

STAAR Spring 2024 Biology Rationales

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Rationale

The food chain that depicts the correct flow of energy in the Texas Hill Country habitat is Grasshopper --> Frog --> Snake --> Hawk.

Frogs do not transfer energy to grasshoppers in the Texas Hill Country habitat, and hawks do not transfer energy to snakes.

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Item Position	Rationale	
3	Option B is correct	The different, interacting populations of organisms in an area form a community.
	Option A is incorrect	A group of individuals of the same species that interact w-6 (a)487.24 0.72 0.48 re f (o)-6 (r)-6 (m a)-2 (c)-2

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Item Position	Rationale	
5	Option B is correct	Since the offspring has straight hair and is a PTC taster, the offspring would have two recessive alleles (<i>hh</i>) for hair type and be heterozygous (<i>Pp</i>) for PTC tasting.
	Option A is incorrect	An offspring with the <i>Hh</i> genotype would have curly hair.
	Option C is incorrect	An offspring with the <i>Hh</i> genotype would have curly hair, and the <i>pp</i> genotype indicates that the offspring would be a non-taster for PTC.
	Option D is incorrect	An offspring with the <i>pp</i> genotype would be a non-taster for PTC.

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Item Position	Rationale	
6	Option D is correct	Low rainfall and fire can reduce the plant growth rate that drives ecological succession.
	Option A is incorrect	Stimulating plant growth in this ecosystem would speed up the progression of succession.
	Option B is incorrect	Water alone does not dissolve limestone rock s. Carbon dioxide (i)497.4 Tc -0.005 feionccm Tc -0.005t497.Q q 22 0.001 T

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Item Position	Rationale	
8	Option C is correct	The experiment shows that the shoot tip detects light. When the grass shoot tip was cut, the plant did not respond (bend) toward the light ; however, when the shoot tip was present and able to detect light, the plant grew toward the light.
	Option A is incorrect	The light is detected by cells on the shoot tips , but the bending is caused by a growth hormone , not the pigment involved in photosynthesis (chlorophyll).
	Option B is incorrect	The root system 's response to light results in the roots moving away from the light , not in the stem bending toward the light.
	Option D is incorrect	The experiment shows that the shoot tip detects light. However, the roots move away from light. The plant is also growing against gravity (upward as opposed to downward).

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Item Position	Rationale	
9	Option A is correct	The S phase (synthesis) is the phase in which DNA is replicated during the cell cycle. This is when DNA- copying errors are most likely to occur.
	Option B is incorrect	The G ₁ phase (first growth phase) is a period of cell growth, not a period when DNA is copied.
	Option C is incorrect	The G ₂ phase (second growth phase) is a period of cell growth, not a period when DNA is copied.
	Option D is incorrect	

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Item Position	Rationale	
10	Option D is correct	Blood pressure is controlled by a negative feedback mechanism, as shown by the cyclic trend for blood pressure in the graph.
	Option A is incorrect	ATd [(cy)1319.2 (c)4 (orre)-1 - 0.001 Tw 12 0 0 104 Tc -0.0f

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Item Position	Rationale	
13	Option B is correct	There can be more than one codon for the same amino acid. There are 64 different codons, but only 21 amino acids are coded for by these codons. So, an amino acid can be encoded by as many as six different codons.
	Option A is incorrect	One amino acid substitution can significantly change a protein structure. F/-225.72 580.2 -7 (nc)8 (u)-07minore. F

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Item Position	Rationale
15	Option C is correct. Pasteurization involves heating liquids to a high

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Item Position	Rationale	
16	Option D is correct	Organisms V, W, X, and Y all share common ancestors that are more recent than the most - recent common ancestor shared with Organism Z.
	Option A is incorrect	Organism W shares the same most -recent common ancestor with Organisms X and Y, and Organism W is more closely related to Organism V than to either Organism X or Organism Y.
	Option B is incorrect	Organism Y is more closely related to Organism X than to Organism V.
	Option C is incorrect	None of the organisms is the common ancestor of the other organisms in the tree.

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Item Position	Rationale	
18	Option B is correct	Actin is a structural protein. Actin plays a major role in muscle contraction, allowing the body to move.
	Option A is incorrect	Actin is not an enzyme; it does not increase the rate of chemical reactions.
	Option C is incorrect	Actin is not a messenger protein; it does not transmit signals between cells, tissues, and organs.
	Option D is incorrect	Actin is not a transport protein; it does not carry atoms and molecules within cells and throughout the body.

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Item Position	Rationale	
19	Option D is correct	Based on the table , the donkey is most closely related to the mouse, sharing 95.2% of the cytochrome c amino -acid sequence , followed by the horse (94.2%), the chimpanzee (91.3%), and the lamprey (84.6%).
	Option A is incorrect	This answer is not listed in order from the species most closely related to the mouse. The donkey should be listed first.
	Option B is incorrect	This answer is not listed in order from the species most closely related to the mouse. The lamprey should be last, and the horse should be before the chimpanzee.
	Option C is incorrect	This answer is not listed in order from the species most closely related to the mouse. The donkey should be listed first. The horse should be before the chimpanzee, and the lamprey should be last.

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Item Position	Rationale	
20	2 pts	The abrupt appearance of new organisms is evidence of <u>an increase in biodiversity</u> and <u>an unstable environment</u> . OR The abrupt appearance of new organisms is evidence of <u>an unstable environment</u> and <u>an increase in biodiversity</u> .
	1 pt	

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Item Position	Rationale	
21	Option A is correct	Based on the correlation between temperature and color frequencies in the grasshopper population, it can be inferred that temperature affects gene

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Item Position	Rationale	
22	2 pts	The answer s, from top to bottom, are Cellular respiration, Photosynthesis, Photosynthesis, Cellular respiration .
	1 pt	The student provide s half or more than half of the correct answers .

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Item Position	Rationale
23	Option A

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Item Position	Rationale
24	Option B is correct UGC codes for cysteine, UAC codes for tyrosine, AGA codes for arginine, and ACC codes for t

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Item Position	Rationale	
25	Option D is correct	Primary succession can occur in areas around a volcanic eruption in which new soil is created. Secondary succession can happen in places where some disturbance, such as farming, has cleared an existing community.
	Option A is incorrect	Primary succession does not occur in areas with abundant trees.
	Option B is incorrect	An ecosystem that begins on bare rock is an example of primary succession.
	Option C is incorrect	A new ecosystem formed following a hurricane would be an example of secondary succession. The formation of a new sand dune would be an example of primary succession.

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Item Position	Rationale	
26	2 pts	<p>The student should identify Example 1 as mutualism. The bees are benefiting by getting food (energy and nutrients) from the flowers. The flowering plants are benefiting by being pollinated (or cross-pollinated), resulting in fertilization or seed production (or increased biodiversity). AND</p> <p>The student should identify Example 2 as commensalism. Orchids benefit from getting improved access to essential resources such as sunlight, water, and nutrients. The host plant (the tree) neither benefits from nor is harmed by the presence of the orchids.</p>
	1 pt	The student answers half of the questions correctly.
	0 pt	The response is incorrect or irrelevant.

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Item Position	Rationale	
27	Option A is correct	Prophase is characterized by the condensing of chromosomes and the dissolving of the nuclear membrane.
	Option B is incorrect	Metaphase is characterized by chromosomes aligning perpendicular to the spindle fiber apparatus along the metaphase plate.
	Option C is incorrect	Telophase is characterized by the newly made chromosomes being tightly grouped and the formation of e

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Item Position	Rationale	
28	Option A is correct	Both parents are carriers for cystic fibrosis, so they are both heterozygous for the trait. Since cystic fibrosis is a recessive trait, the offspring must inherit a recessive allele from each parent. Therefore, there is a 25% probability that the offspring of two carrier parents will inherit the disorder.
	Option B is incorrect	The4.24 687515t,75</MCID 4 >>BDC Q q 225.24 545.162

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Item Position	Rationale
30	Option D is correct

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Item Position	Rationale	
31	Part A	
	Option A is correct	The release of hormones involves the endocrine system, and the brain is part of the nervous system. Through their interaction, these systems regulate the digestive system.
	Option B is incorrect	The respiratory system exchanges gases in the lungs . This system is not described as regulating the digestive system.
Option C is incorrect	The muscular system supports the body for movement, and the excretory system removes waste from the body. These systems are not described as regulating the digestive system.	

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Item
Position

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Item Position	Rationale	
36	1 pt	15; Meiosis results in haploid daughter cells that have half the number of chromosomes found in diploid cells , and $30 \div 2 = 15$.
	0 pt	The response is incorrect or irrelevant.

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Item Position	Rationale	
37	Option C is correct	Rennin was denatured in Test Tube 3, as evidenced by the fact that it did not cause the milk to solidify.
	Option A is incorrect Option B is incorrect	There is no evidence that the enzyme in Test Tube 3 caused product to form . The substrate (milk) is still present in Test T

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Item Position	Rationale	
40	Option C is correct	Releasing new beetles into the environment will cause an increase in competition for food resources among all the beetle species in the habitat.
	Option A is incorrect	Releasing new beetles into the environment will not cause an increase in the available habitat for non - native plant species .
	Option B is incorrect	Releasing new beetles into the environment will not cause an increase in the population of the beetles.

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Item Position	Rationale	
41	1 pt	The student selects “Total Carb” (carbohydrates) . Carbohydrates provide the body with a source of quick energy.
	0 pt	The response is incorrect.

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Item Position	Rationale
42	Option B is correct. Gene expression controls the development of

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Item Position	Rationale	
43	2 pts	Almost every organism begins the process of protein synthesis with a triplet____ nucleotide sequence. This start codon is translated to a common amino acid_____ in all organisms.
	1 pt	The student provide s half of the correct answers .
	0 pt	The answers are incorrect.

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