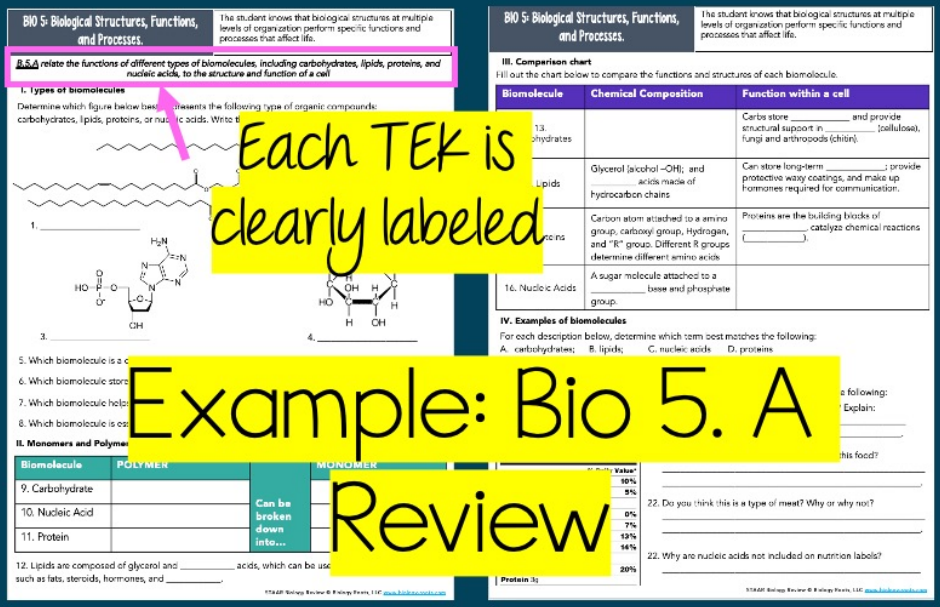
BIOLOGY STAAR

review booklet

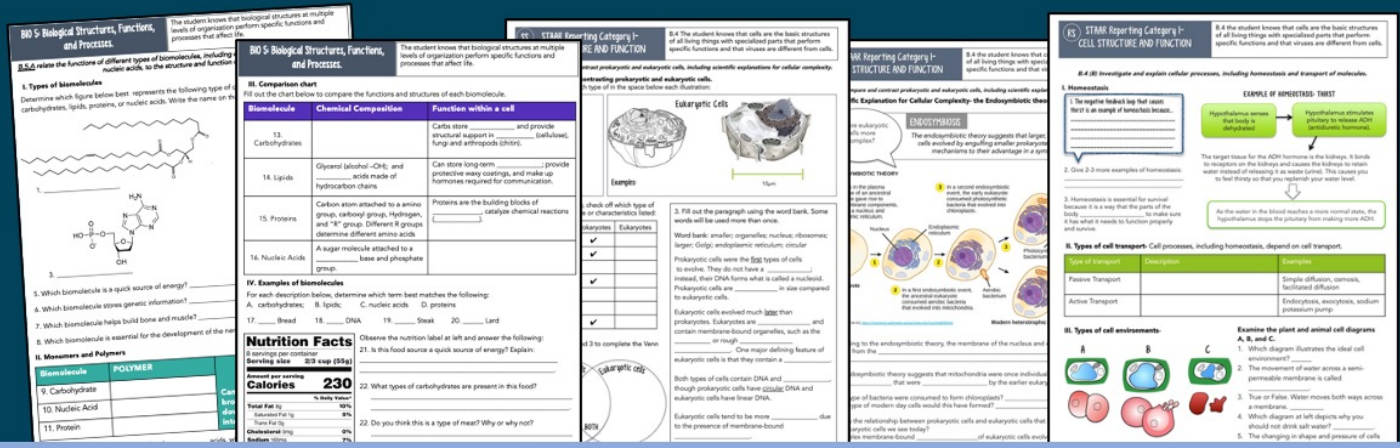
- Includes ALL Bio TEKS
- Condensed into neat review sheets
- Answer keys + differentiation included



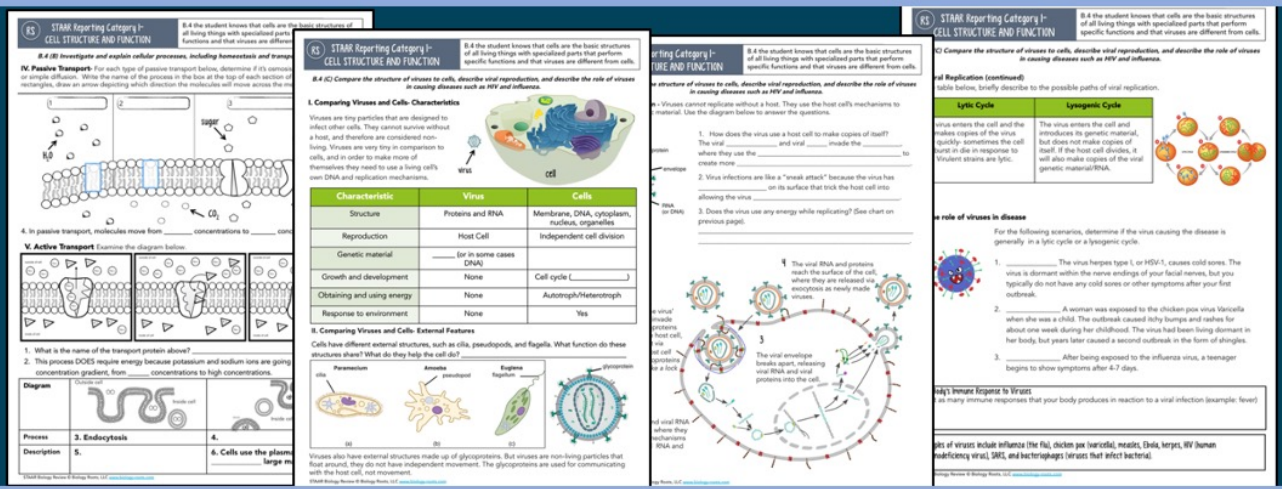
updated for the new TEKS 2024


Engaging & Effective Biology Lessons Designed for student comprehension
biology roots
The original biology STAAR review!
Me at CAST with the STAAR review ☺
TEKS
BIOLOGY STAAR REVIEW
CAST
Vanessa
task cards & exhibition stations
science
digital
genetics
cell division

BIOLOGY STAAR *review booklet*

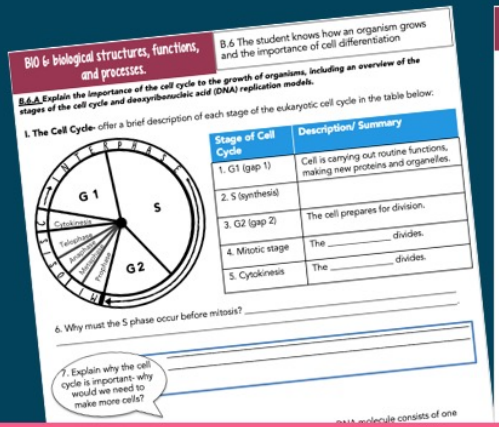


TEKS Bio 5



- **BIO 5** The student knows that biological structures at multiple levels of organization perform specific functions and processes that affect life.

BIOLOGY STAAR *review booklet*


BIO 6: biological structures, functions, and processes. B.6 The student knows how an organism grows and the importance of cell differentiation

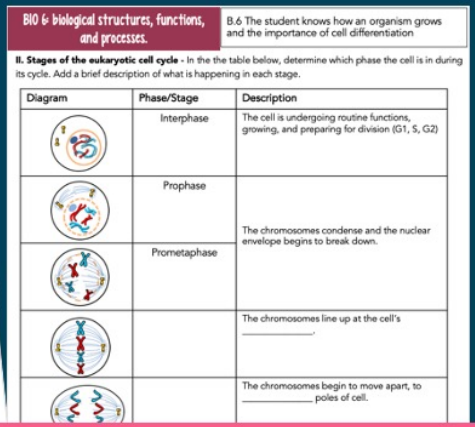
B.6.A Explain the importance of the cell cycle to the growth of organisms, including an overview of the stages of the cell cycle and deoxyribonucleic acid (DNA) replication models.

I. The Cell Cycle- offer a brief description of each stage of the eukaryotic cell cycle in the table below:

Stage of Cell Cycle	Description/ Summary
1. G1 (gap 1)	Cell is carrying out routine functions, making new proteins and organelles.
2. S (synthesis)	
3. G2 (gap 2)	The cell prepares for division.
4. Mitotic stage	The _____ divides.
5. Cytokinesis	The _____ divides.

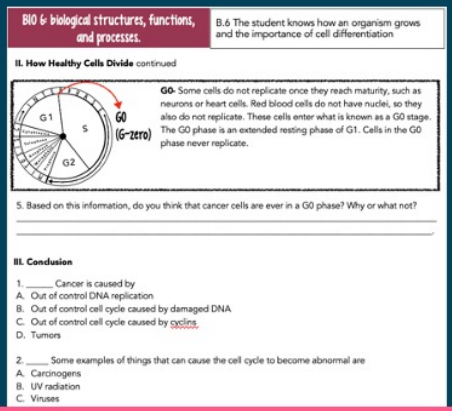
6. Why must the S phase occur before mitosis? _____

7. Explain why the cell cycle is important- why would we need to make more cells?


BIO 6: biological structures, functions, and processes. B.6 The student knows how an organism grows and the importance of cell differentiation

II. Stages of the eukaryotic cell cycle - In the the table below, determine which phase the cell is in during its cycle. Add a brief description of what is happening in each stage.

Diagram	Phase/Stage	Description
	Interphase	The cell is undergoing routine functions, growing, and preparing for division (G1, S, G2)
	Prophase	
	Prometaphase	The chromosomes condense and the nuclear envelope begins to break down.
		The chromosomes line up at the cell's _____.
		The chromosomes begin to move apart, to _____ poles of cell.


BIO 6: biological structures, functions, and processes. B.6 The student knows how an organism grows and the importance of cell differentiation

II. How Healthy Cells Divide continued

G0- Some cells do not replicate once they reach maturity, such as neurons or heart cells. Red blood cells do not have nuclei, so they also do not replicate. These cells enter what is known as a G0 stage. The G0 phase is an extended resting phase of G1. Cells in the G0 phase never replicate.

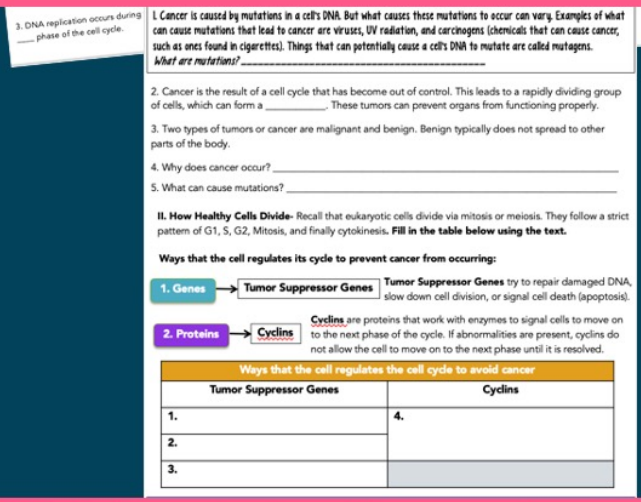
5. Based on this information, do you think that cancer cells are ever in a G0 phase? Why or what not?

III. Conclusion

1. _____ Cancer is caused by
A. Out of control DNA replication
B. Out of control cell cycle caused by damaged DNA
C. Out of control cell cycle caused by cyclins
D. Tumors

2. _____ Some examples of things that can cause the cell cycle to become abnormal are
A. Carcinogens
B. UV radiation
C. Viruses

TEKS Bio 6


3. DNA replication occurs during ____ phase of the cell cycle.

I. Cancer is caused by mutations in a cell's DNA. But what causes these mutations to occur can vary. Examples of what can cause mutations that lead to cancer are viruses, UV radiation, and carcinogens (chemicals that can cause cancer, such as ones found in cigarettes). Things that can potentially cause a cell's DNA to mutate are called mutagens.

What are mutations? _____

2. Cancer is the result of a cell cycle that has become out of control. This leads to a rapidly dividing group of cells, which can form a _____. These tumors can prevent organs from functioning properly.

3. Two types of tumors or cancer are malignant and benign. Benign typically does not spread to other parts of the body.

4. Why does cancer occur? _____

5. What can cause mutations? _____

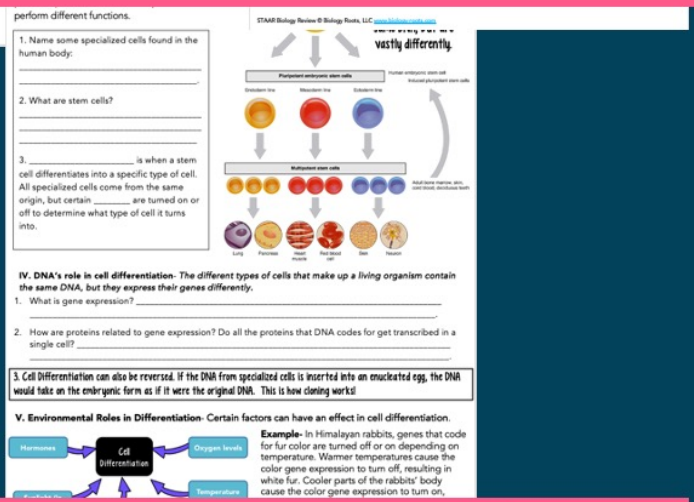
II. How Healthy Cells Divide- Recall that eukaryotic cells divide via mitosis or meiosis. They follow a strict pattern of G1, S, G2, Mitosis, and finally cytokinesis. **Fill in the table below using the text.**

Ways that the cell regulates its cycle to prevent cancer from occurring:

1. Genes → **Tumor Suppressor Genes** **Tumor Suppressor Genes** try to repair damaged DNA, slow down cell division, or signal cell death (apoptosis).

2. Proteins → **Cyclins** **Cyclins** are proteins that work with enzymes to signal cells to move on to the next phase of the cycle. If abnormalities are present, cyclins do not allow the cell to move on to the next phase until it is resolved.

Ways that the cell regulates the cell cycle to avoid cancer	
Tumor Suppressor Genes	**Cyclins**
1.	4.
2.	
3.	


perform different functions.

1. Name some specialized cells found in the human body: _____

2. What are stem cells? _____

3. _____ is when a stem cell differentiates into a specific type of cell. All specialized cells come from the same origin, but certain _____ are turned on or off to determine what type of cell it turns into.

IV. DNA's role in cell differentiation- ***The different types of cells that make up a living organism contain the same DNA, but they express their genes differently.***

1. What is gene expression? _____

2. How are proteins related to gene expression? Do all the proteins that DNA codes for get transcribed in a single cell? _____

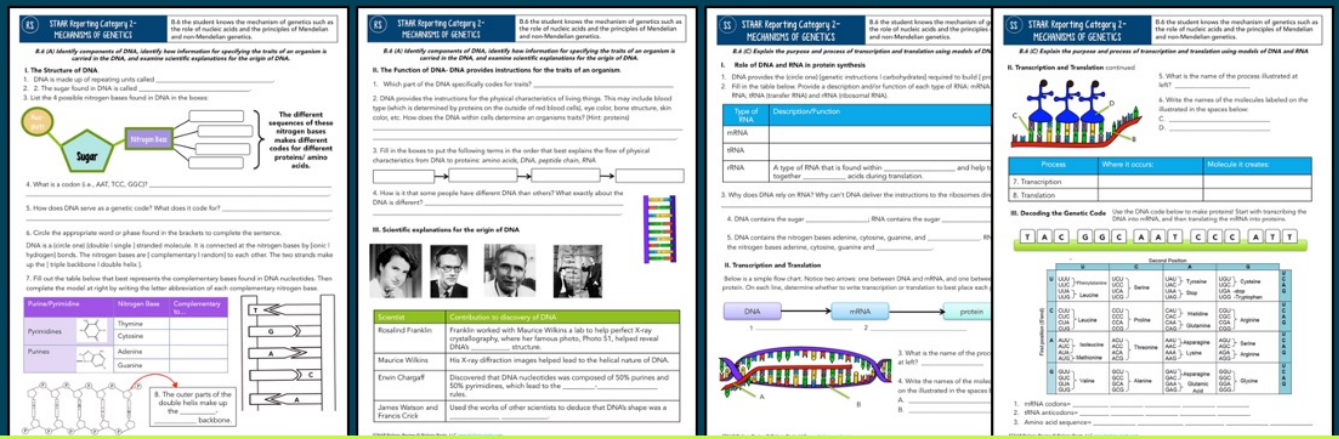
3. Cell Differentiation can also be reversed. If the DNA from specialized cells is inserted into an enucleated egg, the DNA would take on the embryonic form as if it were the original DNA. This is how cloning works!

V. Environmental Roles in Differentiation- Certain factors can have an effect in cell differentiation.

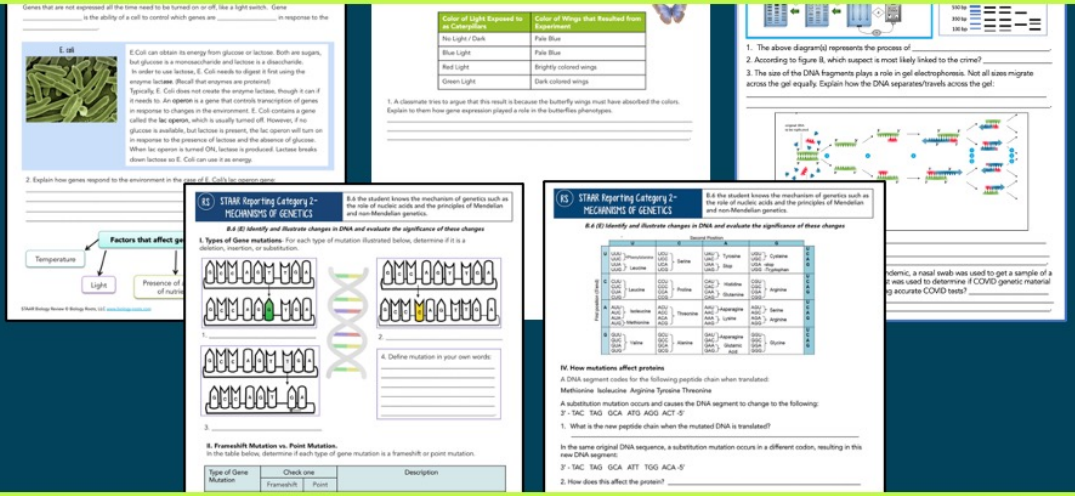
Example- In Himalayan rabbits, genes that code for fur color are turned off or on depending on temperature. Warmer temperatures cause the color gene expression to turn off, resulting in white fur. Cooler parts of the rabbits' body cause the color gene expression to turn on,

- BIO 6 the student knows how an organism grows and the importance of cell differentiation.

BIOLOGY STAAR *review booklet*

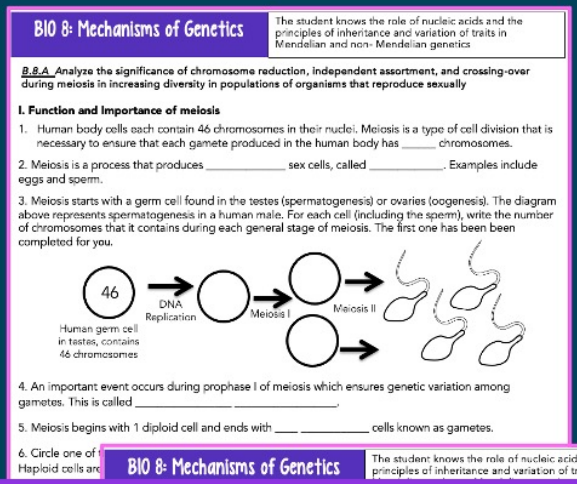


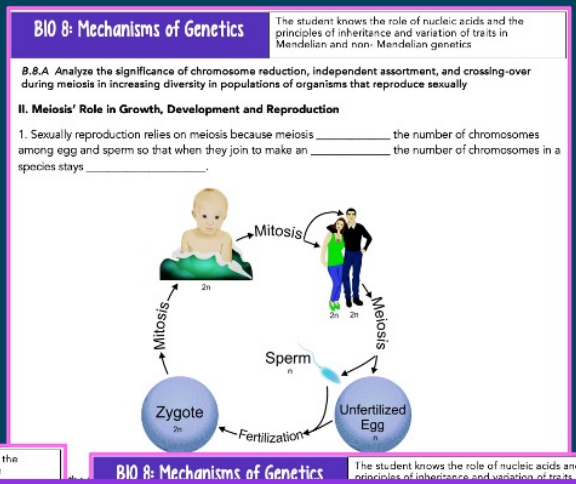
TEKS Bio 7



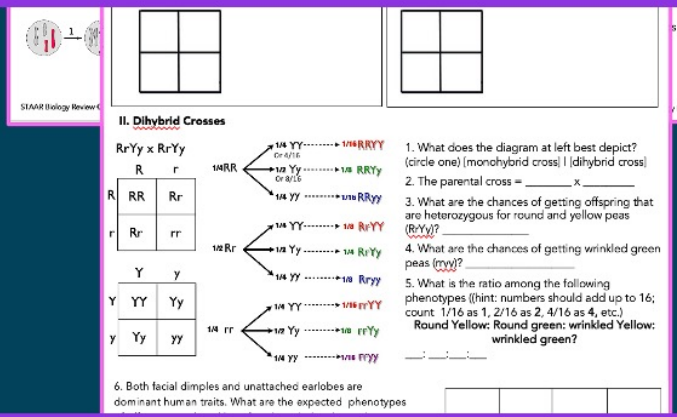
- **BIO 7:** The student knows the role of nucleic acids in gene expression.

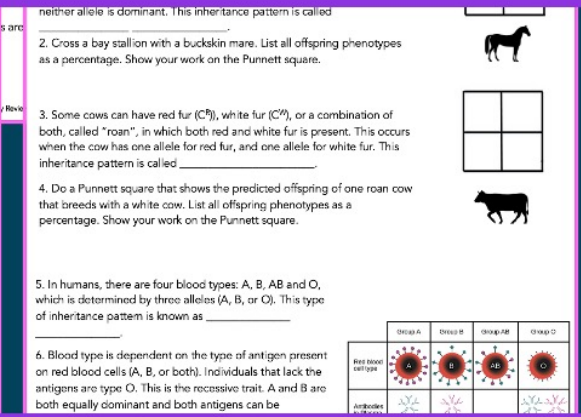
BIOLOGY STAAR *review booklet*





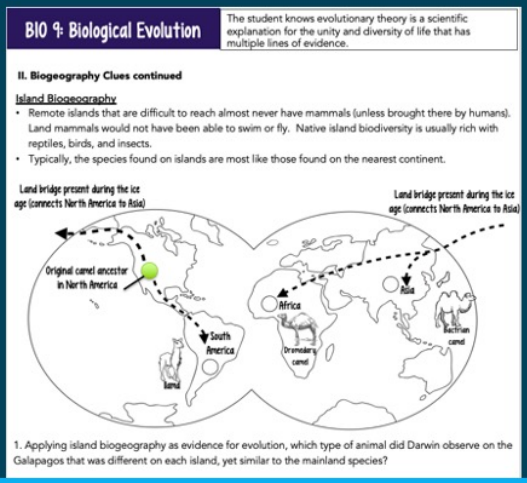
TEKS Bio 8

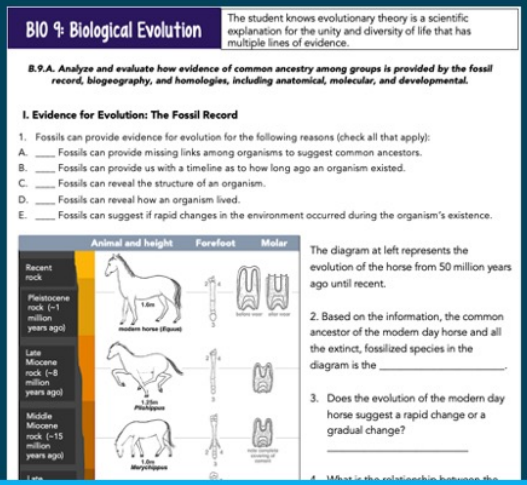




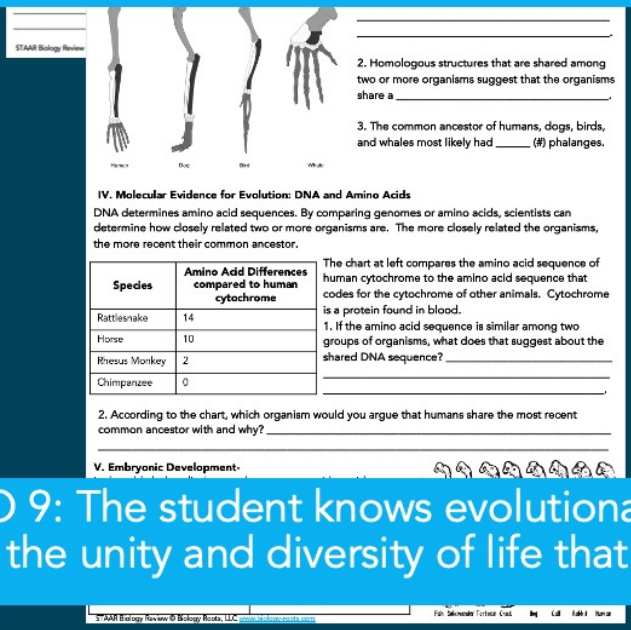
BIO 8: The student knows the role of nucleic acids and the principles of inheritance and variation of traits in Mendelian and non- Mendelian genetics

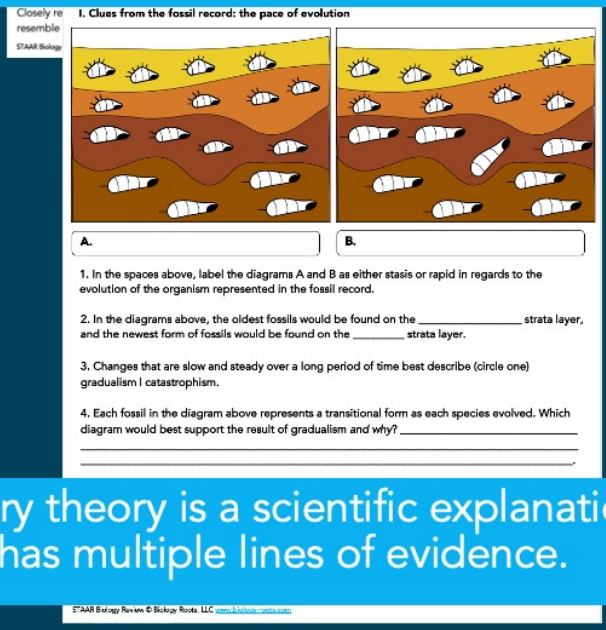
BIOLOGY STAAR *review booklet*





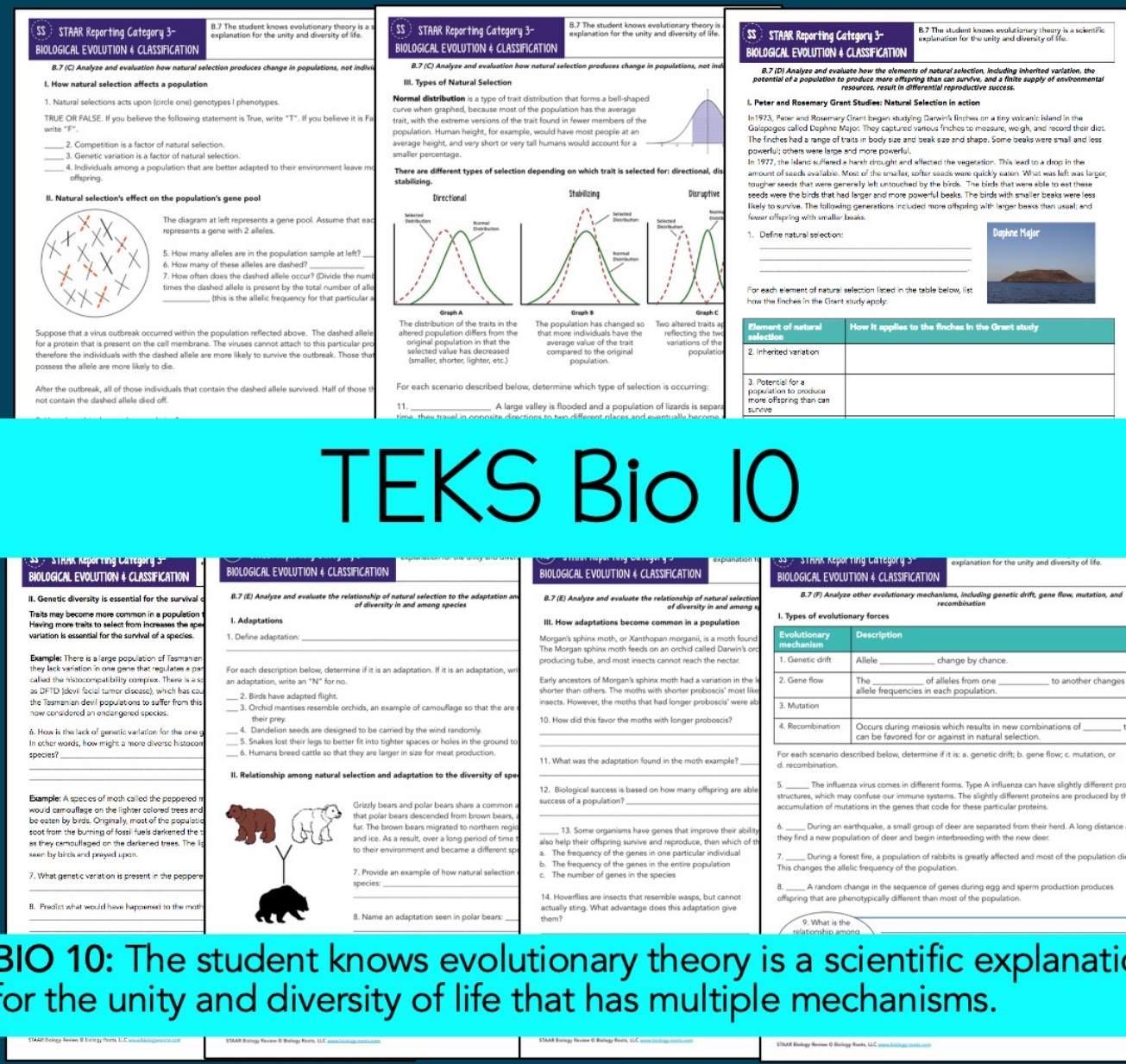
TEKS Bio 9





- BIO 9: The student knows evolutionary theory is a scientific explanation for the unity and diversity of life that has multiple lines of evidence.

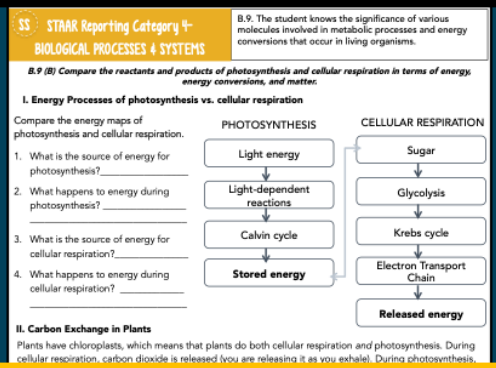
BIOLOGY STAAR *review booklet*



TEKS Bio 10

- **BIO 10:** The student knows evolutionary theory is a scientific explanation for the unity and diversity of life that has multiple mechanisms.

BIOLOGY STAAR *review booklet*


SS STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.9. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.

B.9 (B) Compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions, and matter.

I. Energy Processes of photosynthesis vs. cellular respiration

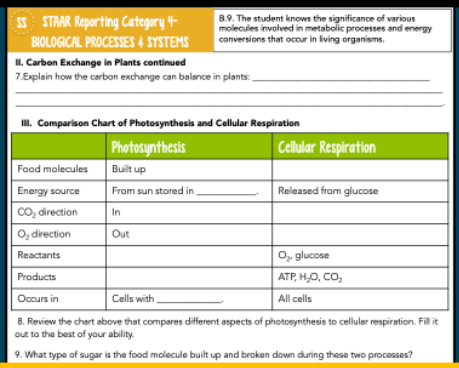
Compare the energy maps of photosynthesis and cellular respiration.

PHOTOSYNTHESIS	CELLULAR RESPIRATION
Light energy	Sugar
Light-dependent reactions	Glycolysis
Calvin cycle	Krebs cycle
Stored energy	Electron Transport Chain
	Released energy

1. What is the source of energy for photosynthesis?_____
2. What happens to energy during photosynthesis? _____
3. What is the source of energy for cellular respiration?_____
4. What happens to energy during cellular respiration? _____

II. Carbon Exchange in Plants

Plants have chloroplasts, which means that plants do both cellular respiration *and* photosynthesis. During cellular respiration, carbon dioxide is released (you are releasing it as you exhale). During photosynthesis,


SS STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.9. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.

II. Carbon Exchange in Plants continued

7.Explain how the carbon exchange can balance in plants: _____

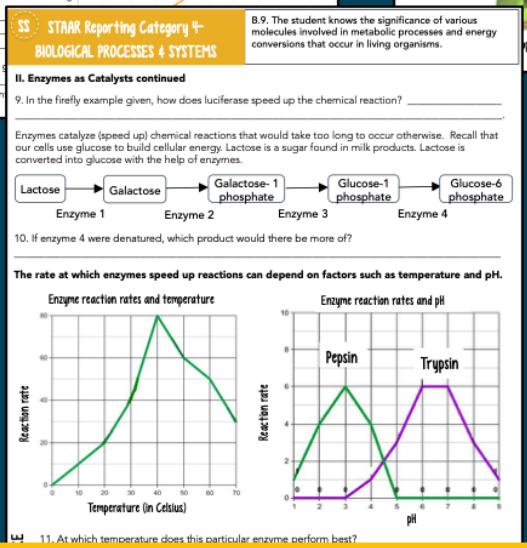
III. Comparison Chart of Photosynthesis and Cellular Respiration

	Photosynthesis	Cellular Respiration
Food molecules	Built up	
Energy source	From sun stored in _____.	Released from glucose
CO_2 direction	In	
O_2 direction	Out	
Reactants		O_2, glucose
Products		ATP, H_2O, CO_2
Occurs in	Cells with _____.	All cells

8. Review the chart above that compares different aspects of photosynthesis to cellular respiration. Fill it out to the best of your ability.

9. What type of sugar is the food molecule built up and broken down during these two processes?

TEKS Bio II


SS STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.9. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.

II. Enzymes as Catalysts continued

9. In the firefly example given, how does luciferase speed up the chemical reaction? _____

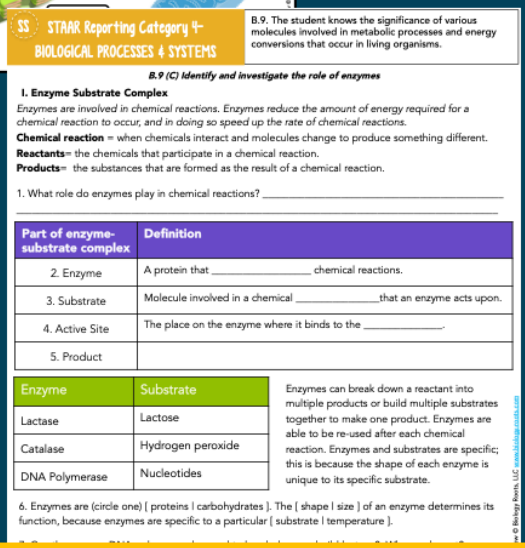
Enzymes catalyze (speed up) chemical reactions that would take too long to occur otherwise. Recall that our cells use glucose to build cellular energy. Lactose is a sugar found in milk products. Lactose is converted into glucose with the help of enzymes.

Lactose → (Enzyme 1) Galactose → (Enzyme 2) Galactose- 1 phosphate → (Enzyme 3) Glucose-1 phosphate → (Enzyme 4) Glucose-6 phosphate

10. If enzyme 4 were denatured, which product would there be more of?

The rate at which enzymes speed up reactions can depend on factors such as temperature and pH.

11. At which temperature does this particular enzyme perform best?


SS STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.9. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms.

B.9 (C) Identify and investigate the role of enzymes

I. Enzyme Substrate Complex

Enzymes are involved in chemical reactions. Enzymes reduce the amount of energy required for a chemical reaction to occur, and in doing so speed up the rate of chemical reactions.

Chemical reaction = when chemicals interact and molecules change to produce something different.
Reactants= the chemicals that participate in a chemical reaction.
Products= the substances that are formed as the result of a chemical reaction.

1. What role do enzymes play in chemical reactions? _____

Part of enzyme-substrate complex	Definition
2. Enzyme	A protein that _____ chemical reactions.
3. Substrate	Molecule involved in a chemical _____that an enzyme acts upon.
4. Active Site	The place on the enzyme where it binds to the _____.
5. Product	

Enzyme	Substrate
Lactase	Lactose
Catalase	Hydrogen peroxide
DNA Polymerase	Nucleotides

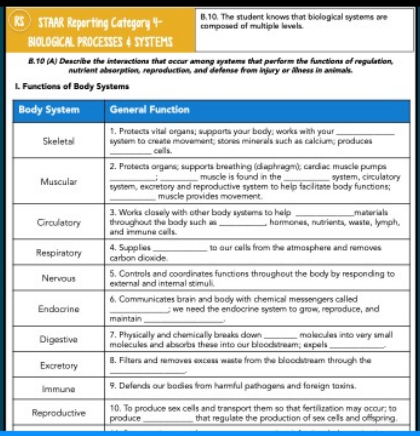
Enzymes can break down a reactant into multiple products or build multiple substrates together to make one product. Enzymes are able to be re-used after each chemical reaction. Enzymes and substrates are specific; this is because the shape of each enzyme is unique to its specific substrate.

6. Enzymes are (circle one) [proteins | carbohydrates]. The [shape | size] of an enzyme determines its function, because enzymes are specific to a particular [substrate | temperature].

© Biology Roots, LLC www.biologyroots.com

- **BIO 11.** The student knows the significance of matter cycling, energy flow, and enzymes in living organisms

BIOLOGY STAAR *review booklet*

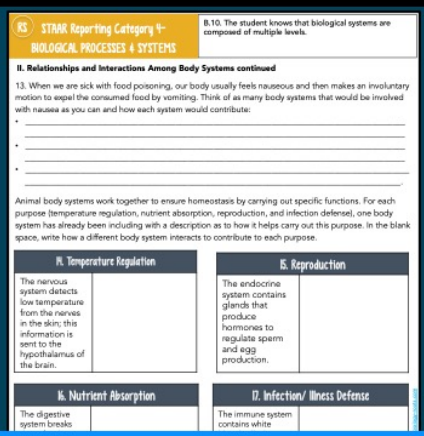

STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.10. The student knows that biological systems are composed of multiple levels.

B.10 (A) Describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals.

I. Functions of Body Systems

Body System	General Function
Skeletal	1. Protects vital organs; supports your body; works with your _____ system to create movement; stores minerals such as calcium; produces _____ cells.
Muscular	2. Protects organs; supports breathing (diaphragm); cardiac muscle pumps _____; _____ muscle is found in the _____ system, circulatory system, excretory and reproductive system to help facilitate body functions; _____ muscle provides movement.
Circulatory	3. Works closely with other body systems to help _____materials throughout the body such as _____ hormones, nutrients, waste, lymph, and immune cells.
Respiratory	4. Supplies _____ to our cells from the atmosphere and removes carbon dioxide.
Nervous	5. Controls and coordinates functions throughout the body by responding to external and internal stimuli.
Endocrine	6. Communicates brain and body with chemical messengers called _____; we need the endocrine system to grow, reproduce, and maintain _____.
Digestive	7. Physically and chemically breaks down _____ molecules into very small molecules and absorbs these into our bloodstream; expels _____.
Excretory	8. Filters and removes excess waste from the bloodstream through the _____.
Immune	9. Defends our bodies from harmful pathogens and foreign toxins.
Reproductive	10. To produce sex cells and transport them so that fertilization may occur; to produce _____ that regulate the production of sex cells and offspring.


STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.10. The student knows that biological systems are composed of multiple levels.

II. Relationships and Interactions Among Body Systems continued

13. When we are sick with food poisoning, our body usually feels nauseous and then makes an involuntary motion to expel the consumed food by vomiting. Think of as many body systems that would be involved with nausea as you can and how each system would contribute:

- _____
- _____
- _____

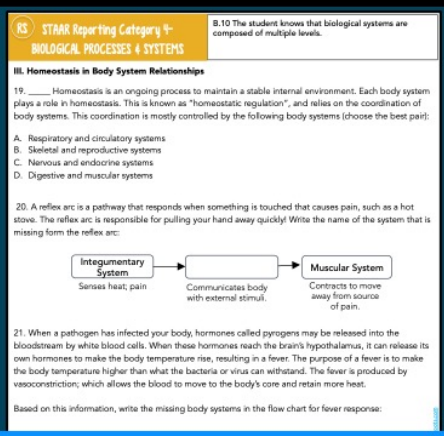
Animal body systems work together to ensure homeostasis by carrying out specific functions. For each purpose (temperature regulation, nutrient absorption, reproduction, and infection defense), one body system has already been including with a description as to how it helps carry out this purpose. In the blank space, write how a different body system interacts to contribute to each purpose.

14. Temperature Regulation	
The nervous system detects low temperature from the nerves in the skin; this information is sent to the hypothalamus of the brain.	

15. Reproduction	
The endocrine system contains glands that produce hormones to regulate sperm and egg production.	

16. Nutrient Absorption	
The digestive system breaks	

17. Infection/ Illness Defense	
The immune system contains white	


STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.10 The student knows that biological systems are composed of multiple levels.

III. Homeostasis in Body System Relationships

19. _____ Homeostasis is an ongoing process to maintain a stable internal environment. Each body system plays a role in homeostasis. This is known as "homeostatic regulation", and relies on the coordination of body systems. This coordination is mostly controlled by the following body systems (choose the best pair):

A. Respiratory and circulatory systems
B. Skeletal and reproductive systems
C. Nervous and endocrine systems
D. Digestive and muscular systems

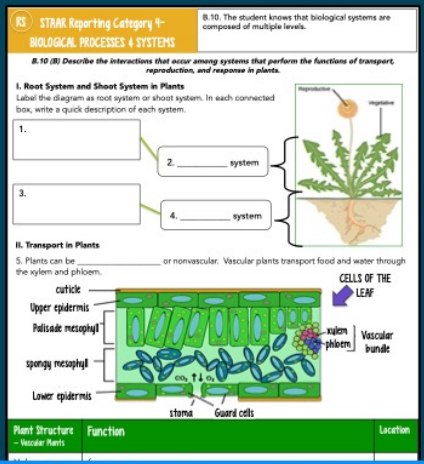
20. A reflex arc is a pathway that responds when something is touched that causes pain, such as a hot stove. The reflex arc is responsible for pulling your hand away quickly! Write the name of the system that is missing form the reflex arc:

Integumentary System (Senses heat; pain) → _____ (Communicates body with external stimuli.) → Muscular System (Contracts to move away from source of pain.)

21. When a pathogen has infected your body, hormones called pyrogens may be released into the bloodstream by white blood cells. When these hormones reach the brain's hypothalamus, it can release its own hormones to make the body temperature rise, resulting in a fever. The purpose of a fever is to make the body temperature higher than what the bacteria or virus can withstand. The fever is produced by vasoconstriction; which allows the blood to move to the body's core and retain more heat.

Based on this information, write the missing body systems in the flow chart for fever response:

TEKS Bio 12


STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.10. The student knows that biological systems are composed of multiple levels.

B.10 (B) Describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants.

I. Root System and Shoot System in Plants

Label the diagram as root system or shoot system. In each connected box, write a quick description of each system.

1. _____
2. _____ system
3. _____
4. _____ system

Reproductive / Vegetative

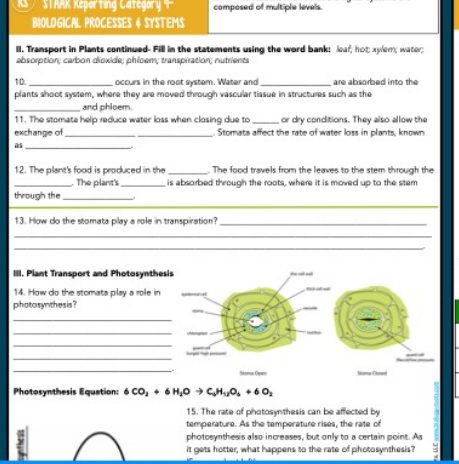
II. Transport in Plants

5. Plants can be _____ or nonvascular. Vascular plants transport food and water through the xylem and phloem.

CELLS OF THE LEAF

cuticle
Upper epidermis
Palisade mesophyll
spongy mesophyll
Lower epidermis
xylem
phloem
Vascular bundle
CO_2 ↑↓ O_2
stoma
Guard cells

Plant Structure – Vascular Plants	Function	Location


STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.10. The student knows that biological systems are composed of multiple levels.

II. Transport in Plants continued- Fill in the statements using the word bank: *leaf; hot; xylem; water; absorption; carbon dioxide; phloem; transpiration; nutrients*

10. _____ occurs in the root system. Water and _____ are absorbed into the plants shoot system, where they are moved through vascular tissue in structures such as the _____ and phloem.

11. The stomata help reduce water loss when closing due to _____ or dry conditions. They also allow the exchange of _____ _____. Stomata affect the rate of water loss in plants, known as _____.

12. The plant's food is produced in the _____. The food travels from the leaves to the stem through the _____. The plant's _____ is absorbed through the roots, where it is moved up to the stem through the _____.

13. How do the stomata play a role in transpiration? _____

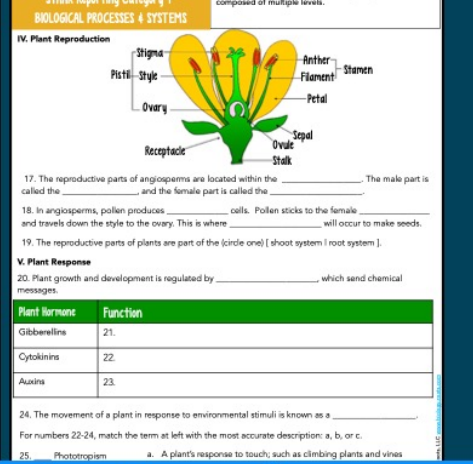
III. Plant Transport and Photosynthesis

14. How do the stomata play a role in photosynthesis?

Stoma Open / Stoma Closed

Photosynthesis Equation: $6\,CO_2 + 6\,H_2O \rightarrow C_6H_{12}O_6 + 6\,O_2$

15. The rate of photosynthesis can be affected by temperature. As the temperature rises, the rate of photosynthesis also increases, but only to a certain point. As it gets hotter, what happens to the rate of photosynthesis?


STAAR Reporting Category 4– BIOLOGICAL PROCESSES & SYSTEMS

B.10. The student knows that biological systems are composed of multiple levels.

IV. Plant Reproduction

Stigma, Pistil, Style, Ovary, Anther, Filament, Stamen, Petal, Sepal, Ovule, Receptacle, Stalk

17. The reproductive parts of angiosperms are located within the _____. The male part is called the _____, and the female part is called the _____.

18. In angiosperms, pollen produces _____ cells. Pollen sticks to the female _____ and travels down the style to the ovary. This is where _____ will occur to make seeds.

19. The reproductive parts of plants are part of the (circle one) [shoot system I root system].

V. Plant Response

20. Plant growth and development is regulated by _____, which send chemical messages.

Plant Hormone	Function
Gibberellins	21.
Cytokinins	22.
Auxins	23.

24. The movement of a plant in response to environmental stimuli is known as a _____.

For numbers 22-24, match the term at left with the most accurate description: a, b, or c.

25. _____ Phototropism — a. A plant's response to touch; such as climbing plants and vines

- **BIO 11.** The student knows the significance of matter cycling, energy flow, and enzymes in living organisms

BIOLOGY STAAR review booklet

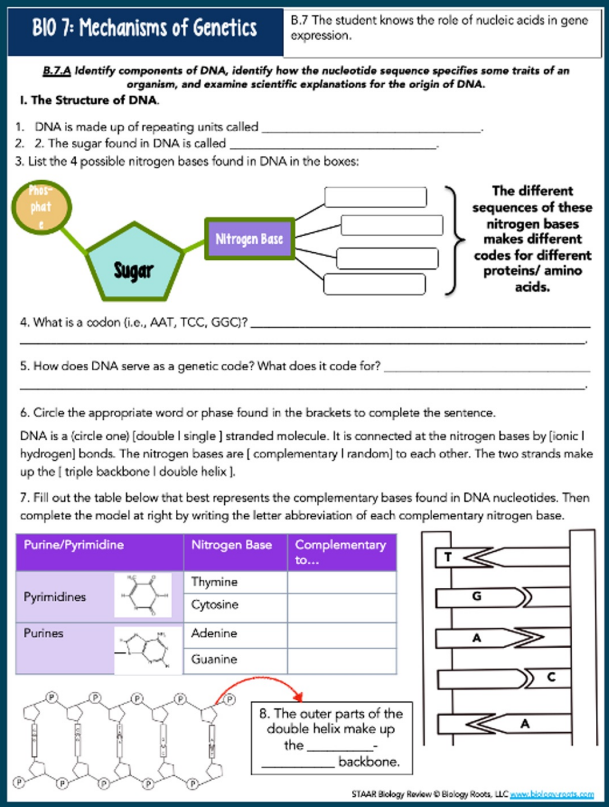
TEKS Bio 13

BIO 13: The student knows that interactions at various levels of organization occur within an ecosystem to maintain stability.

BIOLOGY STAAR

review booklet

- Differentiated versions included for all!



BIO 7: Mechanisms of Genetics | B.7 The student knows the role of nucleic acids in gene expression.

B.7.A Identify components of DNA, identify how the nucleotide sequence specifies some traits of an organism, and examine scientific explanations for the origin of DNA.

I. The Structure of DNA.

1. DNA is made up of repeating units called _____.
2. 2. The sugar found in DNA is called _____.
3. List the 4 possible nitrogen bases found in DNA in the boxes:

Phos-phat e | Sugar | Nitrogen Base

The different sequences of these nitrogen bases makes different codes for different proteins/ amino acids.

4. What is a codon (i.e., AAT, TCC, GGC)? _____

5. How does DNA serve as a genetic code? What does it code for? _____

6. Circle the appropriate word or phase found in the brackets to complete the sentence.

DNA is a (circle one) [double I single] stranded molecule. It is connected at the nitrogen bases by [ionic I hydrogen] bonds. The nitrogen bases are [complementary I random] to each other. The two strands make up the [triple backbone I double helix].

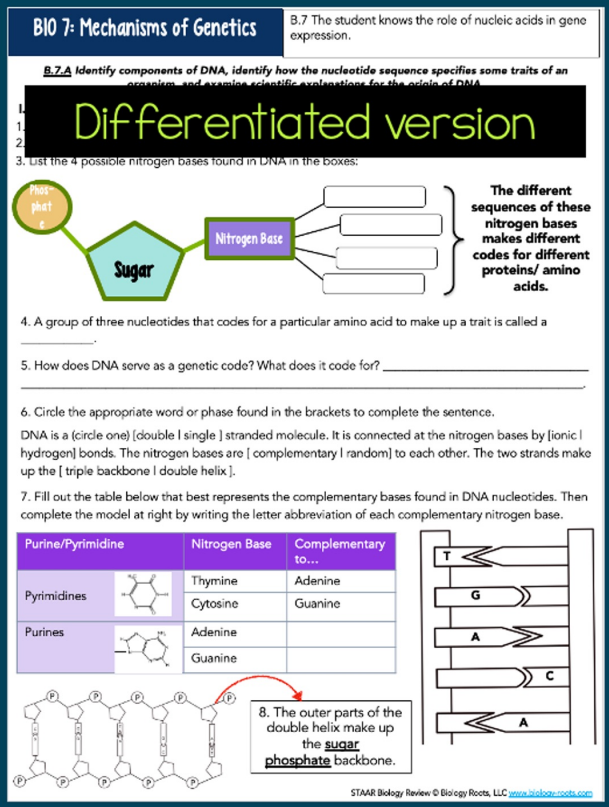
7. Fill out the table below that best represents the complementary bases found in DNA nucleotides. Then complete the model at right by writing the letter abbreviation of each complementary nitrogen base.

Purine/Pyrimidine	Nitrogen Base	Complementary to…
Pyrimidines	Thymine	
	Cytosine	
Purines	Adenine	
	Guanine	

T G A C A

8. The outer parts of the double helix make up the _____-_____ backbone.

STAAR Biology Review © Biology Roots, LLC www.biology-roots.com



BIO 7: Mechanisms of Genetics | B.7 The student knows the role of nucleic acids in gene expression.

B.7.A Identify components of DNA, identify how the nucleotide sequence specifies some traits of an organism, and examine scientific explanations for the origin of DNA.

3. List the 4 possible nitrogen bases found in DNA in the boxes:

Phos-phat e | Sugar | Nitrogen Base

The different sequences of these nitrogen bases makes different codes for different proteins/ amino acids.

4. A group of three nucleotides that codes for a particular amino acid to make up a trait is called a _____.

5. How does DNA serve as a genetic code? What does it code for? _____

6. Circle the appropriate word or phase found in the brackets to complete the sentence.

DNA is a (circle one) [double I single] stranded molecule. It is connected at the nitrogen bases by [ionic I hydrogen] bonds. The nitrogen bases are [complementary I random] to each other. The two strands make up the [triple backbone I double helix].

7. Fill out the table below that best represents the complementary bases found in DNA nucleotides. Then complete the model at right by writing the letter abbreviation of each complementary nitrogen base.

Purine/Pyrimidine	Nitrogen Base	Complementary to…
Pyrimidines	Thymine	Adenine
	Cytosine	Guanine
Purines	Adenine	
	Guanine	

T G A C A

8. The outer parts of the double helix make up the sugar phosphate backbone.

STAAR Biology Review © Biology Roots, LLC www.biology-roots.com

- Spanish version translated from Google Translate available (disclaimer: Google Translate)

Still not sure if you need this resource?

This is for any biology teacher in Texas whose students are taking the STAAR at the end of the year OR for re-testers who need remediation testing mid-year.

This can also simply be used for homework assignments or as part of a study guide throughout the year as they align perfectly with biology TEKS.

MH

Marisa H.

Feb 13, 2024

★★★★★ **Extremely satisfied**

This is one of the best Biology STAAR EOC reviews out there. You will be hard pressed to find something more concise out there!

Questions? Reach out to vanessa@biology-roots.com



BLOG: www.biology-roots.com
Instagram: www.Instagram.com/biologyroots
Facebook: www.facebook.com/biologyroots
Pinterest: www.pinterest.com/biologyroots

biology roots



Hi! I'm Vanessa. I have been creating high quality content as a teacher author since **2012** and have over ⭐ 20,000 5 star reviews ⭐ I have a Masters in Science Education, plus years of experience as a teacher and teacher mentor. If you have questions about the curriculum or the standards it follows in your district, please email me: vanessa@biology-roots.com