2018 Biology Keystone Study Guide

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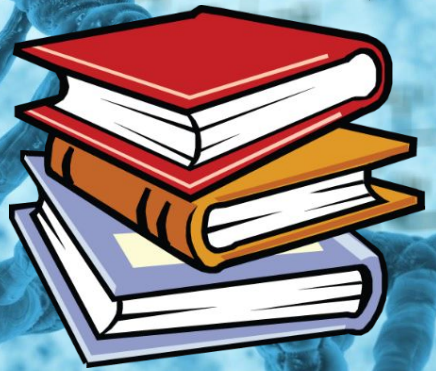
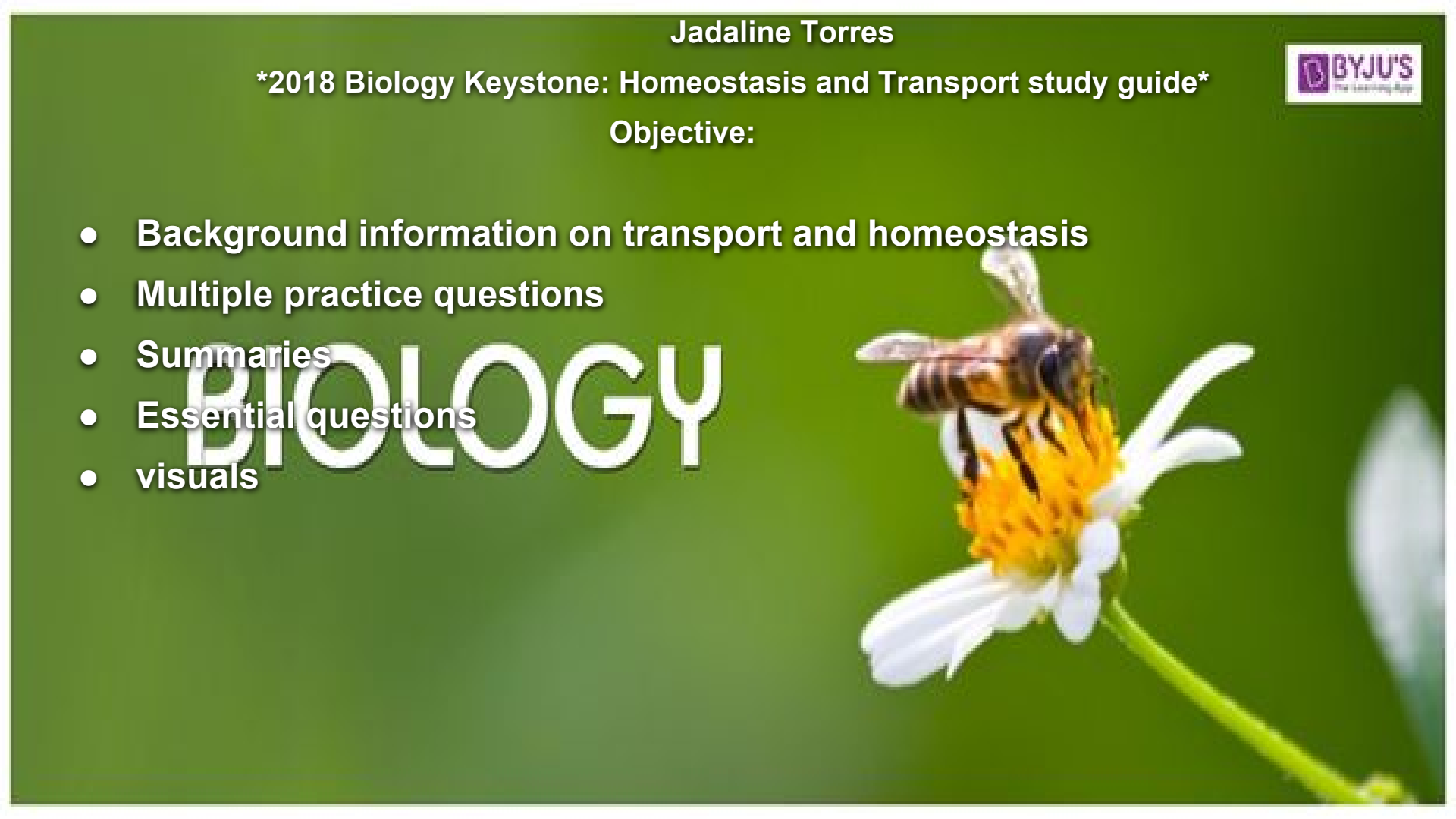


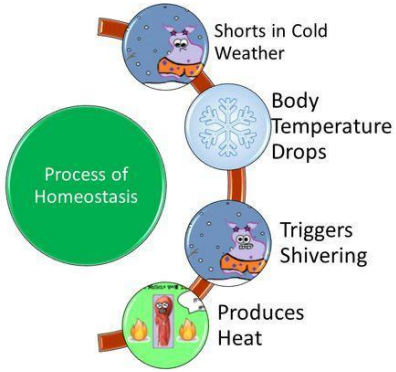
Jadaline Torres

2018 Biology Keystone: Homeostasis and Transport study guide

Objective:

- Background information on transport and homeostasis
- Multiple practice questions
- Summaries
- Essential questions
- visuals





Simple diagram of homeostasis

Homeostasis

Essential question: How will I know how to maintain homeostasis inside my body?

What is Homeostasis?

Homeostasis is the maintenance of a constant internal state inside the plasma membrane. Glucose,water, temperature, PH levels are all examples of what is to be maintained at constant level. The process that allows this to happen is known as **homeostatic mechanism**. It is in charge of regulating the body's internals states for example, temperature level. Your body's normal temperature is at 98.6 degrees. **Thermoregulation** is the regulation of body temperature. If it is ever too far from this point, action is taken and changes place throughout the body to make it back to normal. **Hypothalamus** inside the brain senses the temperature moving if it is not where it should be. With that being said, signals are then sent throughout the body that cause it to retain or release heat. Reactions to regulate your body temperature back include shivering, perspiration, and dilation (widening or tightening of blood vessels in the skin).

Homeostasis (keywords)

- **KeyWords**

Homeostasis	Maintenance of a constant internal state in the body
homestatic mechanism(negative feedback loop)	The process of an organism maintaining/monitors a constant state. EX: temperature
Hypothalamus	Function in the brain that senses and then sends signals to the body. Acts of a thermostat
Positive feedback loop	Opposite to negative feedback loop, a positive feedback loop makes a change to the system, causing it to MOVE FARTHER from its internal state.
Thermoregulation	Regulation of body tempature.

Lets Practice! Try these practice Keystone Questions!

1. **The human body maintains a constant internal temperature of 98.6f. What changes occur when the hypothalamus detects a temperature at 100.1f?**

a.) muscle tissues shiver and skin capillaries dilate

b.) perspiration increases and skin capillaries dilate

c.) muscle tissues shiver and skin capillaries constrict

d.) perspiration increases and skin capillaries constrict

2.) What does it mean when Homeostasis occurs throughout the human body?

a.) Healthy, but not in our normal state

b.) unhealthy, not in our normal state

c.) dehydration

d.) death

(Continued) Practice Keystone Homeostasis Questions

3.) What is another word for negative feedback loop?

a.) homeostatic mechanism

b.) positive feedback loop

c.)hypothalamus

d.) dehydration

- **Open Ended -**

4.) In the winter, with the degrees being at 40, explain what would happen to your body´s internal state? Think about your normal human body temperature (98.6f).

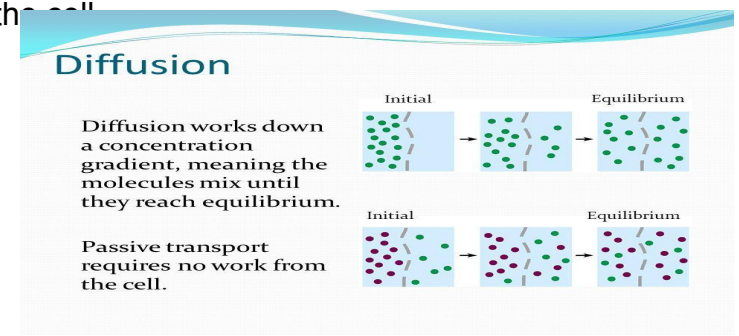
5.) In the summer, with the degrees being at 101.1 degrees, explain what would happen to your body´s internal state? Think about your normal human body temperature (98.6).

TRANSPORT*

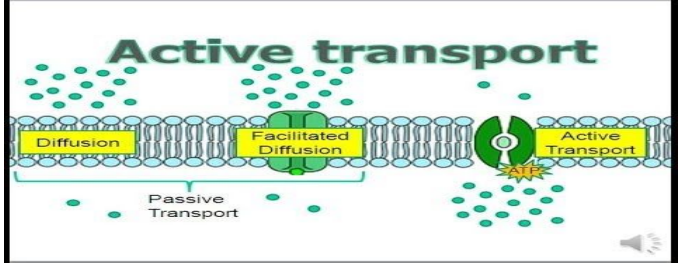
Essential Question: How does active and passive transport further our Understanding of the cell membrane?

What is Passive/Active Transport?

Passive transport is the movement of a substance across the cell membrane without any energy. Examples of passive transport may include **simple diffusion** and **facilitated diffusion**. Passive transport occurs when a **concentration gradient** occurs across the membrane. A concentration gradient is the difference in the concentration of a substance in a solution as a function of distance. If the membrane is permeable to this concentration gradient, it will move across the membrane towards the lower side of concentration because of diffusion. In the diagram below, nonpolar molecules cross the phospholipid bilayer slipping between the phospholipids, crossing in/out the cell.



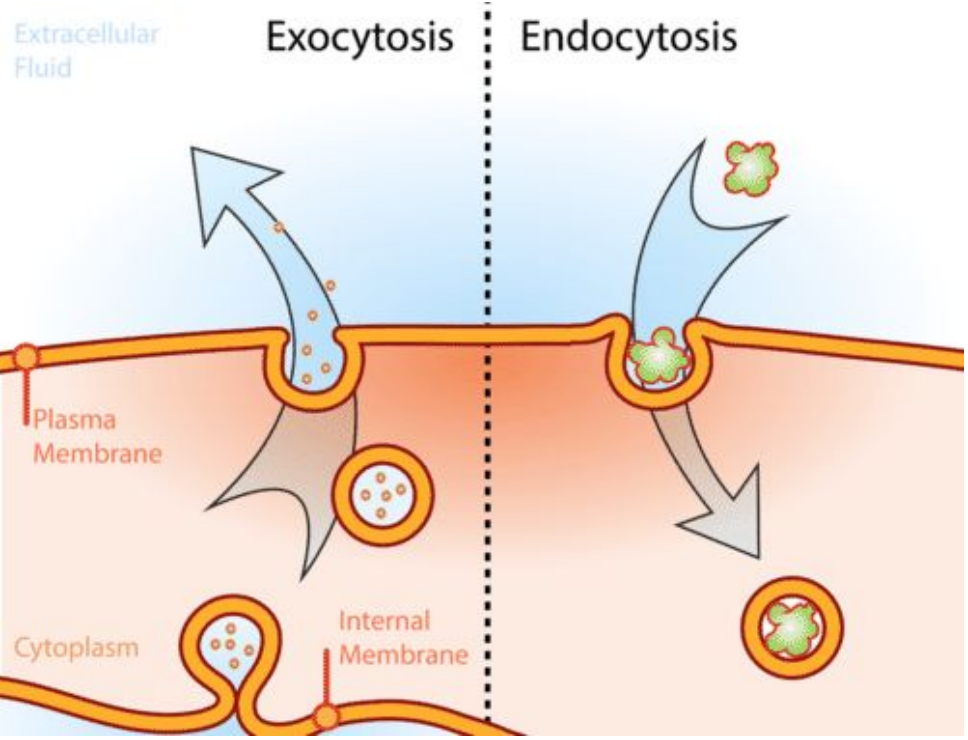
Active Transport



Active Transport is the movement of particles from an area of low concentration to an area of high concentration in the membrane. The difference of active and passive transport is ACTIVE requires an energy source (ATP). Active transport is to build up a concentration gradient. A type of active transport uses membrane proteins known as **ion pumps and molecular pumps** to move materials in and out the cell. These mechanisms use energy (ATP) to move materials across a concentration gradient. Ion pumps move ions/charged atoms while molecular pumps move uncharged molecules.

Sometimes, macromolecules can be often too large to fit inside the cell membrane. To fit, they get packed in vesicles by the cells. **Vesicles** are membrane sacs found in the cytoplasm carrying different materials throughout the cell. Vesicles can also move different materials out the cell in a process called **exocytosis**. In exocytosis, vesicles fuse with the plasma membrane while the phospholipid bilayer then joins the plasma membrane and the material then gets released into the extracellular space. Reversing occurs in the process of **endocytosis.** Endocytosis takes extracellular material into the cell by forming a membrane vesicle around it. The vesicle then fuses with another vesicle containing digestive enzymes that break down the material. Both of these processes are examples of active transport.

Visual of exocytosis vs. endocytosis



Keywords

Key Words

Passive transport	Movement of substances across the plasma membrane without input of ATP
simple diffusion	A type of passive transport
faciliated diffusion	A type of passive transport
concentration gradient	The difference in the concentration of a substance in a solution as a function of distance
Active Transport	The movement of particles from an area of low concentration to high concentration
ion pumps and molecular pumps	Mechanisms of active transport, use ATP to move materials against a concentration gradient
Vesicles	Small membrane sacs, transport materials throughout cytoplasm
exocytosis	Releases substances from the cell
endocytosis	Takes extra cellular material into the cell by forming a membrane around it

Your Turn! Try these practice Keystone Questions!

1. What is the difference between exocytosis and endocytosis?

a.) Exocytosis= releases substances from the cell; Endocytosis= takes extracellular material into the cell

b.) Endocytosis= releases substances from the cell: Exocytosis= takes extracellular material into the cell

c.) Endocytosis is a process occured in passive transport while exocytosis occurs in active transport

d.) endocytosis is a process occured in active transport while exocytosis occurs in passive transport

2.) Which one of the examples below is a type of passive transport?

a.) endocytosis

b.) exocytosis

c.) simple diffusion

d.) sodium potassium pump

3.) What is the role of an ion pump in active transport?

a.) moves particles from low concentration to high concentration in the membrane

b.) relies on membrane proteins to help molecules cross a cell membrane

c.) the use of ATP to move material against a concentration gradient

d.) maintains the body internal state

(Continued) Practice Keystone Questions

- **Open Ended**

4.) In what ways are passive and active transport alike? Give at least two examples.

5.) In what ways are passive and active transport different? Give at least two examples.

* Practice Questions Answer key*

Homeostasis

1.) b 2.) b 3.) a

4.) **With the temperature being at 40 degrees F, my body temperature would decrease along with the effect of shivering and capillaries constricting to conserve heat.**

5.) **With the temperature being at 101.1 degrees F, my body temperature is most likely to increase causing sweating and even dilation of capillaries and perspiration to cool down the body.**

Transport

1.) a 2.) c 3.) c

4.) **Although passive and active transport are two different processes, they can be alike in some ways. Like active, passive transport is able to move ion channels across the cell whether they are going in or out. Secondly, both of these processes are able to move oxygen, water, etc. into cells.**

5.) **In ways, active and passive transport share a lot of differences. The most obvious, active transport is a process that requires ATP as an energy source while passive does not. Secondly, Passive transport is the movement of a substance across the plasma membrane while active transport takes on the role of moving particles from an area of low concentration across the membrane to an area of high concentration.**

Basic Biological Principles

(Olivia Abate)

Anchor: Explain the characteristics common to all organisms

BIO.A.1.1.1 Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms.

Anchor: Describe relationships between structure and function at biological levels of organization.

BIO.A.1.2.1 Compare cellular structures and their functions in prokaryotic and eukaryotic cells.

BIO.A.1.2.2 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).

FYI…

The basic biological principles are based off 5 foundations. These foundations are; cell theory, gene theory, evolution, homeostasis, and the laws of thermodynamics. The cell theory is all living organisms are made of cells. Gene theory is that genes are inherited through gene transmission. Evolution explains that, any genetic change in a population that is inherited over several generations. Homeostasis is maintaining a constant internal environment in response to environmental changes. Thermodynamics is when energy is constant and energy transformation is not all the way efficient.

There are two organisms called prokaryotic and eukaryotic. All living organisms have organization and cells, this could be unicellular or multicellular. Response to stimuli which the stimulus can be a physical or chemical change in the internal or external environment. Homeostasis and metabolism growth and development, which means growth is because of cell division and causes an increase in the amount of cells. Reproduction, this is essential for survival of species. Lastly, change through time and how population of organisms evolve over time.

All cells contain DNA, ribosomes, plasma membrane, and cytosol. Prokaryotic cells do not have a nucleus or any membrane bound organelles. All prokaryotes are microscopic single celled organisms. Example: bacteria

Eukaryotic cells contain membrane bound organelles, certain molecules and organelles are in place to do specific tasks. There is a nucleus that encloses the genetic information. Eukaryotic cells are also larger than prokaryotic cells because of the nucleus. Examples: plants and fungi.

	Prokaryotic Cells	Eukaryotic Cells
Nucleus	No	Yes
DNA	Single circular piece of DNA	Multiple chromosomes
Membrane-Bound Organelles	No	Yes
Examples	Bacteria	Plants, animals, fungi

4 multiple choice

1. Eukaryotic and prokaryotic cells are the 2 basic cells. They have similarities and differences. The big one is that the eukaryotic cells have a nucleus. The nucleus is where the cells store their...?

a. DNA
b. Bacteria
c. Ribosomes
d. Protein

2. What do all cells have in common?

a. Ribosomes and DNA.
b. plasma membrane, cytoplasm, ribosomes, and DNA.
c. Plasma membrane
d. Nothing

3. What are ribosomes?

a. An organelle in which proteins are made
b. A cell without a nucleus
c. An organelle that packages and processes proteins
d. Cell structure that contains DNA

4. A prokaryotic cell is …?

a. A cell without a nucleus or membrane bound organelles.
b. DNA
c. A lipid barrier
d. A cell containing a nucleus

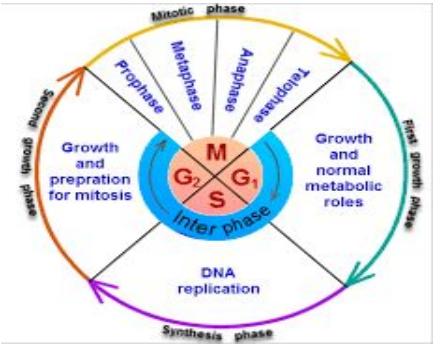
<u>2 opened ended</u>

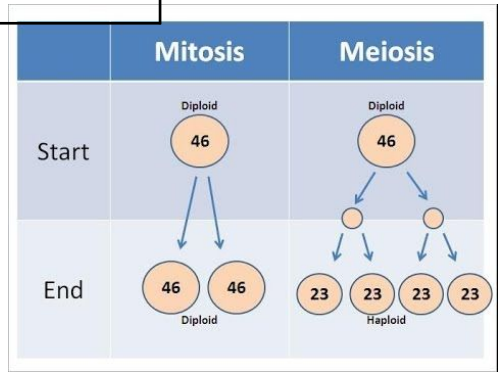
1. Explain the main difference in eukaryotic and prokaryotic cells.
2. What do prokaryotic and eukaryotic cells have in common?

Continuity and Unity of Life: Cell growth and Reproduction

Anchor: Describe the three stages of the cell cycle: interphase, nuclear division, cytokinesis.
BIO.B.1.1.1 Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), cytokinesis.
BIO.B.1.1.2 Compare the processes and outcomes of mitotic and meiotic nuclear divisions.

Anchor: Explain how genetic information is inherited
BIO.B.1.2.1 Describe how the process of DNA replication results in the transmission and/or conservation of genetic information.
BIO.B.1.2.2 Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance.





All multicellular organism starts as a single cell. Then, the cell will split off into two, four, so on and so forth. Every cell goes through a cycle. There are 3 main phases called interphase, nuclear division, and cytokinesis. Interphase contains the following G1 where the cell grows, S where it replicates the DNA, and G2 which produces proteins for mitosis/cell division. Mitosis/Nuclear Division produces a copy of the nucleus and chromosomes. Lastly, cytokinesis is when the parent cell splits into 2 daughter cells.

Mitosis is a type of cell division that results in two daughter cells each having the same number and kind of chromosomes as the parent nucleus. Therefore, it is just replicating itself twice.

Meiosis is a type of cell division that results in four daughter cells. In which they have half the number of chromosomes of the parent cell. In other words, meiosis is just dividing itself by 2, 4, 6, and keeps going from there.

Genetic information is inherited from your parents. Every cell has 23 pairs of chromosomes. One chromosome from each pair is inherited from your mother and one from your father. The chromosomes hold genes inherited from your mother and father. DNA replication is the process of DNA being copied before cell division. During this process a double strand helix will spilt off. Then, the DNA strands will come together to complete each other. This ends in 2 identical strands. This allows the replication to be exact from the cell to get DNA.

DNA: large nucleic acid, macromolecule made of nucleotides. DNA has all genetic information. DNA gets copied in protein synthesis and helps with cell function and characteristics.

Chromosomes: a single strand of coiled DNA and proteins. Each species has its own number of characteristic chromosomes. (example: dogs, 39. Fruit fly, 4)

Genes: a sequence of nucleotides making segments of DNA. This allows information of hereditary traits to be seen.

Alles: variation of a gene’s nucleotide sequence. They are either dominant or recessive.

4 multiple choice:

1. What is the cell cycle?

a. The sequence of growth, development, and division of a cell.
b. The offspring cell that is the result of the division of a parent cell.
c. A chromosome and its duplicate.
d. A structure within a cell that performs a specific task.

2. Mitosis is…?

a. The process by which a mother cell divides into two identical daughter cells.
b. a parent cell's cytoplasm resulting in two daughter cells
c. The region where two sister chromatids are attached.
d. A chromosome

3. Cytokinesis is…?

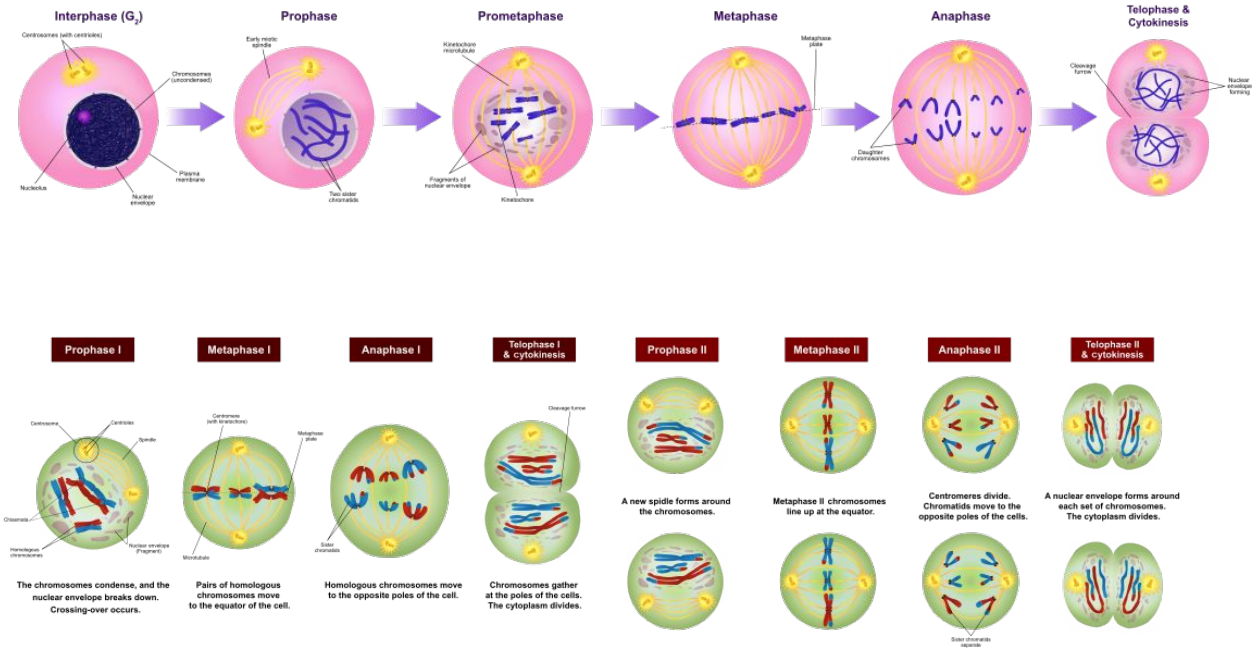
a. A structure within a cell that performs a specific task.
b. The division of a parent cell's cytoplasm resulting in two daughter cells.
c. The offspring cell that is the result of the division of a parent cell.
d. Chemical compound that living things use to store and release energy.

4. How is genetic information inherited?

a. One chromosome from each pair is inherited from your mother/father which contains genes that you inherit.
b. You do not inherit genes
c. Randomly
d. A chemical compound that living things use to store and release energy.

2 Opened ended:

1. Describe the main difference between mitosis and meiosis?
2. Explain the stages of the cell cycle. What are the stages?



Answer Key (Basic Biological Principles)

1. Eukaryotic and prokaryotic cells are the 2 basic cells. They have similarities and differences. The big one is that the eukaryotic cells have a nucleus. The nucleus is where the cells store their...?

a. DNA
b. Bacteria
c. Ribosomes
d. Protein

2. What do all cells have in common?

a. Ribosomes and DNA.
b. **plasma membrane, cytoplasm, ribosomes, and DNA.**
c. Plasma membrane
d. Nothing

3. What are ribosomes?

a. An organelle in which proteins are made
b. A cell without a nucleus
c. An organelle that packages and processes proteins
d. Cell structure that contains DNA

4. A prokaryotic cell is …?

a. A cell without a nucleus or membrane bound organelles.
b. DNA
c. A lipid barrier
d. A cell containing a nucleus

Continued…

2 opened ended

1. Explain the main difference in eukaryotic and prokaryotic cells. **(Prokaryotic does not have a nucleus)**
2. What do prokaryotic and eukaryotic cells have in common?(**All cells have a plasma membrane, ribosomes, cytoplasm, and DNA)**

Continuity and Unity of Life

1. What is the cell cycle? **a. The sequence of growth, development, and division of a cell.** b. The offspring cell that is the result of the division of a parent cell. c. A chromosome and its duplicate. d. A structure within a cell that performs a specific task.	2. Mitosis is…? **a. The process by which a mother cell divides into two identical daughter cells.** b. a parent cell's cytoplasm resulting in two daughter cells c. The region where two sister chromatids are attached. d. A chromosome
3. Cytokinesis is…? a. A structure within a cell that performs a specific task. **b. The division of a parent cell's cytoplasm resulting in two daughter cells.** c. The offspring cell that is the result of the division of a parent cell. d. Chemical compound that living things use to store and release energy.	4. How is genetic information inherited? **a. One chromosome from each pair is inherited from your mother/father which contains genes that you inherit.** b. You do not inherit genes c. Randomly d. A chemical compound that living things use to store and release energy.

Continued…

2 Opened ended:

1. Describe the main difference between mitosis and meiosis? **(mitosis generates identically identical daughter cells.)**
2. Explain the stages of the cell cycle. **(M, G1, S, G2)**

BIOENERGETICS - Ayanna Russell

BIOENERGETICS
Energy for Life

What is bioenergetics?

A) It is the part of biochemistry concerned with the energy involved in making and breaking of chemical bonds in the molecules found in biological organisms.

B) The minimum quantity of energy that the reacting species must possess in order to undergo a specific reaction.

C) The intermediate formed when a substrate molecule interacts with the active site of an enzyme.

D) The transformation of one molecule to a different molecule inside a cell.

(Answers Highlighted)

What is the role of ATP in biochemical reactions?

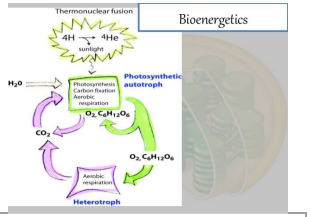
A) Our cells take the chemical energy from different nutrient molecules such as carbohydrates and proteins and use the chemical energy to make ATP.

B) In biochemical reactions, a cell stores its excess energy by forming ATP from ADP and phosphate.

C) The role of ATP is to speed up all chemical reactions that take place within a cell.

D) ATP breaks down food into molecules to give equipped us with energy.

Continued… Bioenergetics



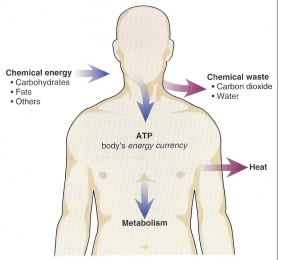
How does the cell process its energy?

A) The cell uses the mitochondria to reserve energy for the cell.

B) The cell uses glucose to break down carbon and oxygen for energy.

C) Through a process called cellular respiration.

D) They break down food and molecules to release stored energy.



(Answers Highlighted)

How do living organisms transform energy?

A) Organisms eat green plants for sugar which is then transformed into ATP.

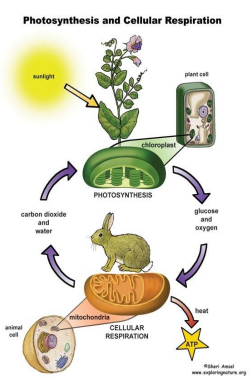
B) Both plants and animals produce oxygen and water as a byproduct of respiration, the cellular processes responsible for producing the energy needed to carry out cell functions.

C) Plants use the sun's energy to make sugar. Organisms use sugar as a source of energy which is released from the breakdown of sugar used by the cells to make ATP.

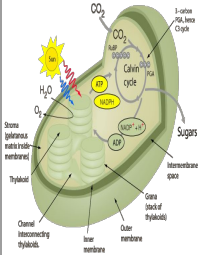
D) Energy is stored in the bonds.

Open Ended -Bioenergetics

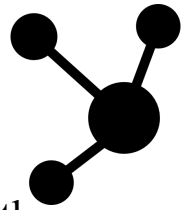
- **What are the fundamental roles of plastids?**
  - Plastids are a class of organelles, organelles may be the mitochondria or chloroplast and they're only found in plants. Plastids are made up on thylakoids sack which are covered in chlorophyll. A process occurs in the mitochondria called photosynthesis where light is converted into glucose by the help of combined water and carbon, the molecules are used to make ATP. When ATP is produced it is stored and saved for later purposes, it is the outcome of cellular respiration.



- **Compare the basic transformation of energy during photosynthesis and cellular respiration.**
  - Photosynthesis is a process used by plants to take energy from sunlight and turn it into chemical energy.
  - It converts materials such as carbon and water into glucose for use as an energy source.
  - C6H12O6
  - Cellular Respiration is reactions in cells of organisms food given energy into ATP or nutrients.
  - Glucose, Fructose and Starch are energy store compounds that cellular respiration their energies as a part of its process.
  - C6H12O6+6 O2 >> 6 H2O+6 CO2+ATP



Summary & Answer Key-Bioenergetics



The cell structures involved in processing energy were the cell membrane, cytoplasm, nucleus, the chloroplasts and other parts are included in its structure. Plastids are a class of organelles, organelles may be the mitochondria or chloroplast and they're only found in plants. Plastids are made up on thylakoids sack which are covered in chlorophyll. They can also be found in algae and are responsible for manufacturing food. ATP also known as Adenosine Triphosphate is the main energy carrier in all living organisms, it is made of stored energy and light sources. It is broken down when taken through biochemical reactions, it helps cells transfer energy from one location to another. Photosynthesis uses light energy from the sun to convert water and carbon dioxide into glucose. Glucose is used in cellular respiration to produce ATP. It is then placed back into carbon dioxide and this is used in photosynthesis. Cells get their energy through chemical bonds from food molecules which is too a form of ATP. Living organisms transform their energy by using photosynthesis for glucose and oxygen from carbon dioxide and water, some energy is used to produced glucose which is then stored in the sugar molecule. This is an example of information clarifying bioenergetics.

Theory Of Evolution - Ayanna Russell

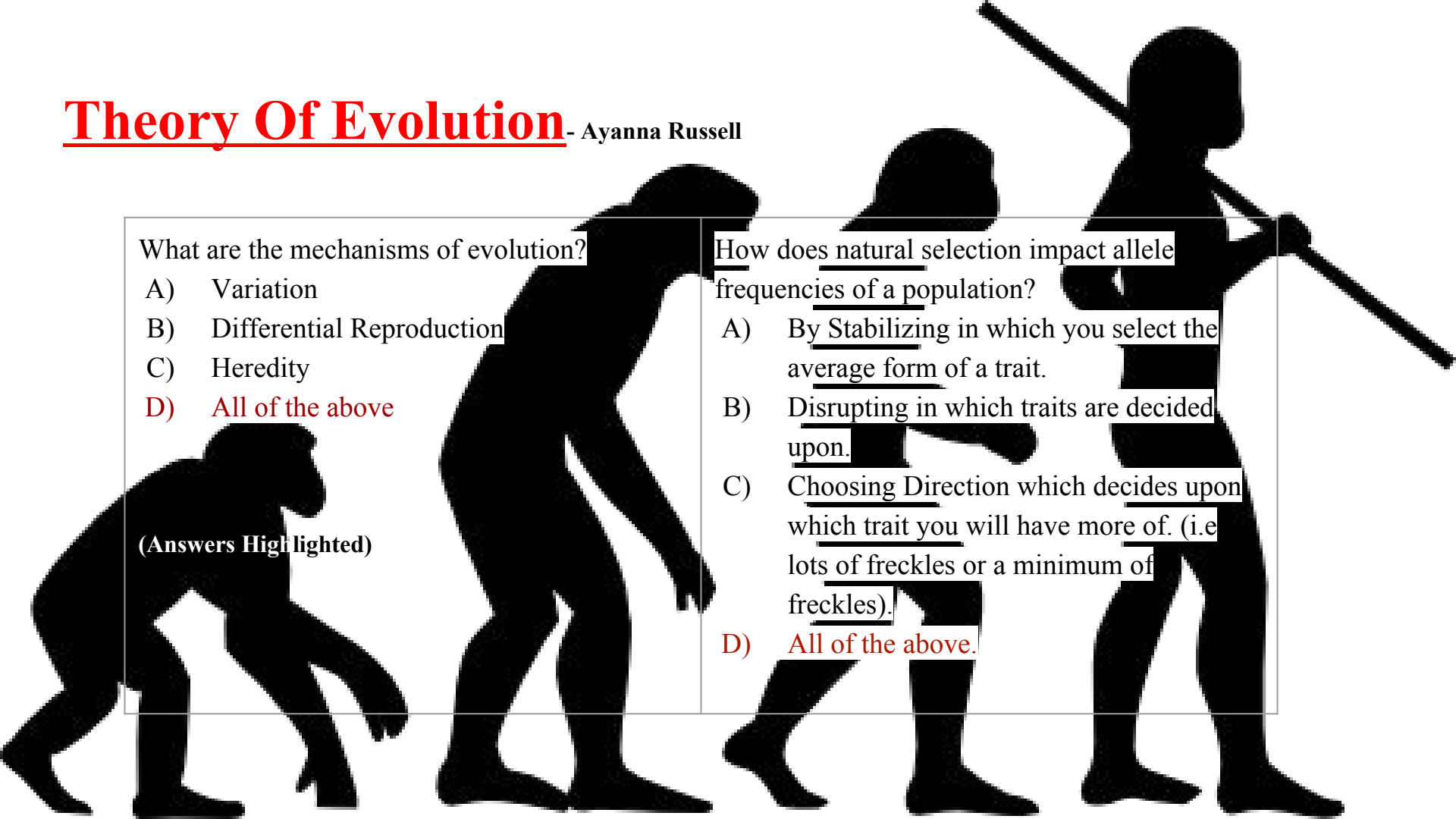
What are the mechanisms of evolution?

A) Variation
B) Differential Reproduction
C) Heredity
D) All of the above

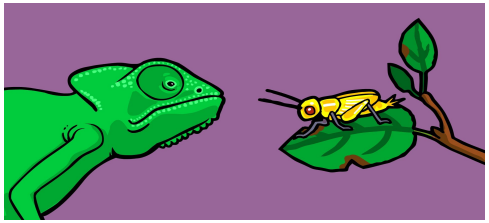
(Answers Highlighted)

How does natural selection impact allele frequencies of a population?

A) By Stabilizing in which you select the average form of a trait.
B) Disrupting in which traits are decided upon.
C) Choosing Direction which decides upon which trait you will have more of. (i.e lots of freckles or a minimum of freckles).
D) All of the above.



Continued…- Theory of Evolution



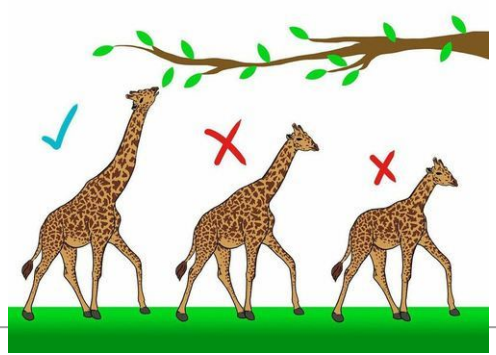
What are the fundamental forces of evolution?

A) Land and Water

B) Animals, Species, Organisms, Life

C) Natural Selection, Genetic Drift, Mutations, Gene Flow

D) None of the above



What is Natural Selection?

A) The procedure of how organisms who are in sync with their environment have better chances of surviving and reproduction.

B) The difference in genotypes within a population this includes disappearance in genes and/or reproduction.

C) The permanent difference in an organism's DNA

D) The transfer or alleles from one place to another.

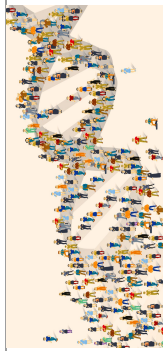
Open Ended - Theory Of Evolution

Open Ended:

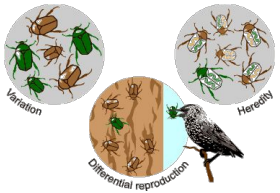
- **What Evidence Supports the theory of evolution**

Evolution is done by natural selection and natural selection takes place when nature picks the species with better qualities of survival and takes their features to enhance a new species then does this all over again. For example, Humans are believed to have extended from monkeys and they became the new species because of their better skill.

- **Differentiate between the terms: hypothesis, inference, law, theory, principle, fact and observation.**
  - Hypothesis is a proposed explanation used for an experiment.
  - Inference is an idea or conclusion drawn from reasoning.
  - Law is a rule used to explain an amount of observations in the form of a statement.
  - Theory is a group of ideas put together to explain something.
  - Principle is a law from which other laws are brought about.
  - Fact is a verifiable observation.
  - Observation is an of noting a scientific fact for an ideal purpose.



Summary & Answer key-Theory Of Evolution



The mechanisms of evolution is a procedure of change that refers to the change of alleles frequencies in an individual population. The alleles frequencies may change due to natural selection, genetic drifts, mutations and gene flow. The cause of evolution is the change is composition over consecutive generations. It includes variation which is the movement of genes from one place to another. Differential reproduction in which explains the way organisms will survive and reproduce in their environments. Heredity is the passing of genes from one parent to their progeny. Natural selection directs when individuals in a population have higher survival skills than others. Evolution happens by natural selection and personal traits that show better chances at surviving in an environment and it is brought upon by different organisms success. If an individual's alleles are beneficial then natural selection will choose upon it because the better the trait, the better the idea will procreate. There are four forces of evolution, they are mutation, genetic drift, gene flow and natural selection. Mutations take place when dna is damaged to send a message to change the genetic message. The gene flow is the movement of genes from one singular to another and genetic drift is the different genotypes in small populations, this is the concept in which earth evolves.

The chemical basis of life- cells and cell process

ASSESSMENT ANCHOR BIO.A.2 The Chemical Basis for Life	
Anchor Descriptor	**Eligible Content**
BIO.A.2.1 Describe how the unique properties of water support life on Earth.	**BIO.A.2.1.1** Describe the unique properties of water and how these properties support life on Earth (e.g., freezing point, high specific heat, cohesion).
Anchor Descriptor	**Eligible Content**
BIO.A.2.2 Describe and interpret relationships between structure and function at various levels of biochemical organization (i.e., atoms, molecules, and macromolecules).	**BIO.A.2.2.1** Explain how carbon is uniquely suited to form biological macromolecules.
	BIO.A.2.2.2 Describe how biological macromolecules form from monomers.
	BIO.A.2.2.3 Compare the structure and function of carbohydrates, lipids, proteins, and nucleic acids in organisms.
Anchor Descriptor	**Eligible Content**
BIO.A.2.3 Explain how enzymes regulate biochemical reactions within a cell.	**BIO.A.2.3.1** Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction.
	BIO.A.2.3.2 Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.

FYI….

The chemical basis for life is the building blocks of biology. Anything and everything is apart of the chemical basis for life. Everything has a structure and a reason to function the way that it does. This includes learning about Enzymes, Carbohydrates, Nucleic acids etc. Enzymes (Protein catalyst) speeds up the rate of chemical reactions. Carbohydrates are one of the four organic molecules. They store energy if sugar or starches and can form complex structures. Nucleic acids are of the four basic organic molecules. They can be used to store genetic information and also they can also add and transfer energy (ATP).

Questions for chemical basis of life

1. **What is cohesion?**
   a. Water attaching to water
   b. Water attaching to objects
   c. Both
   d. Has nothing to do with water
2. **What is Adhesion?**
   a**.** Has nothing to de with water
   B. Water attaching to objects
   C**.** Both
   D. Water
3. **What is the freezing point of water?**
   a. 1 F
   b. 32 F
   c. 7 F
   d. 100 F

4. What is the structure of carbohydrates?

a. Carbon,Water, Hydrogen
b. Carbon, Hydrogen
c. Carbon, Hydrogen, Oxygen
d. Carboxylic, Fatty acid, Oxygen

5. Enzymes attach to what to form products?

a. Proteins
b. Acid
c. Water
d. Substrates

6. In the following what can the change in pH do to a enzyme?

a. Change the shape
b. Change the charge property
c. pH does nothing to the enzyme
d. Change the size

Open ended

1. **Water is fundamental for all life forms, without it everything will die. Please write a brief explanation on why water is a very important element in life.**

2. **How is carbon uniquely suited to form biological macromolecules?**

Answers- Open ended

1. **Water is fundamental for all life forms, without it everything will die. Please write a brief explanation on why water is a very important element in life.**

Water regulates tissues, cells, carries out waste etc.

2. **How is carbon uniquely suited to form biological macromolecules?**

It forms large complex diverse molecules.

Answers- Chemical basis of life

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Genetics-—Continuity and Unity of Life

ASSESSMENT ANCHOR BIO.B.2 Genetics	
Anchor Descriptor	**Eligible Content**
BIO.B.2.1 Compare Mendelian and non-Mendelian patterns of inheritance.	**BIO.B.2.1.1** Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).
	BIO.B.2.1.2 Describe processes that can alter composition or number of chromosomes (i.e., crossing-over, nondisjunction, duplication, translocation, deletion, insertion, and inversion).
Anchor Descriptor	**Eligible Content**
BIO.B.2.2 Explain the process of protein synthesis (i.e., transcription, translation, and protein modification).	**BIO.B.2.2.1** Describe how the processes of transcription and translation are similar in all organisms.
	BIO.B.2.2.2 Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins.
Anchor Descriptor	**Eligible Content**
BIO.B.2.3 Explain how genetic information is expressed.	**BIO.B.2.3.1** Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frame-shift).

As humans we share parts of ourselves called genes with our kids, Each child gains a certain characteristic from their parents. This is what gives us our colored eyes whether its blue, brown, or green. Genes also determine how tall someone is, color of hair, etc. What happens if genes don’t fall properly in place the way they are meant to go? This is called genetic mutation. Genetic mutation can cause problems such as Down Syndrome,

1. **Which of the following receives proteins and lips?**
    a. Golgi apparatus
    b. Ribosome
    c. Endoplasmic reticulum
    d. Nucleus
2. **What is the function of the Endoplasmic reticulum**
    a. Produce and package protein
    b. Make DNA
    c. Protect the cell
    d. Nothing
1. **What's a frame-shift?**
    a. When the DNA sequence is stopped
    b. When the DNA sequence is moved/inserted
    c. When nothing happens
    d. When a new DNA sequence is added

Opened ended

1. **Describe what is X-inactivation**
2. **Explain what happens when nondisjunction appears.**
3. **What does transcription do?**

Answer key- Genetics

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Opened ended

1. **Describe what is X-inactivation**

- X-inactivation is from one of the copies of the X chromosomes in the female is inactive. This happens due to the way it was processed.

2. **Explain what happens when nondisjunction appears.**

- In the mitosis process the sister chromatids don't separate or during the meiosis phase the homologous chromosomes don't separate and cause failure. This is often leading to disorders like Down Syndrome, Turner's Syndrome etc.

3. **What does transcription do?**

- During the transcription phase it makes a messenger RNA (mRNA). The mRNA makes a gene copy temporarily for a protein.

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