

**AP  
Biology  
Student  
Interactive  
Learning  
Guide**

**North Salem University**

**MISSION:** *Engage students to continuously learn, question, define and solve problems through critical and creative thinking.*

**Summer  
2024**

*This chapter covers the basics that you should have learned in your Regents Biology class. The College Board and the Advanced Placement Program refer to this as “**prior knowledge**.” We will be going through this chapter VERY quickly. The questions and activities that follow in this Interactive Learning Guide should help you focus on the most important points of the chapter.*

*If you have any problems – feel free to drop me an email.*

**Chapter 1:  
Themes of Life**

# Chapter 1: Themes of Life

## **OBJECTIVES:**

### **Exploring Life on its Many Levels**

- \_\_1. Diagram the hierarchy of structural levels in biology.
- \_\_2. Explain how the properties of life emerge from complex organization.
- \_\_3. Distinguish between prokaryotic and eukaryotic cells.
- \_\_4. Describe the structure and function of DNA.
- \_\_5. Explain what is meant by "form fits function."
- \_\_6. Explain how an organism is a type of open system.
- \_\_7. Describe the two major dynamic processes of any ecosystem
- \_\_8. Explain how regulatory mechanisms control reactions in organisms.

### **Evolution, Unity, and Diversity**

- \_\_9. Distinguish among the three domains of life. List and distinguish among the kingdoms of eukaryotic life.
- \_\_10. Briefly describe how Charles Darwin's ideas contributed to the conceptual framework of biology.

### **Science as a Process**

- \_\_11. Outline the scientific method.
- \_\_12. Distinguish between inductive and deductive reasoning.
- \_\_13. Distinguish between a scientific hypothesis and a scientific theory.

## **KEY TERMS:**

(There are no key terms for this chapter.)

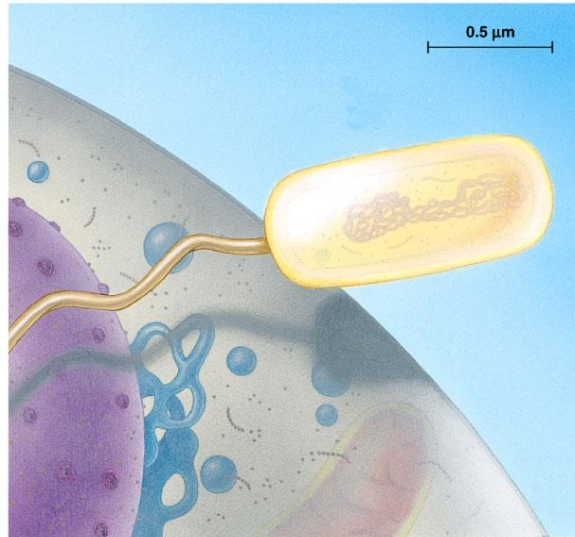
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## **WORD ROOTS:**

(There are no key terms for this chapter.)

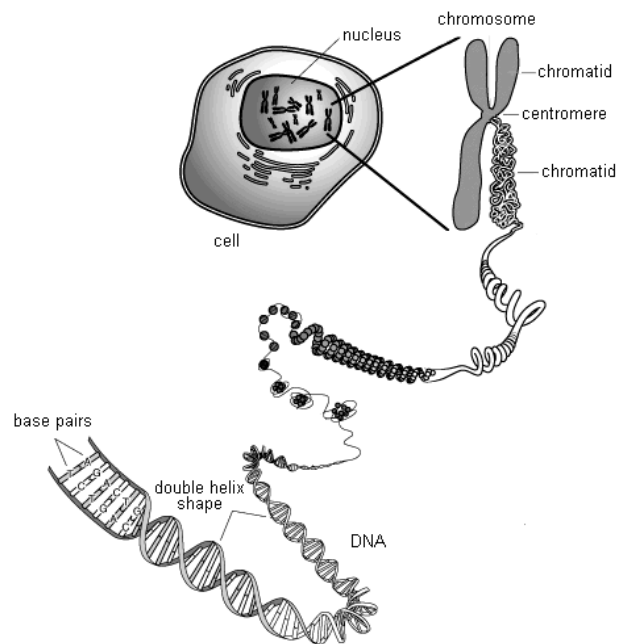
# Guided Reading: Chapter 1

1. Label the diagram below and use it to compare and contrast prokaryotic and eukaryotic cells.

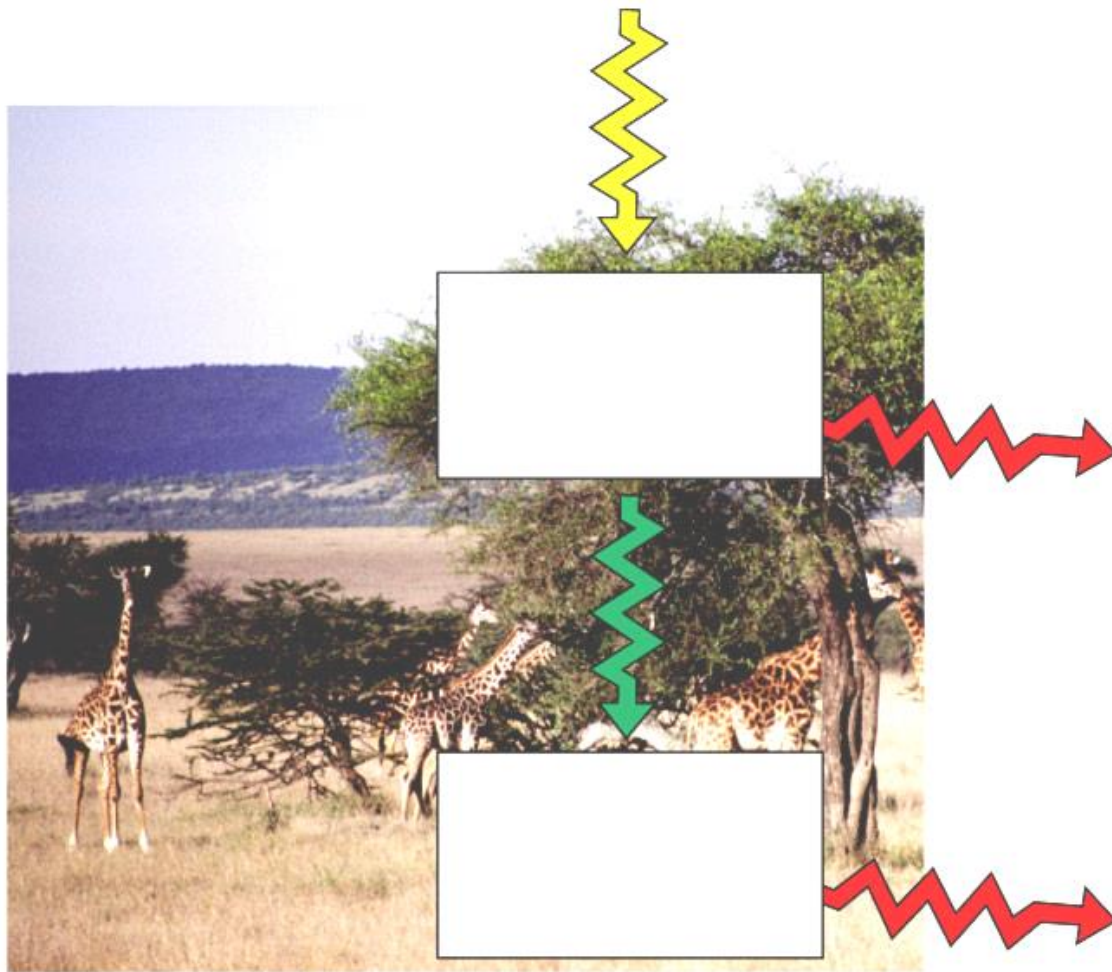


Prokaryotic Cells	Eukaryotic Cells

2. Use the diagram below to help you describe the relationship between DNA, genes, chromosomes, nuclei and cells as the basic unit of structure and function in living organisms?



3. Label the diagram below and use it to describe how energy flows through and ecosystem.



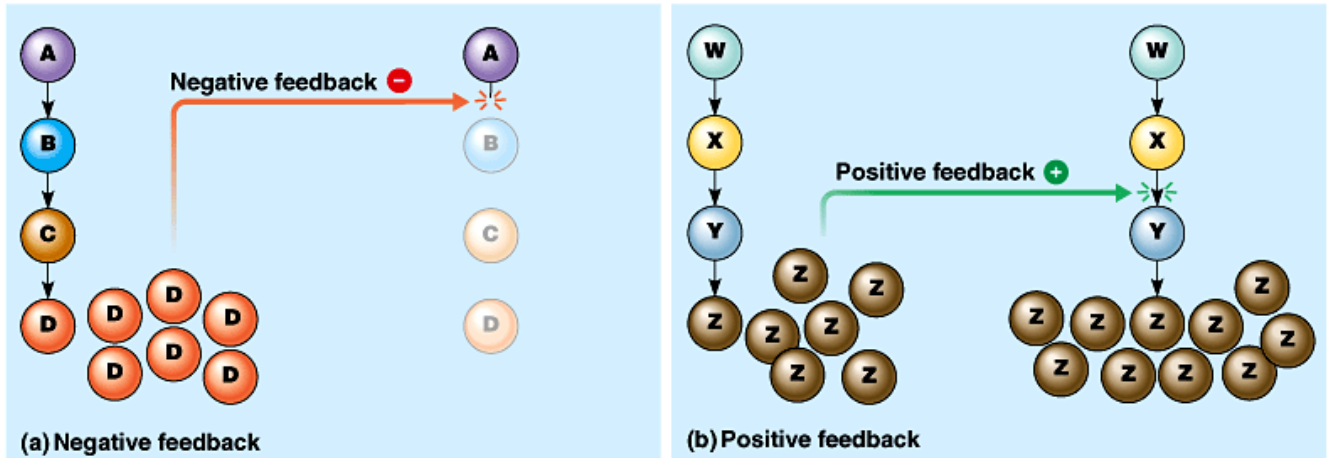
4. Can energy be recycled? Explain.

5. What is feedback and how does it relate to property of life – regulation?

6. By the end of the year you will be able to explain this in your sleep – use the diagrams below to define Negative and Positive Feedback and give an example of each.  
In your own words – relate the example you choose and how it meets the criteria of your definition.

### Negative Feedback

### Positive Feedback



7. Why is classification of living organisms necessary to understanding biology?

8. What does the statement “*there is unity in diversity*” mean in terms of biology and why is it said that “*Evolution is the unifying theme of biology?*”

9. Based on your knowledge of the Darwin's theory of Natural Selection – imagine you are at the dinner table – explain the theory in your own words and give an example that supports your statements.

10. Compare and contrast **inductive** and **deductive** reasoning.

11. Define each of the following terms associated with a well-designed controlled experiment?

a. Experimental Group –

b. Control Group –

12. How is the term *theory* used in science?

# Chapter 1 - Review Questions

- \_\_\_1. Which of the following statements about the properties of life is false?  
A) All organisms have the ability to take in energy and use it.  
B) All organisms have the ability to respond to stimuli from the environment.  
C) All organisms have the ability to reproduce.  
D) All organisms have the ability to maintain a constant internal temperature.
- \_\_\_2. Life is organized in a hierarchical fashion. Which of the following sequences correctly lists that hierarchy from least inclusive to most inclusive?  
A) ecosystem, population, organ system, cell, community, molecule, organ, organism, organelle, tissue  
B) cell, molecule, organ system, organ, organelle, population, tissue, organism, ecosystem, community  
C) organism, organ system, tissue, population, organ, organelle, community, cell, ecosystem, molecule  
D) molecule, organelle, cell, tissue, organ, organ system, organism, population, community, ecosystem
- \_\_\_3. The tree in your backyard is home to two cardinals, a colony of ants, a wasp's nest, two squirrels, and millions of bacteria. Together, all of these organisms represent -  
A) a species.                      B) a population.                      C) a community.                      D) an ecosystem.
- \_\_\_4. If you eat a hamburger, you are mainly eating ground-up beef muscle. What levels of organization are represented in this ground-up muscle?  
A) organism, population, and community                      C) organ, organ system, and organism  
B) organelle, cell, and tissue                      D) tissue, organ, and organ system
- \_\_\_5. Mr. Collea asks you to look into your microscope to see a prokaryotic cell. You will be looking for a cell that -  
A) has a nucleus.                      C) has a membrane.  
B) makes up most of the tissues of your body.                      D) is much larger than most cells in your body.
- \_\_\_6. Which of the following statements about ecosystems is false?  
A) Bacteria and fungi recycle energy within an ecosystem.  
B) Plants and other photosynthetic organisms are producers in ecosystems.  
C) Chemical nutrients cycle within an ecosystem.  
D) In the process of energy conversions within an ecosystem, some energy is converted to heat.
- \_\_\_7. The ultimate source of energy flowing into nearly all ecosystems is -  
A) wind.                      B) electricity.                      C) radioactivity.                      D) sunlight.
- \_\_\_8. In an ecosystem, energy -  
A) cycles along with chemical nutrients.  
B) typically flows from consumers to producers to decomposers.  
C) typically flows from producers through a series of consumers.  
D) comes ultimately from bacteria.
- \_\_\_9. Which of the following statements about genetics is true?  
A) Genes are proteins that produce DNA.  
B) DNA is made up of six different kinds of nucleotides.  
C) Differences among organisms reflect different nucleotide sequences in their DNA.  
D) Each DNA molecule is a single strand of nucleotides.
- \_\_\_10. Organisms that are prokaryotes are in the domains -  
A) Bacteria and Archaea.                      C) Plantae and Animalia.  
B) Eukarya and Archaea.                      D) Fungi and Bacteria.

- \_\_\_11. Which of the following statements about the domain Bacteria is true?  
A) Archaea belong to this domain. C) All bacteria have a membrane-bound nucleus.  
B) All bacteria are multicellular organisms. D) All bacteria lack a nucleus.
- \_\_\_12. Members of the kingdom Animalia -  
A) can obtain their food either by absorption or by photosynthesis.  
B) are composed of cells that lack a cell membrane.  
C) can obtain their food by eating other organisms.  
D) make their own food through photosynthesis.
- \_\_\_13. Kingdom Fungi includes species -  
A) such as mushrooms and plants. C) that use photosynthesis to obtain food.  
B) that obtain food by ingestion. D) that obtain food by decomposing dead organisms and absorbing the nutrients.
- \_\_\_14. Which of the following is a kingdom within the domain Eukarya?  
A) Viruses B) Fungi C) Archaea D) Bacteria
- \_\_\_15. All organisms belonging to the kingdom Plantae -  
A) are photosynthetic.  
B) obtain food by decomposing the remains of dead organisms and absorbing the nutrients.  
C) are unicellular and lack a nucleus.  
D) are multicellular and lack a nucleus.
- \_\_\_16. Which of the following statements is not consistent with Darwin's theory of natural selection?  
A) Individuals in a population exhibit variations, some of which are passed from parents to offspring.  
B) Individual organisms exhibit genetic change during their life spans to better fit their environment.  
C) Factors in the environment result in some organisms having better reproductive success than others.  
D) Natural selection can lead to the appearance of new species.
- \_\_\_17. An antibiotic kills 99.9% of a bacterial population. You would expect the next generation of bacteria -  
A) to be just as susceptible to that antibiotic as was the previous generation.  
B) to be more resistant to that antibiotic.  
C) to die out due to the drastic decrease in population size.  
D) to be more contagious than the prior generation.
- \_\_\_18. A theory is -  
A) an idea that has been proven.  
B) a concept in the early stages that still needs to be tested.  
C) a description of a belief that invokes the supernatural.  
D) an explanation of an idea that is broad in scope and supported by a large body of evidence.
- \_\_\_19. The role of a control in an experiment is to -  
A) provide a basis of comparison to the experimental group.  
B) prove that a hypothesis is correct.  
C) ensure repeatability.  
D) counteract the negative effect of the experiment.
- \_\_\_20. A scientist performs a controlled experiment. This means that -  
A) the experiment is repeated many times to ensure that the results are accurate.  
B) the experiment proceeds at a slow pace to guarantee that the scientist can carefully observe all reactions and process all experimental data.  
C) two experiments are conducted, one differing from the other by only a single variable.  
D) one experiment is performed, but the scientist controls the variables.