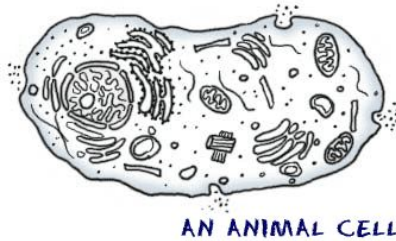


Life Science
Per _____



Name _____

Date _____

I. The Cell

1. The building blocks of life.

Cells are the basic units of **structure** and **function** in all living things.

2. Most cells are **microscopic**.

Some are as large as egg yolks, and others are 2-3 feet long but microscopically thin.

3. Most cells share certain **characteristics**.

Whether an organism has one or more cells and whether it is a plant or animal.

II. Important Cell Scientists

1. Before we could see a cell, **Anton von Leeuwenhoek** had to invent the **microscope**. *He was a Dutch tradesman who called the micro-organisms "animicules"!*
2. **Robert Hooke** "discovered" the cell by looking at thin slices of cork through a microscope in 1663.
3. **Theodor Schwann** studied **animal** cells.
4. **Matthias Schleiden** studied **plant** cells.
5. **Rudolph Virchow** developed the **Theory of Biogenesis**.

III. Some Theories

1. **The Cell Theory** is one of the cornerstones of Modern Biology.
 - a. *All living things are made up of one or more cells.*
 - b. *Cells are the basic unit of structure and function in all living things.*
 - c. *All living cells come from other living cells.*

* Developed by Schleiden, Schwann and Virchow and others, 1838-1859.

2. **The Theory of Biogenesis** "*All living cells come from other living cells*".
3. The theory of **Spontaneous Generation** was scientifically disproved in the 17th century by **Francesco Redi** "*Non-living materials can be transformed into living organisms.*" (**=NOT TRUE!**)

IV. Jobs of Every Cell

- The life processes that almost every cell must perform, no matter what type it is.

1. **Metabolism** - cells get energy from their environment and change that energy to a useable form.
2. **Respiration** - simple food is broken down and energy is released.
3. **Transport** - moving things in and out of the cell.
 - a. **Diffusion** - a force that moves things in and out of the cell.
 - b. **Osmosis** - a type of diffusion that moves WATER in & out.
 - c. **Active Transport** - use reserve energy to move things in & out of cell.
4. **Growth & Development**
5. **Reproduction** - All living cells come from other living cells

V. Jobs of the Organelles (Cell Parts)

- *Within a cell are even smaller structures called organelles.*

- *These structures inside a cell have the following jobs (or functions):*

1. to provide **protection** and **support**
2. to form a **barrier** between the cell and it's environment.
3. to **build** and **repair** cell parts.
4. to **transport** materials.
5. to store and release **energy**
6. to get rid of **waste** materials.
7. to **increase** in number.



Typical Plant Cell



Typical Animal Cell

Cell Structure and Function

I. Outer Coverings

1. **Cell Wall** - The hard outer covering of a **PLANT CELL**
 - a. Gives shape and support for the cell and the plant.
 - b. Non - living
 - c. Made of Cellulose. (Cell Membrane inside.)
2. **Cell Membrane** - Outer covering of an **ANIMAL CELL**
 - a. (Inside the wall of a plant cell).
 - b. Allows materials to enter and leave the cell
 - c. Gives protection.

II. "Stuff" Inside the Cell

A. ORGANELLES - "Tiny Organs" or structures found *inside* a cell.

1. **Chloroplast**
 - Small **PACKETS IN GREEN PLANT cells**
 - **Contain the sun-trapping chemical Chlorophyll**
 - Energy producers in plant cells. (*perform Photosynthesis*)
2. **Endoplasmic Reticulum**
 - Network of canals to transport and store substances.
3. **Ribosomes** – *protein factories* of the cell.
 - The building blocks of the cell are made here.
 - Located on the transport canals, or E.R. (*endoplasmic reticulum*)
4. **Mitochondria** – (Mighty mitochondria!)
 - "Powerhouse of the cell". Generates the power used by the cell
(*site of Respiration*)
5. **Vacuole** – stores food, wastes and/or water
 - Large in plant cells
 - Small in animal cells
6. **Lysosomes** – Cleanup crews for the cell
 - Break down large food molecules into smaller ones
 - Common in **ANIMAL CELLS**
 - Rare in **PLANT CELLS**
7. **RNA** – "Reads" DNA instructions, guides the protein-making process

III. More "Stuff" Inside the Cell

B. **Cytoplasm** (*Cyto* = Cell; *Plasm* = Stuff).

- The jelly like substance **inside the cell** and outside of the nucleus.
- All the organelles in the cell and nucleus "float" about in the cytoplasm

c. NUCLEUS – Control Center of the Cell

1. **Nuclear Membrane**

- a. Outer covering of the nucleus
- b. Allows materials to enter and leave the nucleus

2. **Protoplasm**

- a. The thick, jelly-like fluid inside the nucleus

3. **Nucleolus** = "*Little Nucleus*"

- a. A small organelle inside the nucleus
- b. Believed to produce ribosomes

4. **Chromosomes**

- a. Rodlike structures in the nucleus
- b. Direct all the activities of the cell
- c. Pass on traits of a cell to new cells
- d. Contain DNA (*Deoxyribonucleic Acid* = *Coded genetic material*)
- e. Organized into **threadlike coils** called **Chromatin**

5. **Nucleic Acids - (DNA & RNA)**

- a. Work together to store information
- b. Direct the protein-making process necessary for life.
- c. DNA (*Coded genetic material*) - stays in the nucleus
- d. RNA leaves the nucleus through pores in the nuclear membrane.



Typical Plant Cell



Typical Animal Cell