

What's in Your Cells?

Cross-Curricular Focus: Life Science



Living things eat, grow, get rid of waste products and reproduce. All living things are made of cells. In even the tiniest unit of any living thing, there is a cell. Cells have special structures called organelles. The organelles help cells do the work of moving materials around, dividing to make more cells and making proteins for the body's needs.

Cells get energy through a process called **cellular respiration**. During this process, cells convert sugar (called glucose) and oxygen into water and carbon dioxide. Carbon dioxide is the gas we breathe out. This whole process releases energy for the cell to use. The energy is stored as ATP. The cell keeps ATP in storage, like "back up power." It can be taken out to be used as needed. By storing ATP, the cell always has the energy it needs.

Living things can have just one cell or many. Single-celled organisms include things like bacteria, yeast, and some types of algae. They do the same things that living things do. However, they must do it all within just one cell. Multi-cellular organisms have billions of cells that work together to provide for the organism's needs.

Plant and animal cells both have **organelles**. Some types of organelles are the same in both plant and animal cells. Other types of organelles, however, are only found in plant cells or animal cells.

All cells have a control center called a nucleus. The nucleus stores a special molecule called DNA. The organism's traits are controlled by the coding found in its DNA.

All cells have a cell membrane that surrounds the cell to protect it and control what goes in or out. Materials can move through the membrane by **diffusion** or **osmosis**. Diffusion is when materials move in or out of a cell from a place of high concentration to one of low concentration. Osmosis is a special kind of diffusion that allows water to pass through the membrane. However, in osmosis, many other materials are not allowed to pass through. Plant cells have an extra layer called a cell wall that surrounds each cell's membrane. The cell wall is much stiffer to help the plant's stems stand up and support leaves and flowers.

Cytoplasm is a thick gelatin-like fluid that fills the space between a cell's nucleus and its cell membrane. Organelles float in and are supported by the cytoplasm. Ribosomes are organelles that make proteins. Lysosomes, which are found mostly in animal cells, break apart nutrients. The Golgi apparatus (GOAL-gee ap-a-RAT-us) prepares proteins to be sent to various parts of the body. Vacuoles are like bags of fluid that cells use to store things until they are needed or until they can be disposed of. Mitochondria generate energy for the cell. The endoplasmic reticulum, or ER, is a system of tubes and passages for transporting materials. Chloroplasts, which are found only in plants, allow food to be made using sunlight and carbon dioxide. All the organelles work together to make sure that the cells, and ultimately the living organism, can do all the things that are necessary for survival.

Name: _____

Answer the following questions based on the reading passage. Don't forget to go back to the passage whenever necessary to find or confirm your answers.

1) Contrast a plant cell with an animal cell. How can you tell them apart?

2) List two types of organelles.

3) Predict what might happen if a cell lost its ability to perform cellular respiration.

4) What are the processes in which materials move through a cell membrane?

5) What is the control center of a cell?
