



Life Science
Mr. Galloway

Chapter One
Cells:
The Building Blocks of Life

Section 1 – What is Life?
Six Characteristics of Living *Organisms*

- 1. Cellular Organization
- 2. Chemicals of Life (*Organization*)
- 3. Energy Used
- 4. Growth and Development
- 5. Response to Stimuli
- 6. Reproduction



“Creatures” or Organisms?

- The term “creature” implies a Creator!
- So, it is best to call them creatures.
- Modern textbook authors that deny God do not like to use the term creature.



1. Cellular Organization

- a. *Cell* – basic unit of structure
- b. *Unicellular* – one celled organism
- c. *Multicellular* – many celled organism



2. Chemicals of Life (Organization**)**

- a. *Water* most abundant in cells
- b. *Carbohydrates* (energy)
- c. *Proteins* and *lipids* (building materials)
- d. *Nucleic acids* (genetic material – information)
 - DNA and RNA
 - The computer coding (programs) for the forming and function of living things.

- 3. **Energy Used** – to function (to move, to grow, etc.)
- 4. **Growth and Development**
 - Growth = getting bigger
 - Development = becoming more mature or complex
- 5. **Response** to Stimuli in the Surroundings (**Homeostasis**)
 - Stimulus = what causes the organism to respond.
- 6. **Reproduction** = produce offspring

False information Selective use of evidence

Tuning Up Our Phony Baloney Detector
Let's go baloney hunting



Errors in logic Misleading information

Pure Baloney

A False Idea: Spontaneous Generation

- Scientists once believed that rotten meat turned into fly larvae and old rags turned into mice.
- They believed living things spontaneously generated from these non-living things.
- But, controlled experiments showed that this “scientific” belief (hypothesis) was wrong.

Life Comes From Life, NEVER from spontaneous generation.



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

Life Comes From Life, NEVER from non-living matter.

A man named **Pasteur** did an experiment with 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 to function) Two kinds of feeders –
 - a. **Autotrophs** = make their own food (plants are autotrophs)
 - b. **Heterotrophs** = cannot make their own food (animals) (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.

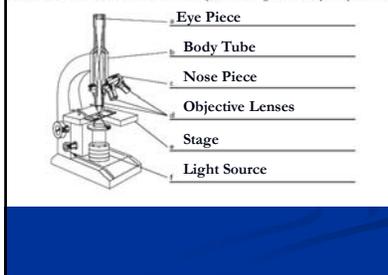
Section 2: Discovering Cells

- **Microscope** = makes small objects appear larger.
- The first cell sightings were possible because of the invention of the microscope.
- * **An Electron Microscope** = does not use light, but uses a beam of electrons instead.
- **Light Microscope**:
 - - **Convex lens** = a lens with a curved shape
 - - **Magnification** = how large image appears under the scope.
 - - **Resolution** = is how clear or sharp the image is.
- **Compound Light Microscope** = a light microscope with more than one lens.

Men Behind the Microscope

- **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.

STRUCTURES AND FUNCTIONS Label each part of the figure in the spaces provided.



Let's Google microscope images!!

Cell Theory

- **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.

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.

GOOGLE ANIMAL AND PLANT CELLS

DRAW & LABEL

BOTH AN ANIMAL AND A PLANT CELL

DNA =
 © **Designed Not Accidental**
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Information
 Always originates
 from
 Intelligence



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LEGO Properties Don't Change

- Regardless of the **number** of LEGO parts, the properties remain the same.
- Properties** = plastic, slick, cold, hard, brittle

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A Wolverine = Protons, Neutrons, & Electrons

- All P, N, and E are the same.
- Yet, the number of P, N, and E in an atom changes its properties.
- Also, the type and number of elements in a molecule also changes the properties of the substance.

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God's Purpose for Biochemistry
Soul (Hebrew = Nephesh) to Soul Relationships

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The Center of the Cell

- Nucleus** = the computer control center of the cell.
 - It contains coded information in chemical form.
 - 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.

ORGANELLES

- Cell Membrane (and/sometimes) Cell Wal
- Cytoplasm = space full of watery gel
- Nucleus (DNA) = computer center
- Mitochondria = power/energy factory
- Endoplasmic Reticulum
- Ribosomes
- Golgi Bodies
- Chloroplasts
- Vacuoles
- Lysosomes

Cytoplasm

- 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
 - 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 like humans and dogs, there are many different 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:

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.
 - 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.
2. **Creation** – The Bible teaches that God (the most intelligent person) made life.
 - God created the universe and all life in six days, about 6,000 years ago, according to the Bible's genealogies and the account in Genesis Chapter 1 and Chapter 2.
 - The information in our DNA could only have come from an intelligent Creator.

FOSSILS: How old? How formed? Why?



This fish is one of Mr. Galloway's fossils.
Notice it was not scavenged.
It didn't decay & fall apart as normal dead floating fish.
So it must have been rapidly BURIED.

Norman Nevin PhD
Professor Emeritus
Medical Genetics,
Queen's University of Belfast

- “The **lack** of transitional fossils remains a **major problem** for **neo-Darwinism**.”
- “... The **theory** of gradual evolution over long time periods **finds no support** in the fossil record, which **fails** to support common descent.” pp. 146-147

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Fossils

- Fossils are 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.
- ** See www.answersingenesis.org for evidence of biblical creation from many respected scientists.

God Did NOT Design **Disease and Death** David DeWitt PhD, Biochemist/Neuroscientist

- “**Theistic** evolution is a significant **threat** to the Christian **church**. It undermines the very foundation of the Christian faith and **causes people to doubt** the truth of Scripture. ... In [theistic evolution], **death** is not the enemy but the very **means by which God created** everything.”
- “But the **Bible is very clear** about this: the wages of sin is death. **Death came** into the world through **Adam's sin**. Therefore there was **no death prior to the fall** of man and **therefore** there **could be no evolution** whatsoever **before that time**.” creation.com

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Your worldview of Earth's **Age**, (whether *thousands vs. millions of years*) affects the **IMAGE of the Creator's Character**: (*Good Shepherd or Evil Monster*)

- If fossil layers are really **millions of years** of evolutionary “survival of the fittest”, dysfunction, disease, and **death - BEFORE** man existed,
- **Then** disease / death are the **design of God, not separation from God** due to “wages of [MAN'S] sin” (Rom 6:23) *God is a Good Shepherd NOT a Predator*
- * **Gospel** → wrong, **IF** man did not cause death, **Rom 5**
- * **Bible** → untrustworthy, **IE** Genesis is false, **John 3:12**

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In Chapter 5 in a few months,
we will study more about
CREATION and CHRIST
vs.
Evolution/Survival of the Fittest
(violence, pain, fear, suffering, death.)