Answer Key - Grades 10

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cell wall is a rigid outer layer found in plant cells, outside the cell membrane. It provides structural support, protection, and maintains the shape of the plant cell. This strong, rigid structure is what allows plants, like wheat, to stand upright and resist external forces like wind, unlike animal cells which lack a cell wall and are more flexible. Answer 2 Correct Answer: C Explanation: Chloroplasts are the organelles in plant cells that contain chlorophyll and are the sites of photosynthesis. During photosynthesis, light energy is converted into chemical energy (glucose), which is then used for the plant's growth and development. This process is fundamental to agriculture and the production of food crops like rice and wheat, which were central to the success of the Green Revolution. Answer 3 Correct Answer: B Explanation: The large central vacuole in a mature plant cell stores water, nutrients, and waste products. When the plant has sufficient water, the vacuole swells and pushes against the cell wall, creating turgor pressure. This pressure makes the cell firm and causes the plant to stand upright. When water is scarce, the vacuole loses water, turgor pressure drops, and the plant wilts. Watering replenishes the vacuole, restoring turgor. Answer 4 Correct Answer: C Explanation: Plant cells are distinctly characterized by the presence of a rigid cell wall (for structural support), chloroplasts (for photosynthesis), and a large, permanent central vacuole (for storage and turgor pressure). While both plant and animal cells have a nucleus and mitochondria, and both have a cell membrane, the combination of a cell wall, chloroplasts, and a large central vacuole is unique to plant cells, making them easily distinguishable from animal cells. Answer 5 Correct Answer: D Explanation: Starch, the primary energy storage carbohydrate in plants, is stored in specialized plastids, particularly amyloplasts. Amyloplasts are a type of leucoplast (a non-pigmented plastid) found in plant cells, especially in storage organs like roots (e.g., potato), seeds (e.g., wheat), and fruits. This storage allows plants to reserve energy for future use, and it is this stored starch that humans consume in foods like roti and aloo gobi.