

Unit One

Nature of Life

Characteristics of living things



Note- Taking



- **Highlighted text** are vocabulary words
- **Underlined text** are important concepts
- If you have a question, raise your hand at any point during the lecture.
- It will help to read the chapter before the lesson.

Tips

You WILL see it again during quizzes and tests.

Unit

1. Review “The Science of Biology” and “Exploration & Discovery”
Breakdown: *Chapter 1.1 & 1.2 page 8*

2. Patterns of Life: Characteristics of Living vs Nonliving *Chapter 1.3 page 22*

3. Cell Structure and Function *Chapter 8 page 240*

The Science of Biology :Overview

- Science is a process- an organized way of observing and asking questions
 - to provide natural and testable observations to make predictions
- observation- noticing and describing events
- hypothesis- an educated guess with scientific explanation (can be tested)
- independent vs dependent variables in controlled experiments
 - What is one scientific process that uses observations and hypothesis?*

Exploration & Discovery:

Overview

- Curiosity, skepticism, open-mindedness, and creativity help scientists and engineers ask new questions and define new problems
 - what is curiosity? skepticism? open-mindedness? creativity?

How can peer-reviews help scientists improve their work?

Patterns of

Life:

- **Biology:** science that uses the scientific method to study living things
- Characteristics of Living Things;
 - Made up of Cells
 - Reproduce
 - Has a genetic code (DNA)
 - Grows and Develops
 - Needs Materials and Energy (to grow)
 - Responds to the Environment
 - Maintains Internal Balance
- Engage : Interactive Video

Patterns of Life:

- Characteristic 1: All living things are made up of cells.
 - Cells are the smallest units of an organism that *can be considered alive*.
 - Cells can grow, respond to their surroundings, and reproduce.
- Characteristic 2: All living things reproduce either sexually or asexually.
 - Sexual Reproduction: cells from 2 different parents unite to produce the first cell of the new organism
 - Asexual Reproduction: the new organism is from one parent
- Characteristic 3: All living things have DNA.
 - DNA is the genetic code that carries traits given from parents to offspring.

- Characteristic 4: All living things Grow & Develop



Examples of Growth in Living Things:

1. when cells divide and multiply
2. when bacteria increase in size

- Characteristic 5: All living things need materials for energy.

- Organisms use energy and constantly supply of materials to grow, develop and reproduce.
- organisms need energy to stay alive.
 - Metabolism: the combination of chemical reactions (in an organism) that creates energy for an organism.

- Characteristic 6: Response to the environment.
 - **Stimulus:** a signal an organism responds to
 - internal vs external stimuli. Sweating vs Hunger
- Characteristic 7: Maintaining Internal Balance.
 - Homeostasis: (homeoSTAYsis) balance of an organism's internal environment despite the external changes.
 - **Your body wants your HOME (internal environment) to STAY the same, SIS!**

In a pair, number your paper 1-7 and complete the passage.

All living things have certain characteristics. The genetic code ___?___ carries the directions for inheritance, and offspring usually resemble their parents. With ___?___, offspring have the same traits as their parents. With ___?___, offspring differ from their parents in some ways. Living organisms use energy and materials to grow, develop, and reproduce. These life processes involve a set of chemical reactions called ___?___. Organisms have means of detecting a change in their environment and responding to this ___?___. Most organisms require that their internal environments remain in a fairly constant range, and so they maintain ___?___. The ability of a group of organisms to change, or ___?___, over time is necessary for survival in an ever-changing environment.

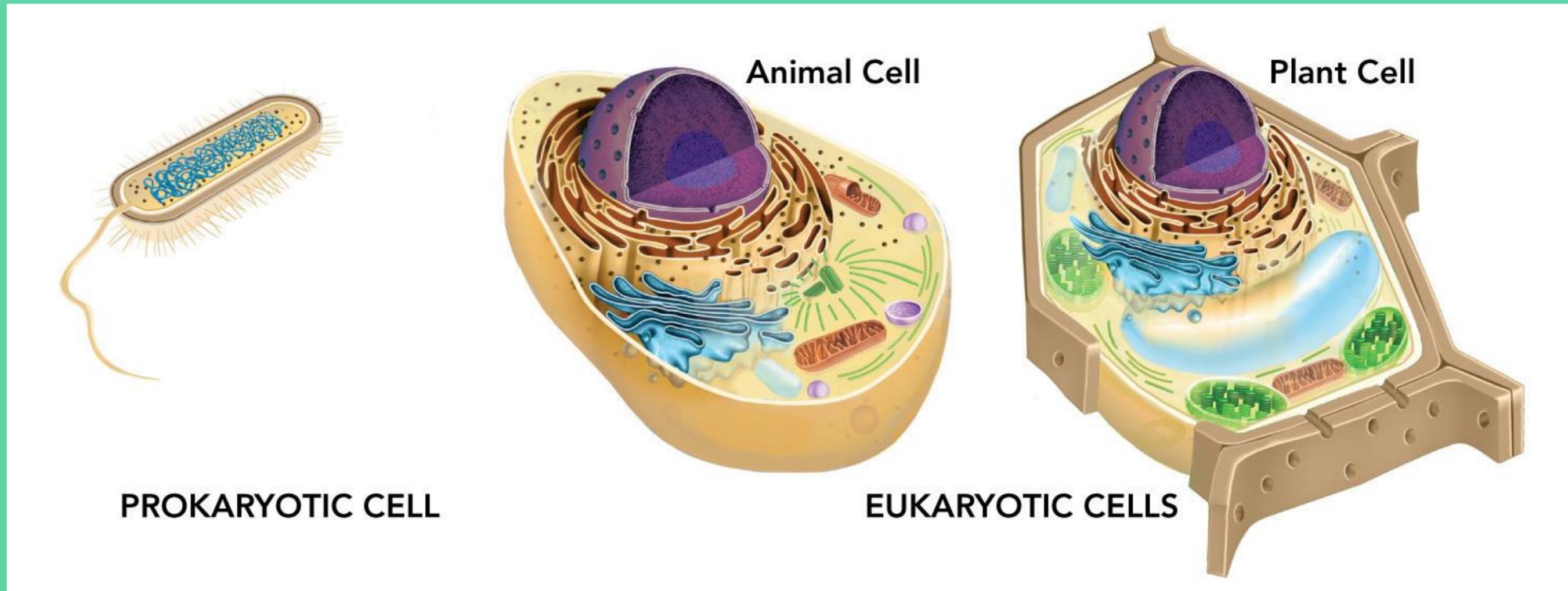
- **metabolism**
- **stimulus**
- **homeostasis**
- **asexual reproduction**
- **sexual reproduction**
- **DNA**

Life is Cellular:

- What is the smallest unit of any living thing that still counts as being “alive”?
- The cell theory states:
 - All living things are made up of cells.
 - Cells are the basic units of structure and function in living things.
 - New cells are produced from existing cells.

Life is Cellular:

- Cells are either Prokaryotic or Eukaryotic
 - Both have cell membranes (thin flexible layer outside of the cell)
 - the difference between Prokaryotic and Eukaryotic cells is the presence of a **nucleus** (membrane enclosed structure that holds genetic material)
 - Eukaryotic cells have nuclei.
 - Prokaryotic cells do NOT have nuclei.



- Bacteria is Prokaryotic
- Eukaryotic organisms include plants, animal, fungi, and many unicellular organisms (unicellular: an organism made up of one cell)
- What other structural similarities/differences do you see between Prokaryotic and Eukaryotic cells

PROKARYOTIC

- smaller and simpler than eukaryotic
- bacteria are prokaryotic
- do not have a nucleus
 - has DNA
- always unicellular

EUKARYOTIC

- larger and more complex
 - has many structures and membranes-highly specialized
 - has a nucleus
- has DNA (inside of nucleus)
- can be unicellular or multicellular

Viruses:

- A **virus** is a noncellular infectious particle that relies on a host to carry out metabolic processes and replicate.
 - a virus is NOT a cell.
 - is made up of DNA or RNA
 - are parasitic : they need hosts to reproduce
 - How Viruses Work Animation: <https://www.youtube.com/watch?v=SBfv-0g3EvE>

Do viruses reproduce?

Do they grow and develop?

Are viruses living or nonliving?

Are viruses made up of cells?

What happens to viruses if they have no host?

Do they have a genetic code?