
Chapter 1 CELLS: The Building Blocks of Life**Section 1 – What is Life?****Characteristics of Living Things (*Organisms*)**

* (*Cells, Chemicals, Energy, Grows, Responds, Reproduces*) CCEGRR

1. Cellular Organization

- Cell* – basic unit of structure
- Unicellular* – one celled organism
- Multicellular* – many celled organism

2. Chemicals of Life (*Organization*)

- Water* most abundant in cells
- Carbohydrates* (energy)
- Proteins* and *lipids* (building materials)
- Nucleic acids* (genetic material – information)

3. Energy Used – to function (to move, to grow, etc.)**4. Growth and Development**

Growth = getting bigger

Development = becoming more mature or complex

5. Homeostasis = Response to Stimuli in the Surroundings

Stimulus = what causes the organism to respond.

6. Reproduction = produce offspring

Life Comes From Life, NOT from *spontaneous generation!*

Life Comes From Life, NOT from *Non-living matter!*

Controlled Experiment = when scientists do two tests that are identical, except for one factor. That one factor that is changed is called the **manipulated variable**.

Two different scientist in the past did experiments to prove that life does not spontaneous arise from non-living matter.

Redi and **Pasteur** were the two men.

Redi experimented with meat, to show that fly larvae only come from fly eggs, not meat.

Pasteur's experiment used flasks to show that bacteria do not come from liquid broth.

The Four Needs of Living Things: (*Energy, Water, Space, Homeostasis*)**1. Energy** (need food for energy to function)

Two kinds of feeders –

- Autotrophs** = make their own food (plants are autotrophs)
- Heterotrophs** = cannot make their own food and must get it from the environment.
(People, dogs, lizards, are heterotrophs).

2. Water – all living things need water to survive.**3. Living Space** – need a place to get food, water, and shelter.**4. Homeostasis = Stable Internal Conditions** – so when the temperature gets too cold or hot, or too wet or dry where they live, their body still stays the same inside.

** When you stand in freezing rain your body shivers in order to produce heat and keep your temperature at a normal 98.6

Section 2: Discovering Cells

Microscope = instrument that makes small objects appear larger.

The first cell sightings were possible because of the invention of the microscope.

Compound Microscope = a light microscope with more than one lens.

Light Microscope:

- **Convex lens** = a lens with a curved shape
- **Magnification** = is how large the image appears under the scope.
- **Resolution** = is how clear or sharp the image is.

Robert **Hooke** = first person to observe cells (cork cells from cork wood).

Leeuwenhoek = first to see tiny one-celled organisms in water drops.

Schleiden = the first scientist to conclude that all plants are composed of cells.

Schwann = the first scientist to conclude that all animals are composed of cells.

Cell Theory = based on the discoveries of these men, and it states that:

1. All living things are composed of cells.
2. Cells are the basic unit of structure and function in living things.
3. All cells are produced by other cells.

* An **Electron Microscope** = does not use light, but uses a beam of electrons instead.

Section 3: Looking Inside Cells

Cell Wall = a tough, rigid layer surrounding the outside of plant cells, not animal cells.

Cell Membrane = The next layer, just inside the cell wall.

* Animal cells only have a membrane layer, and do not have a cell wall.

The cell membrane controls what substances come into and go out of a cell.

It is the gatekeeper of the cell.

Nucleus = the “brain” or code computer control center of the cell.

- It is a large oval structure inside the cell.

Nuclear Membrane = surrounds the oval nucleus.

Chromatin = strands of genetic material (genes) floating inside the nucleus. They contain the coded information which tells the cell how to function.

* God put the coded information into the genes?

Nucleolus = a small object where ribosomes are made.

Cytoplasm = the region inside the cell between the cell membrane and the nucleus.

- It contains a jelly like fluid, with many organelles floating in it.

Organelles in the Cytoplasm = tiny cell structures that carry out functions in the cell.

They function to produce energy, build and transport materials, and store or recycle wastes.

- **Mitochondria** = rod shaped “powerhouse” organelles in the cytoplasm.

* These produce most of the energy the cells needs.

- **Endoplasmic Reticulum** = (ER) a twisted maze of passageways that carry proteins and other materials from one area of the cell to another.

- **Ribosomes** = tiny grain-like bodies.

* Some are attached to the surface of the endoplasmic reticulum.

* Others float in the cytoplasm.

* Ribosomes are factories that make proteins.

* The proteins are then transported to the Golgi Bodies.

- **Golgi Bodies** = look like flat collections of sacs, that function as the mail room.

* They receive the proteins and other newly formed materials from the, ER, package them, and distribute them around the cell, and release them outside the cell.

- **Chloroplasts** = large green structures in plant cells, but NOT animal cells.

* They capture energy from sunlight and use it to produce food for a cell.

* They contain a green coloring (a pigment) called chlorophyll.

- **Vacuoles** = storage areas in cells, for water, food, and waste.

* Plants cells usually have one large vacuole.

* Animals cells have many smaller ones.

- **Lysosomes** = round structures containing chemicals to break down food for use.

* They also break down old cell parts, for reuse again.

* They are the cleanup crew of the cell.

Bacterial Cells = very different from plant and animal cells.

- Usually smaller than plant and animal cells.

- 10 times smaller than a human skin cell is

- Have no nucleus, so they are called prokaryotes.

* Prokaryotes have genetic material like a tangled string in the cytoplasm.

* Prokaryotes have a cell wall and cell membrane.

* Eukaryotes (plants and animals) have a nucleus, and many organelles.

Specialized cells =

- In multicellular organisms (humans/ dogs), there are many kinds of cells, with different sizes, shapes, and functions.

- Skin cells, muscle cells, nerve cells, bone cells, blood cells, etc.

Section 4: Origin of Life:

There are two basic views about the origin of life.

1. **Evolution** – The text book tries to present this view.

* It says that life arose from non-life. That would require spontaneous generation, which has been shown by Redi, Pasteur, and others to be a false belief (a falsified hypothesis). So it violates the **Law of Biogenesis**.

* It mentions the experiments by Miller and Urey, but this experiment did not prove that life arose from non-life. It actually proved that it takes intelligent design by a *person* to create the chemicals of life so that they become ALIVE.

2. **Creation** – The Bible teaches that God (the most intelligent person) made life, which fits the **Law of Biogenesis**.

* God created the universe and all life in six days, only 1,000 years ago, according to the Bible's genealogies and the account in Genesis 1-2. New science discoveries that are accepted by many top scientists now support the biblical time frame (History) for the origin of the universe, the Earth, and living organisms. We will study this in detail when we get to Ch. 5: Change Over Time.

* The **information** in our DNA could only have come from an **intelligent** Creator.

Fossils = traces of organisms that have been preserved in rock or other substances.

* There are billions of dead things, buried in rock layers, laid down by water all over the earth (even sea shells on the tops of mountains).

* Fossils are evidence that must be interpreted by scientists.

* Thousands of scientists interpret the evidence of fossils as supporting the global flood in Noah's time, when billions of creatures were buried under layers of sand and water, that solidified into rock like concrete.

Origins Web Resource Sites: (Creation v. Evolution)

- Science & theology reveal that macroevolution is incompatible with the truth of our **Good Shepherd Creator, CHRIST**. A "good" God would not and did not design **violent selfish competition, pain, fear, suffering, & death**. **Thousands of articles, DVD's, & books on every related subject you can imagine written by experts in their various subject areas are available through the recommended organizations below:**

LRA - [Logos Research Associates](#)

VIDEO Shorts from AIG - [AiG - Answers In Genesis](#)

VIDEO Shorts from CMI - [CMI - Creation Ministries International](#)

VIDEO Shorts from ICR ([That's A Fact](#)) - [ICR - Institute for Creation Research](#)

Biblical Creation: is accepted by 1000's of respected PhD scientists, including:

* Dr. [Raymond Damadian](#), Inventor of the MRI

* Dr. [John Baumgardner](#), World renowned geophysicist, Los Alamos

* Dr. [Andrew Snelling](#), Geologist, author [Earth's Catastrophic Past](#)

* Dr. [John Sanford](#), Respected geneticist, Cornell University

-- author of [Genetic Entropy: The Mystery of the Genome](#)

* Dr. [Russ Humphreys](#), Astrophysicist, Sandia National Labs, etc.

-- author of ([Starlight and Time](#)) ([Evidences Young World](#) Booklet)

* Dr. [John Hartnett](#), Prof. Univ. West Australia, astrophysics, etc.

-- author of: ([Dismantling the Big Bang](#)) ([Starlight Time New Physics](#))