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Biochem 2
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Table of context

A. Cells and Cell Processes

Basic Biological Principles; K.G

Objective

Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms.
Compare cellular structures and their functions in prokaryotic and eukaryotic cells.
Describe and interpret relationships between structure and function at various levels of biological organization (i.e., organelles, cells, tissues, organs, organ systems, and multicellular organisms)

Question to know

What is not present in all organisms?

Terms

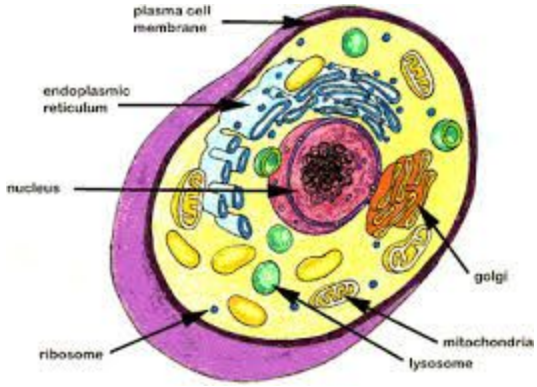
Organisms- an individual animal, plant, or single-celled life form.
Cells -the smallest structural and functional unit of an organism, typically microscopic and consisting of cytoplasm and a nucleus enclosed in a membrane. Microscopic organisms typically consist of a single cell, which is either eukaryotic or prokaryotic.
Unicellular- characterized by the formation or presence of a single cell or cells.
Multicellular -(of an organism or part) having or consisting of many cells.
Homeostasis -the tendency toward a relatively stable equilibrium between interdependent elements, especially as maintained by physiological processes.
Plasma membrane-a microscopic membrane of lipids and proteins that forms the external boundary of the cytoplasm of a cell or encloses a vacuole, and that regulates the passage of molecules in and out of the cytoplasm.
Nucleic acids
Ribosomes
Prokaryotic cell -any of the typically unicellular microorganisms that lack a distinct nucleus and membrane-bound organelles

Eukaryotic - An organism whose cells contain a nucleus surrounded by a membrane and whose DNA is bound together by proteins (histones) into chromosomes.

Summary

The basic biological principles is a couple of things first is the characteristics of life. Characteristics of life needs to have a certain maintenance and it's the following things obtaining and using energy, Maintaining a stable internal state, you have to have the ability to grow and also the ability to reproduce. It has a lot to do with cells and the parts such as Plasma, membranes cytoplasms, DNA, ribosomes. The two type of cells that are major are prokaryotic and eukaryotic cells. Prokaryotes are unicellular organisms that lack membrane-bound organisms. Eukaryotic cells are organisms whose cells contain a nucleus surrounded by a membrane and whose DNA is bound together by proteins into chromosomes.

Charts(to help to understand this)



Test(3 multiple choice and 2 short response)

1. **What characteristic of a cell separates the cell from its environment and regulates the exchange of material into the cell and out of the cell?**

A. Cytoplasm
B. DNA
C. Plasma Membrane
D. Ribosomes

2. Eukaryotic cells are larger than prokaryotic.

A. True
B. False

3. What is characteristics and abilities are needed in characteristics of life?

A. Ability to grow
B. Ability to reproduce
C. Obtain and use energy
D. All of the above

4. What is the function of the cytoplasm of a human cell?
5.What is the function of Homeostasis?
Answer Key
Test(3 multiple choice and 2 short response**)**

2. What characteristic of a cell separates the cell from its environment and regulates the exchange of material into the cell and out of the cell?

E. Cytoplasm
F. DNA
G. Plasma Membrane
H. Ribosomes

2. Eukaryotic cells are larger than prokaryotic.

C. True
D. False

3. What is characteristics and abilities are needed in characteristics of life?

E. Ability to grow
F. Ability to reproduce
G. Obtain and use energy
H. All of the above

4. What is the function of the cytoplasm of a human cell?
Cytoplasm is the substance that fills up the cell's internal volume.

5.What is the function of Homeostasis?

It's the process of maintaining a stable internal environment .

The Chemical Basis Of Life; D.W

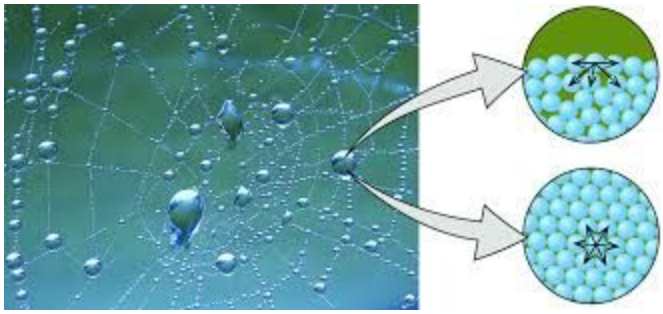
Key terms:

- Adhesion:
- Cohesion
- Catalyst
- pH
- Enzymes
- Lipids

Summary:

Energy is produced when the reactants have less energy than the products. Enzymes cannot function properly when the temperature, pH , concentration, and activators are present. An enzyme can function on a specific pH. Water has a high cohesion due to hydrogen bonding. In DNA and RNA amino acids are the building blocks that can be put together in many ways and sequences in order to make differ polypeptide chains of different lengths. These different polypeptides can be joined together to make different proteins that are needed to perform important tasks that are needed in the body. Other important organic molecules are lipids and carbohydrates. Carbon is unique in its own way because it can have more than one bond and lipids provide the body with a place to store its energy.

Practice:



1. **How do the physical properties of water result in the image above?**

A. Adhesion allows droplets to form, and capillarity keeps the droplets on the web
B. Cohesion allows droplets to form, and capillarity keeps the droplets on the web.

C. Cohesion allows droplets to form, and adhesion keeps the droplets on the web.
D. Adhesion allows droplets to form, and cohesion keeps the droplets on the web.

2. Which of the following choices are not found in both RNA and DNA ?

A. Nitrogenous base
B. Phosphate group
C. Ribose sugar
D. Guanine nucleotide

3. List the 4 factors that affect the rate at which chemical reaction occur.

4. True Or False?

Increasing the pH of an enzyme does not affect the enzymes function.

Explain why you chose this.

Bioenergetics: Photosynthesis and Cellular Respiration; A.B

Objective

- Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in energy transformations.
- Compare the basic transformation of energy during photosynthesis and cellular respiration.

- Describe the role of ATP in biochemical reactions.

Question to know

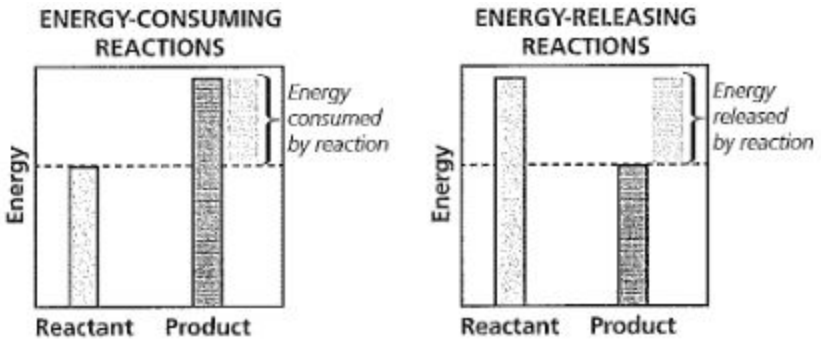
- What role does ATP carry?
- What are the differences in energy between photosynthesis and cellular respiration?
- What are the roles of plastids and mitochondria in energy transformation?

Terms

- ATP, adenosine triphosphate- is a small, soluble molecule that provides energy to reactions throughout the cell. For this reasons, ATP is known as the "energy currency" of cells.
- Aerobic Cellular respiration- Breaks down glucose and oxygen to form carbon dioxide and water.
- Mitochondria- are organelles in animal and plant cells that produce energy(ATP) for the cell
- Photosynthesis- is a biological process in which light energy is used to produce glucose.
- Chloroplasts- the organelles where photosynthesis takes place in eukaryotic cells

Summary

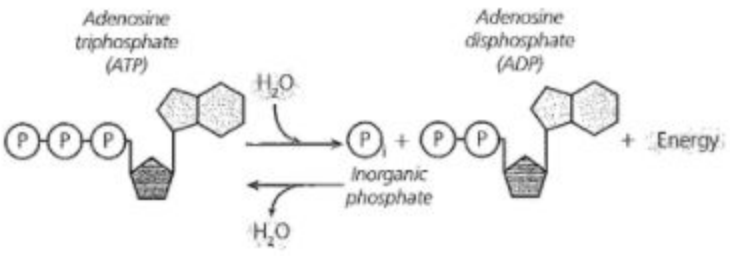
ATP- In the role of Adenosine triphosphate(ATP) there is two types of reactions. One that takes lower-energy reactants and changes them into higher-energy products. While the other one does the opposite by forming lower-energy products and releasing chemical energy stored in the reactants.



Some reactions require energy (left). Others release energy (right).

ATP includes three phosphate groups. When the phosphate group is removed the energy is released, which the energy helps power the reactions that are essential to life.

The bond that attaches the last phosphate group to the ATP, when broken down it release energy. ATP is

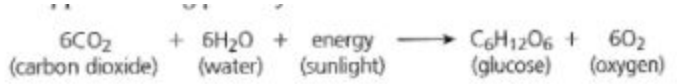


ATP is hydrolyzed to form ADP and a phosphate group. ADP and phosphate can be combined to form ATP.

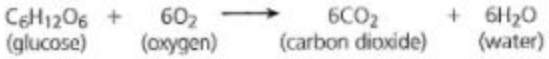
broken down in ADP and a phosphate group, which can be reform back into ATP. The way ATP form into ADP is by hydrolysis. For ADP can change back into by dehydration synthesis reactions.

In cellular respiration, most of the ATP is produced when ions flow across the inner mitochondrial, powering ATP synthase. This enzyme synthesizes ATP from ADP and phosphate. ATP production can increase when having a large surface area.

Photosynthesis and cellular respiration have an opposite process. Photosynthesis use the energy in sunlight into chemical energy stored in compounds such as glucose. Photosynthetic organism use the energy in sunlight to produce glucose and oxygen from carbon dioxide and water. Photosynthesis reactant are carbon dioxide, water, and sunlight and the product are glucose and oxygen.



Meanwhile cellular respiration reactant are glucose and oxygen and their product are carbon dioxide and water.



Test(3 multiple choice and 2 short response**)**

1. Which comparison between ATP and ADP is correct?
    a. ATP stores less chemical energy that ADP and phosphate
    b. ATP stores more chemical energy than ADP and phosphate
    c. Less energy is used to form ATP than is released from ATP hydrolysis
    d. More energy is used to form ATP than is released from ATP hydrolysis
2. Which of the following best explains the relationship between photosynthesis and cellular respiration?
    a. Both produce carbon dioxide and oxygen
    b. Both require energy from the sunlight to occur
    c. The products of one are the reactants of the other
    d. A plant can carry out either one process or the other

3. Which pair of molecules are broken down by the cell to release energy?
    a. ADP and glucose
    b. ATP and glucose
    c. ATP and carbon dioxide
    d. ADP and carbon dioxide

The law of conservation of energy states that energy cannot be destroyed or created. It can only change in form and move from place to place. An ATP molecule in an animal cell is used for energy.

1. Describe how energy changed in form its original source to the ATP molecule.

2. Explain how the energy changes when the ATP molecule is converted to ADP and phosphate.

Answer key

Which comparison between ATP and ADP is correct?
B. ATP stores more chemical energy than ADP and phosphate
Which of the following best explains the relationship between photosynthesis and cellular respiration?
C. The products of one are the reactants of the other
Which pair of molecules are broken down by the cell to release energy?
B. ATP and glucose
Describe how energy changed in form its original source to the ATP molecule
The original source of energy is light from the sun. ATP contains stored chemical energy and energy changed from light energy to chemical energy.
Explain how the energy changes when the ATP molecule is converted to ADP and phosphate
When ATP is converted to ADP and phosphate, it released energy that is used to drive another chemical reaction in the cell.

Homeostasis and transport; J.D

Objective

- Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell.

- Compare the mechanisms that transport materials across the plasma membrane (i.e., passive transport—diffusion, osmosis, facilitated diffusion; and active transport—pumps, endocytosis, exocytosis).
- Describe how membrane-bound cellular organelles (e.g., endoplasmic reticulum, Golgi apparatus) facilitate the transport of materials within a cell.
- Explain how organisms maintain homeostasis (e.g., thermoregulation, water regulation, oxygen regulation).

Summary

Living things perform a balancing act in which the internal conditions including the temperature, water, glucose, and oxygen are regulated and maintained within specific ranges, this process is called **homeostasis**. To continue to maintain homeostasis, the body relies on a cycle that monitors internal conditions. Cells or complex organisms is a system. They interact to produce something greater than the sum of its parts. Living systems work to maintain constant internal state, it changes the temperature or the pH and that can affect their abilities to function. A plasma membrane and the membrane of organelle share a basic molecular structure. The membrane is called a bilayer, it is made up of two layers of phospholipids. It is an area of constant movement as molecules are shuttled back and forth in a variety of ways. The movement of substances may be driven by difference in their concentration inside and outside the cell. When a concentration gradient occurs across a cell membrane. The membrane is preamble to the substance, the substance will move across the membrane toward the side of lower concentration due to simple diffusion. Any type of cellular transport that doesn't require some form of energy input is called passive.

3 multiple choice

1. **The cell membrane is made mostly of what ?**

A. Proteins and carbohydrates bilayer
B. Triglycerides and carbohydrates
C. Phospholipid bilayer and proteins
D. Phospholipids monolayer and proteins

2. **What does it mean when a cell membrane is semi-permeable?**

A. It allows some substances in
B. It allows all the substances in
C. It allows nothing in
D. It doesn't mean anything at allowing

3. **Gases like oxygen and carbon dioxide move across the cell membrane by?**

A. Endocytosis
B. Diffusion
C. Ion channels
D. Air

2 short response)

4. Describe the difference between passive transport and active transport.

5. The difference between the processes of endocytosis and exocytosis.

Answer Key

4. **The cell membrane is made mostly of what ?**

E. Proteins and carbohydrates bilayer
F. Triglycerides and carbohydrates
G. Phospholipid bilayer and proteins
H. Phospholipids monolayer and proteins

5. **What does it mean when a cell membrane is semi-permeable?**

E. It allows some substances in
F. It allows all the substances in
G. It allows nothing in
H. It doesn't mean anything at allowing

Fvb

6. **Gases like oxygen and carbon dioxide move across the cell membrane by?**

E. Endocytosis
F. Diffusion
G. Ion channels
H. Air

2 short response)

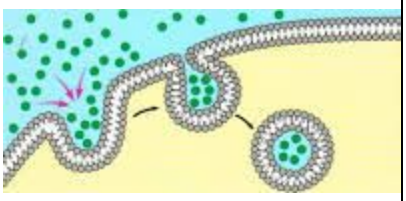
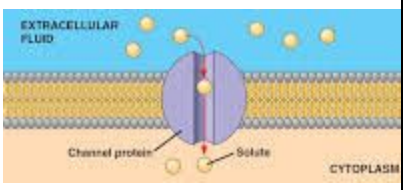
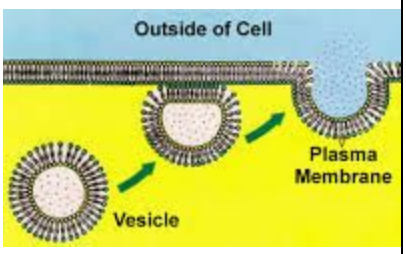
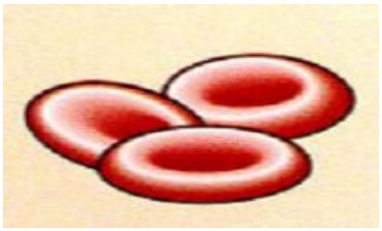
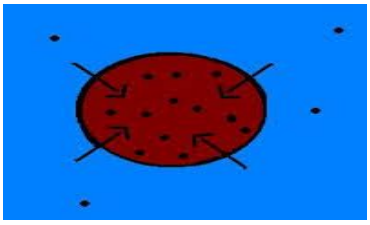
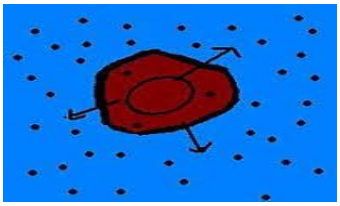
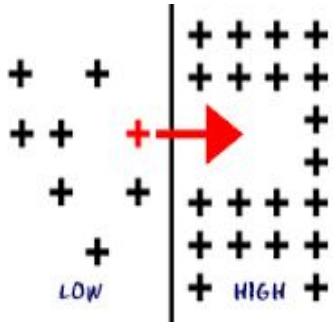
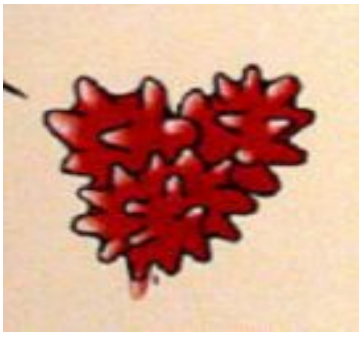
4. Describe the difference between passive transport and active transport.

Passive mediated: the transportation across the membrane were actually proteins that are embedded within the membrane structure; active transport:

when energy is required and the substance is moved across the membrane against the concentration gradient.

5. The difference between the processes of endocytosis and exocytosis.

Endocytosis is the process by which a cell membrane surrounds a particle and encloses the particle in a vesicle to bring the particle into the cell. Exocytosis is the reverse of endocytosis.

Endocytosis	Facilitated Diffusion	Exocytosis
		
Isotonic	**Hypotonic**	**Hypertonic**
		
Active Transport		**Hypertonic**
		

B. Continuity and Unity of Life

Cell growth and reproduction; K.G

Objective

Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), cytokinesis.
Compare the processes and outcomes of mitotic and meiotic nuclear divisions.
Describe how the process of DNA replication results in the transmission and/or conservation of genetic information.
Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance.

Terms

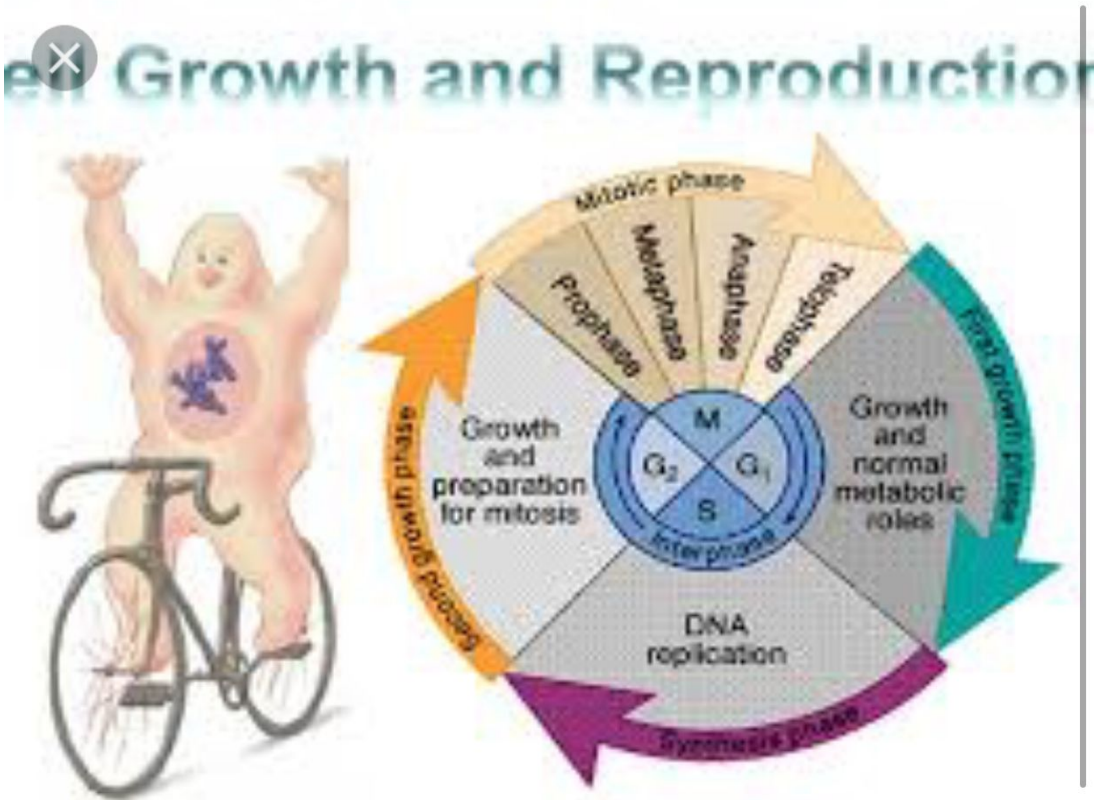
Cell cycle- Describes the stages of a single cell life
Interphase- the resting phase between successive mitotic divisions of a cell, or between the first and second divisions of meiosis.
Mitosis -a type of cell division that results in two daughter cells each having the same number and kind of chromosomes as the parent nucleus, typical of ordinary tissue growth.
Cytokines- The final phase of the cell cycle during which the cytoplasm divides in two.
DNA replication- produce an exact copy of the genetic material in a chromosome.
Meiosis- a type of cell division that results in four daughter cells each with half the number of chromosomes of the parent cell, as in the production of gametes and plant spores.
Allele- one of two or more alternative forms of a gene that arise by mutation and are found at the same place on a chromosome.

Summary

The cell cycle plays a big part in cell growth and reproduction it goes through three main stages which are interphase, nuclear division and cytokines.The longest is interphase which the cell grows and prepares for cell division. Nuclear division produce most cells of the body is meiosis, it then produce an exact replica of the nucleus and all chromosomes. Cytokinesis is the final stage

which the parent cell splits into two daughter cells. There is also the chromosome number which every cell needs to first duplicate its nucleus.

Charts



Test(3 multiple choice and 2

1. During cell interphase the cell grows and prepares for cell division.
A. True
B. False

2. What is DNA replication carried out by?
A. Energy
B. mRNA
C. Enzymes
D. None of the above

3. Mitosis is the duplication of the nucleus.
A.true
B.false

4. **Which phase of mitosis do the chromosomes line up in the middle of the cell and why?**

5. How does the process of meiosis and mitosis work together ?

Test(3 multiple choice and 2
Answer key

2. During cell interphase the cell grows and prepares for cell division.
   C. True
   D. False

2. What is DNA replication carried out by?
   E. Energy
   F. mRNA
   G. Enzymes
   H. None of the above
3. Mitosis is the duplication of the nucleus.
A.true
B.false

4. **Which phase of mitosis do the chromosomes line up in the middle of the cell and why?**
Metaphase

5. How does the process of meiosis and mitosis work together ?
Meiosis on the other hand is a special form of mitosis that occurs only in a special subset of our cells to form eggs and sperm.

Theory of Evolution; A.B

Objective

- Explain how natural selection can impact allele frequencies of a population.
- Describe the factors that can contribute to the development of new species (e.g., isolating mechanisms, genetic drift, founder effect, migration).
- Explain how genetic mutations may result in genotypic and phenotypic variations within a population.

- Interpret evidence supporting the theory of evolution (i.e., fossil, anatomical, physiological, embryological, biochemical, and universal genetic code).
- Distinguish between the scientific terms: hypothesis, inference, law, theory, principle, fact, and observation.

Question to know

Why genetic mutation affect the genotypic and phenotypic?
What are the factors that can contribute to the development of a new species?
Why can natural selection can impact allele frequencies of a population?

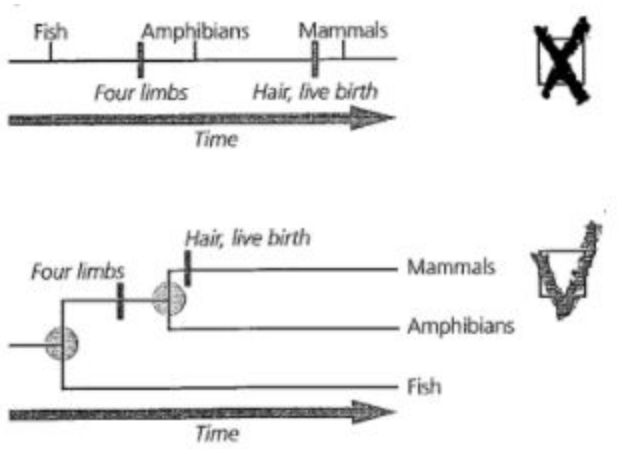
Terms

Fossils- Remains or traces of organisms that once lived and have been preserved
Homologous structures- Share an evolutionary relationship. They will have the same tissues, but in different forms
Analogous- Perform similar functions
Vestigial structure- Lost in its original function, with the ancestor with the fully intact, functional structure
Mutation- is a change in a DNA sequence.
Evolution- Is the change in allele frequencies over time.
Natural selection- is the process in which alleles for traits that give an advantage in survival and reproduction are more likely to be passed onto offspring.
Allele frequency- refers to how commonly an allele occurs in a population
Population- organisms inhabits an area and shares a gene pool
Genetic drift- is a change in allele frequencies that occurs due to chance events rather than differences in fitness.
Migration- Movement of individuals into and out of a population
Founder effect- is a decrease in gene variation in a population.
Speciation- refers to the formation of new species and occurs when one population is isolated from another.
Species- is defined as a group of similar organisms that are capable of mating and producing fertile offspring
Isolating mechanism- refers to the formation of new species and occurs when one population is isolated from another

Summary

Species are defined by their genetic characteristics. Each species has a typical number of chromosomes and a particular set of genes. Each species may vary since individuals have different alleles which would make them have different traits. As a species evolve over time, some traits may become more common and some others may lose its potency. A mechanism that drive evolution is natural selection. This causes different traits in evolution, by species only mate with others that have a certain type of genotype. Since those particular genotype are helping the species to survive. With more and more generations passing more species would have that genotype.

There are theories that every species on Earth is related to species that exists previously. Any species could related by having a common ancestor species. Some animals can be very close to their ancestor counterpart. For instance tigers and lions share a recent ancestor compared to tigers and butterflies, which share a common ancestor early in the history of animal life. Evolution can be depicted as a tree branch, that grow many different roots and sport many different branch down the way. Over time, new traits form and evolve overtime. For instance, hair first was evolve in an ancient mammal-like species. Which through evolution hair was a trait in every mammal.

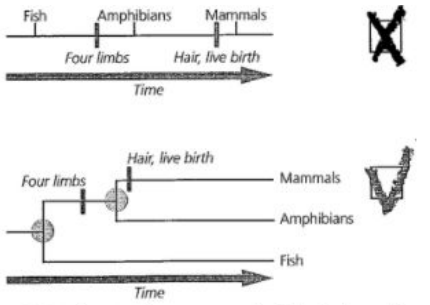


Evolution is not a linear process (top), but a branching process that results in different degrees of relatedness between species (bottom).

<u>Test(</u> <u>3 multiple choice and 2 short response)</u>
<u>Questions</u>

1. **Which of the following is a result of cheetahs having gone through a population bottleneck**
    a. The cheetah species is more likely to become extinct
    b. Mutation occur more frequently in the cheetah genome
    c. Individual cheetahs have different alleles for many genes
    d. The cheetah population cannot increase past a certain size

2. **Based on the diagram, what can be concluded about the last common ancestor of amphibians and mammals**
    a. It had hair
    b. It laid eggs
    c. It did not have gills
    d. It did not have limbs



Evolution is not a linear process (top), but a branching process that results in different degrees of relatedness between species (bottom).

3. **Which statement best describes the significance of Archaeopteryx fossils?**
    a. They revealed the direct ancestor of birds
    b. They prove that dinosaurs were feathered
    c. They provide the first evidence for evolution
    d. They show that birds and dinosaurs have a common ancestor
4. **Explain why the change in color of peppered moth is an example of evolution, but the change in the color of tree bark in the same region is not?**

5. **Natural selection acts only on phenotype, but it ultimately affects the genotypes of an entire population. Explain how this is true in terms of the peppered moth example.**

<u>Answer key</u>

Which of the following is a result of cheetahs having gone through a population bottleneck
    a. The cheetah species is more likely to become extinct
    b. Mutation occur more frequently in the cheetah genome
    c. Individual cheetahs have different alleles for many genes
    d. The cheetah population cannot increase past a certain size

Based on the diagram, what can be concluded about the last common ancestor of amphibians and mammals
    e. It had hair
    f. It laid eggs
    g. It did not have gills
    h. It did not have limbs

Which statement best describes the significance of Archaeopteryx fossils?

i. They revealed the direct ancestor of birds
j. They prove that dinosaurs were feathered
k. They provide the first evidence for evolution
l. **They show that birds and dinosaurs have a common ancestor**

Explain why the change in color of peppered moth is an example of evolution, but the change in the color of tree bark in the same region is not?
Evolution is a change in allele frequencies in a population. Black moths survive more and were given a higher chance of reproducing than gray moths. Thus the darker moths grew darker over the generations. However trees changed color because of environmental factors. Trees change colors due to the environment and not the genotypes in the trees.

Natural selection acts only on phenotype, but it ultimately affects the genotypes of an entire population. Explain how this is true in terms of the peppered moth example.
The phenotypes of the peppered moths determined how well they survived in the changed environment. Since the moth coloration is determined by genotype, selection favoring black moths also favors the alleles that cause this phenotype.

Ecology; J.D

Objective

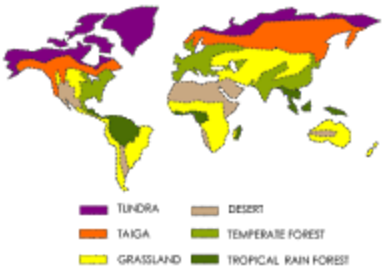
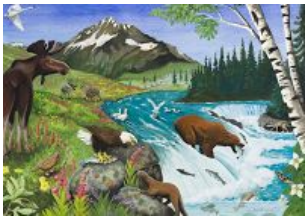
- Describe the levels of ecological organization (i.e., organism, population, community, ecosystem, biome, and biosphere).
- Describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.
- Describe how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).
- Describe biotic interactions in an ecosystem (e.g., competition, predation, symbiosis).
- Describe how matter recycles through an ecosystem (i.e., water cycle, carbon cycle, oxygen cycle, and nitrogen cycle)

- Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of nonnative species, pollution, fires).
- Describe the effects of limiting factors on population dynamics and potential species extinction.

Summary

The study of the interactions among different types of organisms and between organisms and their physical environment goes by the name of **Ecology**. All **organisms** with living and nonliving things in their environments are interdependent. Ecologist study different levels of organization on the entire planet Earth. They study the smallest and most specific species, such as a ladybug, an oak tree or a black bear. Single species that inhabit a in a particular area make up a **population.** If there is multiple population living in the same area then make up a **community**. In each community there are stages of ecological **successions**, a plant community changes the ecosystem, making it more suitable for different plant species. Along with the community, along with the nonliving things in the environment makes up an ecosystem. If you are to find groups with similar characteristics around the world, then you found **biomes**. And all the biomes that make up the planet earth are called **biosphere**, and that the largest level of ecological organizations. Organisms have to interact with the communities around them. They have to depend on each other for food, to protect each other from other populations, and to compete for the same resources with another populations. The energy from the sun reaches the earth and enters the earth's ecosystem.

Organism	Abiotic Factor	Population
		
Habitat	Biome	Ecosystem

		 
Community	**Population**	
		

3 multiple choice

1.A group of organisms that can breed and produce fertile offspring is known as ?

A. An ecosystem.
B. An species.
C. An biome.
D. An community.

2.The main source of energy for life on Earth is ?

A. Organic chemical compounds
B. Inorganic chemical compounds
C. Sunlight
D. producers

3.The moment of individuals into an area is called ?

A. demography
B. logistic growth
C. Immigration
D. Emigration

2 short response)

4. What is true about ecotypes?

5. How does the ecosystem change ?

Answer Key
3 multiple choice
1.A group of organisms that can breed and produce fertile offspring is known as ?

E. An ecosystem.
F. An species.
G. An biome.
H. An community.

2.The main source of energy for life on Earth is ?

E. Organic chemical compounds
F. Inorganic chemical compounds
G. Sunlight
H. producers

3.The moment of individuals into an area is called ?

E. demography
F. logistic growth
G. Immigration
H. Emigration

2 short response)

4. What is true about ecotypes?
Ecotypes are a consequence of the properties of fitness and experimental variation; ecotype formation requires an abrupt change in the selection pressures.

5. How does the ecosystem change ?
Though succession is the natural process following a disturbance in which One community of organisms replaces another.

Terms
System; a set of component that interact to produce something greater than the sum of its parts
Homeostasis; the steady-state physiological condition of the body

Homeostatic mechanism; a method by which an organism regulates its internal environment, such as thermoregulation
Thermoregulation; is the process that allows the body to maintain its core internal temperature. All thermoregulation mechanisms are designed to return your body to homeostasis, the state that your body is in is called *equilibrium.*
Gas Exchange; the diffusion of gases from an area of higher concentration to an area of lower concentration, especially the exchange of oxygen and carbon dioxide between an organism and its environment.
Regulation of Blood Glucose;
Passive Transport; the movement of substances across a cell membrane without the use of energy by the cell
Semi - permeable; It allows only certain things to pass through it.
Diffusion; the movement of particles from regions of higher density to regions of lower density
Facilitated Diffusion; the transport of substances through a cell membrane along a concentration gradient with the aid of carrier proteins
Osmosis; the diffusion of water or another solvent from a move dilute solution (of a solute) to a move concentrated solution (of a solute) through a membrane that is permeable to the solvent
Hypotonic solution; describes a solution whose solute concentration is lower than the solute concentration inside a cell
Hypertonic solution; describes a solution whose solute concentration is higher than the solute concentration inside a cell
Isotonic solution; describes a solution whose solute concentration is equal to the solute concentration inside a cell
Active Transport; the movement of chemical substances, usually across the cell membrane, against a concentration gradient; requires cells to use energy
Endocytosis; the process by which a cell membrane surrounds a particle and encloses the particle in a vesicle to bring the particle into the cell
Exocytosis; the process by which a substance is released from the cell through a vesicle that transports the substance to the cell surface and then fuses with the membrane to let the substance out.
Succession; a series of predictable sequential changes in an ecosystem over time.
Population dynamics; depends on numbers of births, deaths, individuals moving into the population and individuals leaving it.
Endemic species; a species living in the area where it originated.

Nonnative species; a species living outside the area where it originated, introduced either intentionally or accidentally by humans; also called invasive species.
Limiting factors; is an biotic or abiotic resource that limits the size of a population. The availability of food species, sunlight, water and nutrients are all examples of limiting factors.
The ozone layer; is a region of the upper concentrations of ozone gas absorb much of sun's ultraviolet radiation.
Population; a group of individual organisms that occupies an area and shares the gene pool.
Deforestation; is the clearing of all trees from an area.
Habitats; an area within an ecosystem that provides an organism with the resources it needs to survive
Global warming; is an increase in average temperatures worldwide.
Greenhouse gases; are atmospheric gases such as water vapor, carbon dioxide, nitrous oxide, and methane that trap heat energy.
Greenhouse effect; is a natural process in which certain gases in the atmosphere retain heat radiating from earth's surface.
Biodiversity; is the variety of life forms in an area. It may be measures in terms of genes, species or entire ecosystems. The number of different species in an area is one important aspects of biodiversity.
Herbivore; a type of primary consumer, is an animal that feeds exclusively on plants.
Carrying capacity; is the maximum populations size ecosystem can support. The carrying capacity of an ecosystem limits the sizes of population in it.
Biogeochemical cycles; the movement of abiotic factors such as carbon, oxygen, nitrogen and water between living and nonliving parts of an ecosystem.
Organic; compound that contains the elements carbon and hydrogen. Carbon dioxide is not an organic compound.
The carbon cycle; is the movement of carbon between the atmosphere, earth's crust, and living things. It converts carbon between organic and inorganic factors.
The nitrogen cycle; is the movement of nitrogen between atmosphere, the soil, and living things. It is made possible by bacteria that chemically convert nitrogen gas to different compounds.
Transpiration; is the evaporation of water from the surface of plant leaves. The water was originally that up from the ground by the plant's roots.
Runoff; liquid water that runs over lan and flows into a body of water.

Competition; occurs when organisms seek the same limited resource.
Commensalism; one species benefits without harming or benefiting the others.
Parasitism; one species benefits at the expense of the other. A parasite does not normally kill the host.
Producer; use the energy from the sunlight to build sugars and other organic molecules. The molecules are used to build the organism bodies and provide energy to consumers.
Photosynthesis; converts carbon dioxide and water to simple sugars and oxygen gas.
Food chain; shows the flow of energy from one organism to another, in the direction shown by the arrows. Energy moves from producers to primary consumers to secondary consumers and so on.
Food web; shows the interrelationships of many food chains. Food webs illustrate that organisms can move than one role in an ecosystem. In the food web the eastern crayfish is both a secondary and tertiary consumer.
Trophic level; is its position in a food chain and web. Producers occupy the lowest and largest, trophic level, followed by primary consumers, secondary consumers, and tertiary and higher-older consumers.
Energy pyramid; is a model that shows the amount of energy stored in the bodies of organism at different trophic levels an ecosystem.
Terrestrial; biomes are confined to land.
Aquatic; biomes consist of bodies of water or ocean zones.
Invertebrates; are organism that lack a backbone. They include crabs, clams, oysters, shrimp, lobsters, and snails, Marine invertebrates also includes squid, octopus and jellyfish.

Testing strategies

- Maintain a positive attitude.
- Organize your thoughts before you begin to write.
- Process of elimination
- Manage Your Time
- Proper Pacing