



Class 9 Science Chapter 2 – Important Questions



Cell: The Building Block of Life



New NCERT *Exploration* | 2026–27

These questions are aligned with the **new Chapter 2** of *Exploration*, covering **cell study and microscopy, cell structure, cell membrane, diffusion and osmosis, prokaryotic and eukaryotic cells, cell organelles, plant and animal cells, cell division, mitosis, meiosis and uncontrolled cell division/cancer.**



SECTION A – VERY SHORT ANSWER QUESTIONS

1. What is a cell?
2. Why is the cell called the basic structural and functional unit of life?
3. Who first observed cells?
4. Why are microscopes useful for studying cells?
5. What is the cell membrane?
6. What is the main function of the cell membrane?
7. What is cytoplasm?
8. What is the nucleus?
9. What is genetic material?
10. What is a chromosome?

11. What is a gene?
 12. What is a prokaryotic cell?
 13. What is a eukaryotic cell?
 14. What is a nucleoid?
 15. What are membrane-bound organelles?
 16. What is diffusion?
 17. What is osmosis?
 18. What is a selectively permeable membrane?
 19. What is a cell wall?
 20. What is a vacuole?
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SECTION B – CELL STRUCTURE & ORGANELLES

21. Name the main structures present in a typical cell.
22. What is the function of the nucleus?
23. Why is the nucleus called the control centre of the cell?
24. What is the role of chromosomes?
25. What are genes?
26. What is the function of the cytoplasm?
27. What is the role of mitochondria?

28. Why are mitochondria called the powerhouses of the cell?
29. What is the function of ribosomes?
30. What is the function of the endoplasmic reticulum?
31. Distinguish between rough endoplasmic reticulum and smooth endoplasmic reticulum.
32. What is the function of the Golgi apparatus?
33. What are lysosomes?
34. Why are lysosomes sometimes called the "suicidal bags" of the cell?
35. What is the function of vacuoles?
36. What is cell sap?
37. What are plastids?
38. Name the different types of plastids.
39. What is the function of chloroplasts?
40. What is the role of leucoplasts?

The chapter specifically includes **plastids, vacuoles and their functions** among the major cell structures.



SECTION C – PLANT CELL & ANIMAL CELL

41. What are the main differences between plant and animal cells?
42. Why do plant cells have a cell wall?

43. Why are chloroplasts present in plant cells but generally absent in animal cells?
44. Why is the central vacuole usually large in a mature plant cell?
45. What is the function of the cell wall?
46. How does the cell wall differ from the cell membrane?
47. Name two structures found in plant cells but not typically found in animal cells.
48. Why do animal cells generally have smaller vacuoles?
49. Compare plant and animal cells on the basis of:
- Cell wall
 - Chloroplasts
 - Vacuoles
 - Shape
50. Draw and label a typical plant cell.
51. Draw and label a typical animal cell.
52. Why can a plant cell maintain a relatively fixed shape while an animal cell can change shape more easily?
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SECTION D – PROKARYOTIC & EUKARYOTIC CELLS

53. What is the major difference between prokaryotic and eukaryotic cells?
54. What is meant by a well-defined nucleus?
55. Where is the genetic material located in a prokaryotic cell?
56. Why are prokaryotic cells generally simpler in organisation?

- 57. Why are eukaryotic cells called "true nucleus" cells?**
- 58. Give two examples of prokaryotic organisms.**
- 59. Give two examples of eukaryotic organisms.**
- 60. Differentiate between prokaryotic and eukaryotic cells.**
- 61. Why are membrane-bound organelles generally absent in prokaryotic cells?**
- 62. A cell has a cell membrane and cytoplasm but no membrane-bound nucleus. What type of cell is it? Give a reason.**

The textbook gives the key comparison: prokaryotes lack a membrane-bound nucleus and membrane-bound organelles, whereas eukaryotes possess them.



SECTION E – DIFFUSION & OSMOSIS

- 63. What is diffusion?**
- 64. In which direction do particles generally move during diffusion?**
- 65. What is osmosis?**
- 66. How is osmosis different from diffusion?**
- 67. Why is a selectively permeable membrane important in osmosis?**
- 68. What happens to a plant cell when it gains water by osmosis?**
- 69. What happens to a plant cell when it loses water?**
- 70. Why may a plant wilt when it does not receive enough water?**
- 71. Why do cells need diffusion and osmosis?**

72. What would happen if the cell membrane were freely permeable to all substances?

73. Explain osmosis using the example of a raisin placed in water.

74. What happens when a plant cell is placed in a concentrated salt solution?

75. Why does water move across a selectively permeable membrane during osmosis?

The chapter specifically connects osmosis with water movement through a selectively permeable membrane and explains that loss of water can reduce cell firmness.



SECTION F – CELL DIVISION

76. What is cell division?

77. Why is cell division necessary for multicellular organisms?

78. How does cell division help in growth?

79. How does cell division help in repair?

80. What is mitosis?

81. What is meiosis?

82. How many daughter cells are generally produced by mitosis?

83. How many daughter cells are generally produced by meiosis?

84. What happens to chromosome number during meiosis?

85. Why is mitosis important for growth and repair?

86. Why is meiosis important for sexual reproduction?

87. How does meiosis contribute to genetic diversity?
88. Differentiate between mitosis and meiosis.
89. Why must chromosome number be reduced during meiosis?
90. Why is uncontrolled cell division harmful?
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SECTION G – MITOSIS & MEIOSIS

91. Compare mitosis and meiosis with respect to:
- Number of daughter cells
 - Chromosome number
 - Genetic similarity
 - Function
92. Why are daughter cells formed by mitosis generally genetically similar?
93. Why are cells produced through meiosis genetically different?
94. Which type of cell division is involved in producing cells for sexual reproduction?
95. Which type of cell division is mainly involved in growth and repair?
96. What would happen if meiosis did not reduce the chromosome number?
97. Why is genetic variation important for organisms?
98. Explain how mitosis maintains chromosome number.
99. Explain how meiosis helps maintain chromosome number across generations.
100. A body cell divides to produce two similar daughter cells. Identify the type of cell division and explain your answer.



SECTION H – CANCER & UNCONTROLLED CELL DIVISION

101. What is uncontrolled cell division?

102. What is cancer?

103. How are cancer cells different from normal cells?

104. Why is uncontrolled cell division dangerous?

105. How can uncontrolled growth of cells affect surrounding tissues?

106. Why is regulation of cell division important for maintaining a healthy body?

107. What can happen if the normal controls over cell division fail?

The chapter identifies **loss of control over cell division** as a key characteristic of cancer cells.



SECTION I – APPLICATION-BASED QUESTIONS

108. A student observes an onion peel under a microscope.

Answer the following:

- a) What type of cells would the student observe?
 - b) Which structure gives the cells their definite shape?
 - c) Which large structure is usually visible inside a mature plant cell?
 - d) Why is staining sometimes used while observing cells?
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109. A student places raisins in plain water and observes them after several hours.

- a) What happens to the raisins?
 - b) Which process is responsible?
 - c) Why does water enter the raisins?
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110. A plant is watered with a very concentrated salt solution and soon begins to wilt.

- a) What happens to water in the plant cells?
 - b) Which process is involved?
 - c) Why do the cells lose firmness?
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111. A scientist observes a cell with DNA but no membrane-bound nucleus.

- a) Is the cell prokaryotic or eukaryotic?
 - b) Where is its genetic material located?
 - c) Would you expect membrane-bound organelles?
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112. A cell contains chloroplasts, a cell wall and a large central vacuole.

- a) Is it a plant or animal cell?
 - b) What is the function of chloroplasts?
 - c) What is the function of the large vacuole?
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113. A cell divides to produce four cells, each with half the chromosome number of the parent cell.

- a) Identify the process.
 - b) Why is this process important?
 - c) How does it contribute to sexual reproduction?
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SECTION J – COMPETENCY-BASED QUESTIONS

114. Case Study – Cell Membrane

A student places a cell in a solution and notices that water moves across the cell membrane.

Answer:

- a) Name the process.
 - b) What type of membrane is involved?
 - c) Which substance is moving?
 - d) Why is this process important to cells?
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115. Case Study – Plant Cell

A plant cell has a cell wall, chloroplasts and a large central vacuole.

- a) Identify the type of cell.
 - b) Which structure provides rigidity?
 - c) Which organelle carries out photosynthesis?
 - d) What is stored in the vacuole?
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116. Case Study – Cell Division

A growing child needs new cells for growth and replacement of damaged cells.

- a) Which type of cell division is mainly involved?
 - b) How many daughter cells are generally produced?
 - c) Are the daughter cells generally genetically similar?
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117. Case Study – Cancer

A group of cells begins dividing continuously without responding to normal controls.

- a) What condition may result?
- b) What is abnormal about these cells?
- c) Why can uncontrolled division be harmful?



SECTION K – HIGHER-ORDER THINKING QUESTIONS

118. Why is the cell membrane described as a selective barrier rather than simply a covering?

119. Why would a cell become unable to function properly if its nucleus were damaged?

120. Why do cells need specialised organelles?

121. Why can a large multicellular organism not function as one giant cell?

122. Why is compartmentalisation useful in eukaryotic cells?

123. Why are mitochondria essential even though they are not found only in one particular type of organism?

124. Why is the presence of chloroplasts linked to the mode of nutrition in plants?

125. Why would a plant cell be more likely than an animal cell to withstand changes in shape?

126. Why is osmosis important for maintaining the water balance of cells?

127. Why would uncontrolled cell division be more serious in a multicellular organism than in a single-celled organism?



SECTION L – LONG ANSWER QUESTIONS

128. Describe the structure of a typical cell and explain the functions of its major organelles.

129. Explain the differences between plant and animal cells with a suitable labelled diagram.

130. Explain the differences between prokaryotic and eukaryotic cells.

131. Explain diffusion and osmosis with suitable examples.

132. Explain the structure and functions of the cell membrane.

133. Explain the structure and functions of the nucleus, mitochondria, ribosomes, endoplasmic reticulum and Golgi apparatus.

134. Explain the role of plastids and vacuoles in plant cells.

135. Explain cell division and its importance in the life of an organism.

136. Differentiate between mitosis and meiosis.

137. Explain why meiosis is important for sexual reproduction and genetic variation.

138. Explain how uncontrolled cell division can lead to cancer.

MOST IMPORTANT QUESTIONS FOR EXAM

If students have limited time, **these should be prepared first:**

★ **1. Why is the cell called the basic structural and functional unit of life?**

★ **2. Draw and label a plant cell.**

★ **3. Draw and label an animal cell.**

★ **4. Differentiate between plant and animal cells.**

- ★ 5. Differentiate between prokaryotic and eukaryotic cells.
 - ★ 6. Explain the functions of the major cell organelles.
 - ★ 7. What is diffusion? What is osmosis? Differentiate between them.
 - ★ 8. Explain what happens to a plant cell when it loses or gains water.
 - ★ 9. Explain the importance of mitochondria, chloroplasts and vacuoles.
 - ★ 10. What is cell division? Why is it important?
 - ★ 11. Differentiate between mitosis and meiosis.
 - ★ 12. Why is meiosis important for sexual reproduction?
 - ★ 13. What is uncontrolled cell division? How is it related to cancer?
 - ★ 14. Explain the importance of the nucleus and chromosomes.
 - ★ 15. A cell has no membrane-bound nucleus. Identify it and explain its characteristics.
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QUICK REVISION BOX

-  **Cell** → Basic structural and functional unit of life
-  **Nucleus** → Contains genetic material and controls cellular activities
-  **Cell wall** → Provides rigidity and support in plant cells
-  **Cell membrane** → Selectively controls movement of substances
-  **Vacuole** → Storage; helps maintain cell firmness
-  **Mitochondria** → Major site of energy release
-  **Chloroplast** → Photosynthesis
-  **Ribosome** → Protein synthesis
-  **Golgi apparatus** → Modification, packaging and transport
-  **Endoplasmic reticulum** → Synthesis and transport of cellular materials

 **Lysosome** → Digestion/breakdown of unwanted materials

 **Prokaryotic** → No membrane-bound nucleus

 **Eukaryotic** → Membrane-bound nucleus and organelles

 **Diffusion** → Movement of particles from higher to lower concentration

 **Osmosis** → Movement of water through a selectively permeable membrane

 **Mitosis** → Growth, repair; generally two similar daughter cells

 **Meiosis** → Sexual reproduction; chromosome number reduced; variation

 **Cancer** → Uncontrolled cell division

The chapter's core coverage confirms these as the major examinable themes.

TOP 10 MUST-PRACTISE

1.  **Plant cell labelled diagram**
2.  **Animal cell labelled diagram**
3.  **Prokaryotic vs eukaryotic cells**
4.  **Plant vs animal cells**
5.  **Functions of cell organelles**
6.  **Diffusion vs osmosis**
7.  **Nucleus, chromosomes and genes**
8.  **Mitosis vs meiosis**
9.  **Importance of meiosis and variation**
10.  **Uncontrolled cell division and cancer**