

# How Are Living Systems Organized?

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## How Are Living Systems Organized?

- God created many \_\_\_\_\_ organisms.
- Their diversity lies in a variety of different \_\_\_\_\_.
- He designed the structure of each cell to match its \_\_\_\_\_.
- Cells can be grouped by these \_\_\_\_\_ and \_\_\_\_\_.

## A Review of Cells

- How many cells can fit on a period at the end of a sentence?
- Some cells are so small that \_\_\_\_\_ would fit.
- How do scientists study these tiny structures?
- As \_\_\_\_\_ improved, scientists could study in cell structure.
- They identified the \_\_\_\_\_, which controls what enters and leaves the cell.
- Inside each cell membrane is a watery substance called \_\_\_\_\_.
- \_\_\_\_\_ are small structures located in the cytoplasm of the cell.
- One of these is the \_\_\_\_\_.
- Mitochondria are structures that use \_\_\_\_\_ to release \_\_\_\_\_ from food.
- There are several \_\_\_\_\_ mitochondria in a typical cell.
- Cells also contain \_\_\_\_\_.
- DNA is the molecule that \_\_\_\_\_ the \_\_\_\_\_ of the cell.
- If you stretch out a strand of human DNA, it would be 2 meters (\_\_\_\_\_) long.
- All your DNA lined up that way would reach the \_\_\_\_\_ and back over \_\_\_\_\_ times.
- This incredibly efficient information storage system is \_\_\_\_\_ of a wise \_\_\_\_\_.
- In cells of fungi, plants, and animals, DNA is found in \_\_\_\_\_, which are strands in the nucleus of the cell.
- Bacteria lacks a \_\_\_\_\_.

- Instead, the one chromosome containing the \_\_\_\_\_ is spread out in the \_\_\_\_\_.

### How Cells Differ

- Unicellular organisms must carry out the \_\_\_\_\_ that large, multicellular plants and animals perform.
- Even bacteria with only one cell can take in \_\_\_\_\_, move \_\_\_\_\_, get rid of \_\_\_\_\_, and \_\_\_\_\_.
- Cells have important differences in their \_\_\_\_\_ so that they can perform these jobs.
- Some bacteria and protists are equipped with long, thin, whip-like structures called \_\_\_\_\_.
- These structures are also found in both animal and plant \_\_\_\_\_ cells.
- Some unicellular organisms are covered with \_\_\_\_\_.
- \_\_\_\_\_ are short, hair-like structures.
- The cilia move the cell through the \_\_\_\_\_, like oars on a boat.
- In the human \_\_\_\_\_, the cilia trap dust and particles in the mucus and move the mucus \_\_\_\_\_ from your lungs.

### Difference Between Plant Cells & Animal Cells

- Plants have certain features that are not found in \_\_\_\_\_.
- The \_\_\_\_\_ provides a protective layer and structural support the plant cell.
- It is composed of \_\_\_\_\_, a complex sugar.
- The cell wall contains tiny holes to allow \_\_\_\_\_ to enter the cell and \_\_\_\_\_ to be removed.
- The \_\_\_\_\_ is where the plant produces energy.
- The chloroplast contains \_\_\_\_\_.
- The \_\_\_\_\_ is located inside the chloroplast where starches are created.
- The \_\_\_\_\_ is several small disc-shaped structures arranged in a stack.
- Each thylakoid contains \_\_\_\_\_, which captures sunlight to create sugars.
- Animal cells contain structures not found in \_\_\_\_\_.
- The \_\_\_\_\_ are structures that help the nucleus separate during mitosis and meiosis.
- Centrioles are made of \_\_\_\_\_.

- When the cell is not dividing, the centrioles are located near the nucleus as a \_\_\_\_\_.
- Animal cells also contain a \_\_\_\_\_, which hold enzymes to digest things in the cell.
- The enzymes are proteins produced in the \_\_\_\_\_.

| Plant Cell Characteristics | Animal Cell Characteristics                |
|----------------------------|--|
|                            | Has a nucleus                              |
| Contains cytoplasm         |  |
|                            | Surrounded by cell membrane (no cell wall) |
| Has large vacuoles         |  |
|                            | Has mitochondria                           |
| Has chloroplasts           |  |

### Cell Specialization

- In a \_\_\_\_\_ organism, one cell does all the work.
- But the activities of a \_\_\_\_\_ organism are more like a group project.
- Animal body cells are \_\_\_\_\_.
- An animal cell might become \_\_\_\_\_ as a skin cell, a muscle cell, a blood cell, or a nerve cell.

### Cell Specialization: Stem Cells

- Specialized cells develop from \_\_\_\_\_, cells that have no specialty.
- Stem cells can \_\_\_\_\_ and become whatever kind of \_\_\_\_\_ the body needs.
- A stem cell can \_\_\_\_\_ and make \_\_\_\_\_ for aging or damaged cells.
- There are two kinds of stem cells: \_\_\_\_\_ stem cell and \_\_\_\_\_ stem cells.

- \_\_\_\_\_ are found in newly developing embryos.
- As the body develops, these cells \_\_\_\_\_ and \_\_\_\_\_ muscle cells, nerve cells, blood cells, and other specialized cells.
- \_\_\_\_\_ are unspecialized cells that are found in tissues throughout the body.
- Scientists think that they might be used to \_\_\_\_\_ damaged tissues.

**Cell Specialization: Tissues**

- Cells combine and form \_\_\_\_\_.
- A \_\_\_\_\_ is a group of like cells that perform a specific job.

| <b>Tissue Type</b>      | <b>Example</b>                                      | <b>How it Works</b>  |
|-------------------------|---|--|
| Muscle                  | Muscles (heart, skeletal, smooth)                   |  |
|                         | Blood, ligaments, bone, cartilage, tendons, and fat | Blood cells transport oxygen. Ligaments connect bone to bone. Tendons connect muscle to bone. Fat protects |
| Nerve                   |   | Nerve cells transmit information to and from the brain using electrical signals                            |
| Protective (Epithelial) | Skin, and tissues that line the digestive system    |  |

**Cell Specialization: Organs and Systems**

- Different kinds of tissues work together to form \_\_\_\_\_.
- Your \_\_\_\_\_, stomach, and \_\_\_\_\_ are organs.
- Organs work together as \_\_\_\_\_.
- Your \_\_\_\_\_ system is made up of your heart, blood vessels, and blood.
- The \_\_\_\_\_ system consists of the bones of your body.
- Other systems are the muscle, nervous, respiratory, endocrine, and reproductive systems.
- Plants have \_\_\_\_\_ cells and tissues.
- They are often found in the \_\_\_\_\_ and \_\_\_\_\_ of the plant.

- \_\_\_\_\_ are grouped together to form the various tissues and organs of the plant.
- \_\_\_\_\_ cover and protect the plant.
- The dermal tissue is often coated with a waxy \_\_\_\_\_.
- Other dermal tissues include the \_\_\_\_\_ in the leaves that allow water and gases to escape, called \_\_\_\_\_.
- Stomata are paired with \_\_\_\_\_ that control the gas and water exchange of the plant.
- Another group of specialized cells in stems forms transport tissue called \_\_\_\_\_ and \_\_\_\_\_.
- These tissues \_\_\_\_\_ water from roots to leaves and food to the rest of the plant.

### Structure and Function

- \_\_\_\_\_ refers to the parts of an object and how the parts are put together.
- \_\_\_\_\_ describes the specific job that something does.
- For example, the function of a cell membrane is to control what \_\_\_\_\_ and \_\_\_\_\_ a cell.
- You have now studied the structure and function of \_\_\_\_\_.