



# TEACHER GUIDE

## PLANT AND ANIMAL CELLS GRADES 6-8

### COMMON MISCONCEPTIONS

- **All cells are structured the same.**  
Cells from the same organism can be structured differently due to their function. For example, skin cells are flat and closely packed together. On the other hand, nerve cells have finger like projections that help them send signals.
- **All cells are approximately the same size.**  
Since cells are microscopic and often depicted on a screen, students have difficulty understanding that cell size varies. For example, an amoeba is more than 100 times larger than a red blood cell and 1,000 times larger than an *E. coli* bacteria. (~1 mm vs ~0.01 mm vs. ~0.001 mm).
- **All clear round things viewed under a microscope are cells.**  
Students will often identify air bubbles or other debris viewed under the microscope as cells. To help with this show students the proper way to prepare slides to minimize air bubbles. You can also show them air bubbles under a microscope so that they can be aware of what they look like.
- ⚠ **Safety tip:** Please use extreme caution if viewing cheek cells in the classroom since it can easily spread germs. We recommend viewing onion cells in class and instead of cheek cells, use a pack of professionally prepared animal cell slides (\$10-20 on Amazon, search “prepared microscope slides.”)

### BASIC CELL STRUCTURE

Cells contain a variety of organelles that have specific functions. The nucleus, the cell membrane, lysosomes, mitochondria, cytoplasm, and vacuoles are the commonly identified organelles at this grade level, but there are several more that students will likely learn at the high school level: Endoplasmic reticulum, Golgi complex, ribosomes, and centrioles for example.

### CELL DIFFERENTIATION

The human body is made up of about 200 different types of cells. Although the basic organelles of cells are consistent, the structure and composition of cells can be drastically different. Cells combine to form tissue, tissue combines to form organs, and organs work together to form organ systems.

## MITOCHONDRIA ORIGINS

A commonly accepted scientific theory is that mitochondria were once bacteria cells. Scientists believe that early cells ingested the bacteria cells and used them as a source of energy. The bacteria cells benefited from this ingestion since they had endless food sources inside the cell. Over time, the ingested bacteria evolved into mitochondria. Some evidence that points to this theory include the mitochondria having its own DNA and that it has a double membrane. Scientific debate and research remains active in this area.

## TEACHER TIPS

Give students opportunities to view onion cells under a microscope. Students will need guidance on how to prepare slides properly. Try devoting a class period to microscope care and use along with slide preparation before diving into your cell unit.

