

Name: _____ Date: _____

Answer Key: Operation Organelle: A 5th Grade Mission to Save the Cellular City

Imagine the cell as a high-tech metropolis; students must analyze how power grids and security gates prevent a total infrastructure collapse.

1. If a plant cell were a sprawling factory, which organelle acts as the solar panel array, capturing sunbeams to manufacture glucose fuel?

Answer: B) The Chloroplasts

Chloroplasts contain chlorophyll which captures light energy for photosynthesis, a process unique to producers like plants.

2. A cell membrane is compared to a drawbridge because it is 'selectively permeable,' meaning it intentionally decides which substances can enter or exit.

Answer: A) True

Selective permeability is a critical concept where the membrane maintains homeostasis by regulating the passage of molecules.

3. Without the _____, a cell would lose its blueprints and be unable to direct the construction of new proteins or replicate itself.

Answer: C) Nucleus

The nucleus houses the DNA, which serves as the master instruction manual for all cellular activities and reproduction.

4. In a high-energy muscle cell, you would expect to see a much higher concentration of which 'power plant' organelle to sustain movement?

Answer: B) Mitochondria

Mitochondria perform cellular respiration to produce ATP; cells with high energy demands require more of them.

5. The _____ acts like a postal shipping center, modifying and tagging protein 'packages' before sending them to their final destination.

Answer: A) Golgi Apparatus

Name: _____ **Date:** _____

The Golgi apparatus is responsible for sorting, packaging, and distributing proteins and lipids produced by the cell.

6. If a scientist observes a cell under a microscope and sees a thick, rigid outer boundary and a giant water-filled sac, what is the most likely source?

Answer: C) An oak tree leaf

The 'thick boundary' is a cell wall and the 'water sac' is a large central vacuole, both of which are defining features of plant cells.

7. Lysosomes are the 'recycling technicians' of the cell, using chemicals to break down old cell parts and waste materials.

Answer: A) True

Lysosomes contain digestive enzymes that break down metabolic waste and damaged organelles to keep the cell clean.

8. Ribosomes are like tiny assembly lines that build _____ based on instructions received from the nucleus.

Answer: B) Proteins

Ribosomes translate genetic code into chains of amino acids to create functional proteins for the organism.

9. Which organelle serves as a vast transportation network, moving materials through the cell like a system of tunnels or conveyor belts?

Answer: C) Endoplasmic Reticulum

The Endoplasmic Reticulum (ER) provides a surface for chemical reactions and a pathway for moving substances throughout the cell.

10. The cytoplasm is just empty space inside the cell that allows organelles to rattle around freely.

Answer: B) False

Cytoplasm is a jelly-like substance that provides structural support and contains the cytoskeleton which keeps organelles in place.