

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Answer Key: Cytoplasmic Quest: A 6th Grade Organelle Systems Mission

Comparative analysis, cellular logistics, and energy transformations — this 10-question challenge applies organelle roles to specialized biological systems.

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**1. In a leaf cell responsible for photosynthesis, which organelle acts like a solar panel to capture light energy and convert it into sugar?**

**Answer:** B) Chloroplast

Chloroplasts contain chlorophyll which absorbs solar energy to produce glucose, a process unique to plant and algal cells.

**2. Just as a central warehouse stores and ships products, the \_\_\_\_ modifies and packages proteins into vesicles for delivery to specific locations.**

**Answer:** C) Golgi Apparatus

The Golgi apparatus functions as the cell's processing and distribution center for proteins synthesized in the ER.

**3. Unlike animal cells, plant cells possess a rigid cell wall located outside of the cell membrane for structural support.**

**Answer:** A) True

The cell wall provides the mechanical strength and protection necessary for plants to grow upright without a skeleton.

**4. A scientist observes a cell with a very high number of mitochondria. Based on this evidence, what is the most likely function of this cell?**

**Answer:** D) Performing tasks that require high energy

Mitochondria are the 'powerhouses' of the cell; cells that work hard, like muscle cells, require more mitochondria to produce ATP.

**5. How does the function of a Vacuole differ between a typical animal cell and a mature plant cell?**

**Answer:** A) Plants have one large central vacuole for water pressure; animals have several small ones.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

The large central vacuole in plants maintains turgor pressure, keeping the plant from wilting, whereas animal vacuoles are smaller and more varied.

**6. The \_\_\_\_ is a jelly-like substance that fills the space within the cell and provides a medium for chemical reactions to occur.**

**Answer:** B) Cytoplasm

The cytoplasm suspends the organelles and contains the various molecules needed for cellular metabolism.

**7. Ribosomes are only found floating freely in the cytoplasm; they never attach to other organelles.**

**Answer:** B) False

Ribosomes can be free-floating or attached to the Endoplasmic Reticulum, creating the 'Rough ER' specifically for protein transport.

**8. If the Nucleus is compared to a city hall, which of the following best describes its primary 'administrative' role?**

**Answer:** C) It contains the instructions for all cellular activities.

The nucleus houses DNA, which serves as the genetic blueprint directing growth, metabolism, and reproduction.

**9. In the human immune system, white blood cells use \_\_\_\_ to digest and destroy invading bacteria.**

**Answer:** A) Lysosomes

Lysosomes contain digestive enzymes that break down waste, old cell parts, and foreign invaders like bacteria.

**10. The Cell Membrane is 'selectively permeable,' meaning it only allows certain substances to pass through while blocking others.**

**Answer:** A) True

Selective permeability is essential for maintaining homeostasis, allowing the cell to regulate its internal environment.