

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
1	Option D is correct	The axolotl salamander has gills, so it is adapted to live in water. The tiger salamander has lungs and stout legs, so it is adapted to live on land.
	Option A is incorrect	The locations where the two species live are reversed. The axolotl salamander lives in the water, and the tiger salamander lives on the land.
	Option B is incorrect	There is no evidence that suggests that either salamander is adapted for living in trees or in caves.
	Option C is incorrect	There is no evidence that suggests that either salamander is adapted for living in trees or in caves.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
2	Option A is correct	Glucose is a product of photosynthesis, the cellular process shown in the diagram.
	Option B is incorrect	Phospholipids are not a product of photosynthesis.
	Option C is incorrect	Insulin is not a product of photosynthesis.
	Option D is incorrect	DNA is not a product of photosynthesis.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
3	2 pts.	The student describes and explains <b>one</b> of the following: An increase in grasses (because mice consume grasses), a decrease in snakes (because snakes consume mice), a decrease in rabbits (because, in the absence of mice as a food source, hawks would prey upon more rabbits), a decrease in lizards (because, in the absence of mice as a food source, hawks would prey upon more lizards ), a decrease in hawks (because hawks consume mice as a food source), or an increase in grasshoppers (because grasshoppers compete with mice for grasses as a food source).
	1 pt.	The student describes one change but does not explain the reason for this change.
	0 pts.	The response is incorrect or irrelevant.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
4	Option B is correct	The diagram shows cell differentiation, which results from cells expressing different sets of genes at different times.
	Option A is incorrect	All these cell types replicate by mitosis.
	Option C is incorrect	All these cells contain the same DNA in their nuclei.
	Option D is incorrect	All cells of an organism use the same enzymes to replicate genetic material.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
5	Option D is correct	The diagram shows a translocation mutation in which parts of the chromosomes replace each other.
	Option A is incorrect	In a deletion mutation, a portion of the chromosome would be lost.
	Option B is incorrect	In an insertion mutation, one or more nucleotides would be added to a chromosome.
	Option C is incorrect	In a duplication mutation, one or more copies of a DNA segment would be inserted within or added to a chromosome.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
6	Part A	
	Option A is correct	In primary succession, first mosses will cover the rocks, creating new soil, then small shrubs will grow, and then small trees will begin to grow.
	Option B is incorrect	Trees do not become rooted before small shrubs grow.
	Option C is incorrect	Mosses cover rocks, breaking the rocks into smaller pieces, before shrubs can grow.
	Option D is incorrect	Soil must be produced by the action of mosses before small shrubs can grow.
	Part B	
	Option C is correct	The nunataks are bare rock, so they will undergo primary succession.
	Option A is incorrect	The slope of a location does not relate to the type of succession that takes place.
	Option B is incorrect	The slope of a location does not relate to the type of succession that takes place.
	Option D is incorrect	Secondary succession takes place in areas that have an established plant community and existing soil.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
7	<p>Viruses: Utilize a capsid structure</p> <p>Both: Contain genetic material</p> <p>Bacteria: Replicate independently, Have active metabolism</p>	<p>The phrase "Utilize a capsid structure" is placed in the "Viruses" portion of the Venn diagram because the genetic material of viruses is encased within a protein structure that is known as a capsid, whereas the genetic material of bacteria is found within the cytoplasm of these cells.</p> <p>The phrase "Contain genetic material" is placed within the overlap in the Venn diagram because viruses and bacterial cells both contain some form of genetic material.</p> <p>The phrase "Replicate independently" is placed in the "Bacteria" portion of the Venn diagram because replication of the genetic material of viruses is dependent upon a host cell, whereas replication of the genetic material of bacteria takes place within the bacterial cell's own cytoplasm.</p> <p>The phrase "Have active metabolism" is placed within the "Bacteria" portion of the Venn diagram because bacteria are cells and therefore are capable of metabolism, whereas viruses lack most of the components found in cells and are therefore unable to perform the processes of metabolism.</p>

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
8	Option C is correct	As sharks eat otters, the prey that otters eat will increase, and the kelp forest will become less stable.
	Option A is incorrect	A decrease in predation pressure is likely to cause an increase in the prey that feed on kelp.
	Option B is incorrect	The replacement of one top predator with another is likely to cause changes to multiple trophic levels in an ecosystem.
	Option D is incorrect	The kelp forests will become less stable, but since sharks are top predators that prey on sea otters, they are unlikely to prey significantly on organisms in lower trophic levels of the ecosystem.



2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
9	Option B is correct	Active transport requires ATP because this process moves materials against the concentration gradient. Passive transport does not require an additional energy input from ATP since materials move along the concentration gradient.
	Option A is incorrect	Active transport and passive transport occur in all cells.
	Option C is incorrect	Active transport moves materials against a concentration gradient. Passive transport moves materials along the concentration gradient.
	Option D is incorrect	Passive transport does not require any input of the energy stored in ATP.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
10	100 or any equivalent value is correct.	The gene for the condition is dominant ( <i>A</i> ). One parent is homozygous dominant ( <i>AA</i> ), while the other parent is homozygous recessive ( <i>aa</i> ). The only possible outcome of a cross between these parents ( <i>AA</i> × <i>aa</i> ) is that 100% of their offspring will have the genotype <i>Aa</i> and the phenotype of achondroplasia.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
11	<p>Slide 1 shows prokaryotic cells.</p> <p>Slides 2, 3, and 4 show eukaryotic cells.</p>	<p>Although some eukaryotic cells have flagella, and some eukaryotic cells are single-celled, the characteristic of having no nucleus allows an observer to classify the cells on Slide 1 as prokaryotic.</p> <p>The ability to go through mitosis is unique to eukaryotic cells, as is the presence of linear DNA and organelles such as the endoplasmic reticulum. These characteristics allow an observer to classify the cells on Slide 2 as eukaryotic.</p> <p>Prokaryotic cells are unicellular, and they lack membrane-bound organelles and a membrane-bound nucleus. Although eukaryotic organisms may be unicellular or multicellular, most eukaryotic cells have a membrane-bound nucleus and membrane-bound organelles. The presence of these characteristics in the cells on Slide 3 allows an observer to classify these cells as eukaryotic.</p> <p>Prokaryotic cells have a relatively simple structure and lack membrane-bound organelles, such as mitochondria. In general, they range in size from 0.1 micrometers to 5.0 micrometers. Although eukaryotic cells vary in size, they typically have a complex structure and have membrane-bound organelles, including mitochondria. The presence of these characteristics in the cells on Slide 4 allows an observer to classify these cells as eukaryotic.</p>

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
12	Option D is correct	Organisms with a cell wall made of cellulose are plants. Almost all organisms in kingdom Plantae are autotrophs. Organisms with a cell wall made of chitin are fungi. Fungi are heterotrophs.
	Option A is incorrect	While plants are multicellular, fungi can also be multicellular.
	Option B is incorrect	Plants are multicellular, but fungi can be unicellular or multicellular.
	Option C is incorrect	Although some plants are heterotrophs, no fungi are autotrophs.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
13	The <b>endocrine</b> system releases hormones into the bloodstream, and the <b>circulatory</b> system carries them to the target location.	Although both the nervous system and endocrine system send messages over a long distance, the nervous system does not directly produce hormones, and its messages are carried to a target location by cells of the nervous system. In contrast, the endocrine system releases hormone messengers into the circulatory system, which transports these messages to specific cells of other systems. Although certain cells of the immune system can produce hormones, these hormones are produced on-site as immune cells move to a specific location.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
14	Option D is correct	This is a mutualistic relationship, so both organisms benefit. Thus, <i>Trichonympha</i> improve the survival of termites.
	Option A is incorrect	Unlike in some parasitic relationships, <i>Trichonympha</i> do not eventually kill the host termites."
	Option B is incorrect	Unlike a parasite, <i>Trichonympha</i> do not cause infection in the host termites.
	Option C is incorrect	Unlike parasites, <i>Trichonympha</i> do not steal resources from the host termites.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
15	Option B is correct	Phylum is a higher, or more broad, level of classification than order. Therefore, two organisms that share the same order would also share the all the same classifications that are higher or broader than order. They would have the same kingdom, phylum, and class, as well as order.
	Option A is incorrect	Family is a more specific level of classification than order, so two organisms in the same order do not necessarily belong to the same family.
	Option C is incorrect	Genus is a more specific level of classification than order, so two organisms in the same order do not necessarily belong to the same genus.
	Option D is incorrect	Species is a more specific level of classification than order, so two organisms in the same order are not necessarily members of the same species.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
16	Option C is correct	Transfer RNA transports amino acids to the ribosome for protein synthesis; the ribosome is composed of rRNA; and mRNA carries the genetic information from DNA to the ribosomes, where translation occurs.
	Option A is incorrect	Transfer RNA does not carry genetic information from the nucleus to the ribosome; mRNA does that task.
	Option B is incorrect	Ribosomal RNA does not bring amino acids to growing polypeptides; tRNA does that task.
	Option D is incorrect	Messenger RNA is not a component of ribosomes; rRNA is.



2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
17	Option A is correct	The process in the diagram shows DNA replication, which takes place during interphase.
	Option B is incorrect	The process in the diagram does not show protein synthesis and does not take place during prophase.
	Option C is incorrect	The process in the diagram does not show crossing over and does not take place during metaphase.
	Option D is incorrect	The process in the diagram does not show cytokinesis and does not take place during anaphase.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
18	Option C is correct	The roots will continue to grow so that the plant can access water, while the stem and leaf growth will decrease to minimize water usage and water loss.
	Option A is incorrect	Leaf and stem production will both be slowed or stopped to limit the use and loss of water, while root growth will continue so that roots are able to grow deeper into the soil to access water.
	Option B is incorrect	While root growth will continue to allow roots to grow deeper into the soil to access water, leaf growth will be slowed to limit the loss of water to the environment and stem growth will be slowed to limit the use of water in cellular respiration.
	Option D is incorrect	While root growth will increase and stem growth will decrease, leaf growth will decrease to limit the movement of water from the roots to shoots through the xylem.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
19	2 pts.	The student identifies that Mutation 2 would have the most significant impact because it would cause a frameshift mutation in which the existing codon sequence (AAA GGC CAC) would be replaced by a different sequence (AAG GCC AC), resulting in the production of a different amino acid sequence.
	1 pt.	The student answers half of the question correctly.
	0 pts.	The response is incorrect or irrelevant.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
20	Option B is correct	The insertion of DNA from other species of salamanders into their own DNA would increase the genetic diversity of the <i>Ambystoma</i> population.
	Option A is incorrect	A decrease in mutations would decrease the genetic diversity of the <i>Ambystoma</i> population.
	Option C is incorrect	An increase in similarity of DNA across the population would decrease the genetic diversity of the <i>Ambystoma</i> population.
	Option D is incorrect	The creation of many genetically identical individuals would decrease the genetic diversity of the <i>Ambystoma</i> population.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
21	Option D is correct	The endocrine, digestive, excretory, and skeletal systems are all represented in the feedback-loop diagram for blood calcium homeostasis.
	Option A is incorrect	The respiratory system and muscular system are not represented in the feedback-loop diagram for blood calcium homeostasis.
	Option B is incorrect	The respiratory system, immune system, and reproductive system are not represented in the feedback-loop diagram for blood calcium homeostasis.
	Option C is incorrect	The integumentary system and muscular system are not represented in the feedback-loop diagram for blood calcium homeostasis.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
22	Option C is correct	The diagram shows movement of glucose through the transport protein after insulin binds to the receptor.
	Option A is incorrect	The diagram does not provide information about the role of white blood cells in the removal of glucose from the blood.
	Option B is incorrect	Although a cell membrane is shown, there is not information provided in the diagram to suggest that the flexibility of the cell membrane might change as glucose moves through it.
	Option D is incorrect	No information in the diagram suggests that, during this process, energy is used to create more glucose.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
23	Option B is correct	While the DNA sequences of the plant and animal differ, these sequences do contain the same types of bases (adenine, guanine, cytosine, thymine).
	Option A is incorrect	Only closely related organisms share an identical genetic sequence for a given gene.
	Option C is incorrect	While the lizard may consume the bluebonnet, the bluebonnet's DNA will not alter the DNA within the cells of the lizard and does not account for any similarity between the two DNA sequences.
	Option D is incorrect	Although mutations do randomly occur in the genetic code, the differences in the organisms' gene sequences are due not to recent random mutations, but to the fact that the organisms are only distantly related.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
24	Option B is correct	Viruses hijack the host cell's DNA, use it to make copies of viral genetic material, and then lyse the cell, spreading the infection.
	Option A is incorrect	Viruses are not able to reproduce without a living host, so two viruses cannot reproduce with each other.
	Option C is incorrect	Viruses are nonliving and cannot obtain energy from food since they do not consume food.
	Option D is incorrect	Vaccines enable hosts to initiate an immune response to counter a viral invasion; the virus does not compete with the host cells for water.



2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
25	Option A is correct	Soil organisms use nitrogen to decompose wood, so adding sawdust to the soil will cause a nitrogen deficiency in the soil and a disruption of the nitrogen cycle. Because plants need nitrogen for biological processes such as transcription and translation, loss of all available nitrogen will cause the growth of plants to cease.
	Option B is incorrect	Limiting nitrogen limits the growth of plants.
	Option C is incorrect	Disruption of the nitrogen cycle will be harmful to both existing plants and plants moving into the environment.
	Option D is incorrect	The plants in this location will be unable to grow and reproduce, as nitrogen is essential to the process of transcription and translation. It is unlikely that a subset of plants in the environment have mutations that allow these processes to take place in the absence of nitrogen. Without such variation in the population, selection for such a trait will not take place.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
26	Option C is correct	Crossing-over is the process that occurs between Step 2 and Step 3 and creates more genetic diversity in the resulting cells.
	Option A is incorrect	Chromosome nondisjunction would cause the cells in Step 4 to contain different numbers of chromosomes. However, all the cells in Step 4 have the same number of chromosomes.
	Option B is incorrect	Genome replication occurs during interphase, which is not illustrated in the diagram.
	Option D is incorrect	Chromosome deletion would cause a change in the size of one or more of the chromosomes shown in Step 4. Although they have a different makeup than those in Step 1, all the chromosomes shown in Step 4 are the same size as those in Step 1.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
27	Option C is correct	The pattern of evolution described is called punctuated equilibrium.
	Option A is incorrect	Convergent evolution is the independent evolution of similar features in organisms that are not closely related. Convergent evolution creates analogous structures that have similar form or function but were not present in the last ancestor that the two species had in common.
	Option B is incorrect	Differentiation is a cellular process by which less-specialized cells develop, or mature, to become more distinct in form and function.
	Option D is incorrect	Gradualism refers to changes that are continual and slow rather than periodic and rapid, as in punctuated equilibrium.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
28	Option B is correct	The function of an enzyme is to reduce the activation energy and speed up the rate of the reaction.
	Option A is incorrect	The function of an enzyme is not to raise the temperature of the system, although an increase in temperature may be one effect of the reaction.
	Option C is incorrect	The function of an enzyme is to aid in the conversion of a substrate molecule into one or more product molecules, not to increase the amount of substrate added.
	Option D is incorrect	The function of an enzyme is to help form a product, not to change the type of product.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
29	Option C is correct	Transcription copies the code of DNA onto a single-stranded RNA molecule that can then leave the nucleus.
	Option A is incorrect	Transcription is not able to correct mutations on the DNA strand; it simply copies DNA's code.
	Option B is incorrect	Replication is the process of making an exact copy of the DNA molecule. In contrast, transcription makes a copy of a portion of a DNA molecule using a different set of nucleotides.
	Option D is incorrect	Transcription copies DNA's code and makes it possible for tRNA to translate the code and direct the formation of the protein.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
30	Option D is correct	The fungus is harming the corn plant while benefiting from the relationship. A relationship between organisms where one benefits and the other is harmed is known as parasitism.
	Option A is incorrect	Competition occurs when two species are competing for limited resources, not when one species uses another as a food source.
	Option B is incorrect	Commensalism is a relationship in which one organism benefits from the relationship and the other is unaffected. Here, the fungus benefits and the plant is harmed.
	Option C is incorrect	Predation is a relationship in which a consumer kills and eats another organism. Although the fungus is extracting nutrients from the corn and may be considered a primary consumer, the fungus does not kill the plant before consuming its resources.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
31	Option A is correct	Cancer cells lack functioning checkpoints, which results in uncontrollable cell division.
	Option B is incorrect	Regulated gene expression happens in noncancerous cells.
	Option C is incorrect	Noncancerous cells can respond to outside stimuli.
	Option D is incorrect	Most eukaryotic cells contain mitochondria.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
32	Option C is correct	The sequence of nucleotides in a DNA molecule determines the sequence of amino acids that are combined to make a protein.
	Option A is incorrect	Although the temperature of a cell may affect the rate at which cellular processes take place and can also affect the folding of amino acids into a protein, temperature will not directly affect the types of amino acids that combine to produce a protein.
	Option B is incorrect	The loss of the chromosomes containing the gene for albumin would result in no translation of albumin, not an albumin molecule with a different amino-acid sequence.
	Option D is incorrect	Although translation, like other cellular processes, requires energy, the lack of energy would result in no translation, not the translation of protein with a different amino-acid sequence.



2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
33	Option C is correct	The pattern of succession shown in the table best represents secondary succession, as large plants are found soon after the disturbance. Plowing a field does not remove all the existing soil and vegetation from the area; thus, if a field were abandoned after being plowed, existing vegetation would quickly regrow.
	Option A is incorrect	The retreat of a glacier would result in the creation of new soil that would undergo primary succession.
	Option B is incorrect	The formation of a volcanic island would produce bare rock that would undergo primary succession.
	Option D is incorrect	The formation of a new sand dune would produce bare sand that would undergo primary succession.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
34	Option B is correct	Using the standard taxonomic system to name the snake species would help avoid confusion since there are a variety of species.
	Option A is incorrect	The taxonomic system is not related to whether organisms appear in the fossil record.
	Option C is incorrect	The standard taxonomic system does not use habitat to classify organisms into groups; it uses the organisms' physical characteristics.
	Option D is incorrect	The impact of ecosystem changes is not quantified by the taxonomic system; the names are based on each organism's physical characteristics.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
35	Option A is correct	A community has two or more populations of species interacting with each other, not one individual of a species interacting with other individuals of the same species.
	Option B is incorrect	Communities of organisms can be in small, indoor areas as well as in large, outdoor areas.
	Option C is incorrect	Living (biotic) and nonliving (abiotic) components interact together within an ecosystem.
	Option D is incorrect	A community may be multigenerational, but this characteristic is not a requirement of a community.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
36	Option C is correct	Dolphin embryos develop hind limbs as embryos because they share genetic information with early ancestors that had hind limbs.
	Option A is incorrect	Populations, not individual organisms, adapt to changes in the environment.
	Option B is incorrect	The genes that control the development of hind limbs are regulated, not destroyed, during the development process.
	Option D is incorrect	The disappearance of hind limbs does not support the claim that dolphins are evolving to become terrestrial animals.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
37	Option C is correct	The phases of mitosis occur in this order: prophase (Z), metaphase (X), anaphase (W), and telophase (Y).
	Option A is incorrect	Z, Y, X, W is not the correct order of the phases of mitosis.
	Option B is incorrect	X, W, Z, Y is not the correct order of the phases of mitosis.
	Option D is incorrect	X, Z, Y, W is not the correct order of the phases of mitosis.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
38	Option C is correct	The question, “How does the eye span of stalk-eyed flies compare from one generation to the next?” indicates that the student is thinking about how traits change over time.
	Option A is incorrect	This question compares traits within two groups of a current population and does not examine how traits in a population change over time.
	Option B is incorrect	This question compares traits that currently exist in a population and does not examine how traits within a population change over time.
	Option D is incorrect	This question does not focus on the change in eye span in stalk-eyed flies.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
39	Part A	
	Option D is correct	Carbohydrates are transported to the fungi from the plant through the phloem.
	Option A is incorrect	The xylem transports water, minerals, and nutrients from the soil to all the plant parts.
	Option B is incorrect	The phloem transports carbohydrates produced by photosynthesis to plant tissues.
	Option C is incorrect	The xylem transports water, minerals, and nutrients from the soil to all the plant parts.
	Part B	
	Option B is correct	The phloem transfers glucose throughout the plant.
	Option A is incorrect	The xylem transports water, minerals, and nutrients, not carbohydrates.
	Option C is incorrect	The xylem transports water, minerals, and nutrients, not carbohydrates.
	Option D is incorrect	The phloem and xylem are tissues that move material throughout the plant. These tissues do not connect within or near the root of the plant.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
40	Option A is correct	The introduction of Texas pumas into the Florida panther population increased the genetic diversity of the Florida population as new genes were introduced into the breeding population. The introduction of the Texas puma added new alleles into the gene pool of the Florida panther.
	Option B is incorrect	Hunting and habitat loss do not produce gene flow. Gene flow increases variation.
	Option C is incorrect	Artificial selection is the selection of organisms by humans for mating, not the introduction of alleles into a population.
	Option D is incorrect	Hunting and the loss of habitat do not result in artificial selection.



2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
41	Option B is correct	Differences in temperature affect the gender of American alligator hatchlings because different genes are expressed at different temperatures.
	Option A is incorrect	Gene repair does occur differently at different temperatures, but the ability to repair DNA does not explain how temperature affects the gender of alligator hatchlings.
	Option C is incorrect	Different genes within the embryo's DNA are turned on or off at different temperatures, not deleted.
	Option D is incorrect	Different genes within the embryo's DNA are turned on or off at different temperatures, not duplicated.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
42	Option D is correct	Chitin, like other carbohydrates, provides support to the organism. Chitinase, like certain other proteins (enzymes), breaks down other molecules.
	Option A is incorrect	Chitinase is an enzyme and therefore does not store genetic information.
	Option B is incorrect	Chitinase is an enzyme and therefore does not have a structural role, such as insulation of an organism.
	Option C is incorrect	Chitin is a carbohydrate and therefore does not store genetic material. Chitinase is an enzyme and therefore does not have a structural role, such as providing support and protection.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
43	Option A is correct	Based on the key, both the red-winged blackbird and the hairy woodpecker do not have a crest.
	Option C is correct	Based on the key, both the red-winged blackbird and the hairy woodpecker do not have a short beak.
	Option B is incorrect	“Is the bird blue?” is a question that differentiates between blue jays and northern cardinals.
	Option D is incorrect	“Does it have a reddish coloration?” is a question that differentiates between rose-breasted grosbeaks and American goldfinches.
	Option E is incorrect	“Is it mostly black and white?” is a question that differentiates between the red-winged blackbird and the woodpeckers.
	Option F is incorrect	“Do its tail feathers have dark spots?” is a question that differentiates between the downy woodpecker and hairy woodpecker.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
44	Option D is correct	The grasses would have the largest amount of energy available, and because of the inefficiency of energy transfer, there is a dramatic difference in available energy at each trophic level as energy is transferred up the chain to the coyotes.
	Option A is incorrect	Energy transfer would not be this efficient in the ecosystem. Only about 10% of the available energy is transferred from one trophic level to the next.
	Option B is incorrect	Top predators do not have the most energy in a food chain.
	Option C is incorrect	Coyotes would not have the most energy in this food chain, as they are top predators.

2023 STAAR Grade Bio Science Rationales

Item #	Rationale	
45	Option C is correct	Guanine (G) pairs with cytosine (C), and thymine (T) pairs with adenine (A). Only Option C shows the complete pairing between the two strands of DNA.
	Option A is incorrect	A does not pair with G.
	Option B is incorrect	G does not pair with G.
	Option D is incorrect	T does not pair with G.