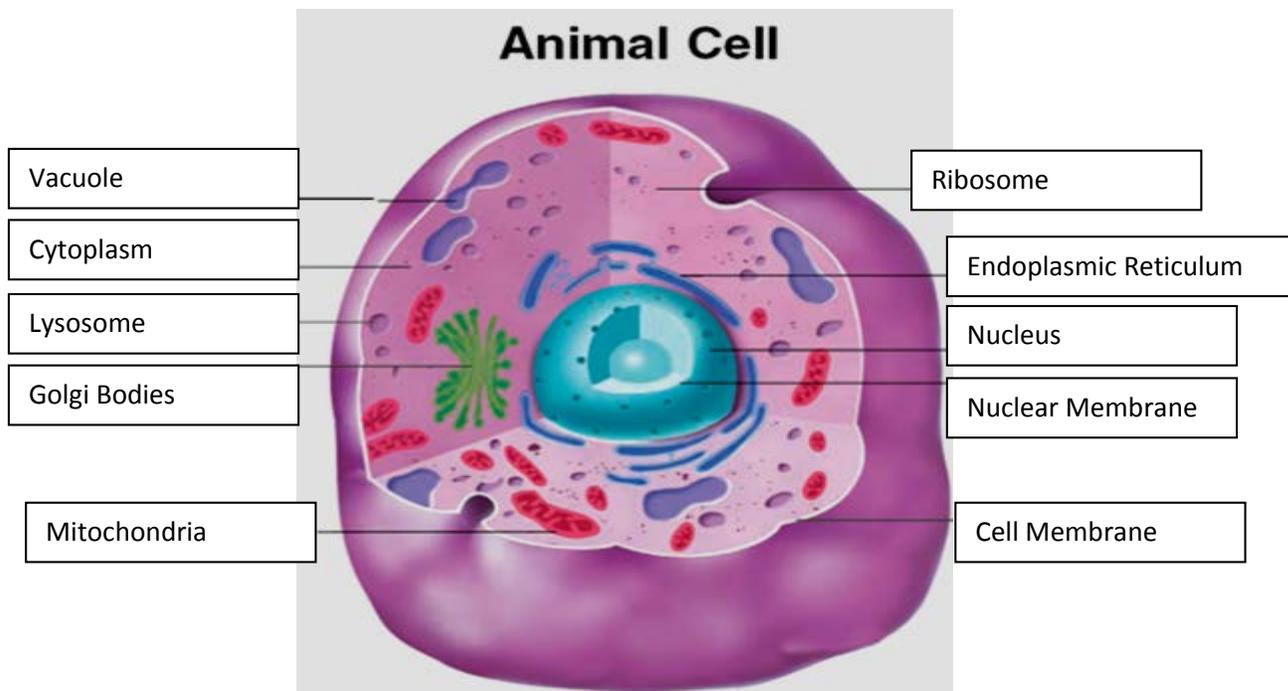


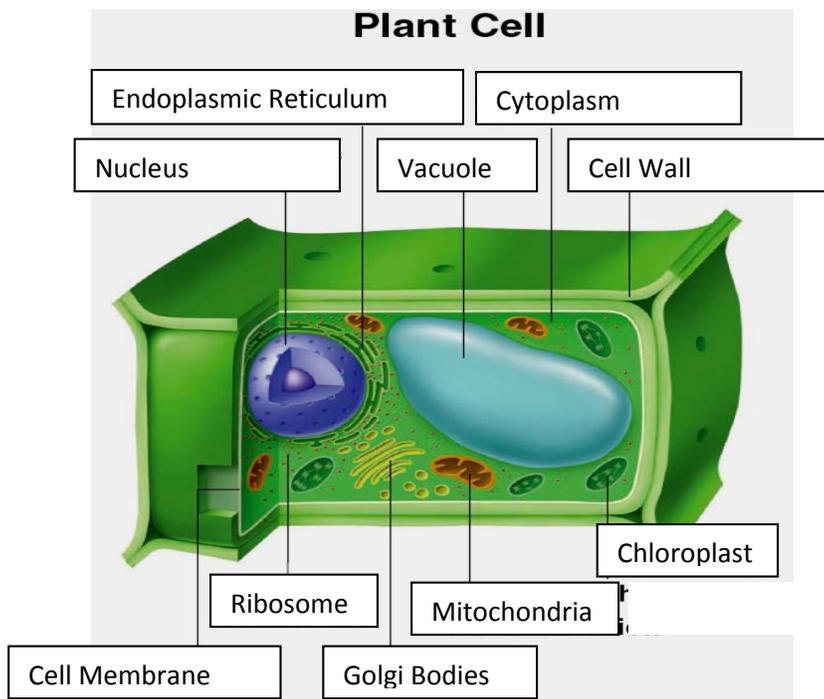
## **STAAR Science Tutorial 48** **TEK 7.12D: Cell Organelles**

**TEK 7.12D: Differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole.**

- The main organelles in an animal cell are labeled below:



- The main organelles in a plant cell are labeled below.



- An organelle is a part of a cell with a specific structure and function.
- The three main differences between plant and animal cell organelles are that: (1) chloroplasts are only found in plant cells, not in animal cells; (2) the cell wall is only found in plant cells, not in animal cells; it creates a plant cell's rectangular shape; and (3) a large central vacuole is only found in plant cells; the vacuoles in animal cells are smaller.
- The function of the cell membrane is as the outer boundary of the cell that controls what items can enter or leave the cell.
- The function of the cell wall in plant cells is to give the cell membrane added support and give plant cells their box-like shape.
- The nucleus, usually found near the center of an animal cell, and along the edge of a plant cell, holds the organism's genetic information and directs most all of the activities in the cell. It is this genetic information (DNA/ Chromosomes/ Genes) which determines the traits of the organism.
- The nuclear membrane controls the movement of materials in and out of the nucleus.
- The cytoplasm is the liquid part in which the other organelles float.
- Mitochondria act as the energy converter and manager of the cell. They take glucose (made by the chloroplast in plant cells or obtained from food in animal cells) and turn it into smaller chemical energy molecules (ATP) for the cell to use.
- The chloroplast in plant cells collects radiant energy from the sun and uses it to convert carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O) into a sugar (glucose).
- The vacuole stores food, water, wastes and other materials in many animal cells. The central vacuole in plant cells helps maintain turgor pressure in plants. Turgor pressure is the internal cell pressure against the cell wall, caused when the vacuole is full of water. It helps plants to stand tall.
- Lysosomes break down and recycle waste within the cell.
- The Endoplasmic Reticulum (ER) is the organelle, found in both a "smooth" and "rough" form, that provides a maze-like assembly line for the production of proteins and other substances. The rough ER is covered with ribosomes, which gives it the rough appearance seen through a microscope.
- Ribosomes assemble protein molecules from amino acids.

- Golgi Bodies are organelles that pinch off of the endoplasmic reticulum, and stores, releases and transports chemicals.

### **Practice Questions**

1. The outer envelope of all cells that acts as a gatekeeper, deciding what can enter the cell, is the \_\_\_\_\_.
2. In all cells, genetic materials are stored in the \_\_\_\_\_.
3. In a plant cell, the \_\_\_\_\_ helps give the plant its rigid structure and its cells their rectangular shape.
4. In a plant cell, \_\_\_\_\_ use radiant energy from the Sun to produce sugar from carbon dioxide and water.
5. In a plant cell, the \_\_\_\_\_ stores water, sugar and other materials. It helps maintain \_\_\_\_\_ in plants, which helps them to stay structurally strong.
6. \_\_\_\_\_ break-down waste within the cell.
7. The organelle that acts as an assembly line for the production of proteins and other substances is the \_\_\_\_\_.
8. The organelle that specifically assembles proteins from amino acids is the \_\_\_\_\_.
9. \_\_\_\_\_ are the organelles that convert glucose molecules into smaller energy units (ATP) that are used by cells.
10. The contents of the cell outside of the nucleus is called the \_\_\_\_\_.