

Name: _____

4th

Date: _____

Notes

Cell Specialization

You have just read about the structures found in plant and animal cells. These structures help to keep the cell alive and functioning properly. In unicellular organisms such as bacteria, the single cell performs all the functions necessary for life. But, as you know, many organisms (including yourself) are multicellular. In multicellular organisms, each cell may well perform a specialized function for the entire organism. That is, the cell not only completes all its own life activities, it also contributes to the life of the organism. Without cell specialization, the evolution of multicellular organisms could not have occurred.

2 or more cells
each cell has a specific job in a multicellular org.

1 cell



Figure 2-15 In multicellular organisms, many cells are specialized to perform a specific function for the organism. Here you see nerve cells (neurons) in the part of the brain used for thinking skills such as reading and understanding this textbook.

Tissues, Organs, and Organ Systems

You have just read that cells in multicellular organisms are specialized to perform specific tasks for the organism. So it should not surprise you to learn that cells are often organized in order to better serve the needs of the organism. In other words, within a multicellular organism there is a division of labor. Division of labor means that the work of keeping the organism alive is divided among the different parts of the body. Each part has a specific job to do. And as each part does its special job, it works in harmony with all the other parts.

The arrangement of specialized parts within a living thing is sometimes referred to as levels of organization. Cells, of course, are the first level of organization.

TISSUES: LEVEL TWO In any multicellular organism, cells rarely work alone. Cells that are similar in structure and function are usually joined together to form tissues. Tissues are the second level of organization. What is the first level of organization?

For example, bone cells in your body form bone tissue, a strong, solid tissue that gives you shape and support. Blood cells in your body are part of blood tissue, a liquid tissue responsible for transporting food and oxygen throughout the body. What other types of tissues are found in your body?

1 Blood cell
2 Blood Tissue

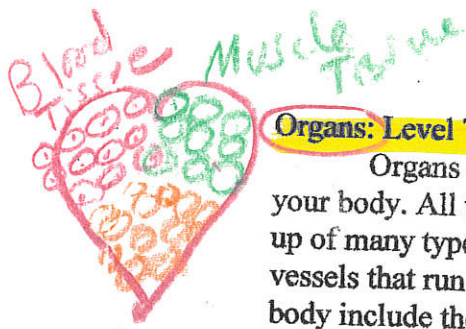
ACTIVITY

WRITING

Word Clues

The definition of a word can often be determined by knowing the meaning of its prefix. For the following words, look up the prefix in each and tell how it relates to the definition:

- chloroplast
- mitochondria
- chromosome
- lysosome
- cytoplasm



Organs: Level Three

Organs are the third level of organization. For example, the **heart is** an organ in your body. All tissue cells that make up a heart are not identical. The heart itself is made up of many types of tissue cells, and the ventricles are made of different cells and the vessels that run to the heart are made of even different ones. Other large organs in your body include the **brain, liver, stomach, lung, and small and large intestines**. Each of these has many different types of cells that compose it - each type of cell performs a specific function to keep that organ working.

Nerve Tissue

Organ Systems: Level Four

Your body has 10 different systems that keep it running smoothly. Each of these has billions of cells, all of these are specifically designed to help the system. Your **skin** is a system that keeps your cells moist and allows water (perspiration) and heat to escape. It keeps your body at the perfect temperature, and is the largest of your organ systems. Your **nervous system** contains your brain and all the nerves in your body. It allows you to think, react, and protect itself, it does this by alerting you to harmful situations. Your **skeletal system** contains all of the bones in your body. Bones allow you to sit, stand, and move in many ways. Your **muscular system** contains all of the muscles in your body. These can help you to run, lift, smile, hold onto things, and carry out all your life activities. Muscles are usually attached to bones. Your **respiratory system** is the system that contains your lungs. You use this system to inhale oxygen and oxidize food and use it for energy. It also allows you to release carbon dioxide as you exhale. (Plants love this!) Your **circulatory system** contains your heart and all the vessels, arteries and capillaries that carry your blood throughout your body. This keeps your body alive because it carries vitamins and minerals to all the parts of your body. Your **endocrine system** contains your liver, pancreas and all the glands in your body. These organs cleanse the body of impurities and give off many of the hormones your body needs to grow and repair itself. Your **excretory system** is the system that gets rid of your body's waste. It contains your small and large intestine. This system is vital, since a lot of vitamins and minerals are removed from your food and sent throughout your body from your large intestine. This system also allows you to remove waste from your body. Your **digestive system** contains your stomach, mouth, esophagus etc.. This system helps you to break down the food you eat, so that it can be used to reenergize your body. It contains many different acids to help you in breaking down your food. Finally, your **reproductive system** helps you to be able to reproduce another in your form. This system allows us to be able to keep the human race constant on the planet.

ORGANISMS: LEVEL FIVE

The last level of organization are all the organisms found on the planet. Whether it be a **human** (with all its systems), or a **fly** (with all its systems) or a **tree** (with all its systems), or a rose bush (with all its systems), a complete organism that can survive on our planet, can only do so by the working systems that complete its existence. **The specialized cells of each organ system keep these organisms alive.**

