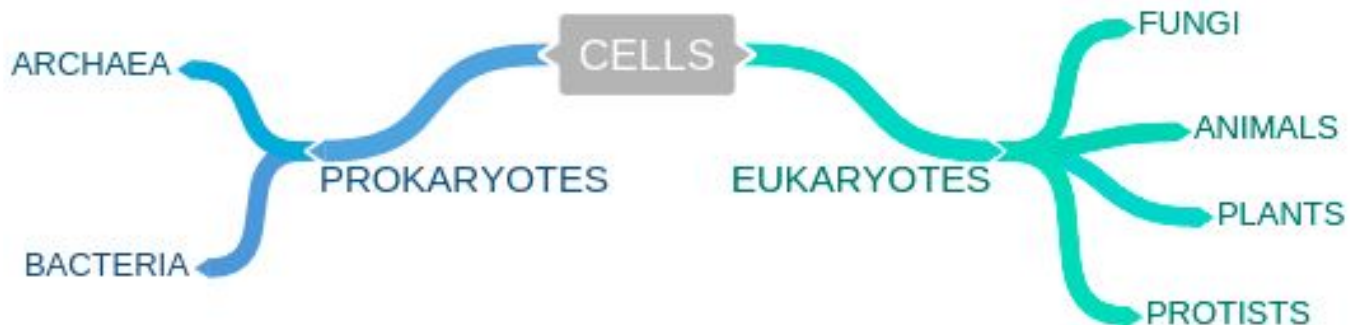


# BIOLOGY EOC REVIEW PACKET

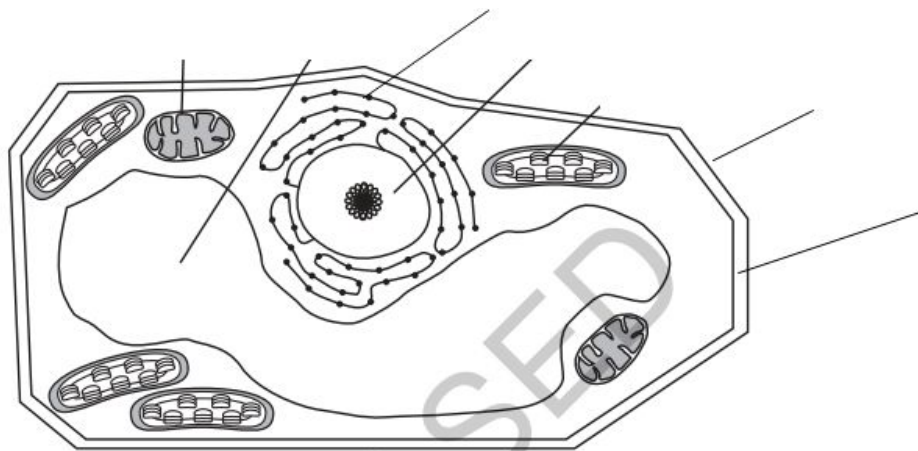
## 1.1.1: Structure & Function of Organelles

Identify the FUNCTION of the following organelles:

- ribosome
- nucleus
- chloroplast
- cell membrane
- mitochondria



Label the picture using the following: ribosome, nucleus, cell membrane, vacuole, cell wall, mitochondria and chloroplast



### Review Questions

- Is this cell a plant or animal cell? Explain
- Are these cells prokaryotic or eukaryotic? Explain

## Released Test Questions

**What will most likely be the result if all of the mitochondria are removed from a plant cell?**

- A It will be unable to carry out respiration.
- B It will lose water through osmosis.
- C It will break down the ribosomes in the cell.
- D It will be unable to photosynthesize.

**Which best explains why muscle cells are different from blood cells?**

- A A mutation occurs during the development of muscle cells but not in blood cells.
- B Different genes are activated in muscle cells than in blood cells.
- C Muscles cells experience different environmental influences than blood cells.
- D Muscle cells are produced by the brain, but blood cells are produced by the heart.

**Euglena have small hairlike extensions called cilia on their exterior and Paramecium have a long whip-like structure. Which function do these structures have in common?**

- A digestion
- B gathering food
- C movement
- D reproduction

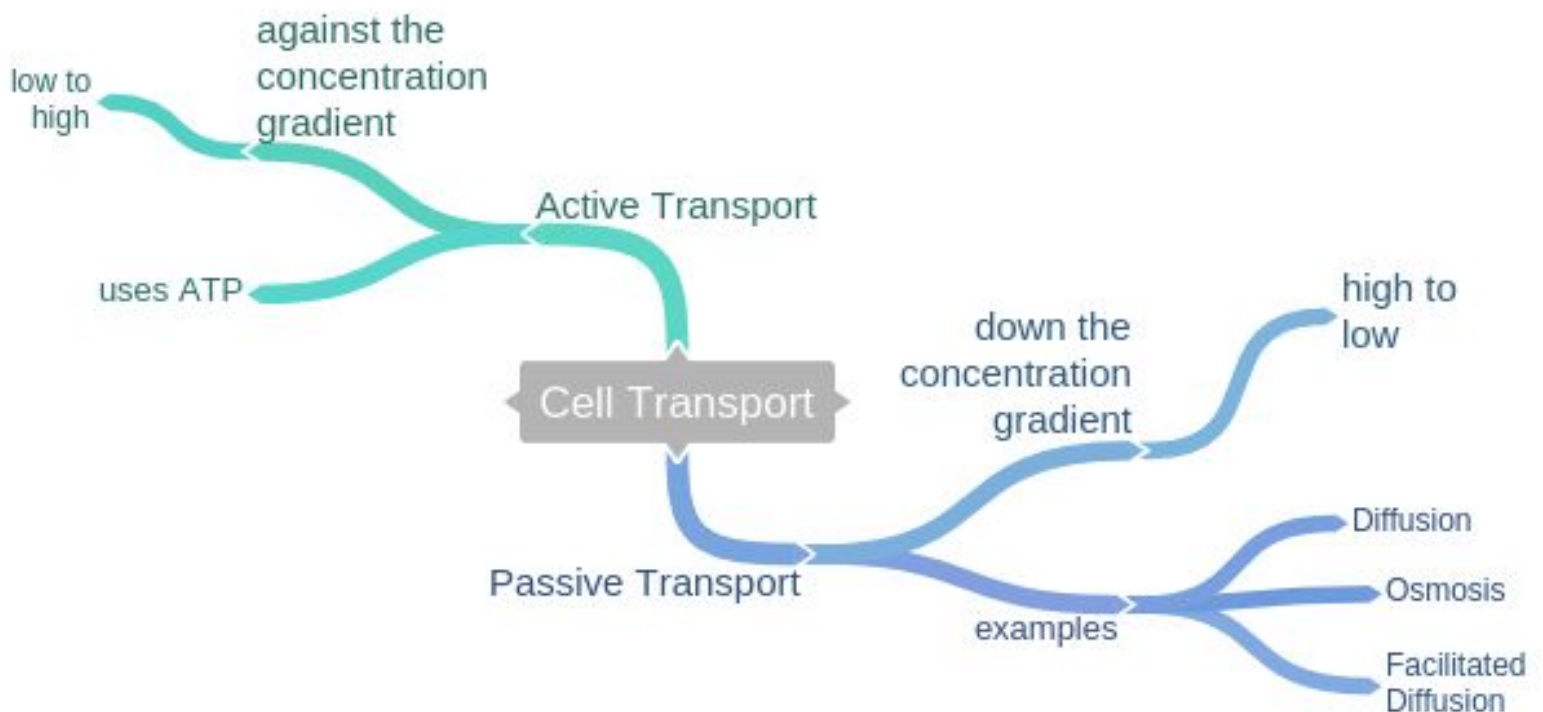
**How are prokaryotic and eukaryotic cells similar?**

- A Both contain a nucleus.
- B Both contain ribosomes.
- C Both contain membrane-bound organelles.
- D Both contain cell walls.

---

### 1.2.1: Homeostasis

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Define each of the following terms:

- passive transport
- osmosis
- diffusion

- active transport

- ATP

### Review Questions

- Which type of transport requires ATP?
- Which type of transport allows molecules to move with the concentration gradient (high to low concentration)?
- Which type of transport uses protein channels?

### Released Test Questions

**Which would be the best evidence that a cell is using active transport to move a substance across its cell membrane?**

- A Substances are moving rapidly across the cell membrane.
- B ATP is being rapidly consumed near the cellular membrane.
- C Substances are moving from high to low concentrations.
- D Substances are moving through channels in the cell membrane

**If energy is needed to move materials into or out of a cell, what is most likely occurring?**

- A active transport
- B passive transport
- C osmosis
- D diffusion

### 1.2.2: Cell Cycle/Mitosis

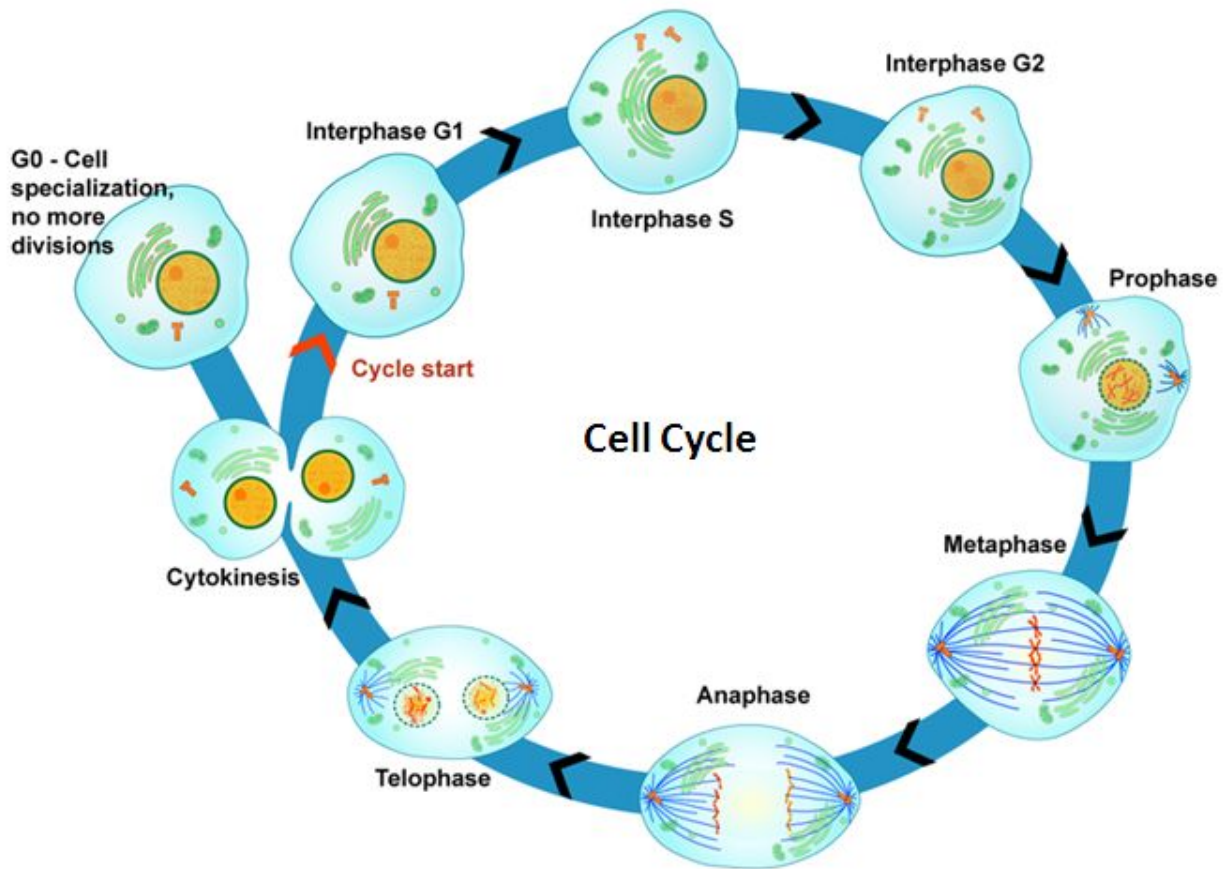
Define each of the following terms:

- mitosis
- chromosome
- asexual reproduction
- diploid
- haploid

### Review Questions

- When does DNA replication occur?
- When do the chromosomes line up in the center of the cell?
- When does the cytoplasm separate to form two cells?
- How does the DNA compare of the two cells formed by mitosis?

➤ What is cell specialization?



### Released Test Questions

**Before mitosis begins, which happens before the nucleus starts dividing?**

- A The cytoplasm separates.
- B The DNA replicates.
- C The sister chromatids separate.
- D The homologous chromosomes cross over.

**During which phase of the cell cycle is the cell growing and preparing for cellular division?**

- A cytokinesis
- B anaphase
- C prophase
- D interphase

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### 4.1.3: Enzymes

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Define each of the following terms:

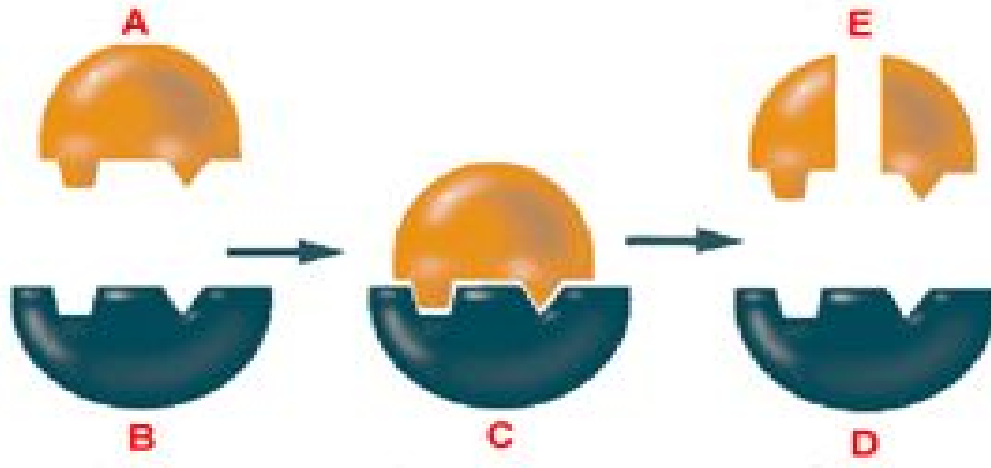
- activation energy
- active site
- substrate
- denature

Label the following letters below: products, substrate, enzyme

A-

B, C and D-

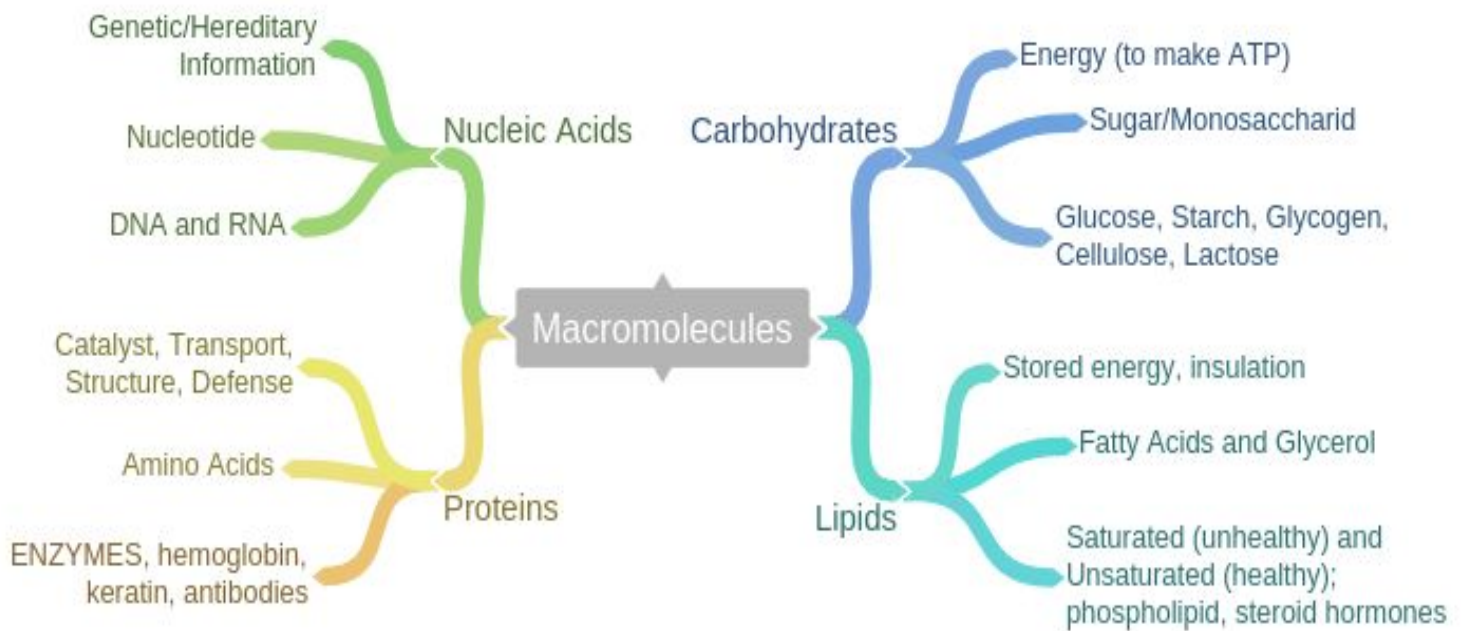
E-



Review Questions WORD BANK: There are two extra words in the list below.

activation    more    proteins    food    decrease  
increase    shape    less    DNA

- Enzymes belong to the macromolecule group called \_\_\_\_\_.
- All proteins function only if their 3D \_\_\_\_\_ is correct. This means the \_\_\_\_\_ (nucleic acid) that codes for each protein must be written without mutation.
- Enzymes lower the \_\_\_\_\_ energy of a chemical reaction. This means the reaction occurs using much \_\_\_\_\_ energy than without the enzyme.
- Enzymes also \_\_\_\_\_ the rate of chemical reactions. Without enzymes, animals couldn't eat enough \_\_\_\_\_ to make enough energy for survival.



## Released Test Questions

**What type of organic molecules are enzymes?**

- A carbohydrates
- B lipids
- C nucleic acids
- D proteins

**Which type of molecule do whales use for energy storage and insulation?**

- A DNA
- B glucose
- C fat
- D starch

**What are the subunits of DNA and their function?**

- A nucleotides that store information
- B monosaccharides that provide quick energy for the cell
- C lipids that store energy and provide insulation
- D proteins that provide the building blocks for the structural components of organisms

**Which most directly controls the rate at which food is broken down to release energy?**

- A enzymes
- B hormones
- C nucleic acids
- D vitamins

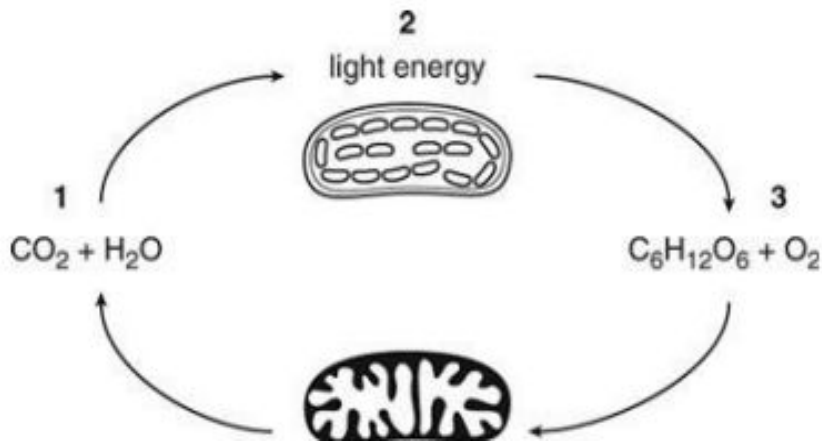
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## 4.2.1: Photosynthesis and Respiration

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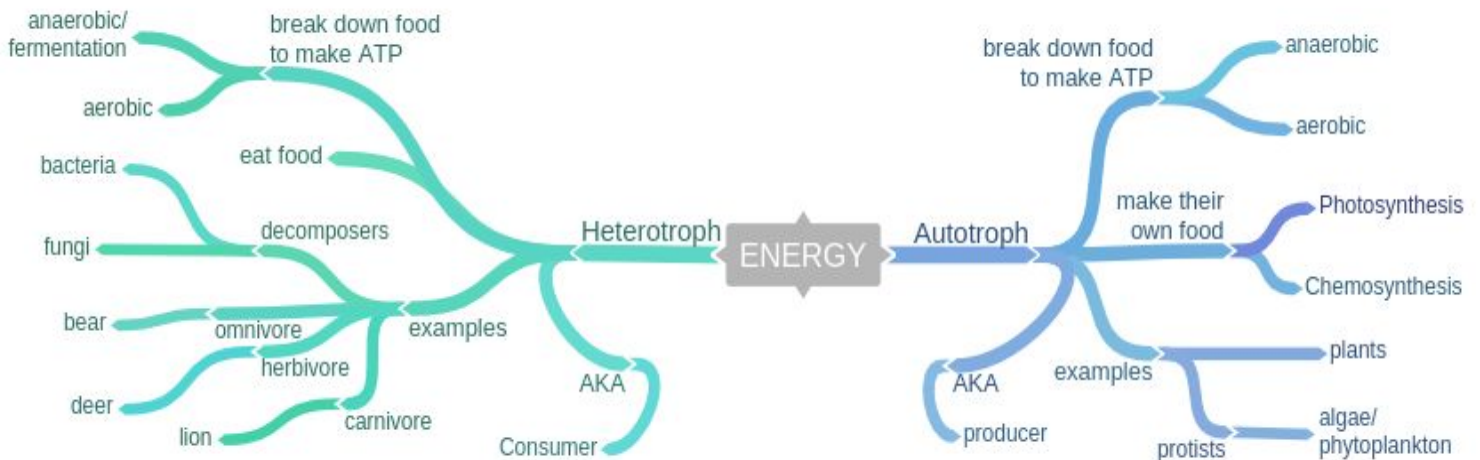
Define each of the following terms:

- glucose
- mitochondria
- chloroplast
- aerobic
- anaerobic
- ATP
- Label the chloroplast and mitochondria.



### Review Questions

- What process is occurring between # 1 and #3? Write the equation
- What process is occurring between # 3 and #1? Write the equation



### Released Test Questions

**How does the amount of energy resulting from fermentation compare with that of aerobic respiration?**

- A Aerobic respiration results in less energy.
- B Aerobic respiration results in more energy.
- C Each process results in equal amounts of energy.
- D Each process results in variable amounts of energy.

**Which statement best compares aerobic and anaerobic respiration?**

- A Less ATP is generated during anaerobic respiration than during aerobic respiration.
- B More water is generated during anaerobic respiration than during aerobic respiration.
- C More oxygen is generated during anaerobic respiration than during aerobic respiration.
- D Less lactic acid is generated during anaerobic respiration than during aerobic respiration.

### 3.1.2: Transcription & Translation

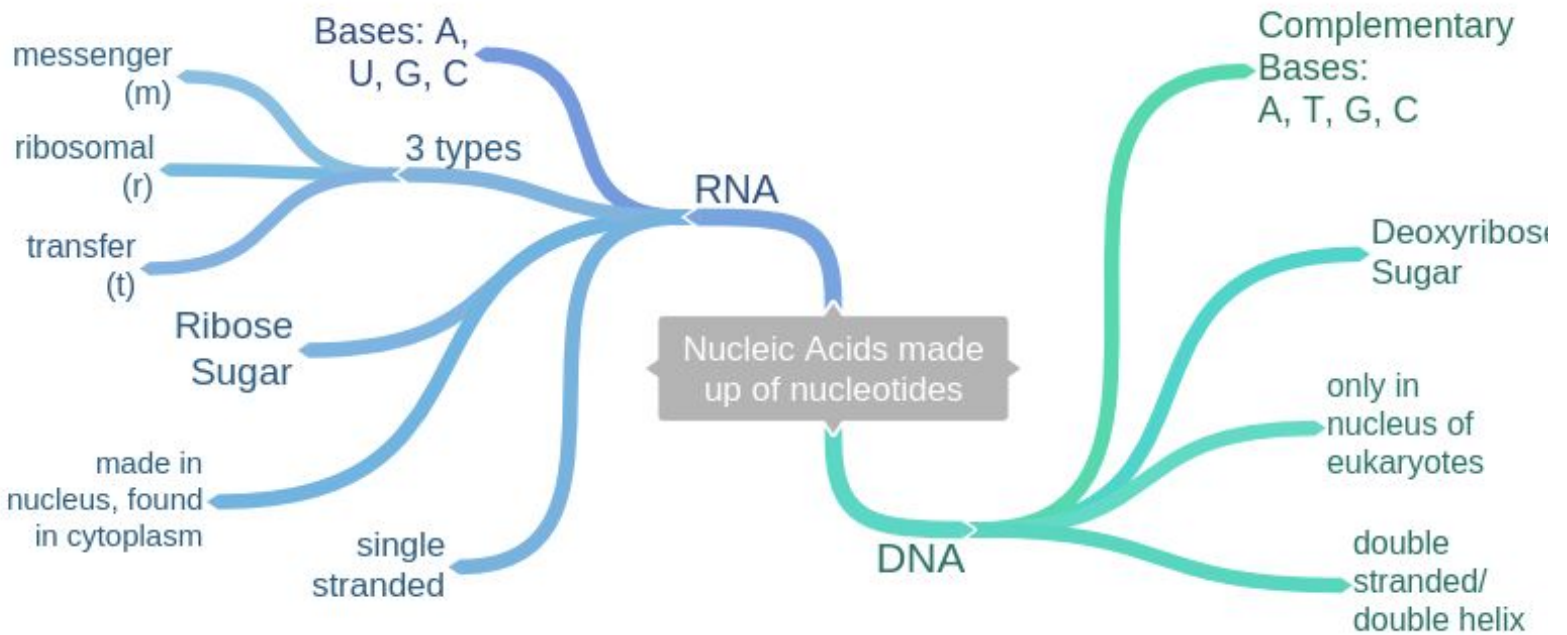
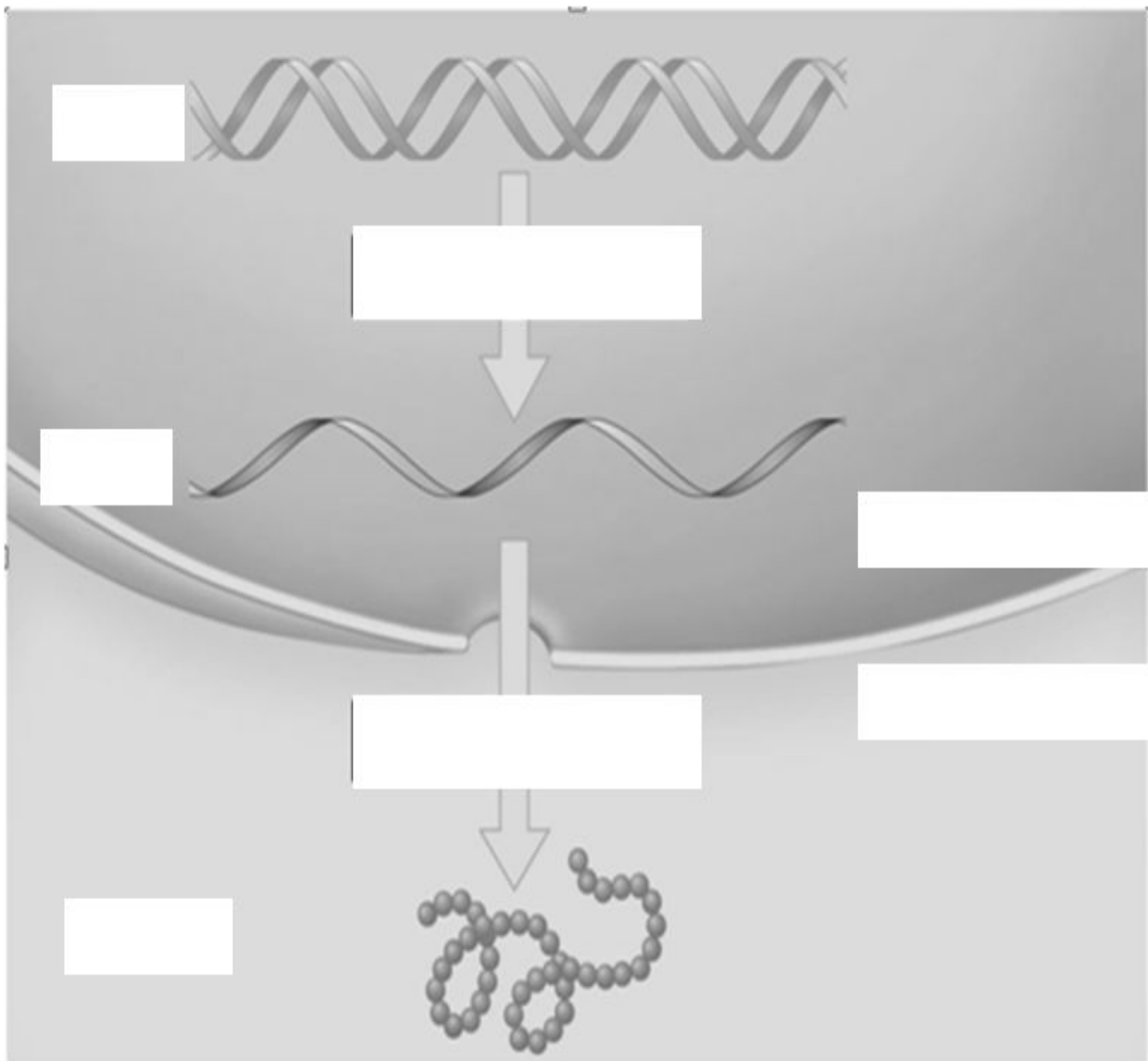
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Define each of the following terms:

- RNA
- replication
- DNA
- transcription
- mutation
- translation

Label the following: DNA, RNA, Protein, Nucleus, Cytoplasm, Transcription and Translation





**A strand of DNA has these bases:**

**AGC CAT GTA TAC What is the complementary DNA strand?**

- A ACG GAT CTA TAG
- B TCG GTA CAT ATG
- C TGC CTA GAT ATC
- D UCG CUA CAU AUG

**A segment of DNA has this sequence: ATA GCA CAT GTA What is the mRNA sequence transcribed from this segment?**

- A TAT CGT GTA CAT
- B TAT GCT CTA GAT
- C UAU CGU GUA CAU
- D UAU GCU CUA CAU

**How does DNA code for proteins in a cell?**

- A by creating a new double helix structure
- B by using its phosphate and sugar molecules
- C by adding more hydrogen bonds to its structure
- D by arranging certain nitrogen bases of the cell in a particular order

**Which will most likely cause variations to occur within a species?**

- A competition
- B mutation
- C mutualism
- D predation

**Which statement best describes the relationship that exists among proteins, DNA, and cells?**

- A Proteins combine to produce cells, which produce DNA.
- B Proteins are made up of DNA, which determines the cells that are produced.
- C DNA is made up of proteins, which tell a cell how to function.
- D Cells contain DNA, which controls the production of proteins.

**Which would most likely produce a mutation that is passed on to offspring?**

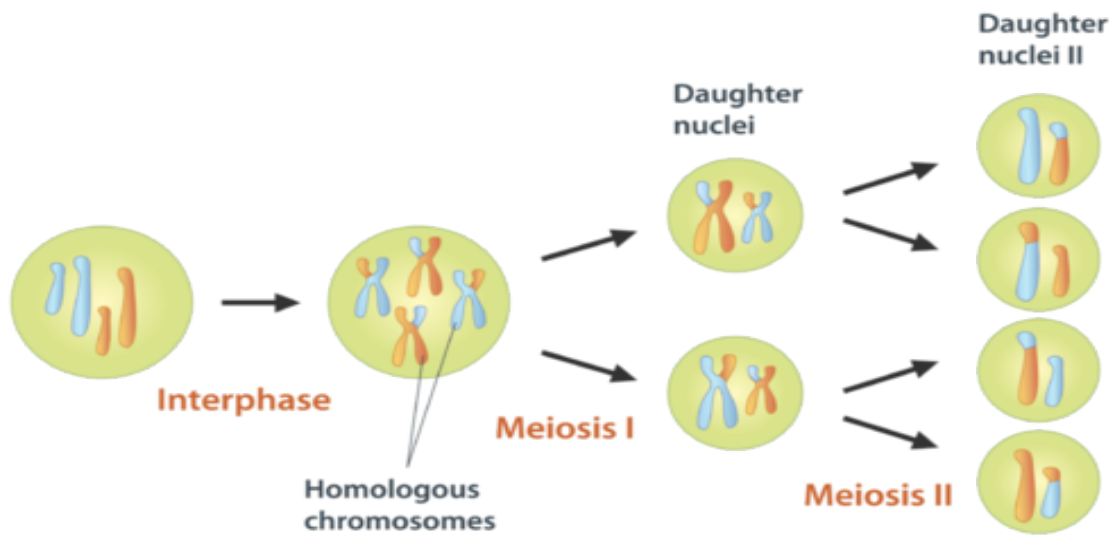
- A radiation changing the DNA sequence in skin cells
- B a gamete with an extra chromosome forming
- C tobacco smoke altering the genes in lung cells
- D exposure to chemicals altering nerve cell function

**How would overexposure to X-rays affect most animal cells?**

- A It would increase cell specialization in organs. B It would change the sequence of DNA nucleotides in affected cells.
- C It would produce new nucleotides for DNA molecules.
- D It would cause an increase in red blood cell production.

**Which factor most affects the order of amino acids in a protein?**

- A the DNA located in the nucleus of the cell
- B the cell in which the protein is located
- C the amount of ATP available for the cell's use
- D the area in a cell where proteins are produced



Define each of the following terms:

- meiosis
- crossing over
- nondisjunction
- sexual reproduction
- crossing over
- asexual reproduction

Review Questions: For each paired statements, check the statement that is true.

- Meiosis is another name for sexual reproduction.
- Meiosis is another name for asexual reproduction.
- Meiosis makes body/somatic cells.
- Meiosis makes gametes (egg, sperm).
- Meiosis is the reason why a child can get a gene that neither parent shows.
- Meiosis is the reason why a child can only get genes that both parents show.
- Meiosis allows for genetic variation.
- Meiosis doesn't allow genetic variation.

## Released Test Questions

**Which process produces the most variation within a species?**

- A asexual reproduction
- B sexual reproduction
- C mitosis
- D cloning

**What is the result when a single cell reproduces by mitosis?**

- A two cells with genetic material identical to the parent cell
- B two cells with half the genetic material of the parent cell
- C four cells with half the genetic material of the parent cell
- D four cells with genetic material identical to the parent cell

**Which characteristic is present in offspring produced by sexual reproduction, but is missing in offspring produced by asexual reproduction?**

- A an identical copy of parent chromosomes
- B twice the number of parent chromosomes
- C only half the number of parent chromosomes
- D an independent assortment of parent chromosomes

**Why is meiosis important for sexual reproduction?**

- A It allows the zygote formed from fertilization to have triple the chromosome number of the organism.
- B It allows gametes to have twice the original number of chromosomes of the organism.
- C It allows gametes to have half the original number of chromosomes of the organism.
- D It allows the zygote formed from fertilization to have half the original number of chromosomes of the organism.

**How are sexual reproduction and asexual reproduction different?**

- A Sexual reproduction produces offspring identical to the parents, but asexual reproduction produces offspring with traits from both parents.
- B Asexual reproduction produces offspring identical to the parents, but sexual reproduction produces offspring with traits from both parents.
- C Sexual reproduction only occurs in multicellular organisms, but asexual reproduction only occurs in unicellular organisms.
- D Asexual reproduction only occurs in multicellular organisms, but sexual reproduction only occurs in unicellular organisms.

---

### 3.2.2: Inheritance Patterns

---

Define each of the following terms:

- homozygous
- genotype
- heterozygous
- phenotype

## Types of Inheritance Matching

A. Codominance

B. X-linked

C. Incomplete dominance

D. Multiple alleles

E. Polygenic

F. Environmental influenced

- \_\_\_\_\_ Colorblind sons inherit the trait from their mom
- \_\_\_\_\_ Red and white flowers have pink flowers in the next generation
- \_\_\_\_\_ Uses XX and XY
- \_\_\_\_\_ A chicken that has black AND white feathers
- \_\_\_\_\_ A black labrador mom has brown, black, and white fur puppies.
- \_\_\_\_\_ More common in males
- \_\_\_\_\_ Recessive blood type is type O blood.
- \_\_\_\_\_ Only females are carriers
- \_\_\_\_\_  $I^A I^A$  and  $I^A i$  have the same phenotype
- \_\_\_\_\_ Your skin will make more dark pigment (color) melanin if you are in the sun.
- \_\_\_\_\_ Height, weight, skin and eye color.
- \_\_\_\_\_ Temperature and pH can affect the gene expression of plants.

## Genetic Disorders:

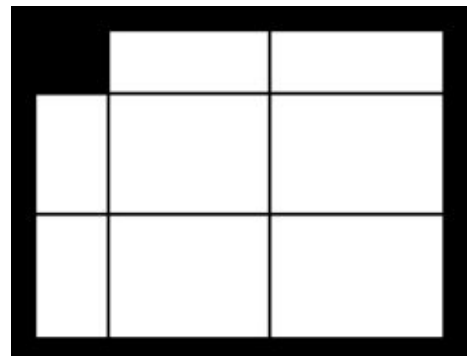
- \_\_\_\_\_ Dominant disease
  - \_\_\_\_\_ Forms mucus in the digestive system
  - \_\_\_\_\_ Results from an immunity to malaria
  - \_\_\_\_\_ African ancestry
  - \_\_\_\_\_ Onset later in life
  - \_\_\_\_\_ Getting an injection of enzyme can keep this disease inactive
  - \_\_\_\_\_ Gene therapy has extended the lifespan of patients
  - \_\_\_\_\_ Can't eat a lot of animal protein
- A. Cystic fibrosis
  - B. PKU
  - C. Sickle-cell anemia
  - D. Huntington's

## Released Test Questions

In guinea pigs, the allele for black hair (B) is dominant to the allele for brown hair (b). Two black-haired guinea pigs are crossed. One of the guinea pigs is homozygous for black hair and one is heterozygous.

What percentage of the offspring are expected to have black hair

- a. 25%
- b. 50%
- c. 75%
- d. 100%



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### 3.3.1: DNA Technology

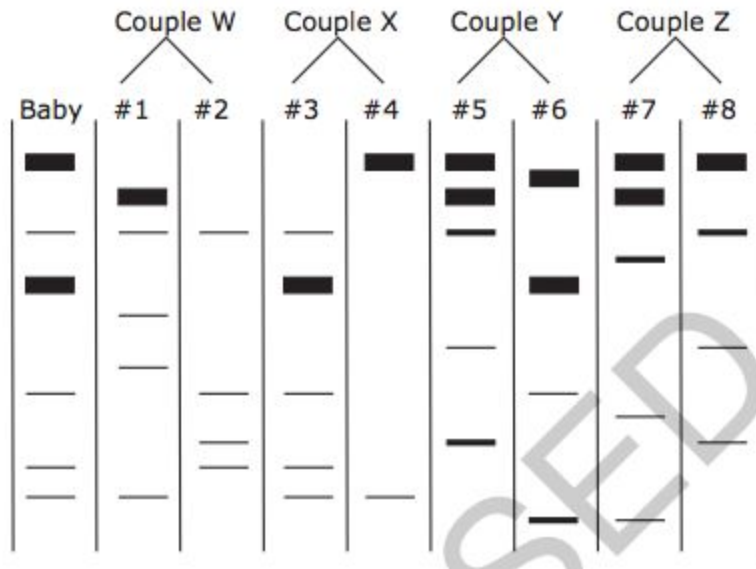
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Define each of the following terms:

- gel electrophoresis
- Transgenic organism
- stem cells

#### Review Questions

- Check all statements that are true about transgenic organisms. There are three answers.
  - \_\_\_\_\_ are also called genetically engineered organisms.
  - \_\_\_\_\_ have DNA from two different organisms within them.
  - \_\_\_\_\_ are also called GMO: genetically modified organisms.
  - \_\_\_\_\_ are clones of the parent organism.
- Circle the statements that are true about plasmids. There are three correct answers.
  - \_\_\_\_\_ Plasmids are made of proteins.
  - \_\_\_\_\_ Plasmids are found in bacteria/prokaryotic organisms.
  - \_\_\_\_\_ Plasmids can be genetically engineered by adding genes from other organisms.
  - \_\_\_\_\_ Plasmids can be added to human DNA.
  - \_\_\_\_\_ Plasmids are made of DNA.
- Circle true statements about gel electrophoresis. There are four correct answers.
  - \_\_\_\_\_ Gel electrophoresis separates DNA segments by size.
  - \_\_\_\_\_ Gel electrophoresis is used to solve crimes by forensic scientists.
  - \_\_\_\_\_ Gel electrophoresis is used to create DNA fingerprints.
  - \_\_\_\_\_ Gel electrophoresis doesn't use electricity.
  - \_\_\_\_\_ Large DNA segments stay at the top and short DNA segments move to the end.
  - \_\_\_\_\_ DNA is a positive molecule.



➤ What is this picture above represent? How is it made?

➤ Which couple is most likely the parents of the baby? Explain

### Released Test Questions

**Which technique would most likely be used by forensic scientists?**

- A gene cloning
- B gene therapy
- C DNA fingerprinting
- D karyotyping

**Which is a step in the process of producing transgenic bacteria?**

- A A plasmid is used to replace a faulty gene in a human cell.
- B A chain of bacterial amino acids is inserted into human DNA.
- C A human gene is inserted into a bacterial plasmid.
- D A mutation is produced in a bacterial cell.

**Which is one reason scientists produce transgenic organisms?**

- A to create new species of organisms
- B to control microorganisms in the soil
- C to prevent habitats from being destroyed
- D to treat certain types of diseases

**Two people believe they are related. Which would be the best technique to determine if they are related?**

- A testing blood types
- B comparing DNA
- C examining karyotypes
- D testing for genetic disorders

---

### 3.4.1: Evolutionary Evidence and 3.4.2: Natural Selection

---

Define each of the following terms:

- vestigial
- homologous structures
- biochemical
- embryological
- fossil
- resistance
- fitness
- stabilizing selection
- directional selection
- disruptive selection
- geographic isolation

#### Released Test Questions

**The use of pesticides on crops has been a common farming practice for decades. What has been the greatest effect of natural selection through the use of pesticides on certain insect populations?**

A Natural selection has been altered because the insects and their predators are killed.

B The rate of selection is increased because the pesticides do not kill the insects that are naturally resistant to it.

C The rate of selection has decreased because the pesticides kill only young insects.

D The pesticides have altered natural selection by causing the insect DNA to spontaneously mutate

**A large population of cockroaches was sprayed with an insecticide. A few of the cockroaches survived and produced a population of cockroaches that was resistant to this spray. What can best be inferred from this example?**

A A species will adapt no matter what the environment.

B The environment has no effect on the survival of an organism.

C Insecticides cause mutations that are passed on to the next generation.

D Individuals with favorable variations survive and reproduce.

Review Questions WORD BANK: Words are used once!



algae	phosphate	bacteria	mitochondrion	eukaryotic
plants	nucleus	anaerobic	prokaryotic	Archaeobacteria
ATP	oxygen			

- The atmosphere of early Earth was lacking in \_\_\_\_\_, this gas that is now important for many living things.
- The first/simplest cells on Earth were \_\_\_\_\_ cells. These cells lack a nucleus, thus can't use a \_\_\_\_\_ to make ATP like eukaryotic/advanced cells.
- These simple cells, also called \_\_\_\_\_, make ATP by a process called fermentation/ \_\_\_\_\_ respiration. This process doesn't make much ATP, thus all bacteria are very small!
- \_\_\_\_\_/advanced cells have many organelles and use mitochondria to make \_\_\_\_\_/energy. Adenosine triphosphate releases energy by breaking the third \_\_\_\_\_ to make a molecule called ADP.
- This process releases a LOT of energy and are why most eukaryotic organisms are multicellular like fungi, \_\_\_\_\_, and animals.
- Kingdom protists are also eukaryotic though many are unicellular. Examples of protists are the \_\_\_\_\_ found in ponds (makes ponds green in the summer).
- Eukaryotic cells are considered advanced because they protect their DNA in the organelle called the \_\_\_\_\_.
- Prokaryotic kingdoms have prokaryotic/ bacterial cells. There are two prokaryotic kingdoms called Eubacteria (found in mouth, soil) and \_\_\_\_\_ (found in the intestines of animals.)

### 3.5.2: Classification

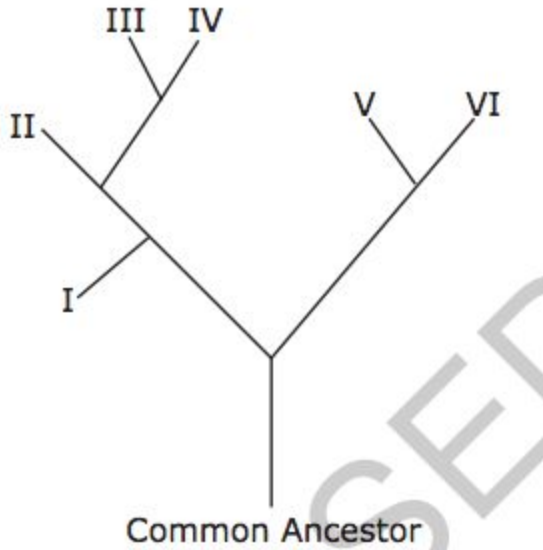
Define the following terms:

- phylogeneic tree/cladogram
- binomial nomenclature/ scientific name
- dichotomous key
- KPCOFGS

Review Questions

- What are the the following mnemonics supposed to help you remember:
  - Keep Pots Clean Or Family Gets Sick
  - King Phillip Came Over For Great S\_\_\_\_\_
- Which is the largest/most inclusive taxon?
- Which is the most specific, least diverse taxon?

### Released Test Questions

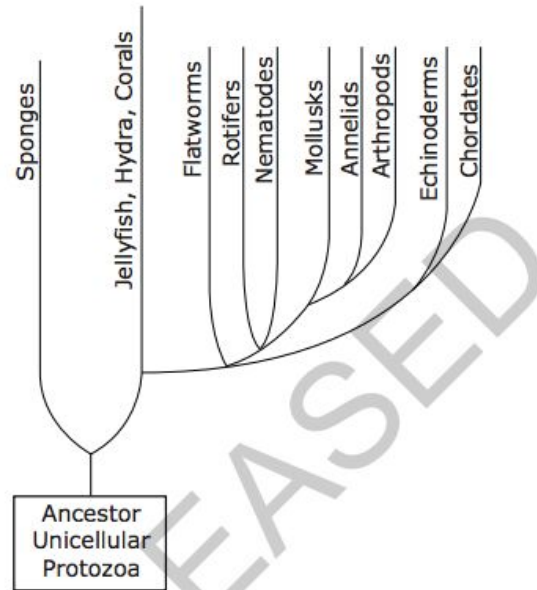


This diagram shows a cladogram of six species based on amino acid similarities. Which two species are the most closely related?

- A I and II
- B II and IV
- C I and V
- D V and VI

What is the best explanation for the continual changes in the classification system of organisms?

- A All organisms struggle for existence and become extinct.
- B All organisms compete to be at the top of the food chain.
- C Technological advances have allowed scientists to better compare organisms.
- D More species have been discovered, but scientists have not analyzed all the data.



The diagram below shows a phylogenetic tree for animals. Which two groups of organisms have the most genetic differences?

- A rotifers and nematodes
- B mollusks and annelids
- C mollusks and arthropods
- D echinoderms and chordates

What is the difference between the full classification of organisms and their scientific names?

- A The full classification of organisms and their scientific names vary in different countries.
- B The scientific names of organisms include the order and family of the organisms, but the full classification includes only the species name.
- C The full classification of organisms will include more categories of organisms than their scientific names.

---

## 2.2.1: Human Impacts

---

Define the following terms:

- pollution
- climate change
- habitat destruction
- population growth
- invasive species
- learned behavior
- innate behavior

Released Test Questions

**What will most likely happen if the human population continues to grow at current rates?**

- A There will be fewer natural resources available for future generations.
- B There will be an increase in nitrogen levels in the atmosphere.
- C There will be a decrease in water pollution.
- D There will be an increase in the number of strong hurricanes.

**The construction of a new coal-burning power plant would have the greatest impact on which environmental issue?**

- A depletion of the ozone
- B production of acid rain
- C release of radiation
- D increase in deforestation

**Which environmental factor would cause the greatest decrease in the number of species of plants and animals living in some of the lakes in the United States?**

- B global warming
- C ozone destruction

**If worldwide deforestation is not regulated, what could most likely result?**

- A Acid rain could lower the pH of rivers and lakes to dangerous levels for aquatic life.
- B CO<sub>2</sub> levels in the atmosphere could increase and contribute to global warming problems.
- C Plants and animals could become better adapted to living in desert conditions.
- D Future generations of humans could have an excess of wood and paper products.

**Which environmental concern is most associated with burning fossil fuels?**

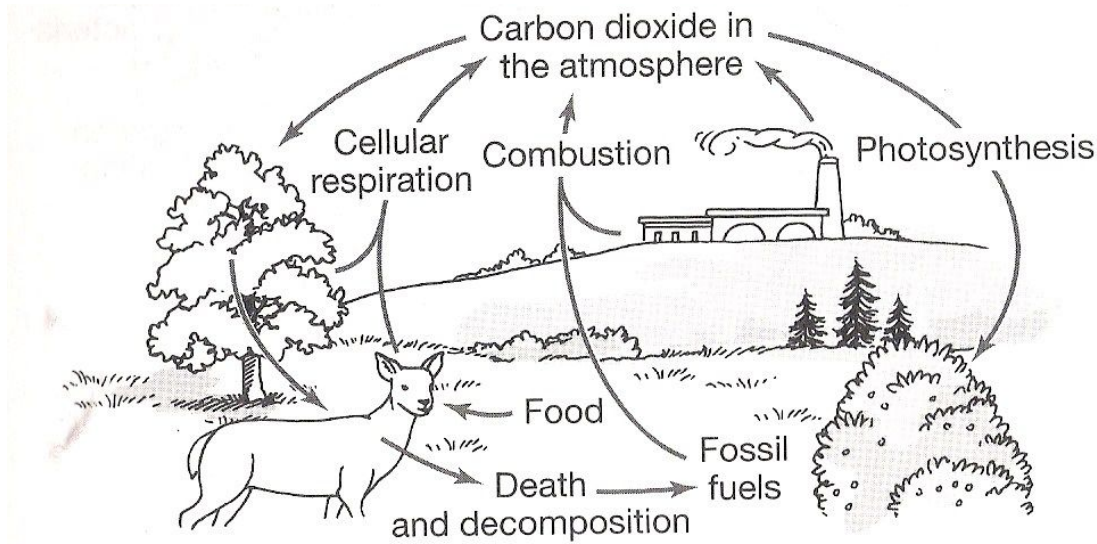
- A global climate change
- B pollution of ocean waters
- C ozone layer destruction
- D decrease in levels of atmospheric carbon dioxide

**What is the function of autotrophs in the carbon cycle?**

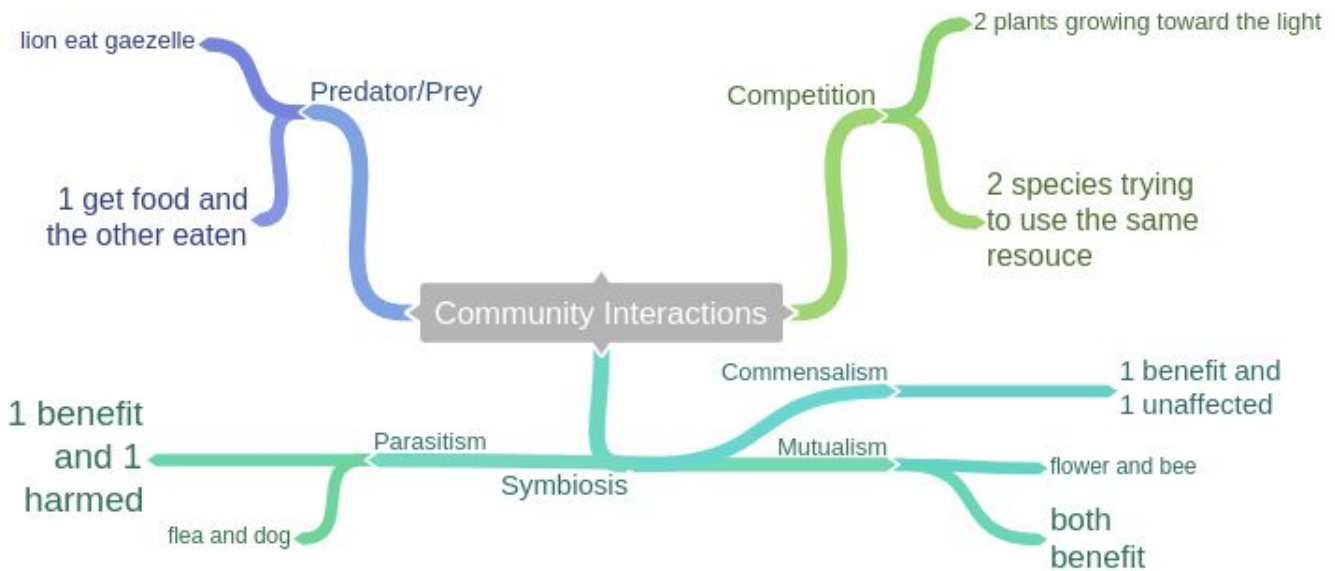
- A to use oxygen to produce glucose
- B to take in excess water
- C to use carbon dioxide to produce glucose
- D to feed on herbivores

## D acid rain

### Review Questions



- Do plants take in or release carbon dioxide?
- Do animals take in or release carbon dioxide?
- How does burning fossil fuels affect global climate?



### Released Test Questions

The yucca moth, attracted by the scent of a yucca plant, gathers pollen from the yucca flower. This ensures that the plant will be cross-pollinated and that the yucca moth larvae have a steady food supply. Which

Two different populations of birds live in the same area and eat the same types of food. Which most likely describes the relationship between these two populations of birds?  
A competition

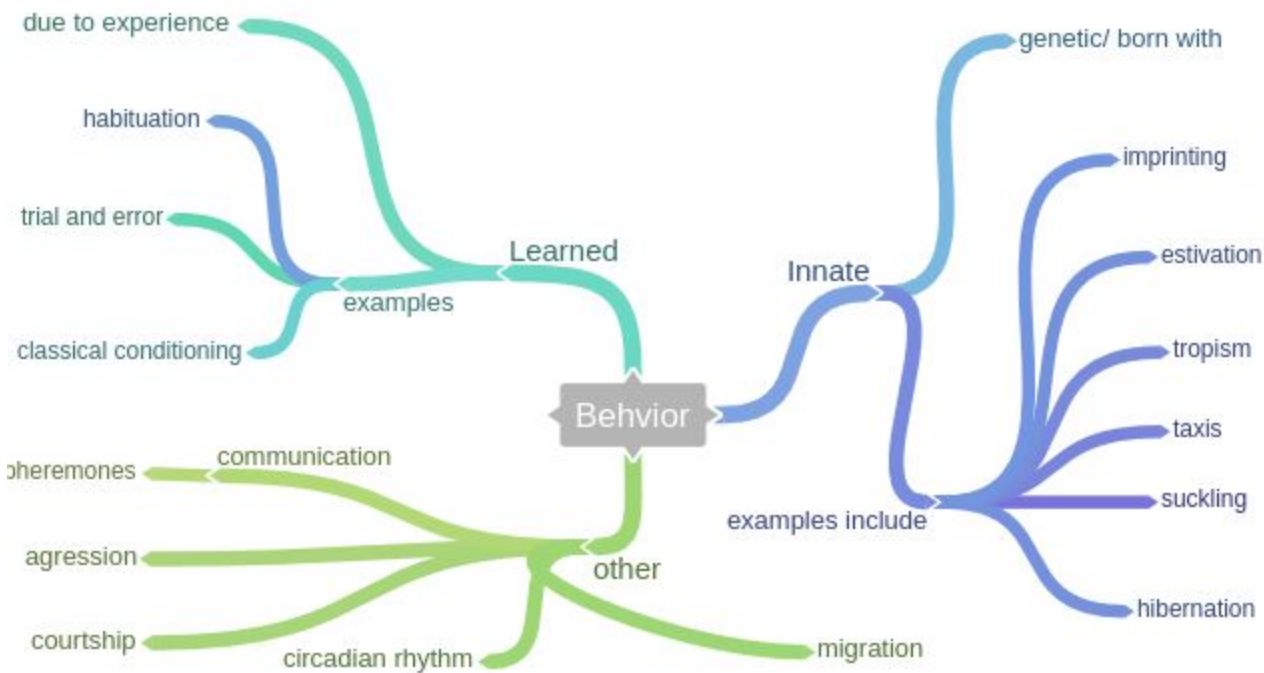
relationship does this best illustrate?

- A commensalism
- B mutualism
- C parasitism
- D predation

B mutualism

C parasitism

D predator-prey



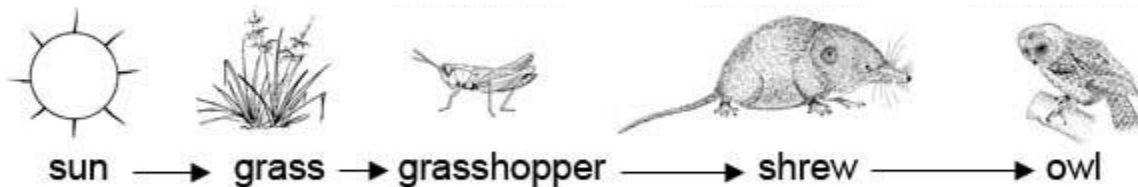
At night, moths travel toward light. Which type of behavior does this describe?

- A habituation
- B imprinting
- C innate behavior
- D learned behavior

The males of a bird species do a “dance” and “sing a song” each spring. What is the main purpose of these behaviors?

- A to scare off young birds
- B to imprint young birds
- C to clean their feathers
- D to attract female birds

Consider the following food chain:



- Which organism is the producer?
- Which organism is the primary consumer?
- Which organism is the secondary consumer?
- Which organisms are affected when the frog is taken out of the food chain.

- How much energy is passed through each trophic level? What happens to the rest of the energy?