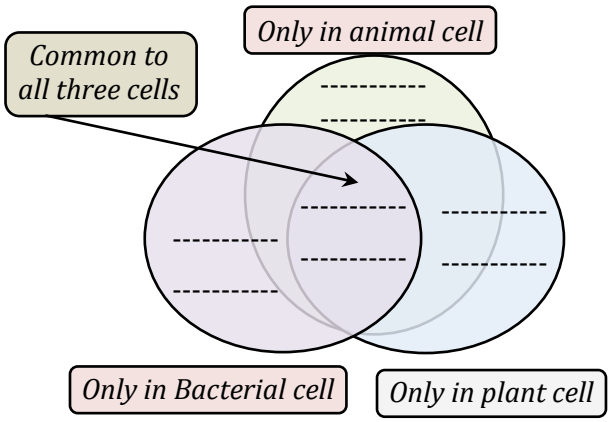
NCERT QUESTIONS WITH SOLUTIONS

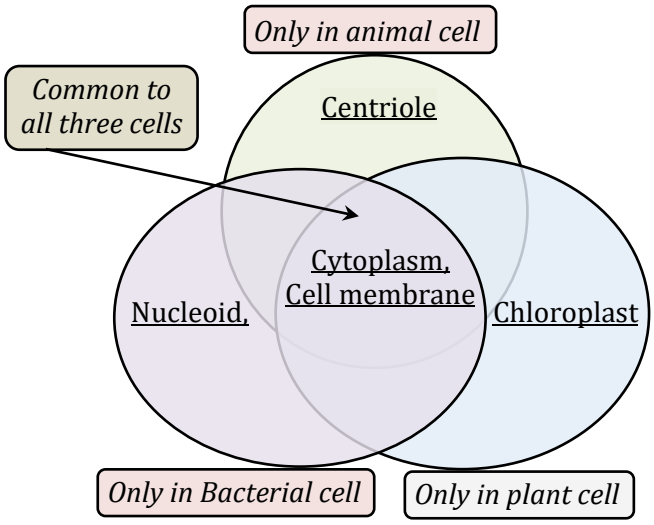
1. Various parts of a cell are given below.

Write them in the appropriate places in the following diagram.

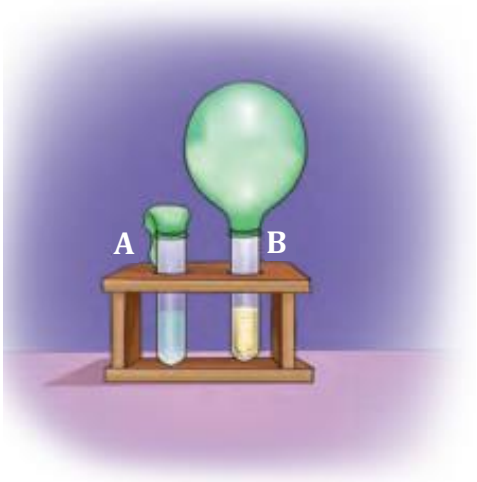


Nucleus
Chloroplast
Cell membrane
Centriole
Cytoplasm
Cell wall
Nucleoid

Ans.



2. Aanandi took two test tubes and marked them A and B. She put two spoonfuls of sugar solution in each of the test tubes. In test tube B, she added a spoonful of yeast. Then she attached two incompletely inflated balloons to the mouth of each test tube. She kept the set-up in a warm place, away from sunlight.



Experimental set-up

(i) What do you predict will happen after 3–4 days? She observed that the balloon attached to test tube B was inflated. What can be a possible explanation for this?

(a) Water evaporated in test tube B and filled the balloon with the water vapour.

(b) The warm atmosphere expanded the air inside the test tube B, which inflated the balloon.

(c) Yeast produced a gas inside the test tube B which inflated the balloon.

(d) Sugar reacted with warm air, which produced gas, eventually inflating the balloon.

(ii) She took another test tube, 1/4 filled with lime water. She removed the balloon from test tube B in such a manner that the gas inside the balloon did not escape. She attached the balloon to the test tube with lime water and shook it well. What do you think she wants to find out?

Ans. **(i)** **Prediction:** After 3–4 days, the balloon on test tube B will become inflated, while the balloon on tube A will remain mostly the same.

The balloon attached to test tube B will become inflated because yeast in that test tube ferments the sugar solution, producing carbon dioxide gas (CO_2). This gas collects and inflates the balloon. So, the answer is option (c) Yeast produced a gas inside the test tube B which inflated the balloon.

(ii) Aanandi wants to find out which gas was collected in the balloon by using lime water. The gas present in the balloon was produced by the yeast in the test tube B. If the lime water turns milky, it shows that carbon dioxide is present. This is a common test used to check for carbon dioxide and helps prove that yeast ferments sugar to produce carbon dioxide gas.

3. A farmer was planting wheat crops in his field. He added nitrogen-rich fertiliser to the soil to get a good yield of crops. In the neighbouring field, another farmer was growing bean crops, but she preferred not to add nitrogen fertiliser to get healthy crops. Can you think of the reasons?

Ans. Yes, there is a clear reason for the difference in their approach:

Bean plants are a type of legume, just like peas and lentils. These leguminous plants have special bacteria called *Rhizobium* in their root nodules.

Rhizobium is in symbiotic association with leguminous plant. It converts atmospheric nitrogen into a form that plants can absorb and this process is known as nitrogen fixation. Because of this natural process the farmer growing beans didn't need to add nitrogen fertilizer. On the other hand, wheat plants don't have these bacteria, so the farmer growing wheat plants needs to add nitrogen fertilizer to make sure the plants got enough nutrients for healthy growth and a good harvest.

4. Snehal dug two pits, A and B, in her garden. In pit A, she put fruit and vegetable peels and mixed it with dried leaves. In pit B, she dumped the same kind of waste without mixing it with dried leaves. She covered both the pits with soil and observed after 3 weeks. What is she trying to test?

Ans. Snehal is trying to find out how dried leaves help in the process of decomposition and manure formation. She put the same kitchen waste in both pits, but in pit A, she mixed in dried leaves, while in pit B, she didn't. Dried leaves are rich in carbon and help balance the carbon and nitrogen ratio, which is important for decomposition. It also improves air flow in the pit and creates a better environment for microorganisms to work. This helps speed up the breakdown of waste and results in faster and better manure formation. After 3 weeks, Snehal can compare which pit has decomposed better and produced good compost.

5. Identify the following microorganisms:

(i) I live in every kind of environment, and inside your gut.

(ii) I make bread and cakes soft and fluffy.

(iii) I live in the roots of pulse crops and provide nutrients for their growth.

Ans. (i) Bacteria.

(ii) Yeast.

(iii) Rhizobium

6. Devise an experiment to test that microorganisms need optimal temperature, air, and moisture for their growth.

Ans. To test that microorganisms, need optimal temperature, air, and moisture for their growth, you can perform this experiment –

(i) Take three slices of bread and keep them in different conditions.

(ii) Keep the first slice in a warm place with moisture and air (for example, in a moist paper towel).

(iii) Keep the second slice in the refrigerator (cold temperature).

(iv) Keep the third slice inside an airtight container to cut off air supply.

(v) Observe the slices after 3-4 days.

Observation:

- The bread kept in warm, moist conditions with air will show growth of microorganisms like fungi as mould spots.
- The bread in the refrigerator will show little or no microbial growth because of low temperature.
- The bread in the airtight container will also show little or no growth because microorganisms need air (oxygen) to grow.

Conclusion: Microorganisms require optimal temperature (warmth), moisture, and air for their growth.

7. Take 2 slices of bread. Place one slice in a plate near the sink. Place the other slice in the refrigerator. Compare after three days. Note your observations. Give reasons for your observations

Ans. Observation: After three days, the bread slice kept near the sink will develop mould (fungi), with patches of green or black spots. while the bread slice stored in the refrigerator will have little or no mould growth.

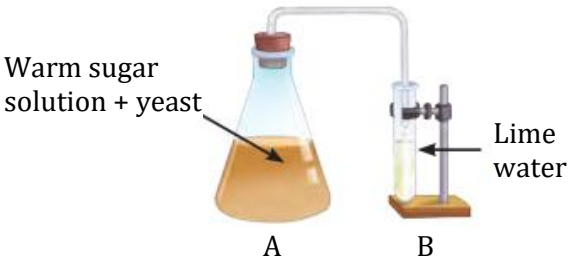
Reason: This happens because fungi and other microorganisms grow faster in warm and moist environments, like near the sink. The cold temperature in the refrigerator slows down their growth, so the bread stays mostly fresh.

8. A student observes that when curd is left out for a day, it becomes more sour. What can be two possible explanations for this observation?

Ans. Lactic acid formation: When curd is left out for a day it becomes more sour because the lactic acid bacteria present in the curd continue to ferment the lactose (milk sugar) into lactic acid. This increased acidity makes the curd taste more sour over time.

Warm temperature: it helps the bacteria grow and multiply faster, speeding up the fermentation process and causing the curd to become sourer over time.

9. Observe the set-up given in Fig. and answer the following questions.



Experimental set-up

(i) What happens to the sugar solution in flask A?

(ii) What do you observe in test tube B after four hours? Why do you think this happened?

(iii) What would happen if yeast was not added in flask A?

Ans. (i) In flask A, the yeast ferments the sugar solution (glucose) in the absence of oxygen, producing alcohol (ethanol) and carbon dioxide gas. This process is called fermentation.

(ii) After four hours, the lime water in test tube B turns milky because the carbon dioxide gas produced in flask A travels through the delivery tube and reacts with the lime water. This reaction forms calcium carbonate, which gives the lime water its milky appearance.

(iii) If yeast was not added to flask A, fermentation would not take place. As a result, no alcohol or carbon dioxide would be produced, so the sugar solution would remain the same. Consequently, the lime water in test tube B would stay clear, showing that carbon dioxide is needed to make the lime water turn milky.