The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

LIFE SCIENCE: BIOLOGY

Thursday, June 18, 2026 — 9:15 a.m. to 12:15 p.m., only

Student Name _____

School Name _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

Use your knowledge of **Life Science: Biology** to answer all questions in this examination.

You are to answer all questions in this examination. You may use scrap paper to work out the answers to the questions, but be sure to record your answers on your answer sheet and in your test booklet. A separate answer sheet for multiple-choice questions has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet. Record your answers for the constructed response questions in your test booklet.

All answers in your test booklet should be written in pen, except for graphs and drawings, which should be done in pencil.

When you have completed the examination, you must sign the declaration printed on your separate answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet and test booklet cannot be accepted if you fail to sign this declaration.

NOTICE …

A four-function or scientific calculator must be available for you to use while taking this examination.

Note that diagrams are not drawn to scale unless otherwise noted.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

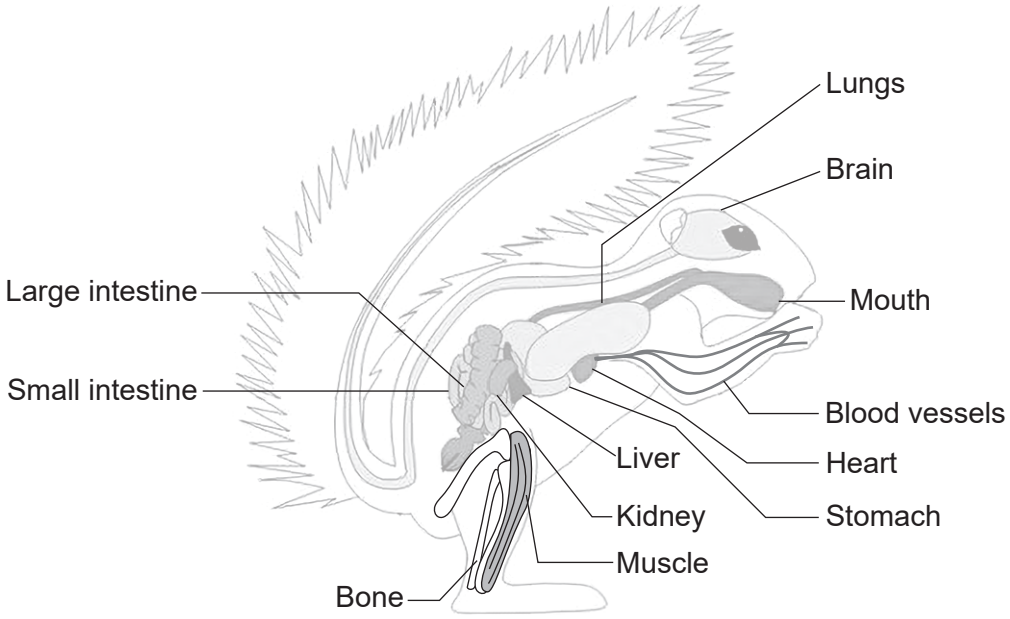
Base your answers to questions 1 through 5 on the information below and on your knowledge of Life Science: Biology. Be sure to record your answers for multiple-choice questions on the separate answer sheet provided. Record your answers for constructed-response questions in your test booklet.

A Seasonal Strategy for Survival

Certain species of organisms living in colder climates have evolved unique adaptations to conserve energy during winter months. These organisms enter a state of hibernation, a period of inactivity that causes life processes to slow down. It has been estimated that this period of inactivity allows organisms to use nearly 70 to 100 times less energy when resources are limited. Some species of ground squirrels hibernate.

The model below includes some components of squirrel body systems.

Anatomy of a Ground Squirrel



Researchers studying animals that hibernate discovered that some of the physiological changes associated with hibernation could also lead to the development of blood clots. These animals had a significant difference in their platelet count when hibernating, compared to when they were not hibernating.

Platelets are a component of blood that are formed within the marrow of bones, such as those in the legs. They help with the clotting of blood.

The information below summarizes some of the changes that occur in hibernating animals.

Sample Physiological Changes in Hibernating Animals

Animal	Condition	Avg Heart Rate (BPM)	Avg Breathing Rate (Breath/min)	Avg Body Temperature (°C)	Platelet Count (#/L)
13-Lined Ground Squirrel	Not Hibernating	250	100	37	445×10^9
	Hibernating	5	3	6	47.9×10^9
Scandinavian Brown Bear	Not Hibernating	45	6	37	262×10^9
	Hibernating	10	1	32	174×10^9

1 Which statement best describes the interactions between body systems found in the *Anatomy of a Ground Squirrel* model that are used to protect the squirrel from blood clot formation during hibernation?

(1) The muscles of the muscular system must be provided with more CO_2 by the lungs of the respiratory system to increase movement and prevent clot formation.

(2) The blood transported by the circulatory system must have an increased number of platelets, produced by the bones of the skeletal system, to prevent clots from forming.

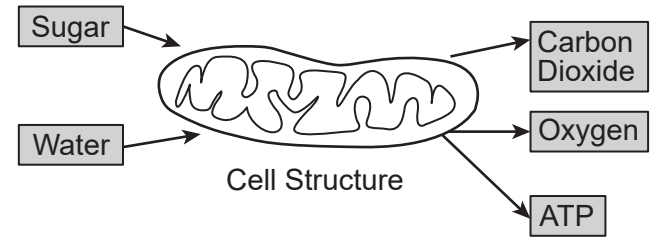
(3) The bone marrow of the skeletal system decreases the production of platelets being released into the circulatory system, preventing clots from disrupting blood flow.

(4) The nervous system increases body temperature, causing the amount of O_2 taken in by the lungs of the respiratory system to decrease, preventing the formation of blood clots.

2 Using the data compiled by the researchers, provide evidence that supports the claim that as environmental temperature drops, feedback mechanisms maintain homeostasis in hibernating animals. [1]

3 Which model below best represents the inputs and outputs of the chemical process by which matter and energy are converted into forms that are usable for the ground squirrel cells?

(1)



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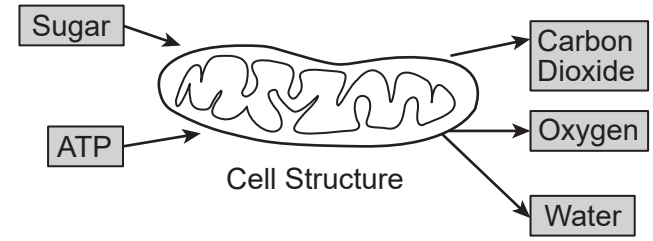

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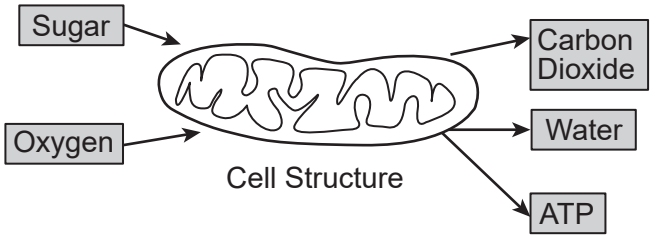
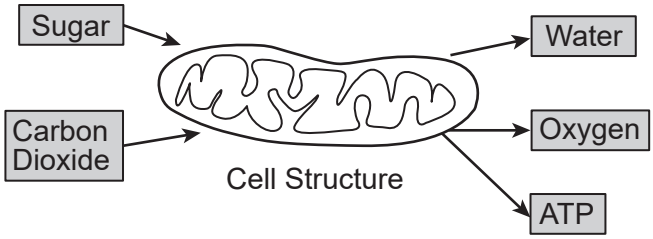


(4)



During hibernation studies, researchers have also found that the function of the immune system may be affected in mammals.

The chart below shows the data collected from the investigations.

Approximate White Blood Cell Reduction During Hibernation

Animal	Percent Reduction
Scandinavian Brown Bear	40%
13-Lined Ground Squirrel	90%
Northern Long-Eared Bat	45%

4 Given the data provided, which explanation best identifies how changes in the immune system allow animals, such as squirrels and bears, to maintain homeostasis during hibernation?

(1) When animals hibernate, white blood cell production increases, which uses more energy to maintain homeostasis.

(2) White blood cell production decreases in the hibernating animals, which allows for the conservation of energy.

(3) During hibernation, white blood cell production in animals decreases, which increases their ability to fight off disease.

(4) When animals hibernate, white blood cell production is not affected and their ability to fight off diseases decreases.

A similar immune response is seen in bats, another mammal, during hibernation. This could affect how the bats fight infections.

A fungus has impacted some colonies of bats, causing massive losses in their populations. It has been suggested that those bats that awaken periodically during hibernation reactivate their immune systems.

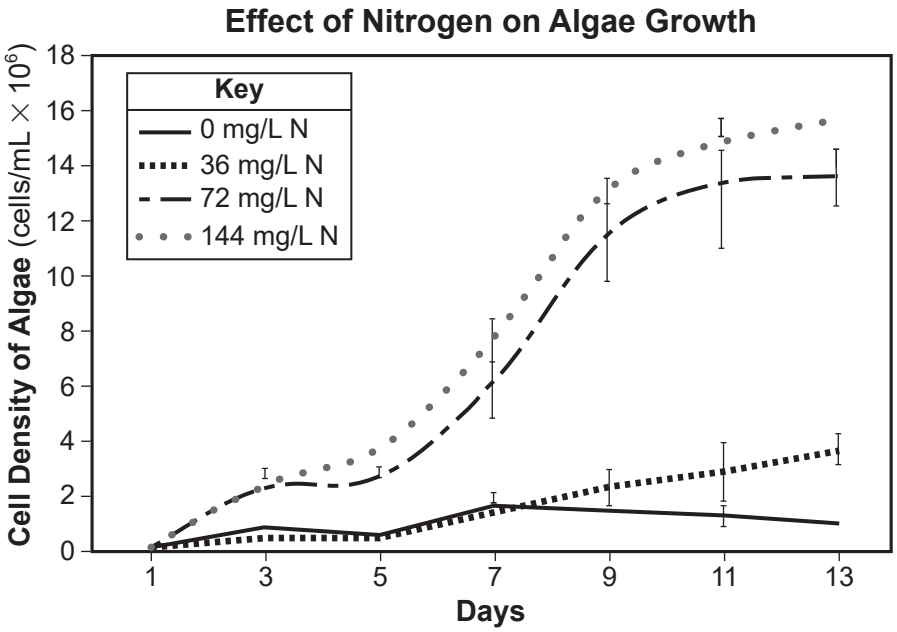
5 Construct an explanation using evidence that bats that awaken periodically will increase in the population as a result of the process of evolution. [1]

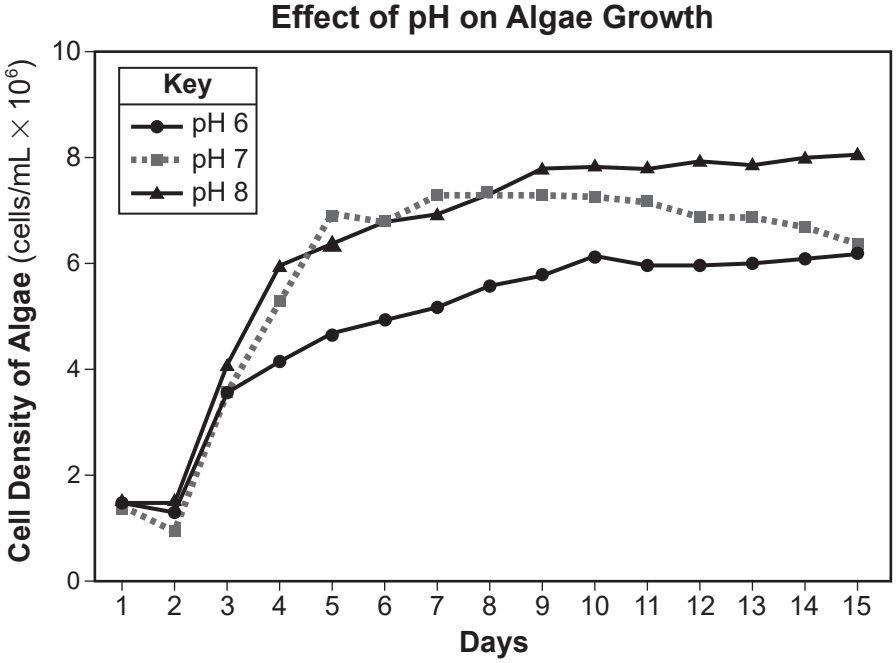
Base your answers to questions 6 through 9 on the information below and on your knowledge of Life Science: Biology.

Nitrogen: Friend or Foe?

Algae are simple, plant-like organisms that play an essential role in many aquatic ecosystems. However, not all algae growth is beneficial to the ecosystem.

Researchers tested the effect of nitrogen (N) on algae growth by adding varying amounts of nitrogen to water samples containing algae. The data they collected are shown in the graphs that follow.





6 Using data from the graphs, which factor has the greatest effect on the size of the algae population?

(1) The algae population exposed to 36 mg/L of nitrogen showed the most growth over the 13 days.

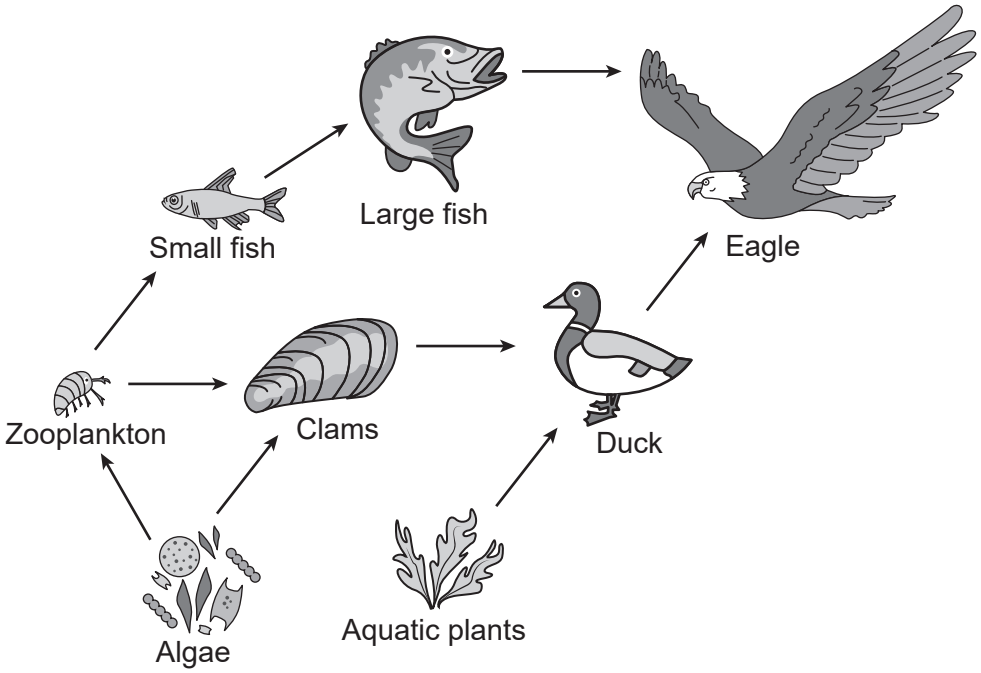
(2) The algae population exposed to a pH of 8 reached the greatest density before seven days.

(3) The algae population exposed to 144 mg/L of nitrogen reached the greatest density at 13 days.

(4) The algae population exposed to a pH of 7 steadily increased after seven days.

The model below shows an example of a freshwater food web.

Freshwater Food Web



7 Scientists claim that the addition of low amounts of nitrogen will affect the carrying capacity of all of the species in the entire food web. Using the given information, which explanation best supports the scientists' claim?

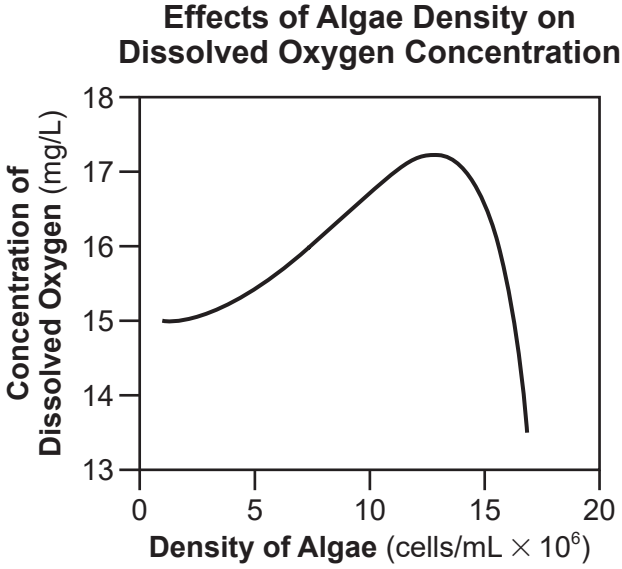
(1) Producers would increase, resulting in a greater amount of energy available for the rest of the food web, increasing their carrying capacities.

(2) Algae populations would have a decreased carrying capacity, resulting in aquatic plants having more energy available, and increasing carrying capacity for the plants and consumers.

(3) The carrying capacity of every organism in the food web will decrease, with the exception of producers, due to the increased algae populations taking in all of the energy available.

(4) There will be an increase in the carrying capacity of the predators because algae is a major component of a predator's diet.

Harmful algae blooms (HABs) are becoming a concern in freshwater bodies worldwide, including lakes in New York State. Farmers often use chemical fertilizers containing nitrogen in their fields. Excess fertilizer can run off into freshwater ecosystems, leading to HABs. The graph below shows the effects of HABs on oxygen levels in a freshwater ecosystem.



8 Scientists claim that 144 mg/L of nitrogen can negatively impact the complex interactions between organisms in freshwater ecosystems. Evaluate whether or not this claim is valid by placing a check mark (✓) in *either* the Valid *or* Not valid box below. Provide data to support your evaluation. [1]

☐ Valid ☐ Not valid

9 Which solution would most effectively and safely ***reduce*** the chances of harmful algae blooms caused by human activity?

(1) Require farmers to use agricultural practices that minimize runoff into bodies of fresh water.

(2) Add non-native species that consume algae to the water to keep algae populations under control.

(3) Add additional chemicals to bodies of water that will eliminate the effects of nitrogen in the water.

(4) Construct concrete barriers around all bodies of fresh water to prevent any nutrient runoff from entering the waterways.

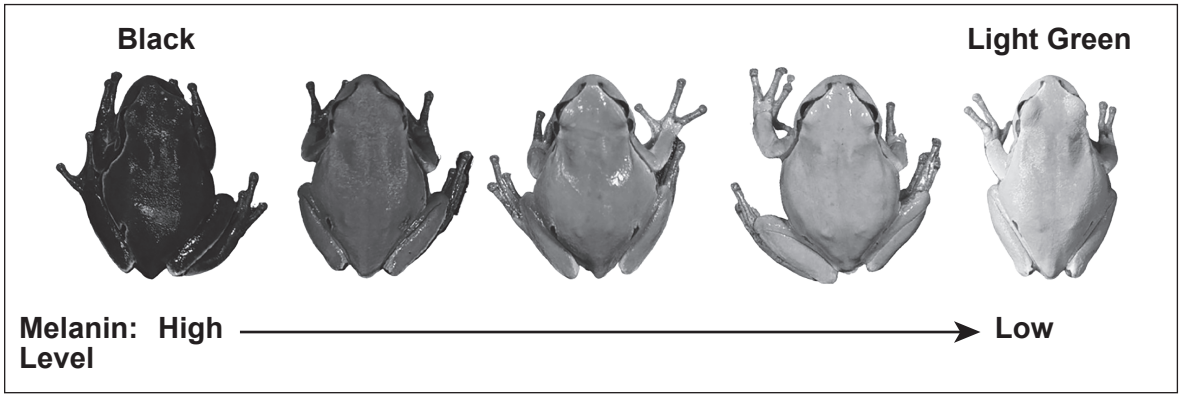
Base your answers to questions 10 through 14 on the information below and on your knowledge of Life Science: Biology.

Green and Black Frogs

In 1986, a nuclear reactor in Chernobyl, located in Eastern Europe, released a massive amount of radioactive material into the atmosphere. The surrounding area remains largely uninhabitable by humans to this day. The released radiation will take many years to naturally return to safe levels.

The Eastern tree frog (*Hyla orientalis*) inhabits the area around the Chernobyl disaster site. It exhibits variations in color due to varying levels of the pigment melanin that is present in skin cells. Prior to the disaster, most Eastern tree frogs were green, with a minority of the frogs exhibiting the black skin cell trait. A 2022 study of the area around Chernobyl determined that current frog populations have become significantly darker, with more black frogs and fewer light green frogs than before. The color variation of these frogs is shown below.

Color Variation in *H. orientalis*



10 Which question best clarifies the role of DNA in causing a change in the inheritance of skin color in frogs?

(1) Why does the DNA in frog skin cells have a different sequence than the DNA in other body cells that don't produce pigment?

(2) How do all frogs of the same species receive identical pigment proteins from their parents?

(3) How does the combination of pigment-producing alleles the frog received from its parents determine frog skin color?

(4) Why do different-colored tree frogs receive different amounts of DNA from their parents?

11 Which evidence would best support the claim that color distribution and frequency in the frog population before the Chernobyl disaster was the result of natural selection?

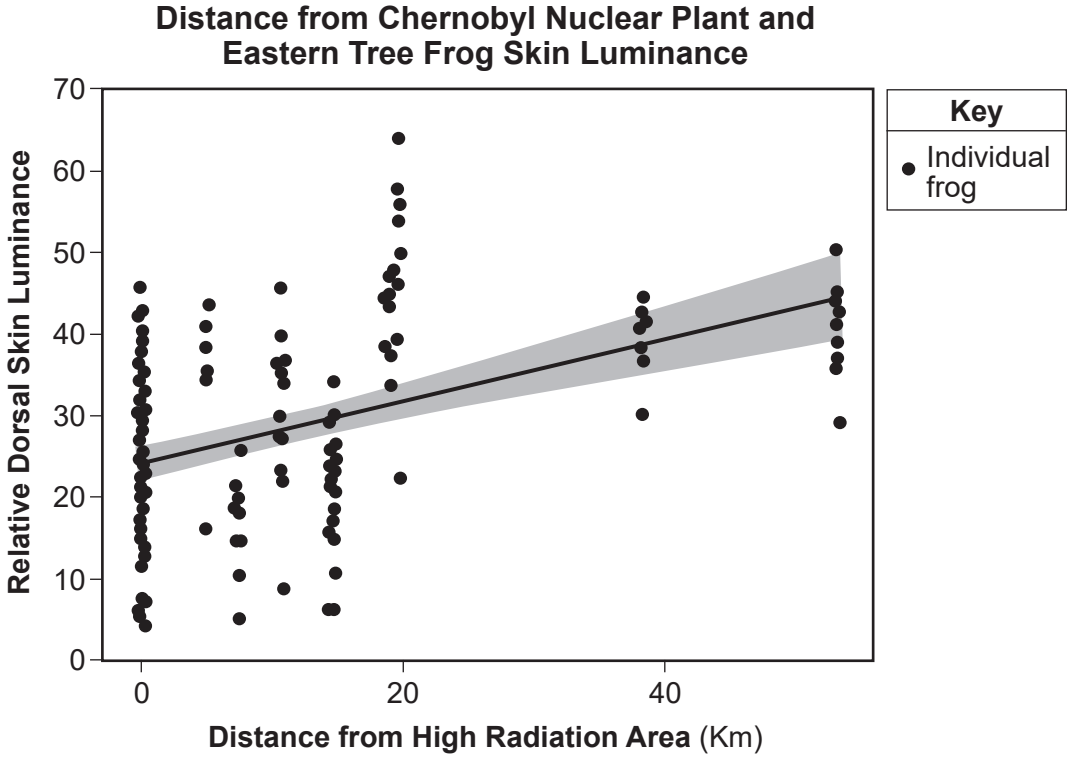
(1) Green pigments absorbed sunlight better than black pigment and kept the frogs warmer.

(2) Black frogs were more effective at avoiding predators than green frogs were.

(3) Green coloration allowed the frogs to better camouflage themselves in the trees.

(4) Black coloration allowed the frogs to attract more mates and produce more offspring.

As the amount of melanin within cells increases, the luminance (the perceived brightness of the skin on their back) decreases. In the 2022 study, researchers measured the frogs' dorsal skin luminance at different distances from the Chernobyl site. The graph below shows the results from their study.



12 Which evidence from the information provided shows that the radiation released into the environment around Chernobyl caused a change in pigmentation in the Eastern tree frog population?

(1) Frogs exposed to high radiation had greater luminance and the lightest green coloration.

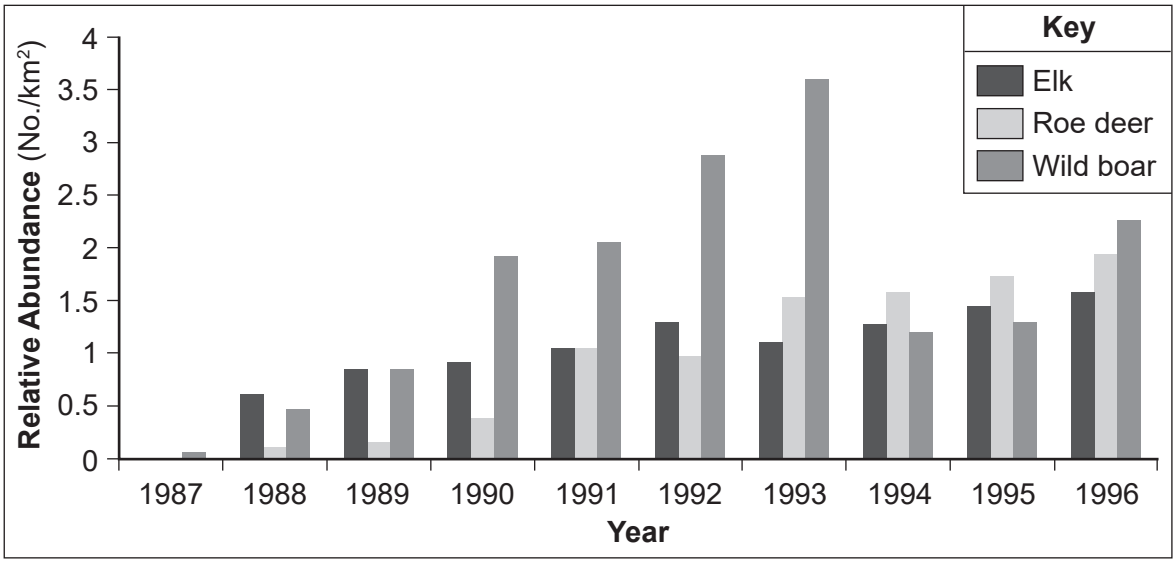
(2) Frogs closest to the nuclear reactor had the lowest luminance and the highest levels of melanin.

(3) Frogs exposed to lower radiation had higher skin luminance and higher levels of melanin.

(4) Frogs farthest from the nuclear reactor had the lowest luminance and the darkest coloration.

After the release of radiation, the populations of animals per square kilometer (No./km^2) near the Chernobyl site were monitored for several years. The populations are now similar in size to protected nature reserve populations not affected by the Chernobyl radiation, with some populations being larger than in uncontaminated areas. The studies showed no correlation between radiation levels and the relative abundance of the animals studied in an area. The graph below shows the data for three animal species in the first few years after the disaster.

Abundance of Animals in the Chernobyl Disaster Zone



13 Which claim about the complex interactions of the animal populations in Chernobyl is best supported by the data after the release of the radiation?

(1) The wild boars were the last to rebound because they were in competition with the roe deer for food.

(2) The elk were always outcompeted for habitat by the roe deer because they live in the same general area.

(3) All the species were initially impacted, and none of them were able to find ways to successfully compete in the new environment.

(4) All the species were initially impacted, and all three species were able to find ways to obtain food and live within the same habitat.

14 Immediately after the Chernobyl disaster, the roe deer population was reduced to almost zero. Construct an explanation as to how natural selection led to the observed increase in the roe deer population after the Chernobyl disaster. [1]

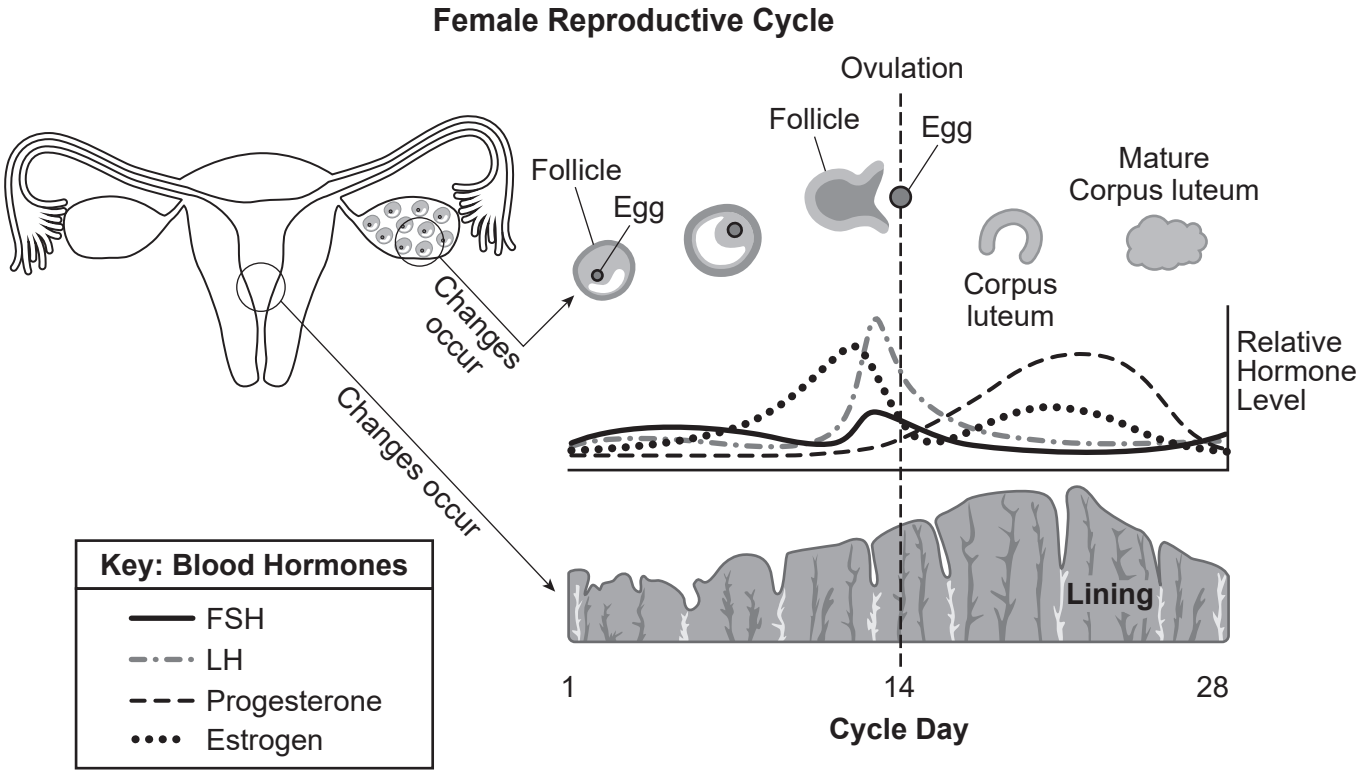
Base your answers to questions 15 through 18 on the information below and on your knowledge of Life Science: Biology.

Polycystic Ovary Syndrome (PCOS)

Human egg cells are highly specialized for the function of sexual reproduction. Egg cells experience a sequence of changes coordinated by the interactions between organs, glands, and hormones.

Polycystic Ovary Syndrome (PCOS) is a disorder that affects 8–13% of women of reproductive age. Many women with PCOS find it more challenging to get pregnant than women without PCOS.

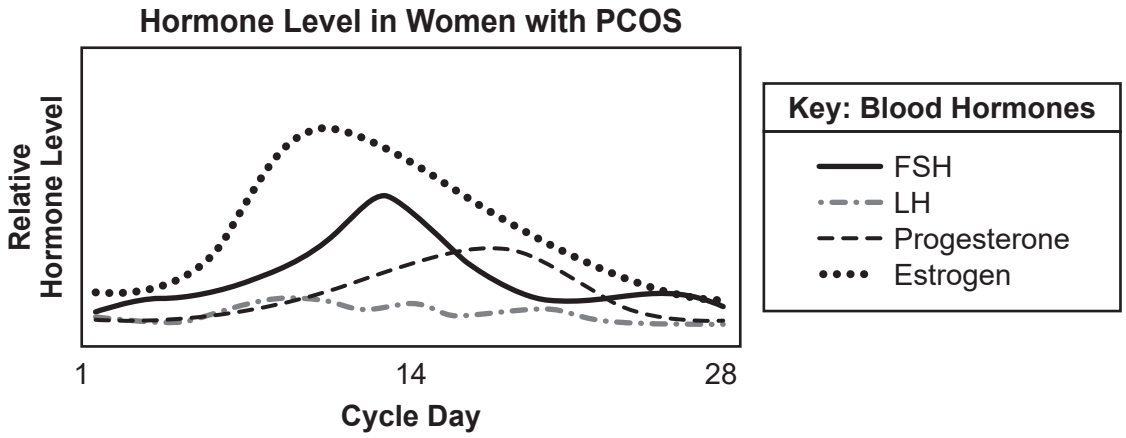
The model below represents the female reproductive cycle over 28 days.



15 Use information from the model to describe how a specific hormone could affect a structure of the female reproductive system. [1]

Research has determined that PCOS patients have twice the number of follicles than women without PCOS, however most are underdeveloped.

The graph below summarizes some of the data collected by researchers while investigating PCOS.



16 Which statement identifies evidence that supports the claim that PCOS is the result of a failure of a feedback mechanism associated with the egg cell?

(1) Patients with PCOS do not experience the peak in FSH production that women without PCOS do, disrupting their menstrual cycle.

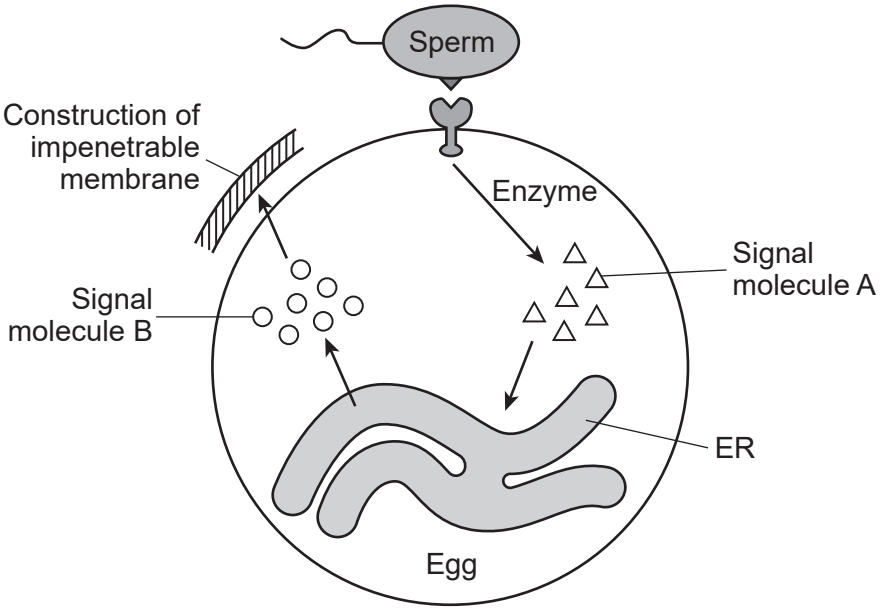
(2) Patients with PCOS have a lower level of LH, so ovulation does not occur.

(3) Progesterone and LH levels in women with PCOS remain elevated after day 14, resulting in irregularities in the menstrual cycle.

(4) The levels of estrogen and FSH in women with PCOS are elevated, resulting in the overdevelopment of follicles present.

Once an egg is released, several mechanisms within the egg ensure that only one sperm contributes genetic information to the zygote. The binding of the sperm with the egg causes the endoplasmic reticulum (ER), an organelle within the egg, to release signals causing changes within the egg. This prevents additional sperm from binding to the egg. The model below represents one proposed mechanism.

Interaction of Sperm and Egg



17 Which statement correctly pairs a structure in the model with a function that leads to the formation of the impenetrable membrane?

(1) The ER stimulates the production of signal molecules, which causes a series of changes that allows the sperm to bind to the egg and form a zygote.

(2) The signal molecules react with a sperm cell, stimulating the ER to release enzymes that are required to form an impenetrable membrane around the egg that prevents multiple sperm from entering it.

(3) The receptor within the membrane of the egg binds with the sperm cell, causing a series of reactions that stimulate the ER to release signals, which leads to the formation of an impenetrable membrane.

(4) The sperm cell membrane has a receptor that attaches to the egg cell, causing the release of enzymes within the sperm that can be used to prevent additional sperm from attaching to the egg.

In addition to increased difficulty in becoming pregnant, PCOS can lead to non-reproductive symptoms. Researchers are investigating strategies that can be used to treat the symptoms of PCOS. Two of these treatment plans are described below.

Plan 1: Medication to manage specific symptoms.

Plan 2: Exercise and improved diet to reduce severity of symptoms.

18 Identify which of the given treatment plans would most effectively ***reduce*** the symptoms of PCOS. You may consider **two** of the following constraints: cost, safety, or reliability. Complete the table to record your response. [1]

Plan Number: _____

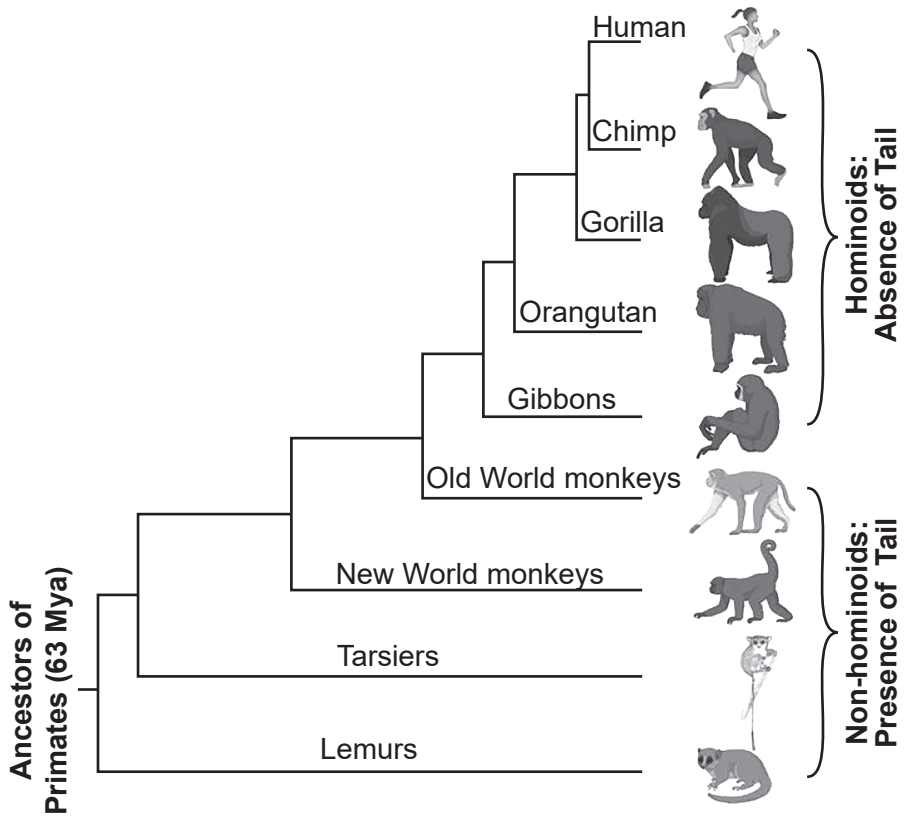
Constraint	Trade-off	Reason Why
	Pro	
	Con	

Base your answers to questions 19 through 22 on the information below and on your knowledge of Life Science: Biology.

Tailless Humans

Humans have a large percentage of DNA in common with other primates. One group, referred to as hominoids, diverged from monkey-like primates 15–20 million years ago (Mya) and evolved without tails, as shown in the model below.

Primate Evolutionary Tree



Scientists have identified a gene, *TBXT*, that plays a role in tail development. The *TBXT* gene codes for a transcription factor (a type of protein) responsible for activating many genes, including those involved in tail production, during early embryonic development in many animals.

19 Which statement provides empirical evidence that could be used to determine the placement of chimps and humans in the evolutionary tree diagram?

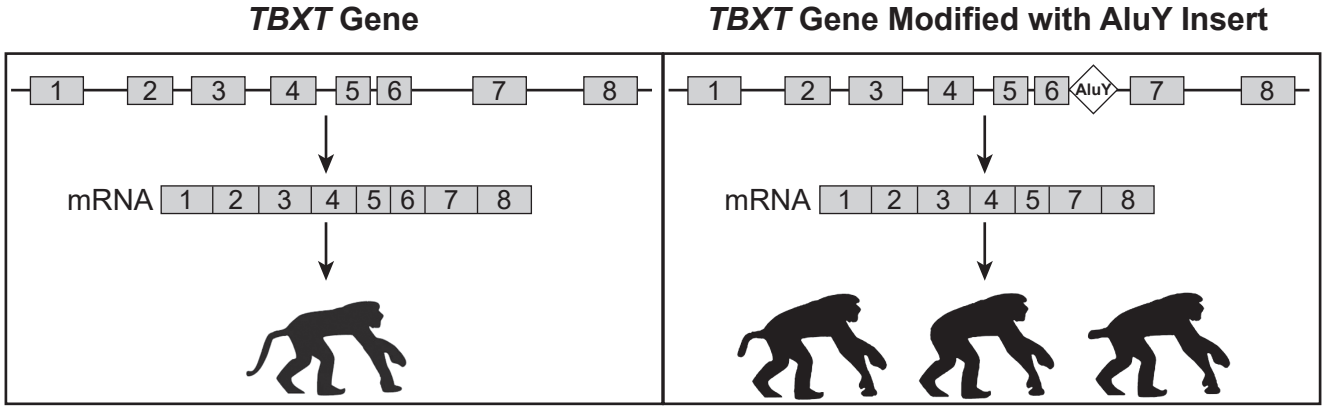
(1) The fossil record indicates that chimps and humans evolved 63 mya from a group of extinct primates that had tails.

(2) Chimps share more DNA bases with humans than any other primate and had the most recent common ancestor.

(3) Both chimps and humans lack a tail and are unable to produce any transcription factors during embryonic development.

(4) Chimps and humans are physically the most similar and are adapted to the same habitat.

Recently, a cause for taillessness in mammals was determined to be a sequence of bases called AluY, which inserts into a noncoding region of the *TBXT* gene. When the *TBXT* gene is transcribed, coding regions (represented by numbered boxes in the diagram below) are spliced together and the noncoding regions (represented by solid lines) are removed, as shown below. However, when the AluY segment is inserted, coding region 6 is spliced out and is not expressed. The resulting animals have shortened or absent tails.



20 Which statement contains evidence that best supports the explanation that the structure of the *TBXT* gene determines the structure of the protein that functions during early development of tails?

(1) If coding region 6 of the *TBXT* gene is expressed, the mRNA has the code necessary to produce the protein for the tailless trait in animal embryos.

(2) The *TBXT* gene is transcribed during embryonic development by both tailed and tailless animals.

(3) Animal embryos will only produce a full-length tail when the coding region 6 of the *TBXT* gene is expressed.

(4) Another coding region in the *TBXT* gene will take the place of coding region 6 if it is not transcribed because its role is critical for animal embryos to develop a tail.

21 Which question about the *TBXT* gene should researchers investigate to help them identify the variation passed from parents to offspring that caused the tailless trait among hominoids?

(1) Why do humans and chimps contain different variations of the *TBXT* gene that result in the tailless trait in both species?

(2) How does comparing the embryonic developmental sequence of hominoids with and without a *TBXT* gene identify the cause for why non-hominoids don't have tails?

(3) How do the base sequences of the *TBXT* gene in hominoids compare with the sequence of the *TBXT* gene in other primates?

(4) Which genes other than the *TBXT* gene can be altered without producing the tailless trait in primates?

Researchers developed a model of the AluY insertion in a mouse. They used genetic engineering techniques to remove region 6 of the *TBXT* gene from one copy of the gene in mice ($TBXT^{-6}$). The other copy was left intact ($TBXT^{+}$).

These hybrid mice were crossed to produce offspring. The results are shown below.

Results of $TBXT^{-6}$ / $TBXT^{+}$ x $TBXT^{-6}$ / $TBXT^{+}$ Parent Cross

Genotype (Genetic Makeup) of Offspring	Number of Surviving Offspring	Phenotype (Physical Appearance of Offspring)
$TBXT^{-6}$ / $TBXT^{-6}$	0	Unavailable
$TBXT^{-6}$ / $TBXT^{+}$	63	No tail or short tail
$TBXT^{+}$ / $TBXT^{+}$	35	Long tail

22 A claim was made that variations produced by genetic engineering are inherited by mouse offspring. Provide evidence from the data to support this claim. [1]

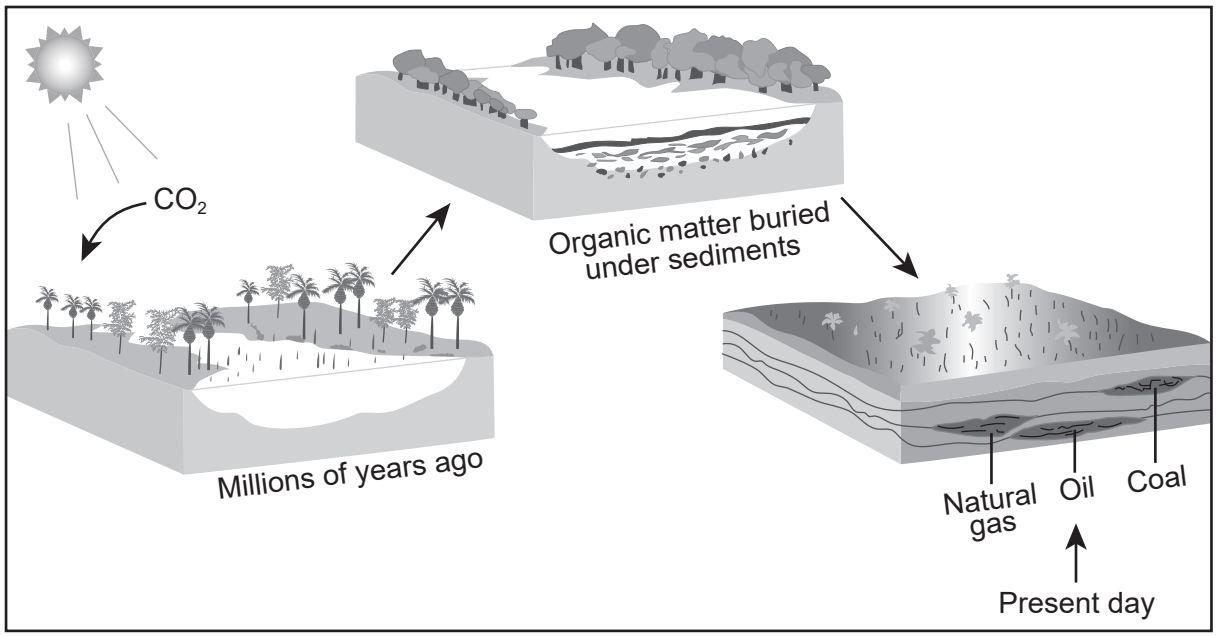
Base your answers to questions 23 through 27 on the information below and on your knowledge of Life Science: Biology.

Fossil Fuels: Out of Sight, but Not Out of Mind

The Carboniferous Period, 359 to 299 million years ago, was characterized by a rapid increase in plant biomass. Incredibly dense forests covered large areas of Earth's tropical regions. The matter stored in the biomass of these forests underwent various processes. The chemical processes at work today are the same that were present on ancient Earth.

The diagram below represents some interactions between components of the Earth's spheres.

Formation of Fossil Fuels



23 Based on the model, which explanation best describes the role of one process involved in the cycling of carbon that led to the formation of fossil fuels?

(1) Photosynthesis stores solar energy in the roots of plants in the atmosphere, which eventually is returned to the environment when fossil fuels are formed in the biosphere.

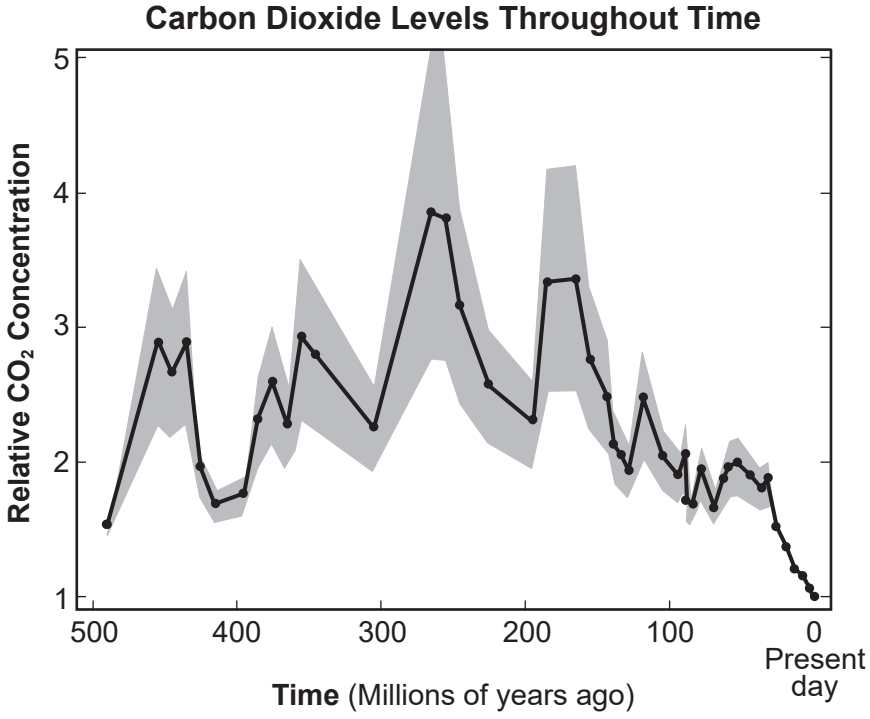
(2) Fossil fuels are formed when carbon from the biosphere is transferred to the geosphere after microbes partially decompose plants.

(3) The carbon dioxide taken in by plants from the atmosphere is cycled back to the geosphere during the process of cellular respiration to form fossil fuels.

(4) Water absorbed from the atmosphere is converted by cellular respiration into the carbon-containing matter in the geosphere, which is transformed into fossil fuels.

There have been many changes in environmental conditions over the course of Earth's history, including during the Carboniferous Period.

The graph below shows one of those changes.



24 Use the evidence provided to support an explanation for why the carrying capacity for plants was much different during the Carboniferous Period than today. [1]

25 Which statement supports the argument that the coevolution of feedbacks between living things and Earth's systems occurred during the Carboniferous Period?

(1) As plants died and decomposed, they provided more fossil fuels, which allowed even more plants to grow.

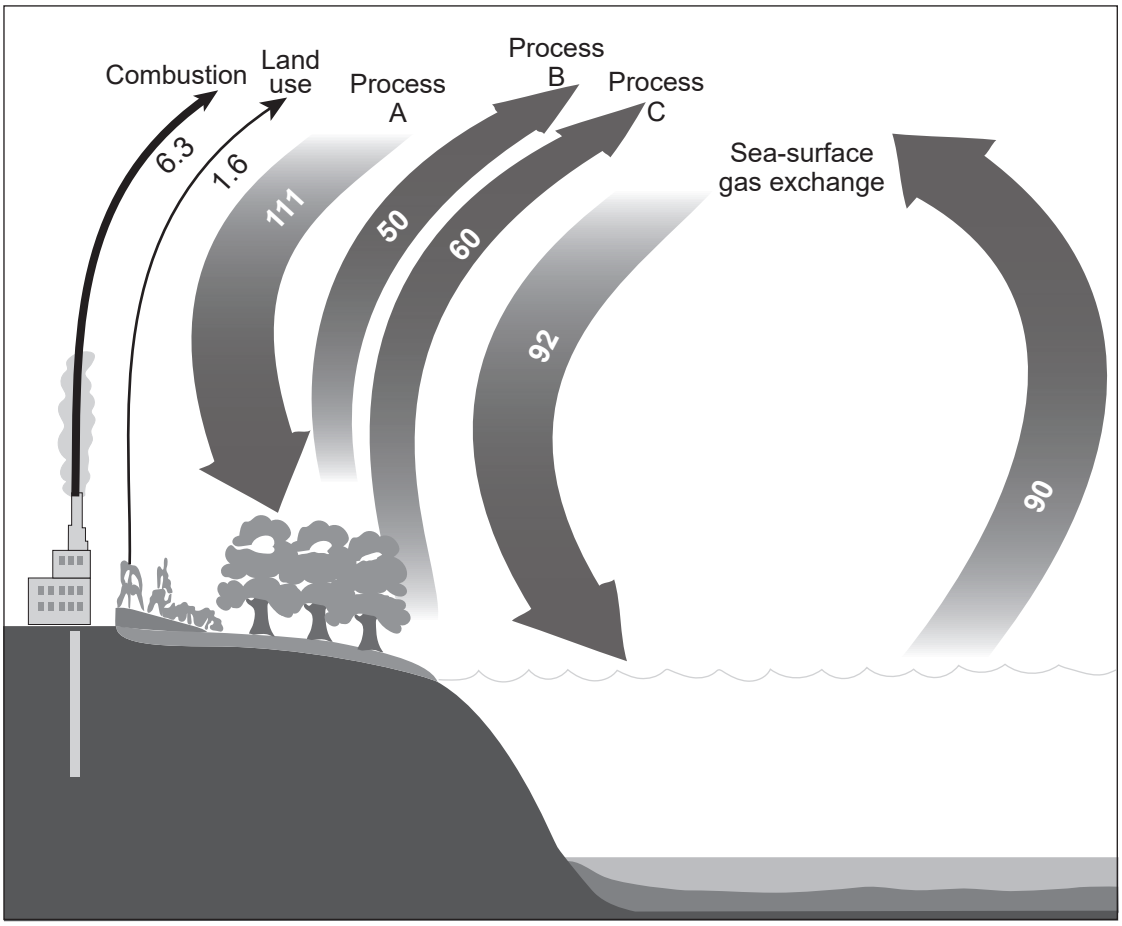
(2) The increase in plant life released more water from photosynthesis, which allowed for the development of land animals.

(3) As less carbon was captured by plants, animals began to develop due to less competition for atmospheric carbon.

(4) Plants were releasing more gases through photosynthesis, which allowed for the development of more complex animal life.

Carbon is cycled throughout the environment by several different processes. The model below shows some information about the carbon cycle.

Cycling of Carbon in Billions of Tons per Year



26 Use quantitative data from the model above to describe how the cycling of carbon between the atmosphere and hydrosphere has been changed by the actions of humans. [1]

Changes in the carbon cycle due to human use of fossil fuels pose a major global challenge. In response, New York State has encouraged more electric passenger vehicles (EVs) to be sold or leased in the future.

27 Which statement best describes a criterion *or* constraint accounting for societal needs that must be considered when designing a solution to the overuse of fossil fuels?

(1) The solution must meet the criteria of reducing the amount of carbon entering the atmosphere in order to address the need for improving air quality.

(2) The size of all EVs must meet the criteria of being able to seat six adults and also limit the amount of carbon the vehicle releases into Earth's atmosphere.

(3) The constraint of the cost of electric vehicles must be higher than those powered by fossil fuels to encourage people to use public transportation.

(4) The constraint of number of vehicle styles and colors must be comparable to those currently available to maintain consumer choice when purchasing an EV.

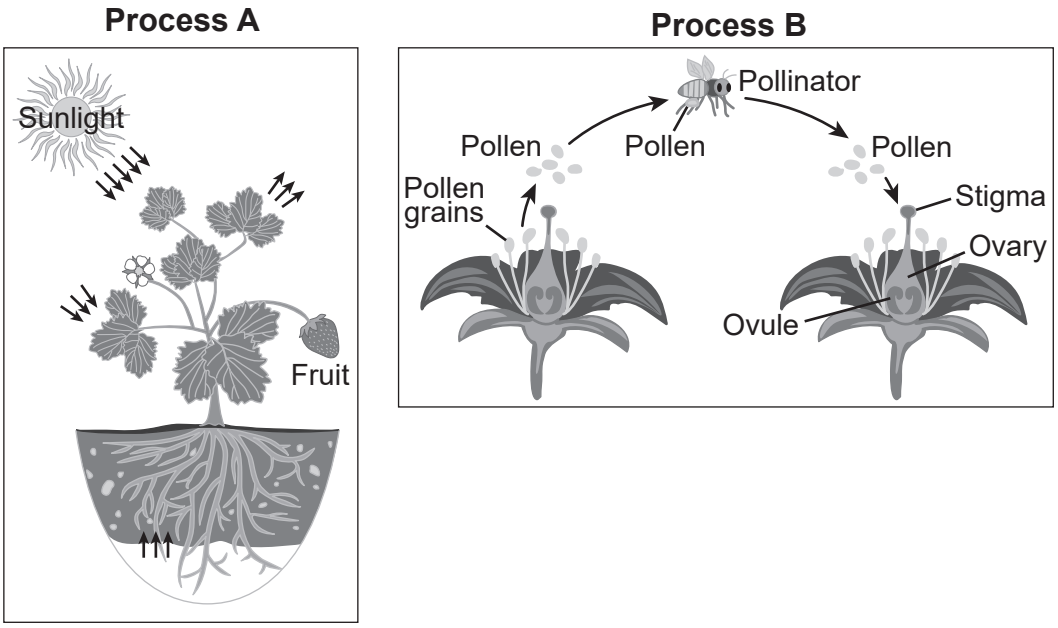
Base your answers to questions 28 through 32 on the information below and on your knowledge of Life Science: Biology.

Buzzy Bees

Honeybees play an essential role in providing ecosystem services for humans. Honeybees alone pollinate 80% of all flowering plants, including more than 130 types of fruits and vegetables. The group behaviors that honeybees employ make them effective at pollination. These bees are especially good at defending their hive and making sure they can provide honey for all the hive members.

Honeybees are social insects that live in colonies, including a queen, thousands of worker bees, and male drones. In spring and summer, young worker bees gather pollen and nectar and defend the colony. Honeybees survive the winters by using nectar and pollen to produce honey.

Two processes shown below are ongoing in the environments in which hives are present.



28 Which explanation best supports the claim that honeybees play a role in the flow of energy in an ecosystem?

(1) Plants use Process *A* to convert sunlight into stored energy within the leaves, which is used as a food source for honeybees.

(2) Honeybees use Process *B* to transfer pollen, which allows the plant to produce fruit that is used as a food source for other organisms.

(3) Plants use Process *B* to convert pollen into fruit within the flowers, which is used as a food source for honeybees.

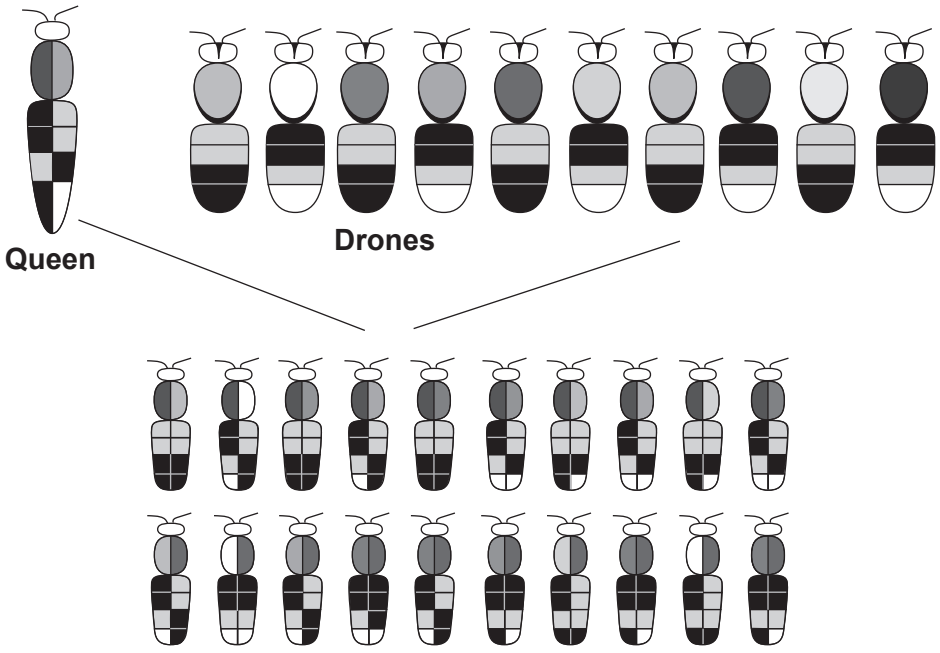
(4) Honeybees use Process *A* to convert sunlight into stored energy, which is used as a food source for other organisms.

Colonies of honeybees consist of members that have different roles within the hive, as indicated in the table below. The diagram at the bottom shows the possible outcomes of mating within a hive.

Role of Types of Honeybees

Type	Roles Within the Hive
Queen 	• Lays up to 2000 eggs per day • Controls the behavior and social order of the hive
Drones 	• Male bees of the hive mate with the queen
Workers 	• Produce wax to build comb • Produce food (honey) • Leave the hive to forage (collect nectar and water for the colony) • Produce pheromones (hormones) to alert the hive • Defend the hive from threats by using their stinger, after which they die

Results of Queen Mating



These are a few of the thousands of gene combinations possible.

29 Construct an explanation, based on evidence, for how reproduction contributes to the process of evolution in honeybees. [1]

30 Which statement identifies evidence that best supports the role of bees using group behavior to increase the survival of the honeybee hive?

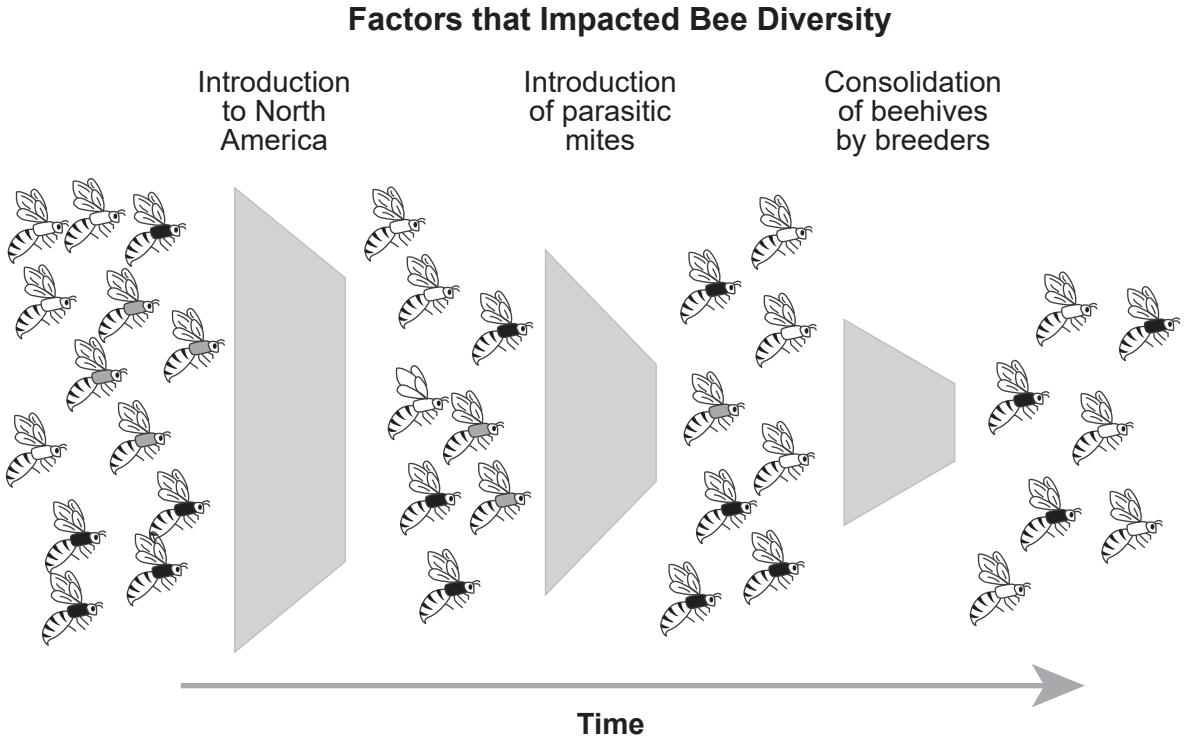
(1) Workers release pheromones to alert other workers, helping the colony defend itself from intruders.

(2) Honeybees rely on instincts for survival, with each bee foraging, gathering pollen, and defending itself.

(3) Drones contribute to defending the hive until they mate with the queen and are no longer useful, and then they are expelled.

(4) Honeybees take on different roles as they age, allowing each bee to be able to complete all the necessary tasks themselves.

Since honeybees were introduced to North America, various events have impacted their population. The model below shows the effect of some of these events. The shading of the bees in the model represents variations in the population.



31 Which claim is supported by the evidence that a change in the honeybees' environment may lead to its extinction?

(1) As honeybees were introduced into North America and experienced a variety of environmental changes, their population and genetic diversity increased.

(2) When parasitic mites were introduced to honeybee colonies, their population size increased and genetic diversity decreased.

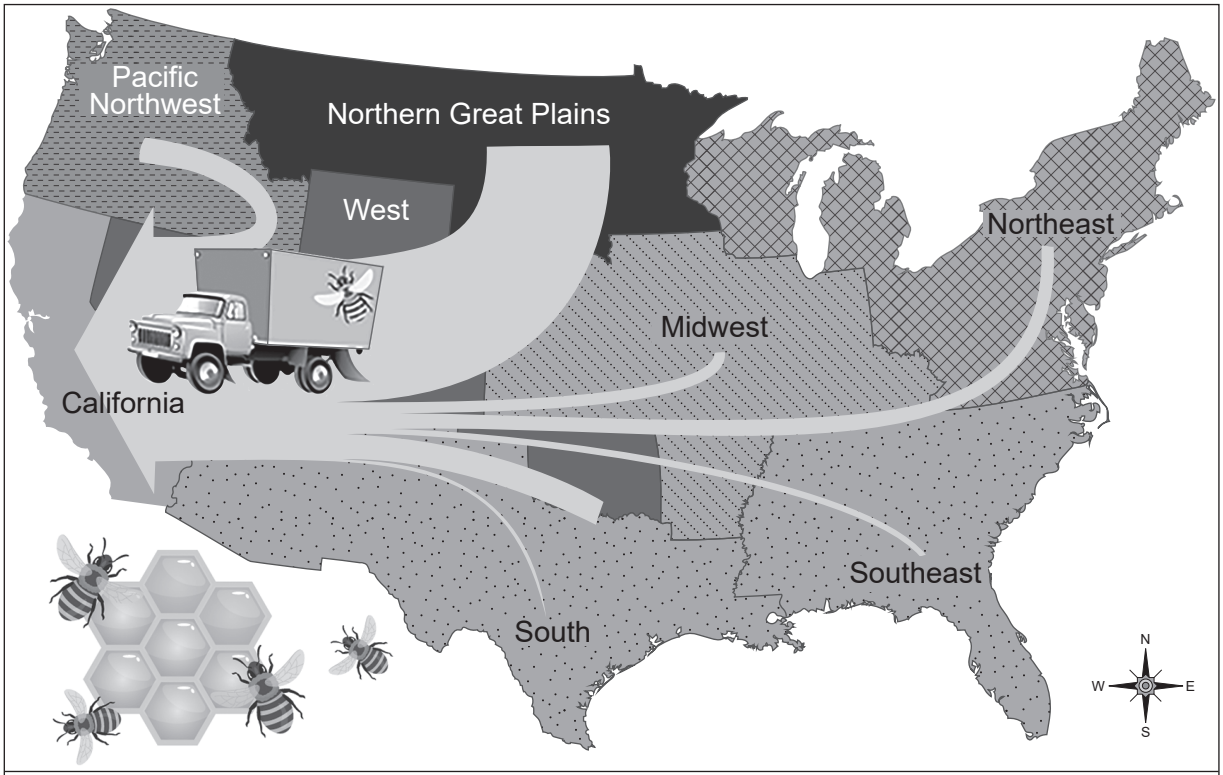
(3) As honeybee breeders join colonies together, neither honeybee beehive size nor diversity is impacted.

(4) As the honeybees experienced many changes over time, their genetic diversity and population size decreased.

Bees may not be present in the areas where they are needed for pollination. Without bees, the food supplies available to humans would be greatly limited. Beekeepers securely transport their hives great distances in trucks to provide pollination services.

The map and table provide some information about the transportation of honeybee colonies.

Honeybee Colony Movements into California, July 1, 2017-Jan. 1, 2018



Number of Colonies					
384,600	65,600	62,900	38,500	29,900	undisclosed

Note: The width of the arrows is proportional to the number of colonies moved.

Advantages and Disadvantages to Transporting Honeybee Colonies

Advantages	Disadvantages
• Constant access to nectar-rich locations • Global honey market expected to surpass $1 billion by 2028 • Beeboxes that contain hives can be easily and neatly stacked in trucks • Provide pollination for many crops, such as almond trees • Forage on different plants for honey production • Beekeepers can move hives to areas of optimal temperature, humidity, and other environmental conditions • Increase honey yield (production)	• Disrupts natural rhythm of the colony • Increased chance of disease by consolidating colonies • Increased competition with local hives • Increased colony exposure to pesticides • High heat, noise, wind, poor ventilation, and lack of water for the colony cause stress while traveling • Bees require additional food and health checks during travel • Appearance of trucks with netting and tarps may not be visually appealing

32 Evaluate whether transporting hives is an effective solution to pollinate crops for human consumption by placing a check mark (✓) in *either* the Effective *or* Not effective box below. Support your evaluation by using each of the specific criteria and trade-offs of cost, safety, and environmental impact. [1]

☐ Effective ☐ Not effective

Base your answers to questions 33 through 37 on the information below and on your knowledge of Life Science: Biology.

The Forest Gardener

Tapirs are a type of mammal that is native to tropical forests. One species, the Baird's tapir, lives in the jungles of Costa Rica in Central America. They have existed for at least 50 million years and are most closely related to the horse and rhinoceros.

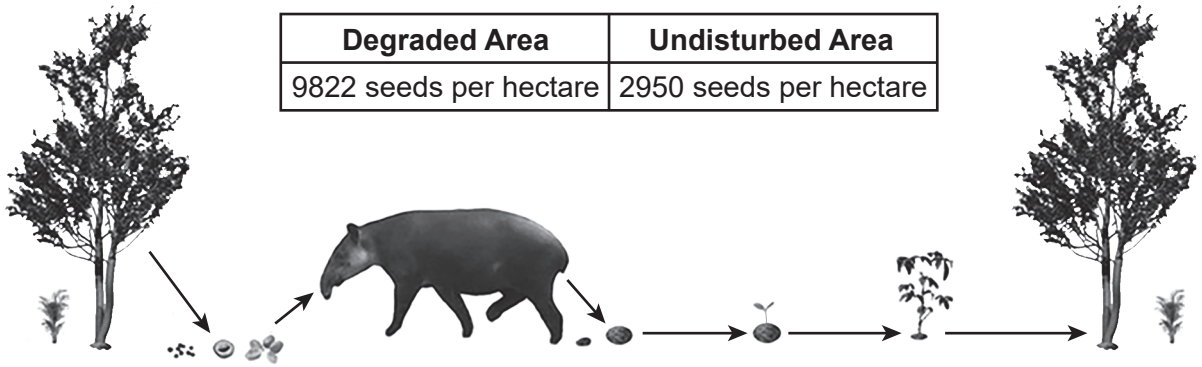
Tapirs consume a wide variety of plants and fruit. They play a vital role in their ecosystem as "gardeners of the forest," contributing to forest regeneration and nutrient cycling. Tapirs eat the fruit of trees, releasing the seeds from the fruit in their feces. This disperses the seeds throughout the forest, as shown in the diagram below.

One study found that the tapir's role in forest regeneration is even more vital when a forest has been degraded (negatively impacted).

Tapir populations have been declining in Central America due to their low reproductive rate, habitat destruction, and poaching (illegal hunting). They are now listed as an endangered species.

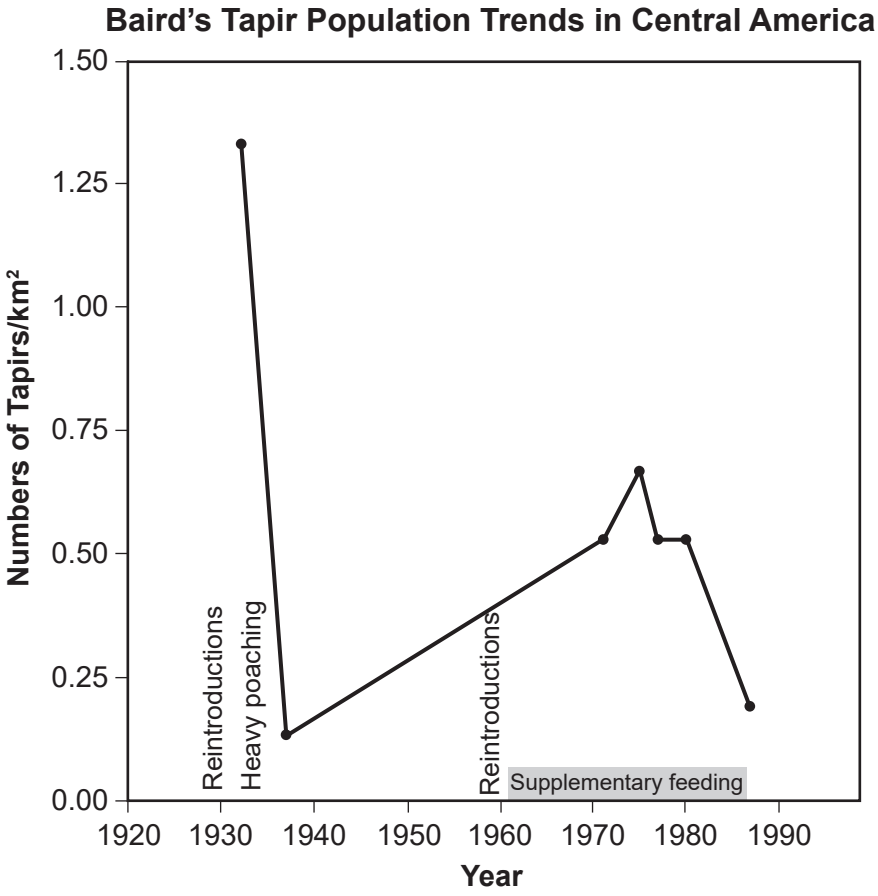
Seed Dispersal by Tapirs

Degraded Area	Undisturbed Area
9822 seeds per hectare	2950 seeds per hectare



Scientists claim that maintaining the Baird's tapir is important because they contribute to the biodiversity of the rainforest ecosystem. In 1929, several tapirs were reintroduced to an island in Central America in an effort to reestablish a population there. Data were collected over the next 60 years to monitor the trends in the Baird's tapir population on the island.

The graph below shows some information about the Baird's tapir population and related human activities.



33 Construct an explanation based on evidence for why the cycling of carbon in the forest may change, resulting in an increase in carbon dioxide levels as the tapir population ***decreases***. [1]

34 Which statement could be used to evaluate the solutions used by the scientists to reduce the impact of humans on this population of Baird's tapir?

(1) Reintroducing tapirs was not successful because the population declined within 10 years after each reintroduction.

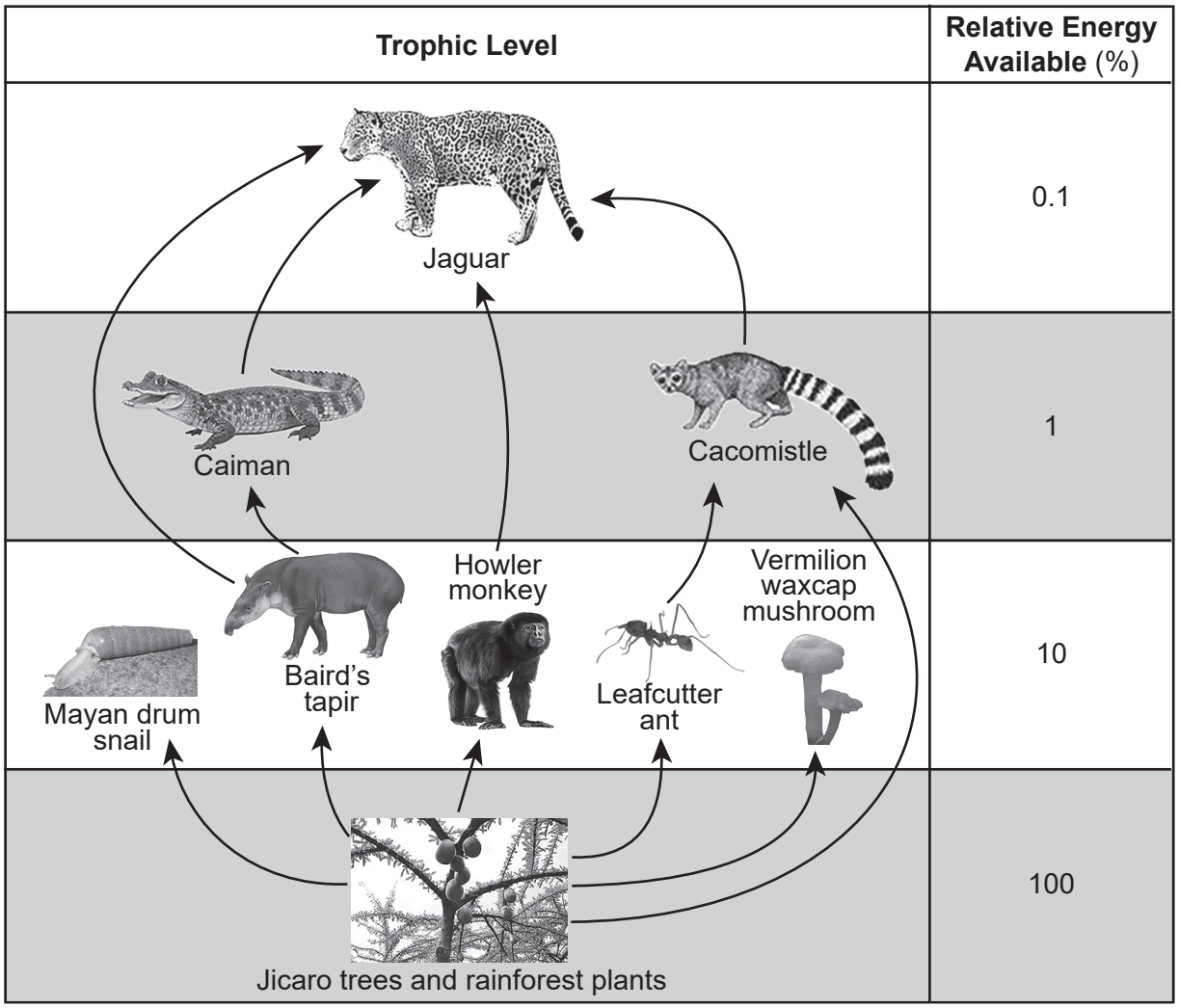
(2) Reintroducing tapirs was successful because the tapir population size increased and then remained stable when reintroductions occurred.

(3) Supplemental feeding did not successfully increase the tapir population because the population declined even when additional food was provided.

(4) Supplemental feeding was successful because once food was provided the population remained stable for the remainder of the study.

The model below shows interactions between tapirs and other organisms in a rainforest ecosystem.

Energy Transfer in a Rainforest Ecosystem



35 Which statement identifies a claim that explains why there would be more Baird's tapirs than jaguars in this rainforest ecosystem?

(1) Jaguars eat more caiman than Baird's tapirs because caiman contain more available energy than Baird's tapirs.

(2) Jaguars are at a higher trophic level than the Baird's tapir, therefore they have a greater percentage of energy available to support their population.

(3) The Baird's tapirs have fewer energy sources available to them at their trophic level than jaguars do at their level.

(4) Baird's tapirs are at a lower trophic level than jaguars, so they have more energy available that can be used to support a larger population.

36 The claim has been made that the complex interactions required to maintain ecosystem stability would have to be changed if the overall trend observed between 1930–1990 in the tapir population continued. State your evaluation of the claim *and* use evidence from the *Energy Transfer in a Rainforest Ecosystem* model *and* the graph to support your evaluation. [1]

Evaluation: _____

Support with Evidence: _____

_____

_____

37 Which statement correctly identifies an explanation for the flow of energy in this forest ecosystem?

(1) The tapir uses the process of photosynthesis to transfer energy throughout the ecosystem.

(2) Energy is captured by the jicaro trees in the process of photosynthesis and then transferred throughout the ecosystem.

(3) Energy is transformed by the jaguar in the process of cellular respiration and then transferred throughout the ecosystem.

(4) Mushrooms capture the Sun's energy during the process of cellular respiration, which then flows throughout the ecosystem.

Base your answers to questions 38 through 41 on the information below and on your knowledge of Life Science: Biology.

Caffeine's Effect on the Body

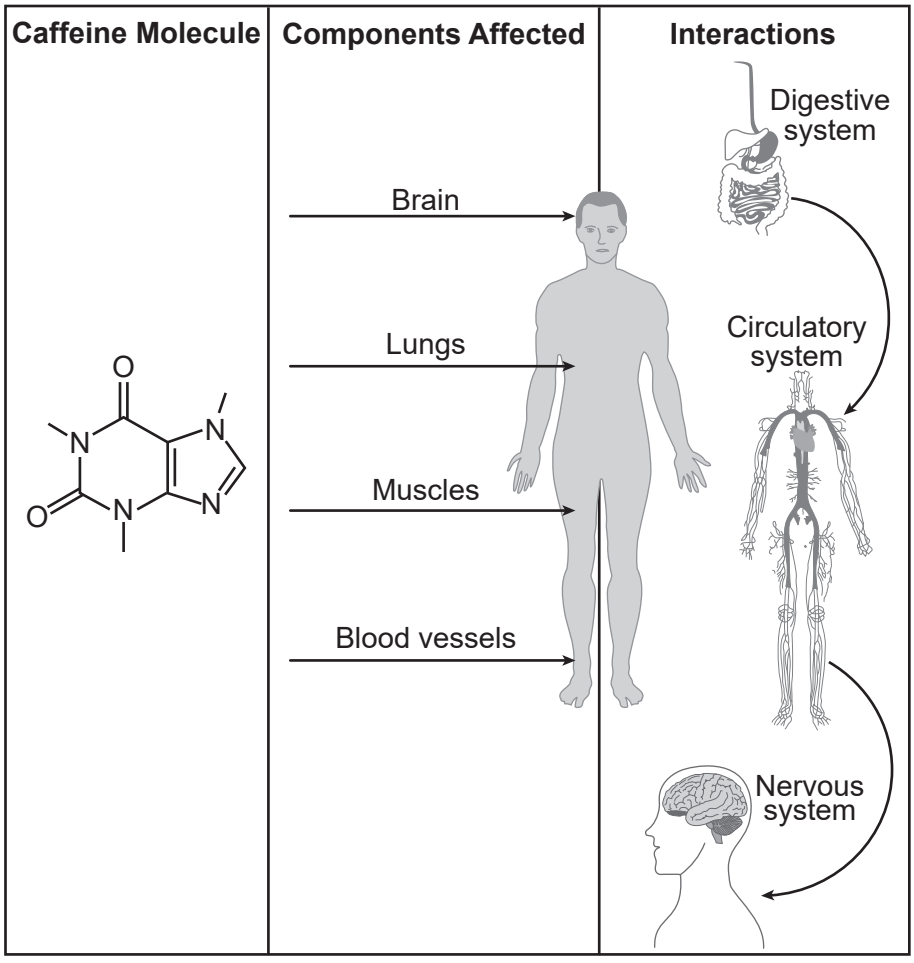
Caffeine is a natural compound found in over 60 plants. Many of these plants are used in food products. However, labels do not always list the amount of caffeine in a food product, making it difficult to know exactly how much caffeine is being consumed per day.

The side effects of caffeine consumption can include increased anxiety, inability to sleep, heart palpitations, irritability, dehydration, and digestive issues like nausea.

One organization of pediatric doctors suggests that teenagers between the ages of 12–18 should not consume more than 100 mg of caffeine per day. Unfortunately, many teenagers and adults far exceed this limit due to the increased popularity of energy drinks that can contain up to 300 mg of caffeine.

The diagram below shows some of the body systems that are affected by caffeine.

Body Systems Affected by Caffeine



38 Which statement best describes interactions between two body systems represented in the model that allow caffeine to be utilized in the body?

(1) Caffeine enters the digestive system through the intestines and is then delivered directly to the nervous system to release energy.

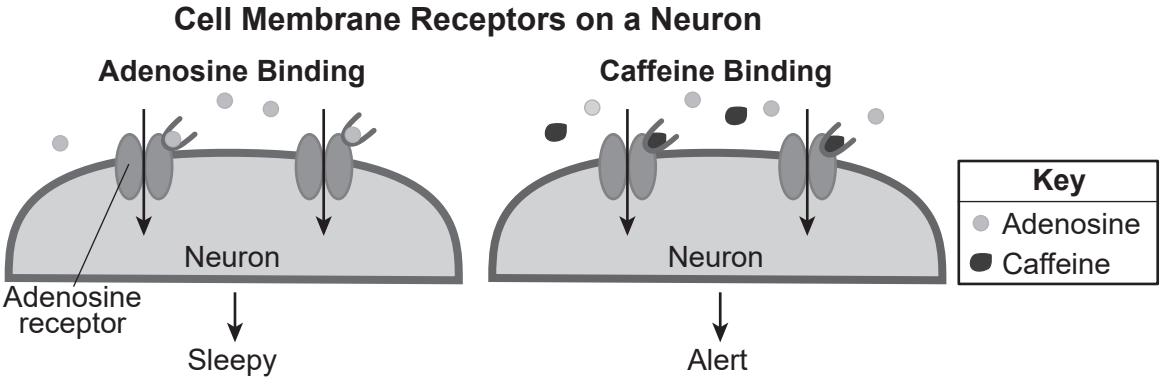
(2) Caffeine is absorbed into the blood vessels of the circulatory system from the intestines of the digestive system for use in the body.

(3) The caffeine enters through the air sacs of the lungs in the respiratory system and then diffuses into the capillaries of the circulatory system for use in the body.

(4) The caffeine enters through the muscles of the muscular system, which delivers it to the digestive system to release energy.

There are several factors that contribute to how a person responds to caffeine. One of these is related to caffeine's ability to bind to adenosine receptors in the membranes of different types of cells. In humans, adenosine helps regulate many processes, such as oxygen consumption and sleep. The *ADORA2A* gene codes for the adenosine receptor.

The model below shows adenosine and caffeine interacting with nerve cells (neurons) in the brain.



39 Construct an explanation based on the evidence provided for how the structure of the *ADORA2A* gene determines the structure *and* function of the adenosine receptor. [1]

The ancestral form of the *ADORA2A* gene has a base *C* at a specific location. In a more recent variant, the *C* is replaced by *T* in one or both alleles, as shown below. This change can influence an individual's response to caffeine. Slow responders are more sensitive to caffeine and can experience its effects for a longer period of time. Fast responders can feel caffeine's effects for shorter periods of time.

Genetic Variations of *ADORA2A* Gene

	CC (Ancestral Form)	**TC/CT**	**TT**
Allele 1	G C T A **C** G C C C	G C T A **T** G C C C	G C T A **T** G C C C
Allele 2	G C T A **C** G C C C	G C T A **C** G C C C	G C T A **T** G C C C
Response to Caffeine	Slow	Slow	Fast

40 Which claim best explains a cause of the recent inheritable variation in the *ADORA2A* gene?

(1) Environmental factors interacted with the DNA of a parent's body cells to change the base sequence of the *ADORA2A* gene.

(2) A new genetic combination occurred in the *ADORA2A* gene during mitosis in the neurons of a parent.

(3) An error occurred in the *ADORA2A* gene during DNA replication that was passed on in the gametes of at least one parent.

(4) Continued exposure to caffeine caused a change in the expression of the *ADORA2A* gene of a parent.

41 When caffeine binds to the adenosine receptor, it is primarily digested by an enzyme, CYP1A2. Which question could be asked to best clarify how DNA codes for the formation of the CYP1A2 enzyme and is passed from parents to offspring?

(1) If heat damages the CYP1A2 enzyme in the parents, does that affect how their child will digest caffeine?

(2) Can variations in the gene that codes for the CYP1A2 enzyme be passed from parents to offspring?

(3) If offspring are exposed to caffeine during development, does that affect how they will digest caffeine?

(4) Can the gene that codes for the CYP1A2 enzyme be in a noncoding region of DNA and be passed from parents to offspring?

Base your answers to questions 42 through 45 on the information below and on your knowledge of Life Science: Biology.

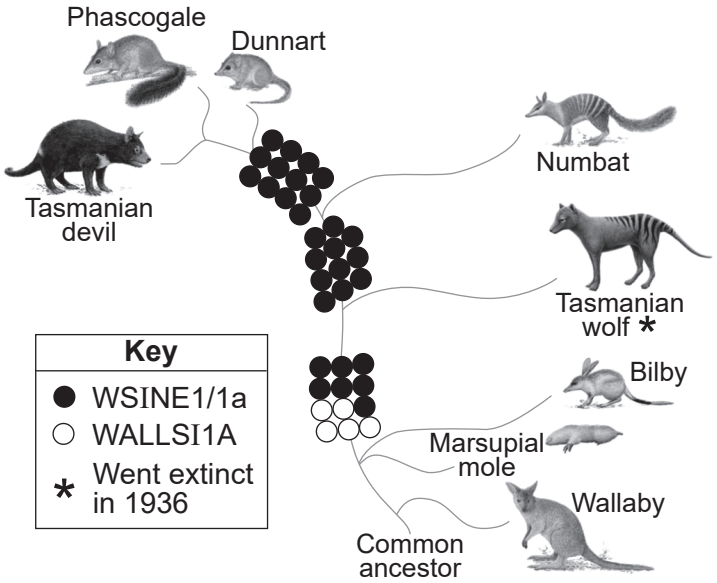
Australian Adaptations

Australia is a uniquely biodiverse continent that has many marsupials, a type of mammal with a pouch to carry their young. Australia was once part of a supercontinent that was home to the earliest marsupials between 178 and 168 million years ago. Australia began to separate from the larger land mass about 130 million years ago, taking its marsupials along with it. When a mass extinction occurred about 65 million years ago, conditions on Earth changed, allowing placental mammals to take over most ecosystems except in Australia, where marsupials continue to dominate to this day.

The genome of the Tasmanian wolf, an extinct marsupial, is being analyzed to determine how it is related to modern-day marsupials. Specific sections of the genome that contained repeated insertions were analyzed. These segments included the *WALLSI1A* and *WSINE1/1a* genes.

Some information about marsupials is provided below.

Ancestral Tree of Modern Marsupials



42 Which statement provides evidence about common ancestry in marsupials?

(1) The bilby shares a more recent common ancestor with the marsupial mole than the Tasmanian wolf because multiple gene insertions separate the Tasmanian wolf and bilby.

(2) The wallaby and the Tasmanian devil share a more recent common ancestor because they have many of the same gene insertions.

(3) The Tasmanian wolf and the numbat share a more recent common ancestor because they have no gene insertions.

(4) The phascogale and the dunnart are less closely related than the dunnart and Tasmanian devil because the dunnart and Tasmanian devil have more gene insertions.

43 Which claim about the effect of changing environmental conditions is supported by the evidence provided?

(1) The separation of Australia from other continents made more habitats available to a greater diversity of marsupials.

(2) Marsupial mammals did not have the genetic variations that they needed to survive in the new environment after the mass extinction.

(3) The isolation of Australia resulted in bilbies, marsupial moles, and wallabies going extinct, which left many niches available for placental mammals to fill.

(4) The genetic variations that led to placental mammals did not occur within isolated marsupial populations in Australia.

Koalas are another marsupial native to Australia with a unique diet of mostly eucalyptus leaves. Eucalyptus contains chemicals that are toxic to most animals. Koalas have a specialized digestive system and a slow metabolism that allows them to consume eucalyptus.

The giant koala was a close relative of the modern-day koala, but it did not survive to present day.

The table below shows some information about koalas.

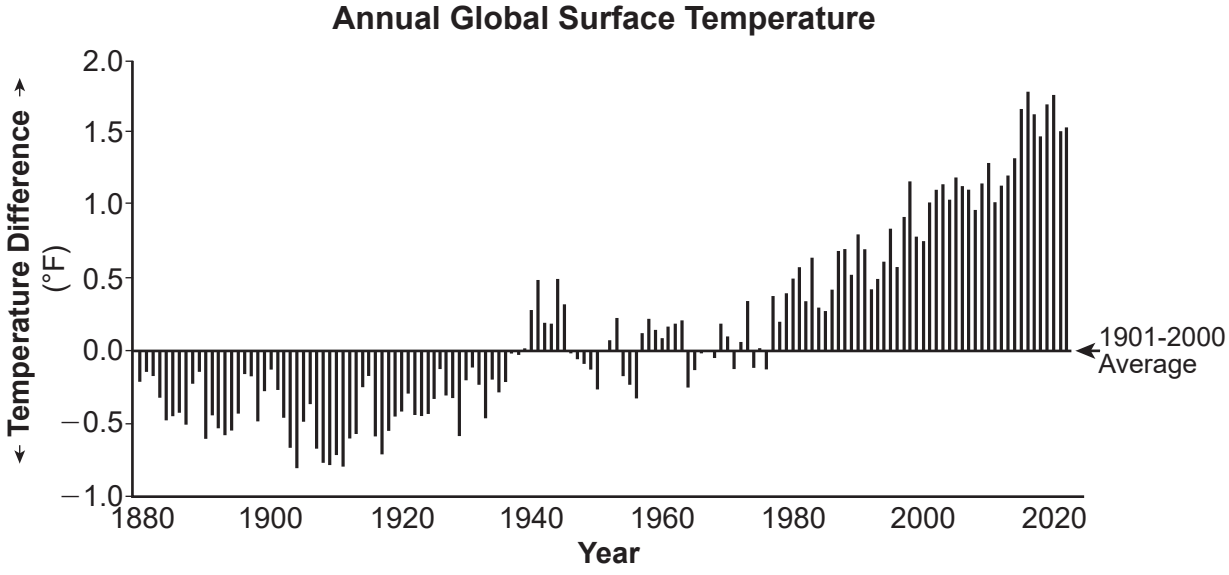
History of Koala Species

Species	Approximate Temporal Range	Environment	Diet	Average Weight (kg)
Giant koala	15 million–12,000 years ago	• Humid climate • Widespread rainforests with some eucalyptus trees	Mainly eucalyptus leaves	15–20
Modern-day koala	25 million years ago–Present day	• Dry climate • Fragmented mixed woodlands with abundant eucalyptus trees	Only eucalyptus leaves	4–15

44 Using the evidence provided, construct an explanation about why the modern-day koala was able to survive while the giant koala went extinct. [1]

Since the late 1800s, scientists have documented an increase in the size of some structures that function to regulate temperature in several Australian animals. For example, appendages such as the beaks of parrots, tails of shrews, and wings of bats are longer in the present day than in the past.

The graph below shows an environmental change that occurred during the same time frame.



45 Which explanation about the change in appendages of several Australian animals is supported by evidence?

(1) Parrots have decreased their beak size to reduce heat loss when the parrot is eating.

(2) An increase in global surface temperatures has caused a decrease in gene frequencies for traits that help regulate body temperature.

(3) An increase in global surface temperature has caused an increase in gene frequencies for traits that help regulate body temperature.

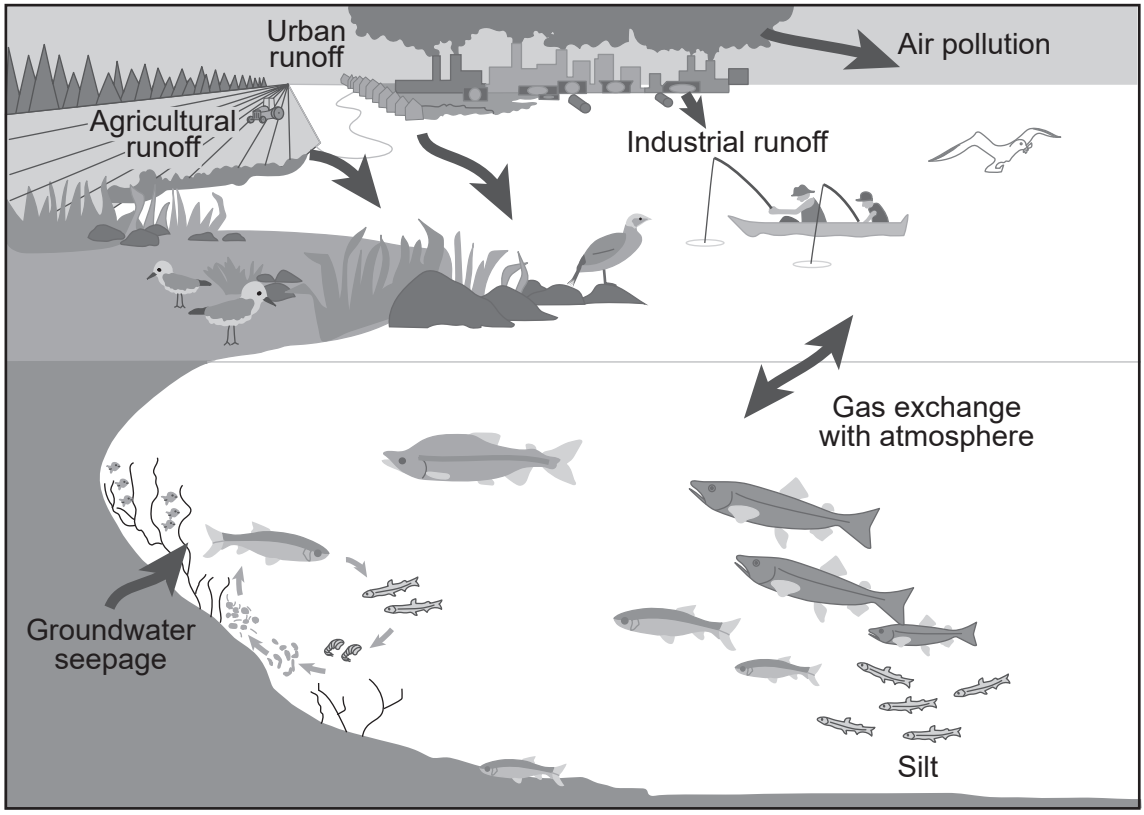
(4) Bat wings have increased in length because longer wings increase body temperature when the bat is at rest.

Base your answers to questions 46 through 49 on the information below and on your knowledge of Life Science: Biology.

Mercury Rising

Onondaga Lake is located in the city of Syracuse, New York. Beginning in the 1880s, an industrial company near the lake started dumping mercury-contaminated waste products directly into Onondaga Lake. This dumping continued until 1970. During this time period, fishing and swimming were banned due to safety concerns regarding the effect of mercury on the health of organisms. Remediation and cleanup of the lake is part of an ongoing land restoration effort that includes the implementation of long-term maintenance and monitoring programs to ensure the remedy's effectiveness. The diagram below shows different ways that pollution can enter a lake.

Pathways of Pollution in a Lake



46 Which solution would further ***reduce*** the impact of human activities on the Onondaga Lake environment and its biodiversity?

(1) Installing electric pumps to reverse the direction of groundwater seepage out of the lake and into the surrounding soil.

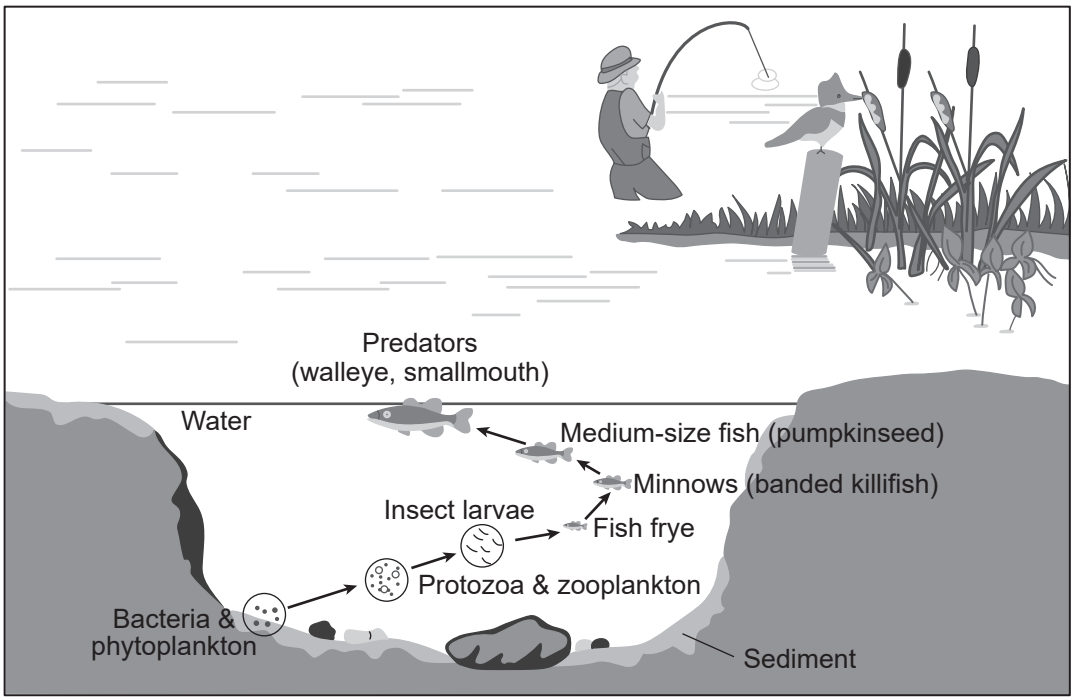
(2) Requiring factories to chemically convert the mercury waste into solid compounds that can be filtered out before wastewater is added to the lake.

(3) Add more chemical fertilizers to the agricultural farms near the lake to decrease food production.

(4) Add more non-native fish species to the lake to increase gas exchange with the atmosphere.

Remediation plans have been moderately successful. The 1970 fishing ban has been lifted, but some restrictions remain. Consuming fish caught in Onondaga Lake is limited due to potentially dangerous levels of mercury stored in the fish tissue. The diagram and table below show the mercury concentration levels in a food chain of a typical lake ecosystem. Mercury is measured in the amount of nanograms per kilogram (ng/kg).

Mercury Concentrations in a Food Chain



Description	Mercury Concentration (ng/kg)
Predators (walleye, smallmouth)	10,000,000
Medium-sized fish (pumpkinseed)	1,000,000
Minnows (banded killifish)	100,000
Fish frye (young)	10,000
Insect larvae	1000
Protozoa & zooplankton	100
Bacteria & phytoplankton	10
Water	1

47 Based on the mathematical information in the diagram and the table, which statement explains why top predators are particularly vulnerable to mercury contamination in Onondaga Lake?

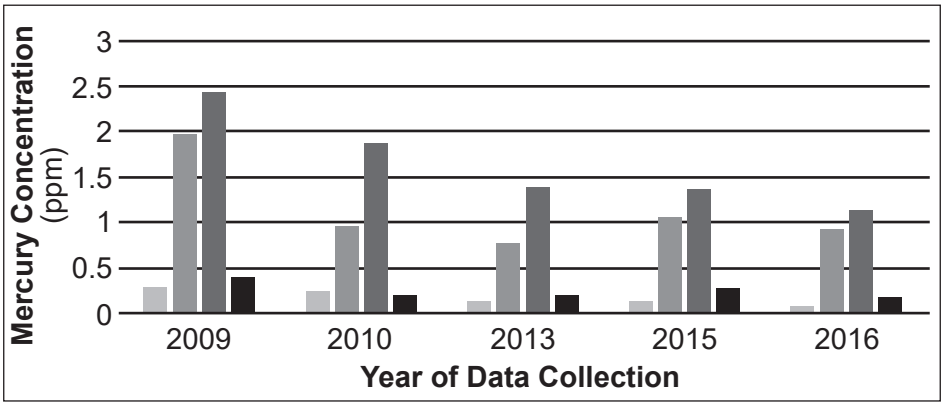
(1) As smaller fish are consumed by larger fish, the mercury within their tissues is passed on to the consumer, causing predators to contain levels of mercury that are ten times higher than their prey.

(2) As smaller fish are consumed, the mercury within their tissues is removed from the environment, causing the ecosystem to recover at a rate ten times faster.

(3) Organisms at lower trophic levels consume levels of mercury 100 times higher than their own as they feed on producers.

(4) Organisms at the higher trophic levels live longer lives compared to other fish and take in ten times more mercury from the water over time.

Successful remediation programs strive to have mercury levels of less than 0.3 ppm (parts per million) in fish tissues. Having too much mercury can negatively impact the reproductive health as well as overall health of an organism. Over a seven-year period, researchers sampled the level of mercury within the tissues of four fish species. The data collected are shown below.



Key	
Type of Fish	**Average Mass**
Banded killifish	1-5 g
Smallmouth	2,994 g
Walleye	10,886 g
Pumpkinseed	450 g

48 Use the data provided to evaluate the claim that the remediation program has affected the complex interactions in the Onondaga Lake ecosystem and could result in a change in the predator species population size. [1]

Fishermen have been warned not to eat some of the fish they catch in Onondaga Lake. Health officials are trying to come up with an effective plan to supply the information to the public in order to prevent these harmful fish from being consumed.

Criteria:

- Must reach as many people that are fishing as possible.
- Must be reliable—inform people so they make the choice not to eat the fish.

Constraints:

- Must cost as little as possible
- Must not require staff to be available at all times

Below is a table of possible solutions.

Solutions	Considerations
1 – Flyers	– Would provide valuable information to fishermen – Staff would need to pass out flyers – Easily discarded/ignored
2 – Signs at boat launches/piers	– Would provide valuable information to fishermen – No staff needed after signs are posted – Only some fishermen will take the time to read the information
3 – Law enforcement boats	– Staff would provide reliable information to each individual that they speak to – Would be able to identify fishermen who are at risk – Staff would be needed to patrol on a consistent basis

49 Identify **one** solution from the table to effectively educate fishermen on the health concerns of eating fish that contain dangerous levels of mercury *and* explain how it meets the given criteria *and* constraints. [1]

Solution:_____

Explanation:_____

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LIFE SCIENCE: BIOLOGY

The State Education Department / The University of the State of New York

Regents Examination in Life Science: Biology – June 2026

Scoring Key: Multiple-Choice Questions

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
Life Science: Biology	June '26	**1**	3	MC	1	1
Life Science: Biology	June '26	**3**	3	MC	1	1
Life Science: Biology	June '26	**4**	2	MC	1	1
Life Science: Biology	June '26	**6**	3	MC	1	1
Life Science: Biology	June '26	**7**	1	MC	1	1
Life Science: Biology	June '26	**9**	1	MC	1	1
Life Science: Biology	June '26	**10**	3	MC	1	1
Life Science: Biology	June '26	**11**	3	MC	1	1
Life Science: Biology	June '26	**12**	2	MC	1	1
Life Science: Biology	June '26	**13**	4	MC	1	1
Life Science: Biology	June '26	**16**	2	MC	1	1
Life Science: Biology	June '26	**17**	3	MC	1	1
Life Science: Biology	June '26	**19**	2	MC	1	1
Life Science: Biology	June '26	**20**	3	MC	1	1
Life Science: Biology	June '26	**21**	3	MC	1	1
Life Science: Biology	June '26	**23**	2	MC	1	1
Life Science: Biology	June '26	**25**	4	MC	1	1
Life Science: Biology	June '26	**27**	1	MC	1	1
Life Science: Biology	June '26	**28**	2	MC	1	1
Life Science: Biology	June '26	**30**	1	MC	1	1
Life Science: Biology	June '26	**31**	4	MC	1	1
Life Science: Biology	June '26	**34**	3	MC	1	1
Life Science: Biology	June '26	**35**	4	MC	1	1
Life Science: Biology	June '26	**37**	2	MC	1	1
Life Science: Biology	June '26	**38**	2	MC	1	1
Life Science: Biology	June '26	**40**	3	MC	1	1
Life Science: Biology	June '26	**41**	2	MC	1	1
Life Science: Biology	June '26	**42**	1	MC	1	1
Life Science: Biology	June '26	**43**	4	MC	1	1
Life Science: Biology	June '26	**45**	3	MC	1	1
Life Science: Biology	June '26	**46**	2	MC	1	1
Life Science: Biology	June '26	**47**	1	MC	1	1

Scoring Key: Constructed Response Questions

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
Life Science: Biology	June '26	**2**	–	CR	1	1
Life Science: Biology	June '26	**5**	–	CR	1	1
Life Science: Biology	June '26	**8**	–	CR	1	1
Life Science: Biology	June '26	**14**	–	CR	1	1
Life Science: Biology	June '26	**15**	–	CR	1	1
Life Science: Biology	June '26	**18**	–	CR	1	1
Life Science: Biology	June '26	**22**	–	CR	1	1
Life Science: Biology	June '26	**24**	–	CR	1	1
Life Science: Biology	June '26	**26**	–	CR	1	1
Life Science: Biology	June '26	**29**	–	CR	1	1
Life Science: Biology	June '26	**32**	–	CR	1	1
Life Science: Biology	June '26	**33**	–	CR	1	1
Life Science: Biology	June '26	**36**	–	CR	1	1
Life Science: Biology	June '26	**39**	–	CR	1	1
Life Science: Biology	June '26	**44**	–	CR	1	1
Life Science: Biology	June '26	**48**	–	CR	1	1
Life Science: Biology	June '26	**49**	–	CR	1	1

Key
MC = Multiple-choice question
CR = Constructed-response question

The chart for determining students' final examination scores for the **June 2026 Regents Examination in Life Science: Biology** will be posted on the Department's website at **https://www.nysedregents.org/life_science_biology/** on the day of the examination. Conversion charts provided for the previous administrations of the Life Science: Biology examination must NOT be used to determine students' final scores for this administration.

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Office of State Assessment
Albany, New York 12234

IMPORTANT NOTICE

Notice to Teachers

Regents Examination in Life Science: Biology
All Editions
Thursday, June 18, 2026, 9:15 a.m.
Questions 20 and 21, only

This notice applies to all students who used any edition of the June 18, 2026 Regents Examination in Life Science: Biology.

Due to typographical errors, Questions 20 and 21 do not have a correct answer choice. All students should be given credit for Questions 20 and 21.

Please photocopy this notice and give a copy to each teacher scoring the Regents Examination in Life Science: Biology.

We apologize for any inconvenience this may have caused you or your students. Thank you for your hard work on behalf of the students in New York State.

FOR TEACHERS ONLY

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

LIFE SCIENCE: BIOLOGY

Thursday, June 18, 2026 — 9:15 a.m. to 12:15 p.m., only

RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 2 before rating student papers.

Updated information regarding the rating of this examination may be posted on the New York State Education Department's website during the rating period. Check this website at: https://www.nysed.gov/state-assessment/high-school-regents-examinations and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Regents Examination in Life Science: Biology. Additional information about scoring is provided in the publication *Directions for Scoring Regents Examinations*.

Allow 1 credit for each correct response.

At least two science teachers must participate in the scoring of the open-ended questions on a student's paper. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score more than approximately one-half of the open-ended questions on a student's answer paper. Teachers may not score their own students' answer papers.

Students' responses must be scored strictly according to the Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the Rating Guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the Rating Guide. Do not attempt to correct the student's work by making insertions or changes of any kind. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

For hand scoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the space provided. The student's score for the Life Science: Biology test should be recorded in the space provided. Then the student's raw score on the test should be converted to a scale score by using the conversion chart that will be posted on the Department's website at: https://www.nysed.gov/state-assessment/high-school-regents-examinations on the day of the examination. The student's scale score should be entered in the box labeled "Scale Score" on the student's answer sheet. The scale score is the student's final examination score.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score.

The test item map on page 11 identifies the Performance Expectation with which each test question is aligned. All NYSP-12SLS Performance Expectations are three-dimensional (https://www.nysed.gov/sites/default/files/programs/standards-instruction/p-12-science-learning-standards.pdf). The integration of these three dimensions provides students with a context for the content of science (DCI), the methods by which science knowledge is acquired and understood (SEP), and the ways in which the sciences are connected through concepts that have universal meaning across the disciplines (CCC).

1 [1] Allow 1 credit for 3.

2 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— As environmental temperature decreases, the body temperature of hibernating animals decreases. This results in a slowdown of metabolic activity such as heart rate. For example, in squirrels the heart rate decreases from 250 bpm to 5 bpm. The heart rate would return back to normal in the spring.

— In bears, the breathing rate drops from eight breaths per minute to less than one breath per minute as the environmental temperature decreases. It would return back to normal as the temperature increases.

— Metabolic activities, such as breathing and heart rate, decrease in squirrels and bears as their body temperature decreases during winter.

3 [1] Allow 1 credit for 3.

4 [1] Allow 1 credit for 2.

5 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Bats have a 45% reduction in white blood cells when hibernating. But when they wake up periodically, the white blood cell count increases; this will protect them from infection. Therefore, they are more likely to survive and reproduce.

— Bats that awaken are better able to fight off the fungus because their white blood cell count increases, making them more likely to survive and reproduce.

6 [1] Allow 1 credit for 3.

7 [1] Allow 1 credit for 1.

8 [1] Allow 1 credit for selecting *Valid* and including evidence as support. Acceptable responses include, but are not limited to:

— As the density of algae increases beyond 12–13 cells/mL $\times$ 10^6 due to agricultural runoff, the dissolved oxygen levels decrease. This will decrease the number of consumers that can be supported in the freshwater food web.

— An increase in nitrogen above 144 mg/L would cause a harmful algae bloom, resulting in lower oxygen levels. This could cause a decrease in the number of animals.

— Agricultural runoff results in algae blooms, decreasing dissolved oxygen. This would result in a decrease in large fish that require large amounts of oxygen for survival.

Note: Allow credit if a symbol other than a check mark is used.

9 [1] Allow 1 credit for 1.

10 [1] Allow 1 credit for 3.

11 [1] Allow 1 credit for 3.

12 [1] Allow 1 credit for 2.

13 [1] Allow 1 credit for 4.

14 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Some roe deer that were less affected by the radiation survived and reproduced, passing on their traits to their offspring. The population was able to increase in number due to their increased survival. Over time, a greater number of deer will display the traits that helped them survive.

— Some roe deer may have had traits that made them better suited to surviving radiation exposure. They reproduced and passed the beneficial traits on to offspring, causing the population to recover. By 1996, more of the roe deer population should carry the alleles for this trait.

— The radiation may have caused a mutation that was beneficial to the roe deer and increased their probability of survival. These deer were then able to reproduce and pass this trait to their offspring. This trait would then become more prevalent in the population in the years following the appearance of the trait.

15 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— When the level of progesterone increases, the uterine lining begins to get thicker.

— When the LH/FSH level in the blood peaks, ovulation occurs, releasing an egg from the ovary that can be fertilized.

16 [1] Allow 1 credit for 2.

17 [1] Allow 1 credit for 3.

18 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Constraint	Trade-off	Reason Why Plan 1 Medication	Reason Why Plan 2 Lifestyle
Cost	Pro	— May be covered by insurance, so it is not expensive	— Individual can decide how much to spend on food/gym — Walking is free
Cost	Con	— Some medications may not be covered by insurance, so they are expensive	— Gym membership is expensive — A healthy diet can increase grocery cost — Seeing a dietician can be costly
Safety	Pro	— Medications have been tested for safety	— Individual can manage intensity of exercise/diet
Safety	Con	— Medications may have side effects or cause allergic reaction	— Possibility of injury
Reliability	Pro	— Medications have been tested to ensure that they work as expected	— Individual has full ownership of their actions — Does not rely on outside organizations
Reliability	Con	— Individuals might miss a dose of medication	— Individual must be consistent for changes to be effective

Note: Students can use the same constraint for both a pro and a con.

19 [1] Allow 1 credit for 2.

20 [1] Allow 1 credit for 3.

21 [1] Allow 1 credit for 3.

22 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Offspring produced by crossing the $TBXT^{-6}/TBXT^{+}$ mice inherited the no-tail/short-tail trait.

— Sixty-three of the 98 mice born inherited a copy of the genetically engineered $TBXT^{-6}$ gene from the parental generation.

— No $TBXT^{-6}/TBXT^{-6}$ offspring survived when the hybrid mice were crossed.

23 [1] Allow 1 credit for 2.

24 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Carbon dioxide levels were much higher in the Carboniferous Period, making the carrying capacity greater than today. The relative CO_2 amount is 3 in the Carboniferous Period and nearly 1 today.

— During the Carboniferous Period, the increased levels of CO_2 increased the carrying capacity by allowing more plants to photosynthesize and produce more biomass.

— The carrying capacity for plants was higher because there was more CO_2 available to the plants for photosynthesis at that time than there is today.

25 [1] Allow 1 credit for 4.

26 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The carbon cycle would remain relatively stable without human actions. Combustion adds an extra 6.3 billion tons of carbon per year to the atmosphere that is not absorbed into the other spheres, including the hydrosphere.

— With humans adding 1.6 billion tons of carbon to the atmosphere from land use per year and combusting 6.3 billion tons per year, the amount of carbon being released from human actions and added to the atmosphere is much greater than can be absorbed by the other processes and the hydrosphere.

— As human activity releases more carbon into the atmosphere, the ocean may absorb even more carbon than it is releasing.

27 [1] Allow 1 credit for 1.

28 [1] Allow 1 credit for 2.

29 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The queen can mate with many different drones, which increases the number of possible combinations of genetic material in the offspring. Those offspring with advantageous gene combinations will better survive and reproduce, resulting in the evolution of the bees.

— The queen is important because she lays plenty of eggs, fertilized with genetic material from different drones, which increases genetic variation in the offspring. These different offspring may be able to better compete for limited resources in their environment.

— Since honeybees reproduce sexually, genetic variation is increased. This can provide traits that allow the bees to survive at a greater rate.

30 [1] Allow 1 credit for 1.

31 [1] Allow 1 credit for 4.

32 [1] Allow 1 credit for identifying either Effective or Not Effective and an acceptable supporting explanation. Acceptable responses include, but are not limited to:

Effective:

— It is an effective solution because bees can be safely transported at a reasonable cost with minimal impact to the environment of the crops. These crops are needed for humans, so transporting bees to increase pollination is definitely worth the benefits to make the food available.

— There are trade-offs to be considered. While there may be many bees that die, and it may cost a great deal for the bees to be transported great distances, this process can be done safely. This process could be considered effective because it can produce a great deal of food, benefiting the environment and humanity.

Not Effective:

— The solution of transporting bees is not very effective because it can be very costly to move all of the bees, many of the bees die, and the environment can be disrupted by too many bees being released at once. Although bees can be transported safely, and they are reliable for pollinating the crops, the costs outweigh the benefits for this process.

Note: Allow credit if a symbol other than a check mark is used.

33 [1] Allow 1 credit for an acceptable evidence. Acceptable responses include, but are not limited to:

— As the tapir population decreases, it does not spread the seeds of the plants it eats, decreasing the number of plants. This decreases the amount of photosynthesis that could occur, increasing the amount of CO_2 in the ecosystem/atmosphere.

— The tapir population correlates to the tree population. As the tapir population decreases, the tree population would also decrease. Less photosynthesis occurs, which would increase the amount of CO_2 in the atmosphere.

— The tapir disperses 9822 seeds per hectare in degraded areas, and that is more than in undisturbed areas, so their decline would greatly reduce tree regeneration and increase CO_2 levels.

34 [1] Allow 1 credit for 3.

35 [1] Allow 1 credit for 4.

36 [1] Allow 1 credit for an acceptable evidence. Acceptable responses include, but are not limited to:

— The claim is valid. Based on the graph, the tapir population is declining. Jaguars would eat more caiman, cacomistle, and howler monkeys, so their numbers would decline.

— I agree with this claim because the tapir population has decreased, causing a disruption in ecosystem stability. The number of caiman living in the rainforest would decrease because less food (tapirs) would be available to them, causing ecosystem instability.

37 [1] Allow 1 credit for 2.

38 [1] Allow 1 credit for 2.

39 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The order of DNA bases determines the shape of the receptor protein. The receptor protein shape is specific to adenosine, so when adenosine attaches, the neuron responds with an effect/sleepiness.

— The order of bases in the *ADORA2A* gene determines the shape of the protein receptor, allowing adenosine to bind there. Caffeine can also attach to the receptor because it is shaped like adenosine. This blocks adenosine from affecting the neuron, preventing the person from becoming sleepy.

— The DNA sequence is transcribed into an mRNA molecule that is translated into a sequence of amino acids in a specific order. The resulting receptor protein will have a shape specific to adenosine, allowing adenosine/caffeine to bind.

40 [1] Allow 1 credit for 3.

41 [1] Allow 1 credit for 2.

42 [1] Allow 1 credit for 1.

43 [1] Allow 1 credit for 4.

44 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The modern-day koala has a more abundant supply of eucalyptus leaves than the giant koala had available in their different environments. Since the giant koalas had less food available, they were not able to survive.

— The giant koala had a larger body size than the modern-day koala and needed more food to survive and reproduce, which was limited when the climate became more dry.

45 [1] Allow 1 credit for 3.

46 [1] Allow 1 credit for 2.

47 [1] Allow 1 credit for 1.

48 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Remediation of the lake reduced the mercury levels below .3 ppm in prey species such as the pumpkinseed. This provides more food for predators such as smallmouth, increasing their population.

— As the mercury levels in the banded killifish decrease as a result of the remediation, their population would likely increase. This could lead to an increase in the walleye population, as they are predators of the banded killifish.

49 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Solution 1 – Although distributing flyers may not reach all fishermen, it would reach some and they might be warned to stop eating the fish. There would need to be staff to pass out the flyers, so this would not be the least expensive alternative.

— Solution 2 – This would require the least staff, and the signs would last for a good period of time without maintenance. This alternative may not reach as many people. However, anyone launching a boat could read it.

— Solution 3 – This would be the most effective as the law enforcement official would actually be talking to the fishermen and providing information. This could cost much more as there would need to be staff/law enforcement on duty for long periods of time.

The *Chart for Determining the Final Examination Score for the June 2026 Regents Examination in Life Science: Biology* will be posted on the Department's website at: https://www.nysed.gov/state-assessment/high-school-regents-examinations no later than on the day of the examination. Conversion charts provided for previous administrations of the Regents Examination in Life Science: Biology must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to https://www.nysed.gov/state-assessment/teacher-feedback-state-assessments.
2. Click Regents Examinations.
3. Complete the required demographic fields.
4. Select the test title from the Regents Examination dropdown list.
5. Complete each evaluation question and provide comments in the space provided.
6. Click the SUBMIT button at the bottom of the page to submit the completed form.

THE STATE EDUCATION DEPARTMENT

THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

June 2026 Life Science: Biology Test Item Map to the Standards

Question	Type	Points	Performance Expectation
1	Multiple Choice	1	HS-LS1-2
2	Constructed Response	1	HS-LS1-3
3	Multiple Choice	1	HS-LS1-7
4	Multiple Choice	1	HS-LS1-3
5	Constructed Response	1	HS-LS4-2
6	Multiple Choice	1	HS-LS2-2
7	Multiple Choice	1	HS-LS2-1
8	Constructed Response	1	HS-LS2-6
9	Multiple Choice	1	HS-ETS1-3
10	Multiple Choice	1	HS-LS3-1
11	Multiple Choice	1	HS-LS4-2
12	Multiple Choice	1	HS-LS4-4
13	Multiple Choice	1	HS-LS2-6
14	Constructed Response	1	HS-LS4-4
15	Constructed Response	1	HS-LS1-8
16	Multiple Choice	1	HS-LS1-3
17	Multiple Choice	1	HS-LS1-8
18	Constructed Response	1	HS-ETS1-3
19	Multiple Choice	1	HS-LS4-1
20	Multiple Choice	1	HS-LS1-1
21	Multiple Choice	1	HS-LS3-1
22	Constructed Response	1	HS-LS3-2
23	Multiple Choice	1	HS-LS2-5
24	Constructed Response	1	HS-LS2-1
25	Multiple Choice	1	HS-ESS2-7
26	Constructed Response	1	HS-ESS2-6
27	Multiple Choice	1	HS-ETS1-1
28	Multiple Choice	1	HS-LS2-3
29	Constructed Response	1	HS-LS4-2
30	Multiple Choice	1	HS-LS2-8
31	Multiple Choice	1	HS-LS4-5
32	Constructed Response	1	HS-ETS1-3
33	Constructed Response	1	HS-LS2-3
34	Multiple Choice	1	HS-LS2-7
35	Multiple Choice	1	HS-LS2-4
36	Constructed Response	1	HS-LS2-6
37	Multiple Choice	1	HS-LS2-3
38	Multiple Choice	1	HS-LS1-2
39	Constructed Response	1	HS-LS1-1
40	Multiple Choice	1	HS-LS3-2
41	Multiple Choice	1	HS-LS3-1
42	Multiple Choice	1	HS-LS4-1
43	Multiple Choice	1	HS-LS4-5
44	Constructed Response	1	HS-LS4-2
45	Multiple Choice	1	HS-LS4-4
46	Multiple Choice	1	HS-LS2-7
47	Multiple Choice	1	HS-LS2-2
48	Constructed Response	1	HS-LS2-1
49	Constructed Response	1	HS-LS2-7

The State Education Department / The University of the State of New York

Regents Examination in Life Science: Biology – JUNE 2026

Chart for Converting Total Test Raw Scores to Final Exam Scores (Scale Scores)

(Use for the June 2026 exam only.)

Raw Score	Scale Score	Performance Level
49	**100**	5
48	**99**	5
47	**99**	5
46	**98**	5
45	**97**	5
44	**96**	5
43	**95**	5
42	**93**	5
41	**92**	5
40	**91**	5
39	**90**	5
38	**89**	5
37	**88**	5
36	**86**	5
35	**85**	5
34	**84**	4
33	**83**	4

Raw Score	Scale Score	Performance Level
32	**82**	4
31	**81**	4
30	**80**	4
29	**79**	4
28	**77**	4
27	**76**	4
26	**75**	3
25	**73**	3
24	**72**	3
23	**70**	3
22	**69**	3
21	**67**	3
20	**65**	3
19	**63**	2
18	**60**	2
17	**58**	2
16	**56**	2

Raw Score	Scale Score	Performance Level
15	**55**	2
14	**50**	1
13	**47**	1
12	**44**	1
11	**41**	1
10	**37**	1
9	**34**	1
8	**30**	1
7	**26**	1
6	**23**	1
5	**19**	1
4	**15**	1
3	**11**	1
2	**8**	1
1	**4**	1
0	**0**	1

To determine the student's final examination score (scale score), find the student's total test raw score in the column labeled "Raw Score" and then locate the scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart change from one administration to another, it is crucial that for each administration the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Regents Examination in Life Science: Biology.