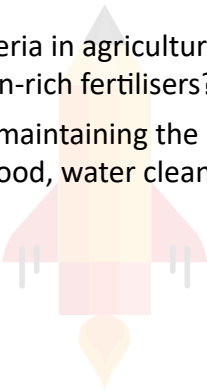
1. Assertion: Plant cells have a rigid structure.
Reason: Plant cells have a cell wall that provides rigidity and strength.
2. Assertion: Nerve cells are long and branched.
Reason: Their shape helps them carry messages to different parts of the body.
3. Assertion: Bacteria have a well-defined nucleus.
Reason: Bacterial cells have a nucleoid instead of a well-defined nucleus.
4. Assertion: Yeast helps make dough soft and fluffy.
Reason: Yeast releases carbon dioxide during the breakdown of food.
5. Assertion: Curd becomes sour when it is left outside for a longer time.
Reason: Lactobacillus produces lactic acid during fermentation.

Short Answer Questions

1. What is a cell? Why is it called the basic unit of life?
2. Who was Robert Hooke? What did he observe using his microscope?
3. What is the function of the cell membrane?
4. What are the functions of the nucleus and cytoplasm?
5. Why do cells have different shapes and structures? Give two examples.
6. What are microorganisms? Name any four groups of microorganisms mentioned in the chapter.
7. Differentiate between unicellular and multicellular organisms with examples.
8. How do microorganisms help in the decomposition of plant and animal waste?
9. What is the role of Lactobacillus in making curd?
10. How does Rhizobium help leguminous plants and improve soil fertility?

Long Answer Questions

1. Describe the structure and functions of the main parts of a typical cell.
2. Differentiate between plant cells, animal cells and bacterial cells on the basis of cell wall, cell membrane, nucleus, nucleoid and chloroplast.
3. Explain the different levels of organisation in the body of a multicellular organism. Give an example of how cells are organised to form a complete organism.
4. Explain how the shape and structure of cells are related to their functions. Describe the roles of cheek cells, muscle cells and nerve cells.
5. What are microorganisms? Describe the different types of microorganisms discussed in the chapter and give suitable examples.
6. Explain how microorganisms help in cleaning the environment and recycling nutrients. Describe the formation of manure from plant waste.
7. Describe the experiment using flour, yeast, sugar and warm water. What changes occur in the dough and why?
8. Explain how curd is formed from milk. Why does curd form faster in warm conditions than in cold conditions?
9. Explain the importance of Rhizobium bacteria in agriculture. Why can farmers growing leguminous crops reduce their dependence on nitrogen-rich fertilisers?
10. Describe the importance of microalgae in maintaining the environment and supporting human life. Mention their role in oxygen production, food, water cleaning and biofuel.



One Point Learning

Answers

Fill in the blanks

1. cell
2. cork
3. Father
4. cytoplasm
5. nucleus
6. tissue
7. unicellular
8. Rhizobium
9. Yeast
10. carbon dioxide

MCQs

1. b) Robert Hooke
2. c) Nucleus
3. d) Cell wall
4. c) Amoeba
5. b) Microscope
6. b) Lactobacillus
7. a) Fungi and bacteria
8. b) Rhizobium
9. c) Carbon dioxide
10. a) Spirulina

Assertion – Reason

1. (a)
2. (a)
3. (d)
4. (a)
5. (a)

Short Questions – Answers

Ans 1. A cell is the basic structural and functional unit of life. All living organisms consist of one or more cells, and cells perform functions necessary for life.

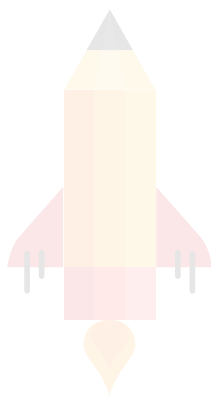
Ans 2. Robert Hooke was a scientist who published Micrographia in 1665. He observed a thin slice of cork under a microscope and saw many small compartments, which he called cells.

Ans 3. The cell membrane encloses the cell contents, separates one cell from another and allows essential materials to enter and waste materials to leave the cell.

Ans 4. The nucleus regulates the activities and growth of the cell. Cytoplasm contains various cell components and is the site of most life processes.

Ans 5. Cells have different shapes and structures because their structures are suited to their specific functions. For example, nerve cells are long and branched to carry messages, while muscle cells are spindle-shaped and help in movement.

Ans 6. Microorganisms are very small living organisms that cannot be seen with the naked eye. Examples include bacteria, protozoa, fungi and algae.



One Point Learning

Ans 7. Unicellular organisms consist of a single cell, such as bacteria and Amoeba. Multicellular organisms consist of many cells, such as plants and animals.

Ans 8. Some bacteria and fungi decompose plant and animal waste into simpler, nutrient-rich substances. These nutrients return to the soil and support plant growth.

Ans 9. Lactobacillus feeds on lactose in milk and ferments it to produce lactic acid. The lactic acid makes the milk turn into curd and gives it a sour taste.

Ans 10. Rhizobium lives in root nodules of legumes such as beans, peas and lentils. It helps trap nitrogen from the air and makes it useful to plants, improving soil fertility.

Long Questions – Answers

Ans 1: Main cell parts:

- Cell membrane: Controls movement of substances into and out of the cell.
- Cytoplasm: Contains cell components and is the site of most life processes.
- Nucleus: Regulates cell activities and growth.
- Cell wall: Present in plant cells; provides strength and rigidity.
- Chloroplast: Contains chlorophyll and helps green plant cells perform photosynthesis.
- Vacuole: Stores substances and helps maintain the shape of plant cells.

Ans 2:

Feature	Animal Cell	Plant Cell	Bacterial Cell
Cell membrane	Present	Present	Present
Cytoplasm	Present	Present	Present
Nucleus	Present	Present	Absent
Nucleoid	Absent	Absent	Present
Cell wall	Absent	Present	Present
Chloroplast	Absent	Present in green cells	Absent

Ans 3: Cell → Tissue → Organ → Organ system → Organism

Similar cells form tissues; tissues combine to form organs; organs work together as organ systems; all organ systems together form a complete organism.

Ans 4: Cells have specialised shapes suited to their functions. Cheek cells are thin and flat and form a protective lining. Muscle cells are spindle-shaped and contract and relax. Nerve cells are long and branched, enabling them to carry messages throughout the body.

Ans 5: Microorganisms are tiny living organisms that cannot normally be seen with the naked eye. The chapter discusses bacteria, protozoa, fungi and algae. Examples include Amoeba and Paramecium (protozoa), yeast and mould (fungi), and various algae. Some microorganisms are unicellular while others are multicellular.

Ans 6: Bacteria and fungi decompose plant and animal waste. They convert complex waste into simpler, nutrient-rich substances. This helps form manure, returns nutrients to the soil and supports plant growth. Thus, microorganisms help recycle nutrients and clean the environment.

Ans 7: Yeast is added to flour along with sugar and warm water. After several hours in a warm place, the dough containing yeast becomes slightly larger, fluffy and develops a different smell. Yeast breaks down food and releases carbon dioxide. The gas forms bubbles in the dough, making it soft and fluffy.