Greenfields Public School

Dilshad Garden

Summer Holiday Homework

(Biochemistry)

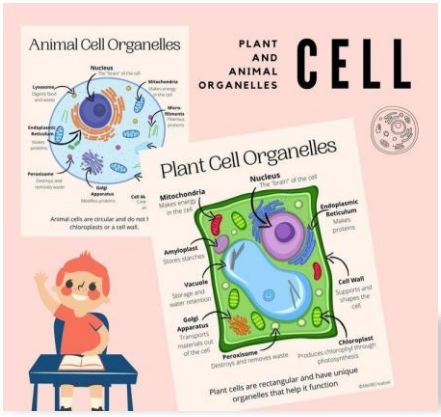
Class-IX

- "Inside the Cell: A 3D Journey Through Organelles"

- You will work in groups of five to design and construct working 3D models of any one cell organelles.
- Each group member will be responsible for researching and creating work, while supporting others in overall presentation and design

Organelles to Choose from:

- Nucleus
- Mitochondria
- Endoplasmic Reticulum (Smooth or Rough)
- Golgi Apparatus
- Lysosome
- Ribosome
- Chloroplast (plant cell only)
- Vacuole
- Cell Membrane
- Cytoplasm
- Cell Wall (plant cell only)



🛠️ Model Guidelines:

- Use eco-friendly or craft materials (clay, cardboard, recycled items, etc.)
- Each organelle model must:
  - Be clearly labeled
  - Be three-dimensional and presentable
  - Include some form of "working" element (e.g., movable parts, lights, or interaction)

📝 Written Report (1–2 Pages per Group):

Attach a brief group report including:

- Names and roles of each group member
- A description of organelle modeled
- Its function and location (plant/animal/both cells)
- A labeled diagram or photo of model
- One interesting fact about organelle

➢ "Save the Ship" Infographic (Environmental Art & Graphic Design)

Oil spills in oceans create a massive heterogeneous mixture that threatens marine life, requiring large-scale physical separation.
Research how environmental engineers separate oil from water during a major ocean spill (focusing on techniques like skimming, centrifugation, or using oil-absorbing materials).

Art Integration:** Design a visually striking **Poster or Digital Infographic** on the given topic.

Balance your poster with powerful imagery of marine life alongside detailed, labeled scientific diagrams of the separation machinery. Focus on neat layouts, bold titles, and a clear color-coded key explaining the density differences that allow oil to float on water.

Additional Worksheet

2 Chapter

Cell: The Building Block of Life

WORKSHEET 2D

Name:_____ Date:_____ Class:_____

A. TICK (✓) THE CORRECT OPTION

1. Which of the following is NOT a feature of plant cells?
   (a) Cell wall composed of cellulose. (b) Presence of chloroplasts.
   (c) Multiple small vacuoles. (d) Mitochondria for energy production.
2. Which of the following is true regarding the endoplasmic reticulum (ER)?
   (a) The rough ER synthesises lipids and detoxifies poisons.
   (b) The smooth ER synthesises proteins and packages them in vesicles.
   (c) The rough ER has ribosomes on its surface and is involved in protein synthesis.
   (d) The smooth ER is primarily responsible for cell division.
3. What is the result of mitosis in a somatic cell?
   (a) Two genetically identical cells with half the chromosome number.
   (b) Two genetically identical cells with the same chromosome number as the parent.
   (c) Four genetically diverse cells.
   (d) Two genetically diverse cells with a half chromosome number.

B. ASSERTION-REASON BASED QUESTIONS

The following question consists of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

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

4. **Assertion (A):** The presence of chloroplasts in plant cells enables photosynthesis.
   Reason (R): Chloroplasts contain mitochondria, which convert sunlight into chemical energy. _____
5. **Assertion (A):** The cell theory states that cell is the basic unit of life.
   Reason (R): Robert Hooke is credited with discovering the cell in 1665. _____

C. VERY SHORT ANSWER TYPE QUESTIONS

6. How does the lipid bilayer contribute to the selective permeability of the cell membrane?

   _____

7. Explain in brief the role of lysosomes in cellular waste disposal.

   _____

9. What are the consequences if mitosis proceeds without proper chromosome segregation?

E. LONG ANSWER TYPE QUESTIONS

10. Describe the processes of active and passive transport in cells. How do these processes differ in terms of energy use, and what types of molecules are transported through each mechanism?

11. How do the rough and smooth endoplasmic reticulum and the Golgi apparatus play roles in processing and modifying the synthesised proteins?

F. CASE STUDY BASED QUESTIONS

Read the given passage and answer the following questions:

12. A plant undergoes excessive water loss due to high temperatures. The stomata in the plant's leaves are op and water is rapidly evaporating through transpiration. Upon closer inspection, the plant shows signs of wilt and dehydration.

(a) How does the temperature influence the rate of osmosis indirectly in plant cells?

(b) How might the structure of the plant's epidermis help in reducing excessive water loss?

(c) What adaptations could this plant have evolved to minimise water loss under high temperatures?

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5 Chapter

Exploring Mixtures and their Separation

WORKSHEET 5B

Topics Covered: 5.3 – Methods of Separation of Homogeneous Mixtures
5.4 – How to Separate the Components of Heterogeneous Mixtures

Name:_____ Date:_____ Class:_____

A. TICK (✓) THE CORRECT OPTION

1. A mixture of sand and common salt is dissolved in water and then filtered. The residue left on the filter paper is dried, and the filtrate is vapourised and then condensed. Which techniques are used in this process?
   (a) Filtration and distillation (b) Filtration and evaporation
   (c) Sedimentation and filtration (d) Crystallisation and distillation
2. A mixture contains naphthalene and salt. Which technique would be the most appropriate to separate naphthalene from the mixture?
   (a) Sublimation (b) Evaporation (c) Filtration (d) Sedimentation
3. Which option is correctly applicable for the separation of these sample mixtures?

	Sample A	Sample B	Sample C
Mixture	Camphor and Sand	Copper Sulphate and Water	Oil and Water

   (a) A - Sublimation, B - Crystallisation, C - Separating funnel
   (b) A - Sieving, B - Distillation, C - Evaporation
   (c) A - Sublimation, B - Sedimentation, C- Chromatography
   (d) A - Magnetic separation, B - Distillation, C - Sublimation
4. A laboratory setup shows a flask connected to a condenser and a receiving flask where vapour condenses into liquid. Which process is being demonstrated?
   (a) Evaporation (b) Distillation (c) Chromatography (d) Sublimation

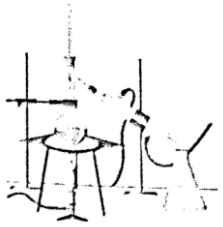
B. ASSERTION-REASON BASED QUESTIONS

The following question consists of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

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

5. **Assertion (A):** Centrifugation can separate very fine suspended particles from liquids.
   Reason (R): Centrifugation involves rapid spinning to increase the rate of settling of heavier particles. ____
6. **Assertion (A):** Distillation can be used to obtain pure water from seawater.
   Reason (R): Distillation separates components based on the differences in their boiling points. ____

8. A diagram shows a round-bottom flask being heated, connected to a condenser with running cold water, and a receiving flask collecting liquid. **[CBQ]**



(a) Identify the separation technique being used.

(b) Which physical property of liquids is used in this method?

(c) Name one real-life application of this technique.

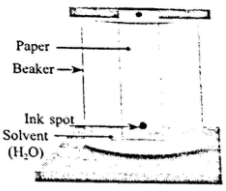
D. LONG ANSWER TYPE QUESTION

9. How do you separate a mixture of two immiscible liquids? Name the process and write the principle involved. Illustrate the steps to be followed with an example.

E. CASE STUDY BASED QUESTIONS

Read the given passage and answer the following questions:

10. A student performs an experiment to separate the colours present in a black ink sample using filter paper and water as solvent. After some time, distinct different coloured spots appear at different heights on the paper. **[CBQ]**



(a) Name the separation technique used.

(b) What role does the solvent play in this process?

(c) Why do different colours travel different distances on the paper?

(d) Give one real-life application of this technique.