

## CELLS, TISSUES, AND ORGANS

### Organelles

A plant cell contains important organelles that each have different jobs to do in order to keep the plant alive and healthy. For example, photosynthesis takes place within the **chloroplast** of a plant cell.

A plant cell (as well as animal cells) contains cytoplasm which supports and protects the organelles of the cell. The mitochondria of a plant cell breaks down sugar molecules into energy. The nucleus in the plant cell (and animal cell once again) is the control center of the cell, the nucleus controls all the cell's activities – so obviously that is one important organelle.



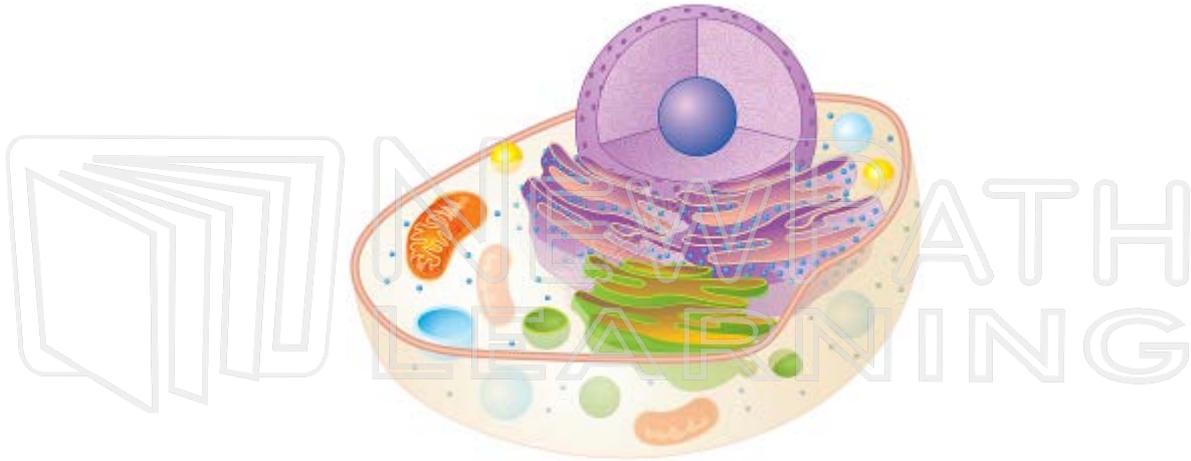
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**Lesson Checkpoint:**  
**Name one organelle that you find in plant cells but NOT in animal cells.**

Other important cell organelles include chromosomes, which contains **hereditary information** and are found in the nucleus of a cell. The **vacuole** of a cell acts stores and breaks down materials within a cell.



Cells come in different shapes and sizes, but they can't be too big or too small. If a cell was too large, then oxygen and important nutrients would die. orga

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This shape helps nerve communicate with the brain by sending signals to/from the brain to our bodies.

Other cells, like skin cells, are flat which allow them to pile up and overlap each other covering large areas. Skin cells are flat. Still other cells, are round. Being round allows red blood cells to carry oxygen all throughout our bodies.



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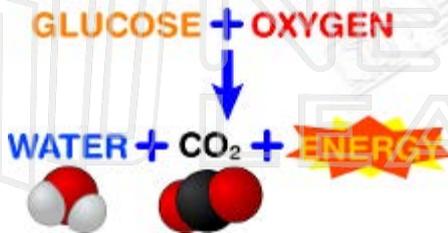
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### Energy for Cells

Cells need ENERGY to do all this work. **Cellular respiration** is the process where cells turn food into usable **energy**.





What else do cells do? When similar cells group together and work together for the same purpose, they form **tissues**. For example, skin tissues protect our bodies from **dirt and germs** getting inside our body. Cold or



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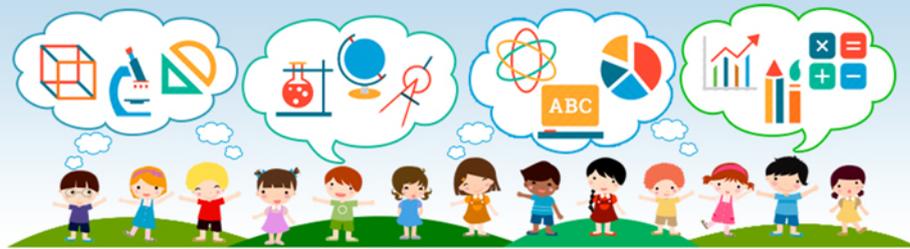
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Now when a group of tissues work together for one reason, they form an organ. Your heart, lungs, stomach, and even skin are all organs.

## Body Systems

Now, when organs and tissues work together to carry out essential processes needed for our survival, they form a **system**. Our bodies have many systems including our skeletal, muscular, respiratory, circulatory, and excretory systems – just to name a few.

Your **circulatory system** is powered by your heart. The job of the circulatory system's job is to move food and oxygen throughout your body and to rid your body of wastes, such as carbon dioxide, through your blood. Your blood is made up of different types of cells. **Red blood cells** carry oxygen throughout your body (as was mentioned earlier) and **white blood cells** help protect your body from germs and sicknesses. Even pieces of cells help us out...can you believe that? It's true. **Platelets** are pieces of cells that stop the bleeding in a vessel that gets cut, it clots the blood so that not too much blood is lost.



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### How does blood get around the body?

**Arteries** are blood vessels that carry blood away from your heart to your body. Arteries have thick walls. **Capillaries** are the smallest of blood vessels. Capillaries have very thin walls. Oxygen moves from blood in your capillaries to your cells – which is important because cells need oxygen to live! Capillaries form together to form veins.

**Veins** are made of blood vessels, carry blood TO the heart, have thinner walls than arteries, and have valves (arteries do not have valves). **Valves** are flaps that only allow blood to flow in one direction.



**Lesson Checkpoint:**

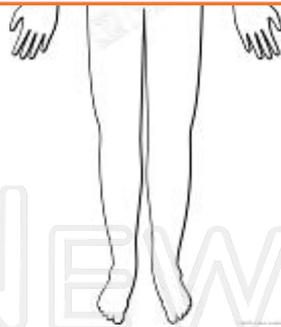
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When you breath in – that stuff called mucus that you may think is gross – helps you out! **Mucus** traps dirt and germs in your nasal passages so the dirt and germs do not go any further into your body! So maybe mucus isn't so gross anymore, is it?

Your **respiratory system** helps you do something important – BREATHE! The oxygen you breathe in through your nose or mouth follows the same pathway right into your lungs. Oxygen travels from your mouth → to the back of your throat → to the larynx → down your trachea → through tubes called bronchi (which lead into your lungs) → into smaller tubes called bronchioles → to air sacs. It is in the air sacs where oxygen enters your blood and where carbon dioxide leaves your blood.

**Lesson Checkpoint:**

**What is the job of your respiratory system?**

## Digestive System

If you like eating, then we should discuss your **digestive system**. You you



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After chewing food in your mouth and swallowing, food goes down through your esophagus into your stomach. But that is not where the majority of the digestion happens! Digestion occurs mostly in your small intestines.

**Lesson Checkpoint:**

**Where does the majority of your food digestion occur?**

## Urinary System

Lastly, when you have to go, you have to go...

Your **urinary system** rids your body of waste that can poison your body. Your kidneys remove waste from your blood.

A row of colorful educational icons including a cube, microscope, protractor, globe, atom, pie chart, bar graph, and math symbols, with a group of diverse children standing below them.

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