The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Friday, January 24, 2025 — 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.

A separate answer sheet for multiple-choice questions in Parts A, B–1, B–2, and D has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

You are to answer all questions in all parts of this examination. Record your answers for all multiple-choice questions, including those in Parts B–2 and D, on the separate answer sheet. Record your answers for all open-ended questions directly in this examination booklet. All answers in this examination booklet should be written in pen, except for graphs and drawings, which should be done in pencil. You may use scrap paper to work out the answers to the questions, but be sure to record all your answers on the answer sheet or in this examination booklet as directed.

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 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.

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

Part A

Answer all questions in this part. [30]

Directions (1–30): For *each* statement or question, record on the separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question.

1 When you cut your finger, new skin quickly grows that repairs and replaces the damaged skin cells. Information directing this process is located in the

(1) mitochondria in neighboring skin cells, which provide the energy needed for mitotic cell division
(2) mitochondria in neighboring skin cells, which provide the energy needed for meiotic cell division
(3) DNA of neighboring cells, which divide by mitotic cell division
(4) DNA of neighboring cells, which divide by meiotic cell division

2 ATP is produced in the

(1) vacuoles
(2) nuclei
(3) mitochondria
(4) ribosomes

3 Some trees release toxins into the soil that can kill the plants nearby. This ability can best be described as

(1) a means of establishing a consistent soil pH
(2) a benefit to the ecosystem, since it results in increased biodiversity
(3) a trait acquired by the species to eliminate the consumers that feed on them
(4) an evolutionary advantage, reducing competition for water, nutrients, and sunlight

4 When the frequency of a gene in a population changes, the most likely result would be

(1) ecological succession
(2) biological evolution
(3) species extinction
(4) genetic mutation

5 During the 1880s, in an attempt to control the rat population, the Asian mongoose was brought to the Hawaiian Islands. However, there was a flaw in the plan. Rats are active at night, while mongooses feed on birds and eggs during the day. They had little effect on the rat population. The mongoose population rapidly increased and caused the extinction of many bird species native to the islands.

Bringing mongooses to the Hawaiian Islands is an example of

(1) a technological fix to solve problems caused by population growth
(2) developing a research plan to study unintended outcomes
(3) humans altering ecosystems, resulting in unintended consequences
(4) an imported species solving an ecological problem

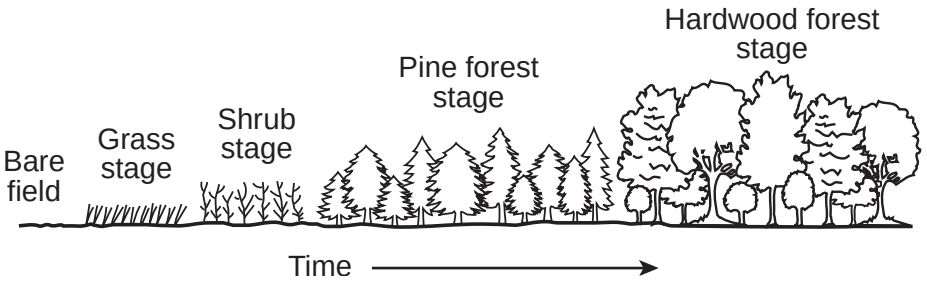
6 Many companies today are looking for ways to reduce the use of finite resources. They are working to recycle, reuse, and repair more products to reduce dumping and pollution. Which statement best describes a positive result of these changes?

(1) Fossil fuels will be renewed for future generations to utilize.
(2) Finite resources will not be depleted as quickly.
(3) These activities can result in unstable ecosystems.
(4) Destruction of ecosystems will result in a loss of biodiversity.

7 Which characteristic would give one species the greatest advantage over other species?

(1) higher number of surviving offspring
(2) lower number of matings
(3) lower adaptation to the environment
(4) higher rate of disease

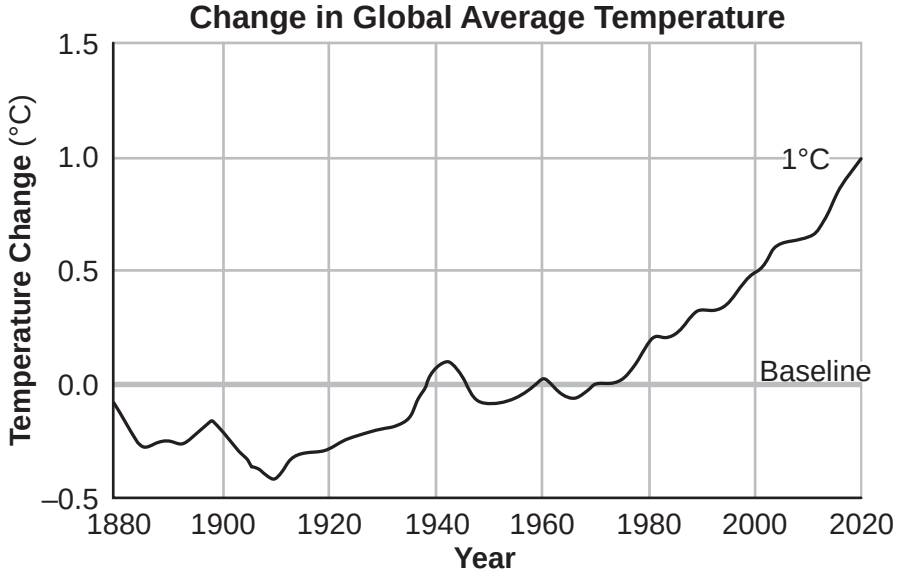
8 The diagram below represents the same location over a period of many years.



As a result of these changes,

(1) biodiversity in the area decreases
(2) the community becomes more stable
(3) the community becomes less stable
(4) biodiversity is not affected

9 Between 1880 and 2020, Earth's temperature increased slightly more than 1°C.



The best explanation for this increase is

(1) a decrease in the amount of sunlight reaching Earth each year
(2) an increase in the amount of solar radiation reflected back into space
(3) changing concentrations of gases in the atmosphere
(4) volcanic activity releasing ash and dust into the atmosphere

10 Two different species of animal prefer the same plant for food. One eats the leaves of the plant, the other prefers the fruit. By eating different parts of the same plant these species can successfully coexist because they do not

(1) compete for limited resources
(2) live in the same area
(3) reproduce at the same time of year
(4) interact in a predator-prey relationship

11 Different techniques are used to study cells. Fluorescent (glowing) tags allow scientists to visualize specific proteins as they are synthesized inside cells. Which part of a cell would be studied when using this technology to visualize protein synthesis?

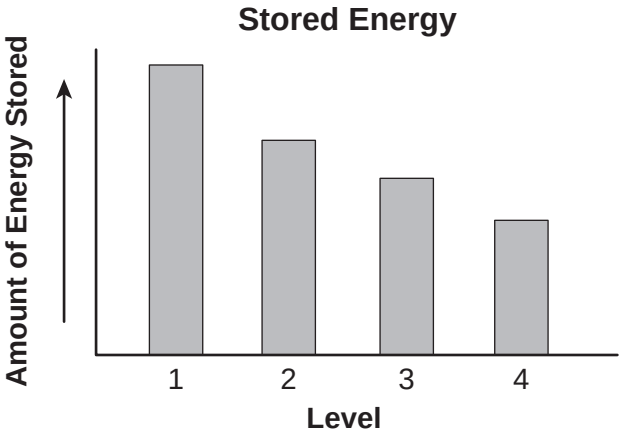
(1) nucleus
(2) ribosome
(3) cell wall
(4) cell membrane

12 The image below shows a recently discovered fossil of an unhatched egg of a theropod dinosaur. The dinosaur is in a prehatching position similar to bird embryos in unhatched eggs today. Prior to finding the fossil, this behavior was never seen in animals other than birds.

The fact that both theropod dinosaurs and birds share this behavior is evidence that

(1) birds and theropod dinosaurs are related and share a common ancestor
(2) animals that develop in eggs must use this behavior to survive
(3) this behavior decreases reproductive success
(4) behaviors like this must be learned from parents

13 The graph below represents the amount of stored energy in each level of an energy pyramid.



The amount of stored energy between level 1 and level 4 *decreases* because

(1) there are more organisms at level 4
(2) level 1 has more consumers
(3) at each level some energy is released as heat
(4) there are more producers at each level

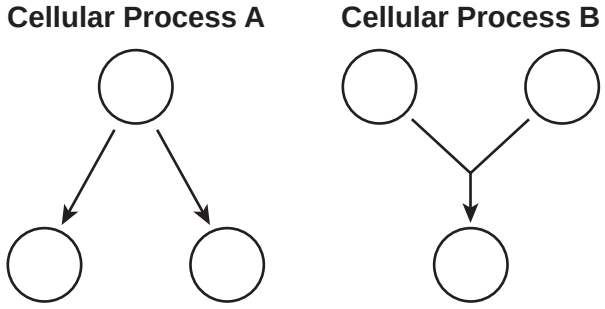
14 In a sexually reproducing species of plant, which change could occur that would have an effect on the species in the future?

(1) changes in the egg cells in the ovaries of the plants' flowers
(2) variations that occur in the root cells of the plants in a field
(3) differences in leaf cells that are exposed to solar radiation
(4) a change in the DNA sequence caused by ultraviolet radiation in the cells of the plants' stems

15 Many factors go into producing goods that are used by people in their everyday lives. In manufacturing, the production of goods and use of energy

(1) is always positive because it is the only way for goods to be produced
(2) can only be negative because it generates a lot of pollution
(3) is neither positive nor negative because the energy is necessary
(4) can have both positive and negative effects

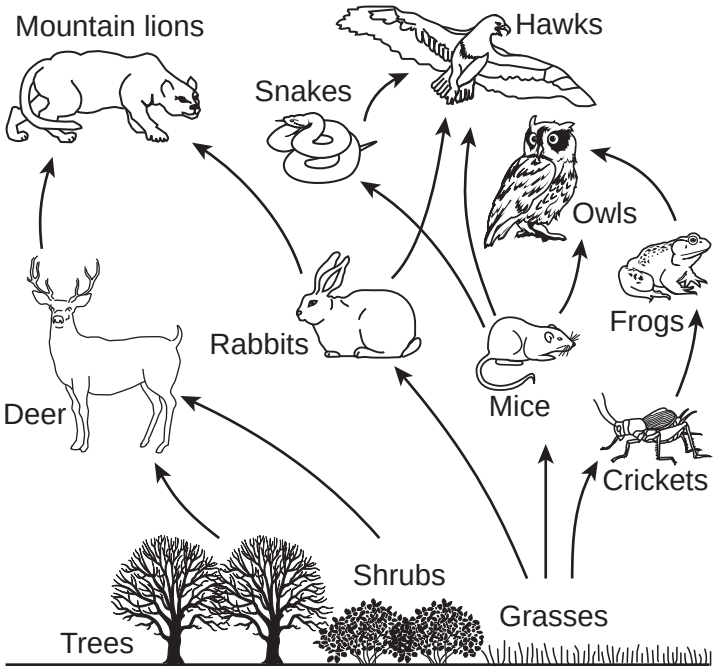
16 The illustration below represents two cellular processes, *A* and *B*.



Select the row in the table that correctly identifies the cellular process.

Row	Cellular Process A	Cellular Process B
(1)	meiosis	differentiation
(2)	recombination	cloning
(3)	fertilization	recombination
(4)	mitosis	fertilization

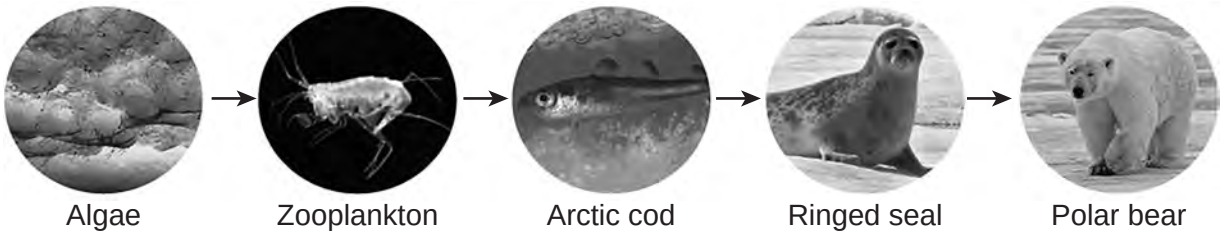
17 A food web is represented below.



A chemical was introduced into this environment that caused a decrease in the population of mice. This would most likely cause

(1) an increase in the deer population
(2) an increase in the shrub population
(3) a decrease in the tree population
(4) a decrease in the snake population

18 Populations of organisms making up an Arctic food chain are represented below.



Which statement concerning this food chain is the most accurate?

(1) The greatest amount of energy in this food chain is located in the polar bear population.
(2) Zooplankton, which provide food for the cod, are the main producers in this chain.
(3) A reduction in the algae populations would most likely affect the survival of all the other populations in this food chain.
(4) The organisms in this chain can all produce their own energy during long periods of cold weather.

19 The protein in a hamburger is broken down into amino acids. Which two processes are involved in the breakdown of the protein and the absorption of the amino acids into the bloodstream?

(1) synthesis and mitosis
(2) digestion and diffusion
(3) mitosis and digestion
(4) active transport and replication

20 Tuatara are the last survivors of an ancient group of reptiles that lived at the same time as the dinosaurs. Tuatara contain a very large genome. The genome, its complete set of genes, is about two-thirds bigger than the human genome.

One possible explanation for why the tuatara has survived since prehistoric times is that their large genome

(1) has enabled them to live on a part of Earth that has not gone through any environmental changes since the time of the dinosaurs
(2) provided the members of the species with characteristics that gave them advantages for survival in changing environments
(3) can mutate when the species needs to develop characteristics that will adapt the members to live in areas that are very cold or very warm
(4) can rearrange genes so that the species evolves when environmental changes occur

21 *Two* primary chemical messengers used in communication within the human body include

(1) antibodies and pathogens
(2) organic catalysts and toxins
(3) enzymes and antigens produced by body cells
(4) hormones and chemicals produced by nerve cells

22 Holstein cows have become the most widespread breed of dairy cow in the United States. They have been selectively bred to have many characteristics beneficial to dairy farmers. Holsteins are known for their ability to produce large quantities of milk. In addition, they are often calm and agreeable animals.

Which statement best describes a potential risk of the selective breeding process to future generations of Holstein dairy cows?

(1) Genetic diversity in the breed may become limited over time.
(2) It increases the chances of having even more desired characteristics.
(3) It results in many highly productive and long-lived animals.
(4) It improves the health of future generations of Holstein cattle.

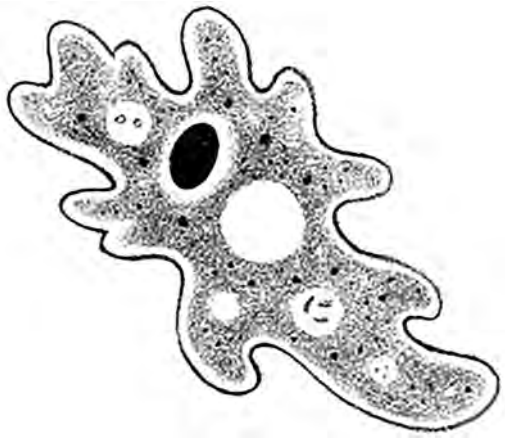
23 An organism that normally has 32 chromosomes in its body cells is found to be producing gametes with either 15 or 17 chromosomes. It has not been able to successfully reproduce. The most likely reason for its inability to reproduce would be errors during the process of

(1) mitosis
(2) differentiation
(3) meiosis
(4) cloning

24 Which sequence correctly identifies the flow of energy through an ecosystem?

(1) producers → consumer → herbivore
(2) consumer → decomposer → producer
(3) carnivore → herbivore → producer
(4) producer → consumer → decomposer

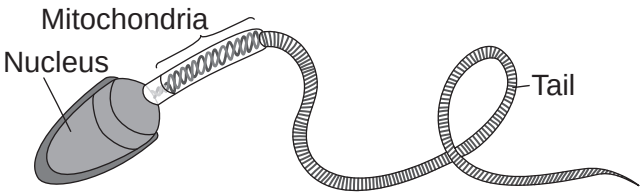
25 An ameba, which is a single-celled aquatic organism, is represented below.



Which of the ameba's cell structures is the most important in obtaining oxygen from its environment?

(1) cell membrane
(2) ribosome
(3) mitochondrion
(4) cell wall

26 The diagram below represents a specialized gamete that plays a role in human reproduction.



The proper functioning of cells like these is vital for human reproduction because

(1) its mitochondria provide the nutrition to support the embryo
(2) the tail makes it possible to deliver all the genetic information needed in a zygote
(3) the cell differentiates to form specialized structures such as tissues and organs
(4) its nucleus carries half the genetic information needed to form a zygote

27 If the amounts of carbon dioxide and water available increase, it is most likely that the first response by the producer organisms would be to

(1) increase glucose synthesis
(2) increase DNA synthesis
(3) decrease amino acid synthesis
(4) decrease nucleic acid synthesis

28 There are high numbers of stray and feral cats in communities across the United States. In order to humanely control these cat populations, many areas are participating in programs to trap, spay, and release the animals. When a female cat is spayed, organs are surgically removed to prevent the animal from being able to reproduce. Which *two* organs are most likely removed from the female cat during this surgery?

(1) uterus and placenta
(2) ovaries and uterus
(3) ovaries and stomach
(4) placenta and testes

29 When you purchase a fishing license in New York State, you are told to check the *Advisory Tables* before consuming any of the fish you catch. The tables list the fish species you should not eat and others you can eat up to four times per month, due to the presence of toxic chemicals in the fish.

A likely reason the table recommends that children under the age of 15 and young women should *not* eat any of the fish caught in some bodies of water is that

(1) young women and children already have a large amount of these chemicals in their bodies
(2) the chemicals may affect their development or harm potential unborn children
(3) the chemicals do not affect males, so they can eat up to four of the fish per month
(4) the fish species on the list are in danger of extinction

30 Examples of two abiotic resources present in an ecosystem are

(1) nitrogen and carbon dioxide in the atmosphere
(2) animal species and water
(3) the plant species and soil minerals
(4) populations of decomposers and pH of the soil

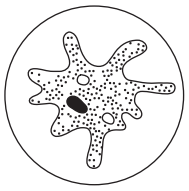
Part B–1

Answer all questions in this part. [13]

Directions (31–43): For *each* statement or question, record on the separate answer sheet the *number* of the word or expression that, of those given, best completes the statement or answers the question.

31 Organisms *A* and *B* represent microorganisms viewed through a microscope. Although both seem to occupy the same field of view, which organism is actually larger?

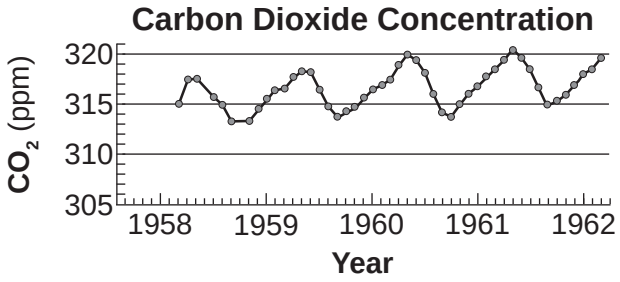
Organism A
viewed with 10x objective



Organism B
viewed with 40x objective

(1) *A* is larger since it fills the field of view at low magnification.
(2) *B* is larger since the magnification is lower.
(3) *A* is larger since the magnification is higher.
(4) *B* is larger since it fills the field of view at high magnification.

32 The data represented in the graph below show differences in the concentration of carbon dioxide (CO_2) in the atmosphere during the summer and winter months.



Which statement best explains why these differences occur?

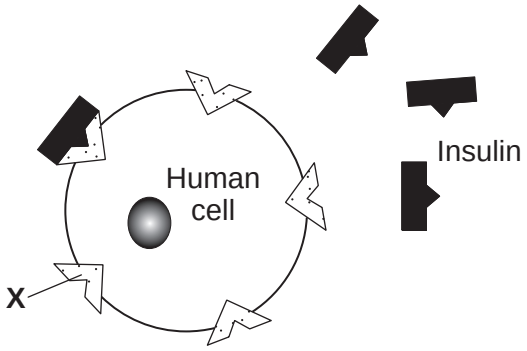
(1) The rate of respiration in plants increases during the summer, releasing more CO_2 into the atmosphere.
(2) The activity of decomposers increases during the winter months, removing large amounts of CO_2 from the atmosphere.
(3) The increased exposure of plants to sunlight during the winter results in increased CO_2 production.
(4) The activity of autotrophs increases during the summer, removing CO_2 from the atmosphere.

33 Altering the DNA of a muscle cell in a mouse by substituting one base pair with another could likely

(1) change all the DNA sequences in the mouse
(2) change one amino acid in a protein a muscle cell produces
(3) alter the carbohydrates that the muscle cells' ribosomes produce
(4) alter the DNA of the offspring of the mouse

Base your answers to questions 34 and 35 on the diagram and information below and on your knowledge of biology.

34 The diagram below represents the interaction of a human cell and the hormone, insulin, that maintains a healthy blood glucose level in the body.



Structure *X* is best described as a

(1) signal molecule that is attached to the cell wall
(2) protein molecule that releases energy that can be used by the cell
(3) carbohydrate molecule that sends signals to other cells
(4) receptor molecule that allows the cell to respond to changes

35 Some individuals cannot produce insulin. As a result, their cells will

(1) produce another molecule to take over the function of insulin
(2) synthesize more glucose for energy production
(3) not respond appropriately to changes in blood glucose levels
(4) divide at a faster rate than when insulin is available

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36 Two different human disorders are compared in the table below.

Blood Disorder That Affects Hemoglobin	Skin Disorder With a Sore That Does Not Heal
• caused by a gene mutation • individuals with two copies of the mutated gene have the disorder • this disorder is more common in some populations than in others • individuals are born with this disorder	• caused by a gene mutation • some individuals exposed to UV radiation develop the disorder • there are environmental factors associated with the disorder • abnormal skin cells reproduce rapidly in exposed individual

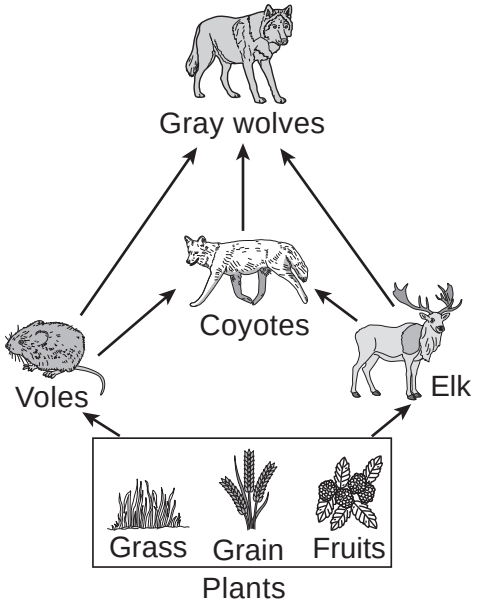
Which statement describes the patterns of inheritance for these two disorders?

(1) The blood disorder is not inherited but the skin disorder is inherited.
(2) Both the blood and skin disorders are not inherited but can be passed to offspring.
(3) The blood disorder can be inherited, and there are factors associated with the skin disorder that may be inherited.
(4) Both the blood and skin disorders can be inherited, with offspring always showing symptoms associated with the disorders.

Base your answers to questions 37 and 38 on the diagram and information below and on your knowledge of biology.

Gray wolves have been identified as a keystone species, which is a species that is critical to the health of the Yellowstone ecosystem.

Food Web in the Yellowstone Ecosystem



37 The ecosystem will be disrupted with the loss of this keystone species because the loss would lead to

(1) a decrease in the elk population
(2) a decrease in the coyote population
(3) an increase in the plant populations
(4) a decrease in the plant populations

38 Due to human concerns, wolves were removed from the Yellowstone ecosystem for approximately 70 years, from the 1920s until 1995. Scientists felt that, as a keystone species, it was important to reintroduce the wolves to

(1) increase the stability of the natural environment
(2) limit the use of pesticides to control plant populations
(3) increase the reproductive rate of the elk population
(4) stimulate growth of the coyote population

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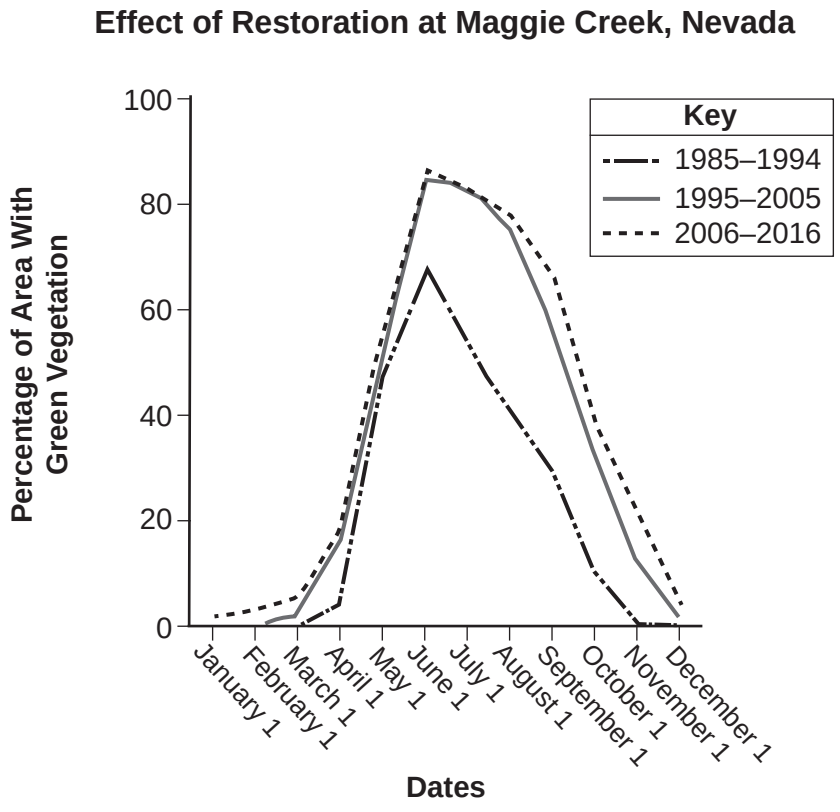
39 Hydrangeas are plants with flowers that can change color. If the pH of the soil in which the plants are growing is altered, the flower color can vary from pink to blue. What is the best explanation for this phenomenon?

(1) The genes of the hydrangea plants are mutated by the change in pH.
(2) Some of the genes of the hydrangea plants die off due to the pH change.
(3) The genes of the hydrangea plants can be turned on and off by different soil pH levels.
(4) The genes of the hydrangea plant change chromosomes with different soil pH levels.

Base your answers to questions 40 and 41 on the information below and on your knowledge of biology.

In the 1990s, ranchers on Maggie Creek in Nevada moved the areas where their cattle were grazing. The move was done to help vegetation regrow on the banks of the creek, which had been eroding due to lack of vegetation.

After the move, vegetation began to return to the creek banks. The graph below shows the changes in the amount of green vegetation from 1985 to 2016.



40 How many more months did the Maggie Creek area have some green vegetation cover in 2006-2016, compared with the number of months of green cover in 1985-1994?

(1) 5 months
(2) 7 months
(3) 3 months
(4) 10 months

41 The change in the environmental conditions of Maggie Creek over time is an example of how

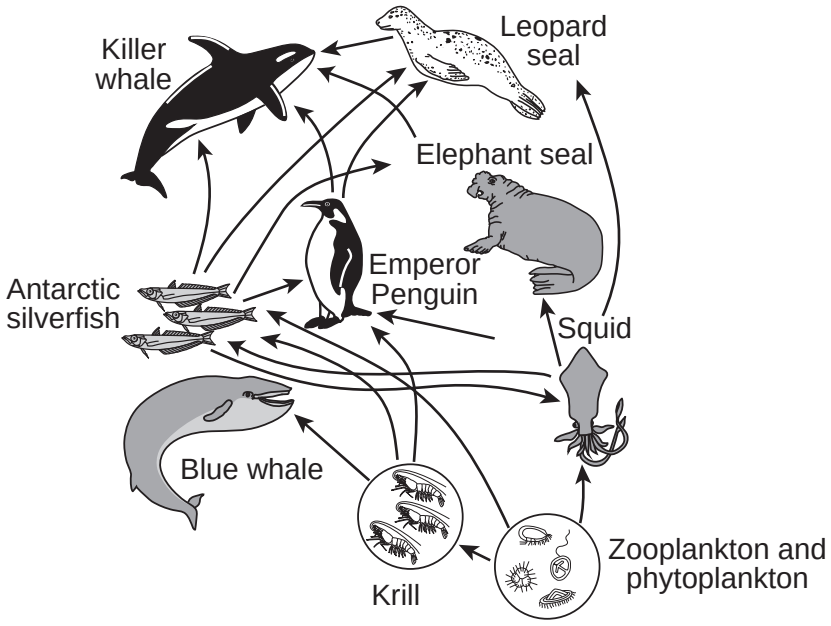
(1) human actions in one state can cause an ecosystem to develop into a stable grassland community in another state
(2) grazing animals will eventually have a positive environmental effect on the land where they are kept
(3) changing agricultural practices can help to restore environmental stability to certain locations
(4) once humans interfere with environmental factors, stability cannot be restored in an ecosystem

Base your answer to question 42 on the information below and on your knowledge of biology.

PCBs in the Environment

PCBs are chemicals once used in electrical equipment. Their use has now been banned because PCBs have been found to cause cancer. These harmful chemicals made their way into the ocean and have accumulated in the tissues of organisms. Beginning with the producers, the levels of PCBs become more concentrated as larger organisms eat smaller ones. It has been shown that organisms higher in the food chain contain the greatest levels of PCBs.

A student examined the diagram below of an Antarctic food web and made the claim that the greatest concentration of PCBs would be found in leopard seals.



42 Based on information provided in the Antarctic food web, *one* reason blue whales may contain a lower concentration of PCBs than killer whales is that blue whales

(1) eat krill, which have a lower accumulation of PCBs than penguins and elephant seals
(2) eat only plants that contain PCBs
(3) are eaten by killer whales that accumulate PCBs from blue whales and other species
(4) do not live as long as killer whales, and therefore their PCB concentration is lower

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43 *C. explodens*, a species of ant that resides in the tropical jungles of Borneo, can explode when their nest is threatened. The nests contain adult ants, eggs, and larvae. When an adult ant comes in contact with an enemy ant, the *C. explodens* ant latches onto it and squeezes its own abdominal muscles until its abdomen bursts open, releasing a toxic goo.

Which statement best describes this phenomenon?

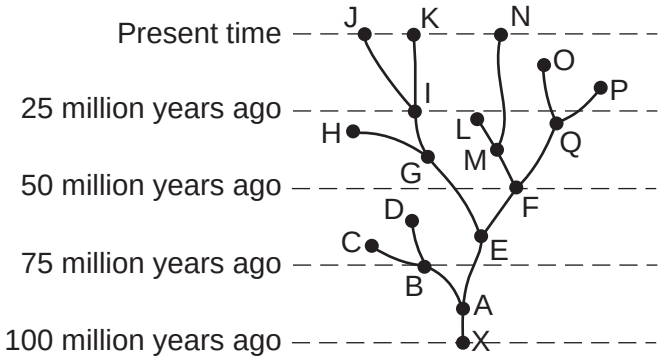
(1) The ants needed a way to protect their offspring, so they developed a way to release a toxic goo to kill enemies.
(2) This behavior has resulted in greater reproductive success of the ants, since it kills the enemies who would have fed on their offspring.
(3) The offspring of the ants will not inherit the exploding abdomen trait because this trait is not genetic.
(4) The ant species will likely become extinct, since most of them die while protecting the nest.

Part B–2

Answer all questions in this part. [12]

Directions (44–55): For those questions that are multiple choice, record on the separate answer sheet the *number* of the choice that, of those given, best completes each statement or answers each question. For all other questions in this part, follow the directions given and record your answers in the spaces provided in this examination booklet.

Base your answer to question 44 on the diagram below and on your knowledge of biology. The diagram represents an evolutionary pathway for certain organisms over many years.



44 Identify the organism in the diagram that became extinct about 60 million years ago. [1]

_____

Base your answers to questions 45 through 48 on the information below and on your knowledge of biology.

The Common Loon

Loons are aquatic birds found on freshwater lakes throughout Canada and the northern part of the United States from early spring through fall. They inhabit lakes over five acres in size, with clear water and a good supply of fish for food. They migrate to coastal areas for the winter.

In most states where loons are found, they are at risk of becoming extinct and require management to ensure the health of the population. To help keep track of how many loons are living on specific lakes, state wildlife specialists train volunteer citizen scientists how to monitor loon populations during breeding season. This provides additional data that helps researchers determine loon population trends and factors affecting their survival.

During the breeding season, a pair of loons typically produces one or two chicks per year. The chicks are slow to mature. They are usually seven years old before their first successful breeding season.

Loons have dense bones rather than the hollow bones characteristic of most birds. Their wings are comparatively small for their body size. Adults weigh an average of 8–12 lbs. Another trait of loons is their large, webbed feet and legs set far back on their bodies. To fly, they run on top of the water, and flap their wings to gain enough momentum for liftoff.

The data table below shows the number of adult loons and chicks counted in the southern part of Maine between 1985 and 2020.

Number of Loon Adults and Chicks Counted in Southern Maine 1985-2020

Year	Chicks	Adults
1985	200	1470
1995	260	2650
2010	280	2780
2017	453	2817
2019	372	2820
2020	414	2974

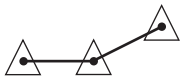
Directions (45–46): Using the information given in the data table, construct a line graph on the grid provided, following the directions below.

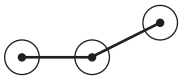
45 Mark an appropriate scale, without any breaks in the data, on *each* labeled axis. [1]

46 Plot the data for both the adults *and* the chicks following the directions below: [1]

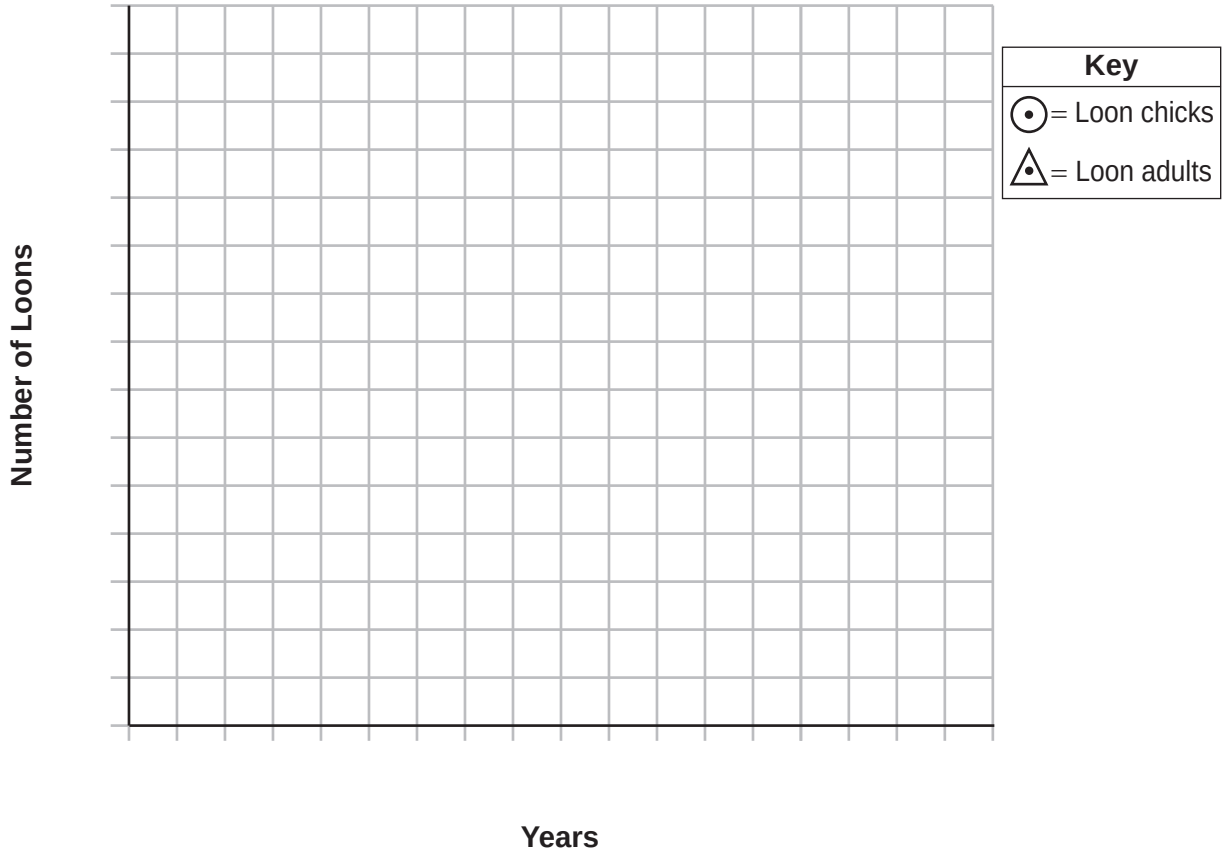
— Plot the data for the loon adults on the grid and connect the points. Surround each point for the loon adults with a small triangle.

— Plot the data for the loon chicks on the grid and connect the points. Surround each point for the loon chicks with a small circle.

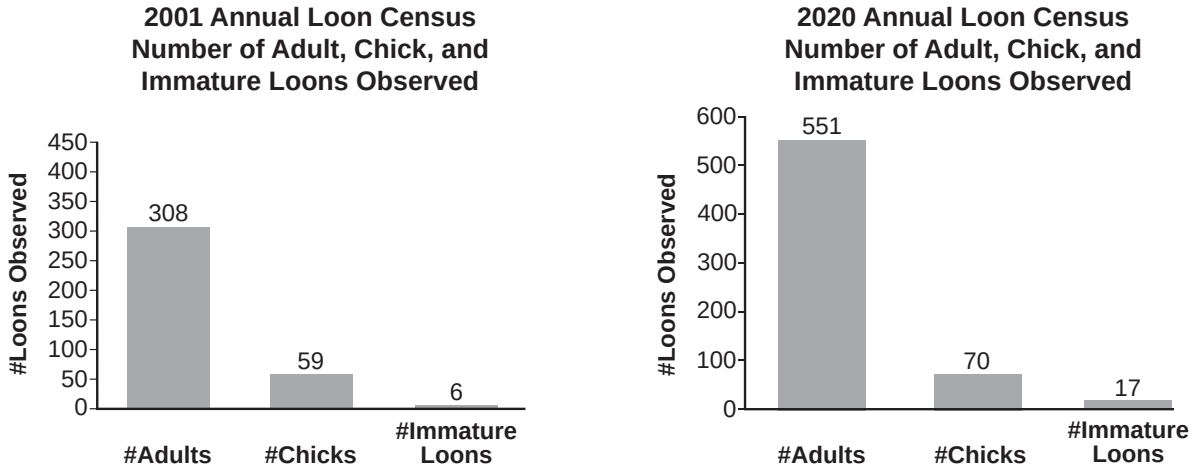
Example:  (loon adults)

Example:  (loon chicks)

Number of Loon Adults and Chicks Counted in Southern Maine 1985-2020



Below are two graphs showing the number of loon adults, immature loons, and chicks observed during the annual loon census conducted by the Audubon Society of New York on the lakes and ponds throughout the Adirondack Park in New York State.



Note: The answer to question 47 should be recorded on your separate answer sheet.

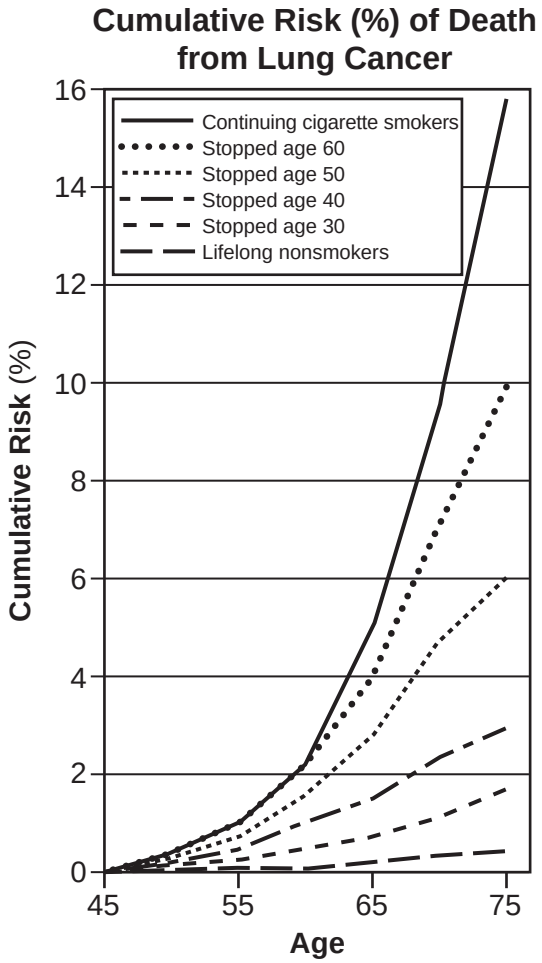
47 The best explanation for why loon populations did *not* show a rapid change in size during the Maine and New York studies is that loons

(1) produce three or four chicks per year
(2) take seven years to reach sexual maturity
(3) live mainly on large lakes
(4) were counted by volunteers, not wildlife experts

48 Compare the trend in loon population sizes over time represented in the two New York graphs above to the trend observed in the data table for the southern part of Maine. Support your answer with information from the New York graphs and Maine data table. [1]

Base your answer to question 49 on the graph below and on your knowledge of biology.

The graph shows the effects of stopping smoking at different ages along with the cumulative risk (%) of death from lung cancer up to age 75 in men. The study took place in the United Kingdom.

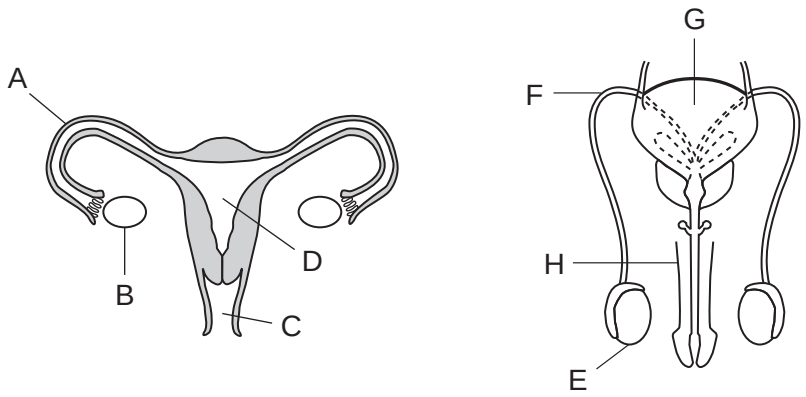


Note: The answer to question 49 should be recorded on your separate answer sheet.

49 Doctors claim that the earlier someone stops smoking, the lower the risk of dying of lung cancer. Which statement best describes evidence that supports this claim?

(1) Men that smoked 40 cigarettes per day have the same risk as smoking 20 cigarettes per day at any age.
(2) Men that continued to smoke had an approximately 16% risk of death, and those that stopped at age 30 had a lower risk.
(3) Men that never smoked had the same risk as those that smoked until the age of 30.
(4) Men that stop smoking at age 40 have a greater risk of bladder cancer than lung cancer.

Base your answers to questions 50 and 51 on the diagram below and on your knowledge of biology. The diagram represents the reproductive systems of the human female and male.



Note: The answer to question 50 should be recorded on your separate answer sheet.

50 The two labeled structures that function to produce gametes and hormones are

(1) *A* and *F*
(2) *B* and *E*
(3) *C* and *H*
(4) *D* and *G*

51 Pelvic inflammatory disease and sexually transmitted infections can lead to a blockage of the structure represented by letter *A*. Explain how this blockage would interfere with the formation of a zygote. [1]

52 Detritivores are animals that consume and break down dead plant and animal matter from ecosystems. Explain why the decline and extinction of many species of detritivores may have *negative* consequences on the stability of an ecosystem. [1]

Base your answers to questions 53 and 54 on the information and photograph below and on your knowledge of biology.

A research team of students added water and an experimental enzyme to a jar containing a piece of the type of plastic that is commonly used in food packaging. Several days later, the plastic was no longer visible.

Jar with original plastic → Jar several days later

53 Identify *one* factor that would influence the rate at which the experimental enzyme breaks down this type of plastic. [1]

The research team claimed that the experimental enzyme would break down all plastics. The students repeated the experiment with a different type of plastic. This time, the plastic was not broken down by the enzyme.

54 Explain why the enzyme is *not* able to break down all types of plastics. [1]

Base your answer to question 55 on the information below and on your knowledge of biology.

Ultrasonic repellents are electronic devices designed to repel and remove household pests. When plugged in, they produce ultrahigh-frequency sound waves to chase away mice, rats, fleas, cockroaches, silverfish, and spiders. The sound these devices make cannot be heard by humans. These pest-control devices are often used in environments where the use of poison is prohibited or not recommended.

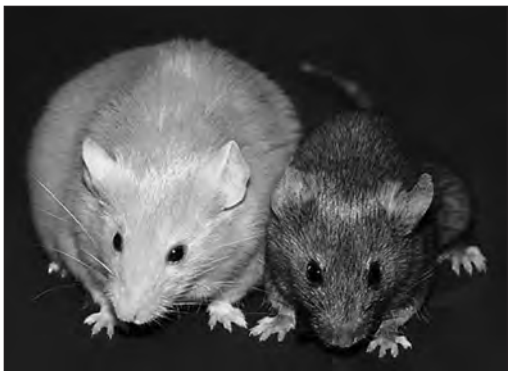
55 Identify *one* concern, other than its effectiveness, that people might have before using it in their home. [1]

Part C
Answer all questions in this part. [17]

Directions (56–72): Record your answers in the spaces provided in this examination booklet.

Base your answers to questions 56 and 57 on the information, photograph, and illustration below and on the next page, and on your knowledge of biology.

Mouse DNA and Epigenetics



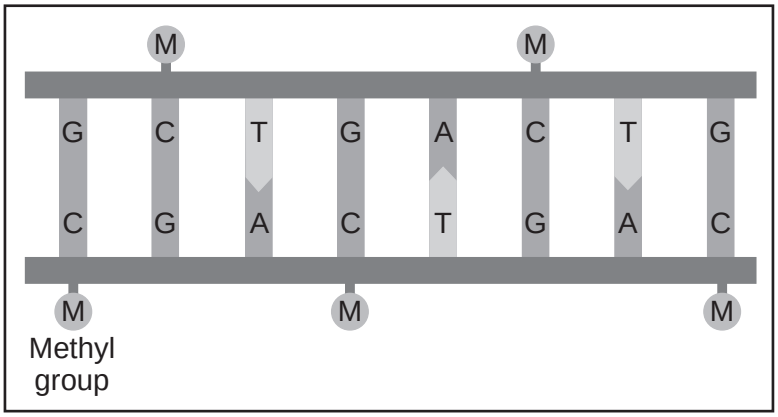
In 2000, scientists at Duke University designed an experiment using mice that carry a gene for yellow fur color. Mice with the yellow fur gene also have a large appetite and a tendency to develop cancer and diabetes. The photo shows a mouse with the yellow fur gene (on the left) next to a normal mouse with the brown fur gene (on the right).

The scientists wanted to see if they could reduce the chances of the offspring of the yellow mice developing these diseases by changing the expression of the gene for yellow fur color.

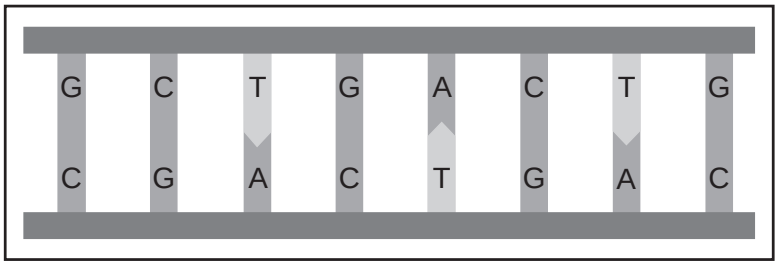
They began by changing the diet of yellow female mice to a diet containing food rich in methyl groups. Methyl groups are small clusters of chemicals that can attach to a gene and turn it off. Their offspring, that had methylated DNA, were found to be thin, have brown fur, and had less chance of developing cancer and diabetes.

The model illustrated below shows methylated and non-methylated DNA.

Methylated DNA



Non-Methylated DNA



The researchers concluded that the offspring were born with an epigenetic alteration to their DNA. Epigenetic alterations are inheritable changes in gene expression patterns independent of the primary DNA sequence. The expression of the gene is altered but the DNA sequence usually remains unchanged. In addition to diet, other factors such as hormones, physical activity, stress, tobacco, and alcohol use can also cause epigenetic changes.

56 Sometimes identical twins have different physical traits. Using the experiment Duke scientists performed on mice with the yellow fur color gene as a model, explain how epigenetics could be the cause of differences observed in identical twins. [1]

57 Explain why epigenetic changes are *not* usually considered to be mutations. [1]

Base your answer to question 58 on the information below and on your knowledge of biology.

A Scorpion's Secret Weapon Ingredient

Getting stung by a scorpion is painful. The pain serves as a warning to its predators to stay away.

Scorpion venom contains toxins that are recognized by the pain receptors on nerve cells. These receptors are the same as those that cause a burning feeling when you touch something hot. But, being stung by a scorpion is much more painful than touching a hot object.

The venom itself doesn't cause all of the pain. It also contains an acid that changes the pH of the area surrounding the affected nerve cells. The change in pH increases the intensity of the pain message.

58 In a population of scorpions, a mutation occurred that resulted in the venom having no effect on its predators. Explain why the number of predators that feed exclusively on scorpions would *decrease* over time. Justify your answer. [1]

Base your answers to questions 59 through 61 on the information below and on your knowledge of biology.

Scientists have studied the medicinal herb, *Fritillaria delavayi* (fritillary), which is very difficult to cultivate. This herb is used in Chinese traditional medicine to treat lung conditions such as bronchitis and bad coughs. This threatened herb grows wild among the rocks in dry, cold, mountainous places in China. Most fritillary have bright green leaves and sunny yellow flowers. The scientists have noticed something unusual: In places where people often gather and harvest the herb, more and more plants of the same species have a dull brown flower color. Many people have trouble finding this dull brown variety that blends in with the rocky area where it grows.

Fritillary Plant

Normal yellow individuals in areas with low harvesting rates

Dull brown individuals in areas with high harvesting rates

59 Identify the original source of the brown variation. [1]

60 Fritillary grows very slowly, taking five years to reproduce. Predict which flower color will be more common in areas accessible by humans after 20 years. Support your answer. [1]

61 Human efforts to cultivate this endangered species have not been successful. What argument could be made to justify continued efforts to preserve this species by cultivation? [1]

Three different food chains present in a food web are represented below.

(a) prickly pear cactus → antelope squirrel → western diamondback rattlesnake → red-tailed hawk

(b) saguaro cactus → wood rat → western diamondback rattlesnake

(c) brittlebrush → grasshopper mouse

62 Identify the food chain, (a), (b) or (c), in which there would be the *least* amount of energy available to the last consumer in the feeding sequence. Support your answer. [1]

Base your answers to questions 63 and 64 on the information below and on your knowledge of biology.

Woman Gives Birth After Uterus Transplant

Women with uterine factor infertility (UFI) either don't have a uterus or have a uterus that doesn't function. A uterus transplant has emerged as a potential solution for these women. In 2019, the first baby in North America was delivered by a mother who received a uterus transplant.

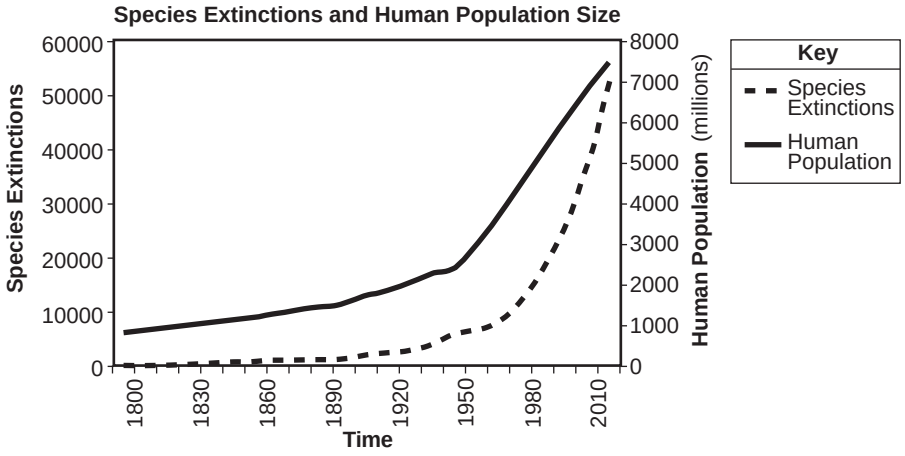
63 Describe a role of the uterus in the process of human reproduction. [1]

During pregnancy, the women are given medication to prevent the transplanted uterus from being rejected. After the baby is born, the transplanted uterus is removed.

64 Explain why a woman's body would reject a transplanted uterus if she does *not* take the medication. [1]

Base your answers to question 65 on the information and graph below and on your knowledge of biology.

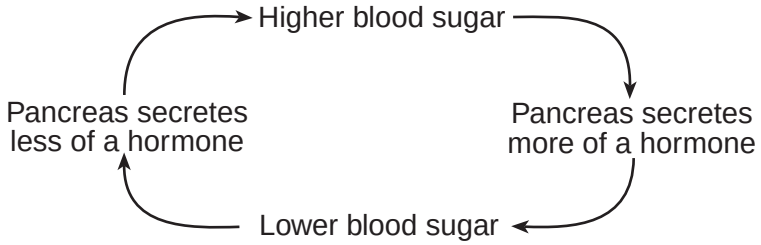
Human actions have affected the biodiversity of multiple ecosystems on Earth.



65 Make a claim as to how human actions have affected biodiversity. Support your claim with evidence from the graph. [1]

Base your answer to question 66 on the diagram below and on your knowledge of biology.

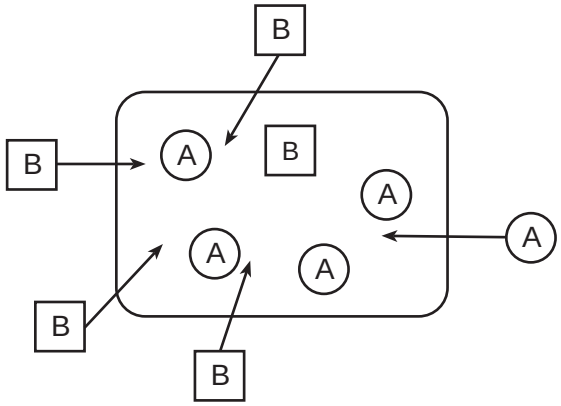
The diagram represents a feedback mechanism in humans.



66 An individual with a healthy pancreas eats a starchy snack. Explain why the pancreas would secrete more hormone a short time later. Support your answer with information from the diagram. [1]

Base your answer to question 67 on the information and diagram below and on your knowledge of biology.

The diagram represents two molecules, *A* and *B*, resulting from the digestion of foods, moving into a cell.

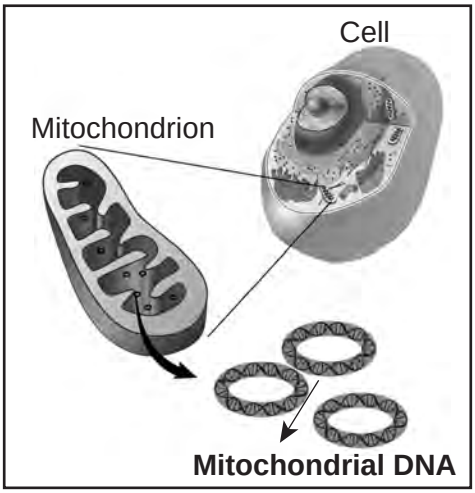


67 Explain how the lack of nutrients can impact the cellular process needed to move molecule *A* into this cell. [1]

Base your answers to questions 68 through 70 on the information below and on your knowledge of biology.

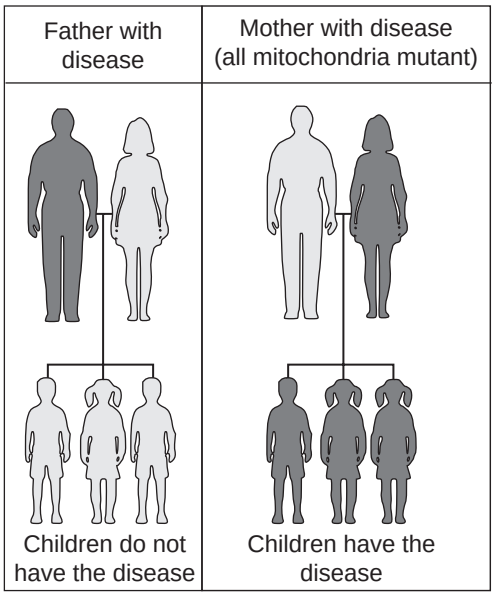
Mitochondria

Mitochondria are organelles present in most complex cells. The diagram below illustrates a typical mitochondrion in cells.



68 Explain why mitochondria are essential to the survival of complex organisms. [1]

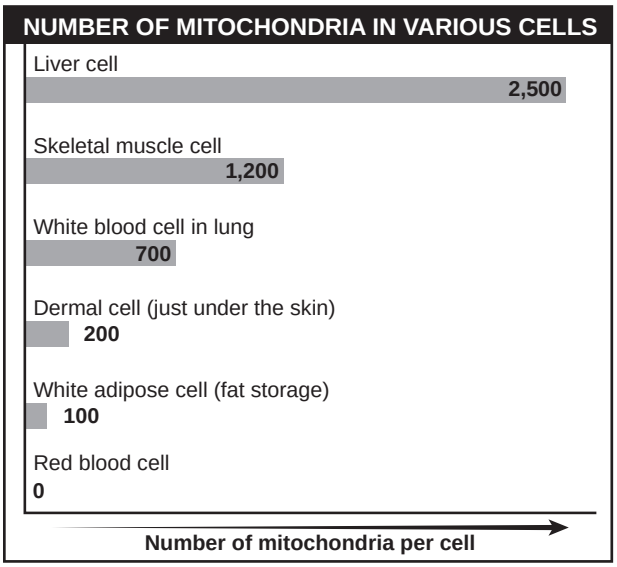
Mitochondrial Inheritance



Unlike most other organelles, mitochondria contain their own DNA. This DNA is in the form of a double-stranded, ring-shaped molecule that can replicate. The number of mitochondria in a cell can increase when mitochondria reproduce.

Mitochondrial DNA mutates. Some of these mutations have been linked to certain diseases in humans. Mitochondrial DNA is passed on to children through their mothers. The chart to the left illustrates this process.

69 Provide evidence from the mitochondrial inheritance chart that supports the claim that mitochondria are usually inherited from the mother. [1]



Different cells in the human body contain different numbers of mitochondria. The chart to the left shows the approximate number of mitochondria present in various cells.

70 State which cell type would probably be most affected by mitochondrial diseases. Support your answer. [1]

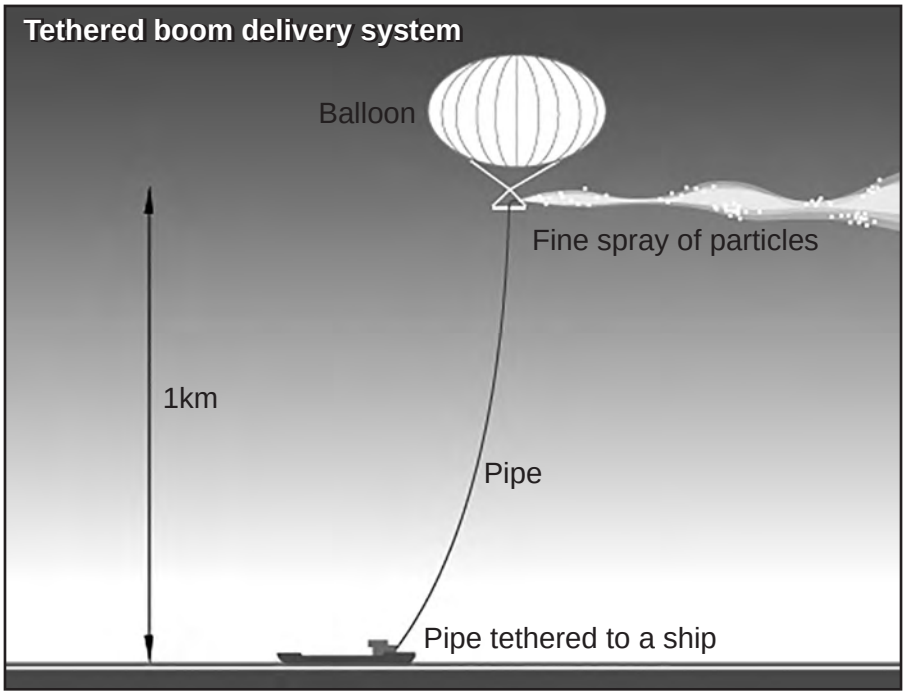
Base your answers to questions 71 and 72 on the information below and on your knowledge of biology.

Why Is the Sky White?

One method researchers are investigating to decrease the impact of climate change is stratospheric aerosol scattering. This involves using airplanes or balloons to spray tiny particles of sulfate aerosols or calcium carbonate into the upper atmosphere. The particles reflect sunlight back into space.

Climate modeling has shown that the use of this technology could lead to a decrease in extreme temperatures and the intensity of tropical storms. It could also reduce ice loss and sea-level rise as well.

However, there are risks associated with this technology. While the models show global benefits, local benefits might vary considerably. Also, since this technology doesn't address carbon emissions, as it continues to get warmer there will be a need to spray more and more particles into the atmosphere. This could change the appearance of the sky from blue to white. There are also concerns that introducing sulfate aerosols into the upper atmosphere could damage the ozone layer.



71 State *one* reason for supporting the use of this technology. [1]

72 Explain why it would be important to continue efforts to reduce carbon emissions even if this technology were to be used. [1]

Part D
Answer all questions in this part. [13]

Directions (73–85): For those questions that are multiple choice, record on the separate answer sheet the *number* of the choice that, of those given, best completes each statement or answers each question. For all other questions in this part, follow the directions given and record your answers in the spaces provided in this examination booklet.

Note: The answer to question 73 should be recorded on your separate answer sheet.

73 When the proportion of a gene for a specific trait in a population of finches increases over time, the most likely cause of this increase would be

(1) selective breeding
(2) species extinction
(3) natural selection
(4) ecological succession

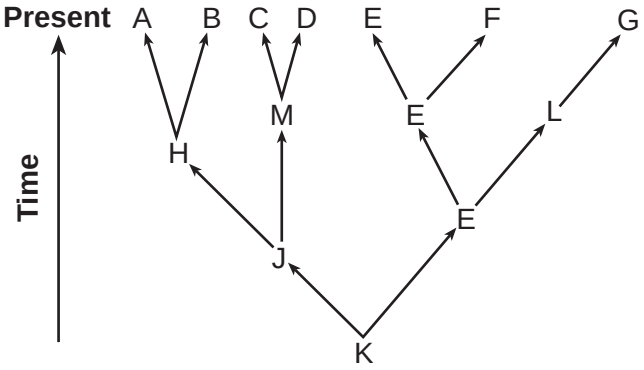
Note: The answer to question 74 should be recorded on your separate answer sheet.

74 A scientist conducts an experiment in order to

(1) choose variables
(2) test a hypothesis
(3) collect data
(4) identify a control

Base your answers to questions 75 through 77 on the information and diagram below and on your knowledge of biology.

The diagram represents evolutionary pathways of seven groups of organisms alive today.



Note: The answer to question 75 should be recorded on your separate answer sheet.

75 Which species is most closely related to species *M*?

(1) *E*
(2) *F*
(3) *G*
(4) *H*

Note: The answer to question 76 should be recorded on your separate answer sheet.

76 Which species appears to have been well adapted to its environment for a long period of time?

(1) *E*
(2) *F*
(3) *C*
(4) *D*

77 The diagram was based on fossil evidence. Explain why other forms of evidence would help support the accuracy of the evolutionary pathways represented in the diagram. [1]

78 When determining a pulse rate, why is it best to use the average of three readings? [1]

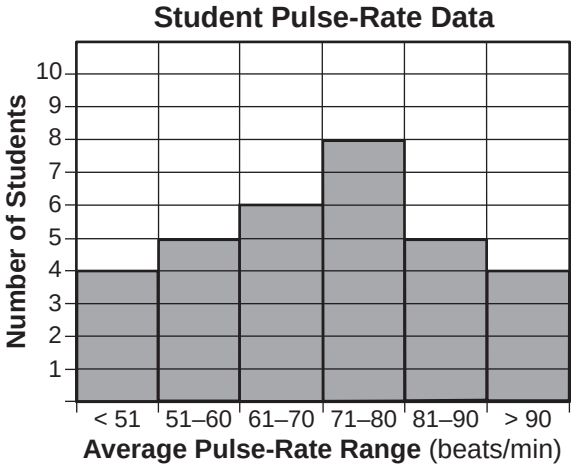
Base your answer to question 79 on the information below and on your knowledge of biology.

Selecting agents can have a significant impact on the size of many populations living in an area.

79 Identify *one* selecting agent that could have a potential impact on the number of individuals in the various penguin populations living in the Antarctic Peninsula. [1]

Base your answer to question 80 on the information below and on your knowledge of biology.

Pulse-rate data were collected from some students during their study hall. The data are shown in the histogram below.



80 State *one* way the data would most likely be different if the pulse rates were collected immediately after gym class instead of during study hall. [1]

Note: The answer to question 81 should be recorded on your separate answer sheet.

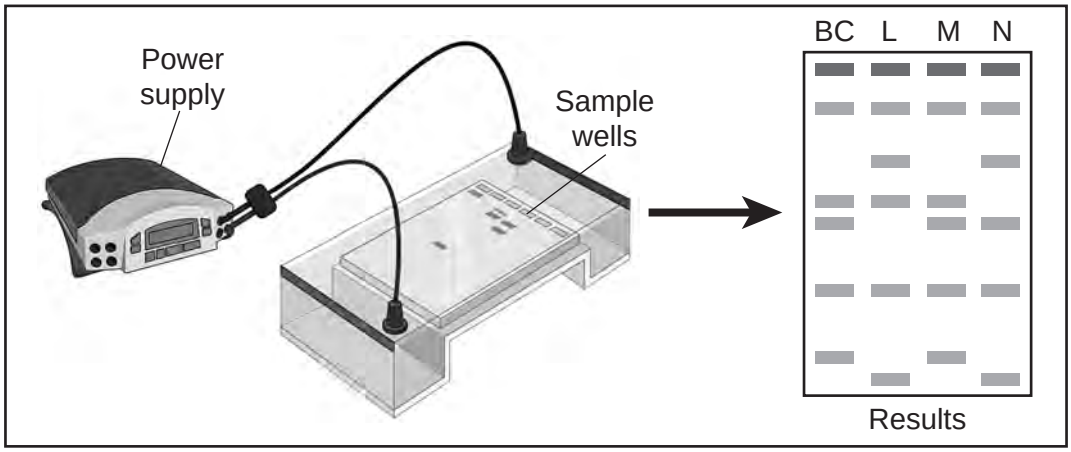
81 Ground finches in the Galapagos Islands are seed eaters. The beaks of the offspring are very close in size to the beaks of their parents. The best explanation for this observation is that

(1) a bird with a very small beak will die
(2) the temperature of the environment determines the size of the beak
(3) only birds with very small beaks are able to reproduce
(4) the size of the beak is determined mostly by genes

Base your answers to questions 82 and 83 on the information below and on your knowledge of biology.

A student was assigned the task of determining which of three species of plant (species *L*, *M*, or *N*) was most closely related to *Botana curus* (*BC*).

The student compared a segment of genetic material from each species using the procedure represented below.



Note: The answer to question 82 should be recorded on your separate answer sheet.

82 A valid conclusion that can be drawn from these results is that

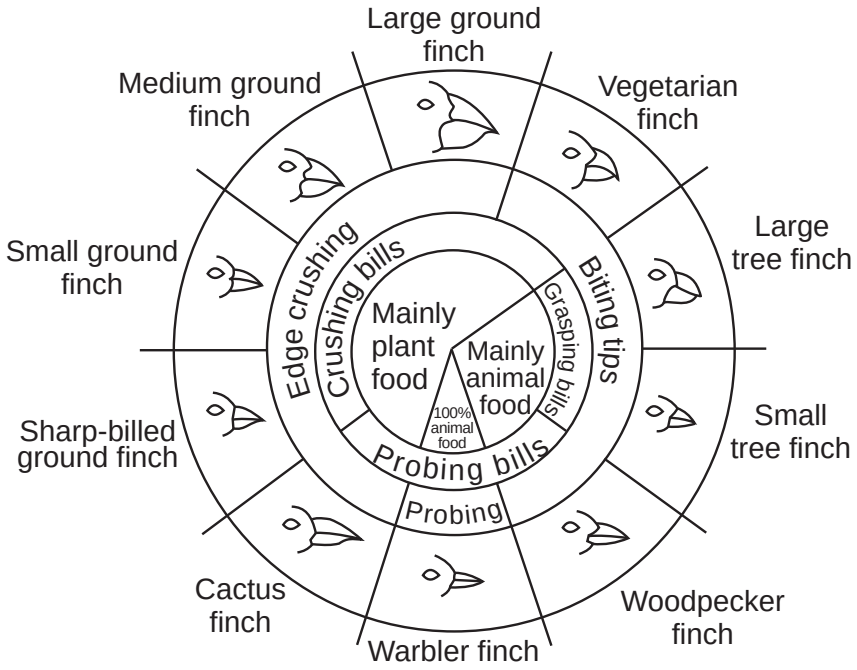
(1) genetic material is not useful in determining evolutionary relationships
(2) species *M* is most closely related to *BC*
(3) species *L* and *N* are most closely related to *BC*
(4) *BC* is not related to any of the species

83 Identify another biochemical test that would provide data to support which of the three plant species is most closely related to *Botana curus*. [1]

84 During physical activity, a person's pulse rate changes. Choose *one* body system, other than circulatory, that would be involved in maintaining homeostasis, and describe *one* change that would occur in that system. [1]

Base your answer to question 85 on the diagram below and on your knowledge of biology.

Variation in Beaks of Galapagos Islands Finches



85 State *one* reason why it would be possible for a single island to support populations of both small tree finches and sharp-billed ground finches. [1]

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LIVING ENVIRONMENT

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

Regents Examination in Living Environment – January 2025

Scoring Key: Parts A, B-1, B-2 and D (Multiple-Choice Questions) - Updated, 12:30 p.m., 1/24/2025

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
Living Environment	January '25	1	3	MC	1	1
Living Environment	January '25	2	3	MC	1	1
Living Environment	January '25	3	4	MC	1	1
Living Environment	January '25	4	2	MC	1	1
Living Environment	January '25	5	3	MC	1	1
Living Environment	January '25	6	2	MC	1	1
Living Environment	January '25	7	1	MC	1	1
Living Environment	January '25	8	2	MC	1	1
Living Environment	January '25	9	3	MC	1	1
Living Environment	January '25	10	1	MC	1	1
Living Environment	January '25	11	2	MC	1	1
Living Environment	January '25	12	1	MC	1	1
Living Environment	January '25	13	3	MC	1	1
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Living Environment	January '25	42	1	MC	1	1
Living Environment	January '25	43	2	MC	1	1
Living Environment	January '25	47	2	MC	1	1
Living Environment	January '25	49	2	MC	1	1
Living Environment	January '25	50	2	MC	1	1
Living Environment	January '25	73	3	MC	1	1
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Living Environment	January '25	76	1	MC	1	1
Living Environment	January '25	81	4	MC	1	1
Living Environment	January '25	82	2	MC	1	1

Regents Examination in Living Environment – January 2025

Scoring Key: Parts B-2, C, and D (Constructed Response Questions)

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
Living Environment	January '25	**44**	–	CR	1	1
Living Environment	January '25	**45**	–	CR	1	1
Living Environment	January '25	**46**	–	CR	1	1
Living Environment	January '25	**48**	–	CR	1	1
Living Environment	January '25	**51**	–	CR	1	1
Living Environment	January '25	**52**	–	CR	1	1
Living Environment	January '25	**53**	–	CR	1	1
Living Environment	January '25	**54**	–	CR	1	1
Living Environment	January '25	**55**	–	CR	1	1
Living Environment	January '25	**56**	–	CR	1	1
Living Environment	January '25	**57**	–	CR	1	1
Living Environment	January '25	**58**	–	CR	1	1
Living Environment	January '25	**59**	–	CR	1	1
Living Environment	January '25	**60**	–	CR	1	1
Living Environment	January '25	**61**	–	CR	1	1
Living Environment	January '25	**62**	–	CR	1	1
Living Environment	January '25	**63**	–	CR	1	1
Living Environment	January '25	**64**	–	CR	1	1
Living Environment	January '25	**65**	–	CR	1	1
Living Environment	January '25	**66**	–	CR	1	1
Living Environment	January '25	**67**	–	CR	1	1
Living Environment	January '25	**68**	–	CR	1	1
Living Environment	January '25	**69**	–	CR	1	1
Living Environment	January '25	**70**	–	CR	1	1
Living Environment	January '25	**71**	–	CR	1	1
Living Environment	January '25	**72**	–	CR	1	1
Living Environment	January '25	**77**	–	CR	1	1
Living Environment	January '25	**78**	–	CR	1	1
Living Environment	January '25	**79**	–	CR	1	1
Living Environment	January '25	**80**	–	CR	1	1
Living Environment	January '25	**83**	–	CR	1	1
Living Environment	January '25	**84**	–	CR	1	1
Living Environment	January '25	**85**	–	CR	1	1

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

The chart for determining students' final examination scores for the **January 2025 Regents Examination in Living Environment** will be posted on the Department's web site at https://www.nysedregents.org/LivingEnvironment/ on the day of the examination. Conversion charts provided for the previous administrations of the Living Environment examination must NOT be used to determine students' final scores for this administration.

FOR TEACHERS ONLY

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

LIVING ENVIRONMENT

Friday, January 24, 2025 — 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 web site during the rating period. Check this web site 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 Living Environment. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

Allow 1 credit for a correct response to each item.

At least two science teachers must participate in the scoring of the Part B–2, Part C, and Part D 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 box labeled "Total Raw Score." Then the student's raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations on Friday, January 24, 2025. 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.

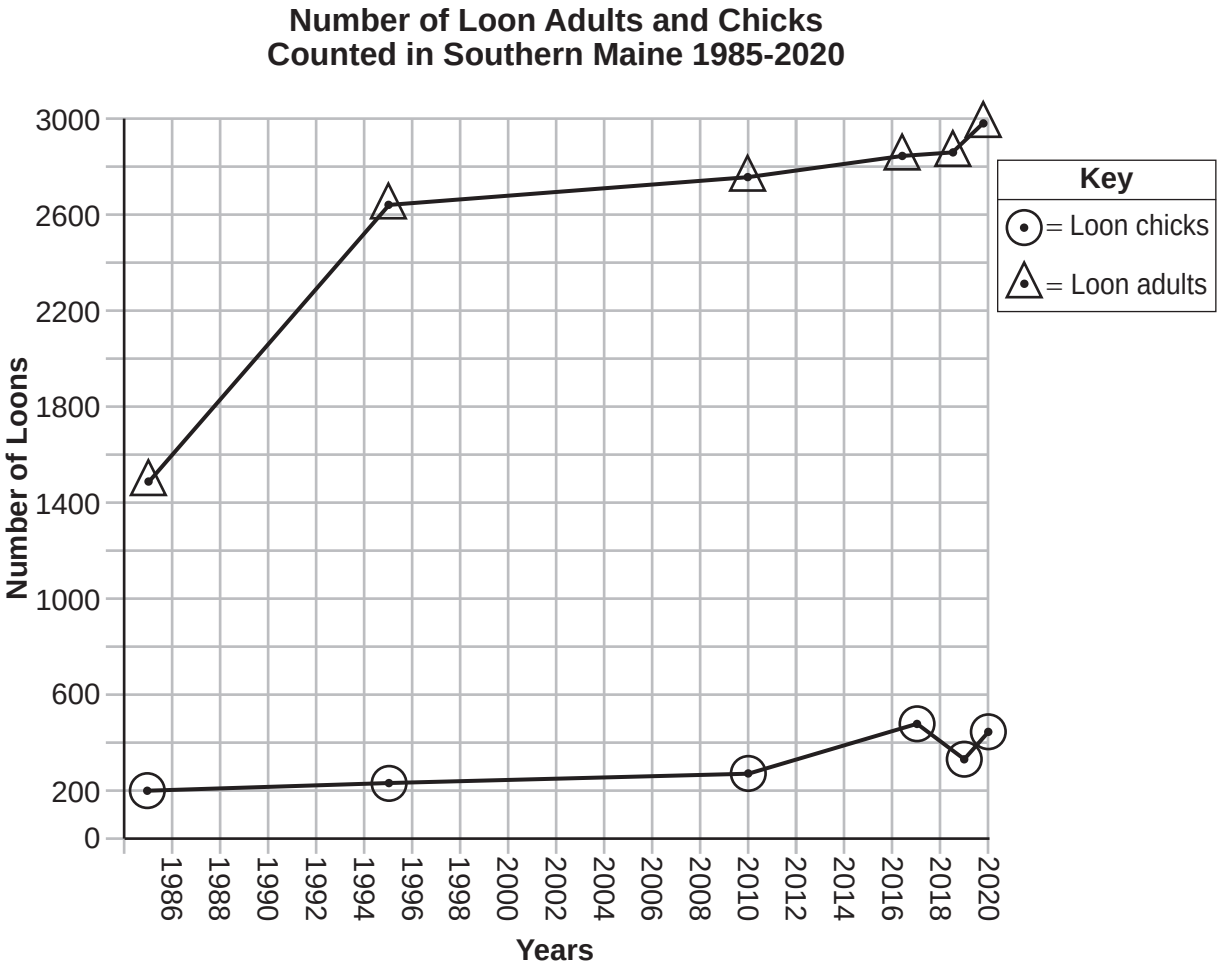
Part B–2

44 [1] Allow 1 credit for *D*.

45 [1] Allow 1 credit for marking an appropriate scale, without any breaks in the data, on *each* labeled axis.

46 [1] Allow 1 credit for correctly plotting the data, connecting the points, and surrounding each point for the loon adults with a small triangle and each point for the loon chicks with a small circle.

Example of a 2-credit graph for questions 45-46:



Do *not* assume the intersection of the *x*- and *y*-axes is the origin (0,0) unless it is labeled. An appropriate scale only needs to include the data range in the data table.

Do *not* allow credit if points are plotted that are not in the data table, e.g., (0,0), or for extending lines beyond the data points.

47 2

48 [1] Allow 1 credit for comparing the trend in loon population sizes represented in the two New York graphs to the trend observed in the data table for the southern part of Maine and supporting the answer. Acceptable responses include, but are not limited to:

— In both New York and Maine the number of adult loons and chicks increased.

— In 2001 there were 308 adults and 59 chicks counted in New York. The number increased to 551 adults and 70 chicks in 2020. In Maine the number of adults and chicks also increased over this time.

— In New York and Maine the number of loons increased during the study. In Maine, there were 2780 adult loons in 2010 and in 2020, there were 2974. In New York, there were 308 adult loons in 2001 and 551 in 2020.

49 2

50 2

51 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The blockage could prevent sperm from fertilizing the egg.

— The sperm will be prevented from reaching the egg.

— This could cause infertility since gametes won't combine.

— If the other oviduct/fallopian tube is not blocked, fertilization could still occur but the chance of pregnancy would be reduced.

— It prevents fertilization in humans.

52 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Detritivores recycle nutrients needed for ecosystem stability.

— If detritivores were removed, the dead organisms would not be broken down in the ecosystem, and there would not be enough nutrients for other organisms.

— Nutrients/material cycles will be disrupted.

53 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— pH
— temperature
— concentration of enzyme
— concentration of substrate

54 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Enzymes are specific.
— Enzymes react with substrates based on shape.
— because enzymes/substrates do not fit

55 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— It might harm pets such as dogs and cats.
— Is it safe for people?

Part C

56 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— One of the twins could have a diet high in foods with methyl groups while the other twin does not.

— One twin may be under more stress/smoke/use drugs while the other twin is/does not. These activities could cause epigenetic changes.

— Some genes could be turned off (not function) due to methylation in one twin and not the other.

— Only one twin has methylated DNA.

57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The original DNA sequence is not altered.

— The sequence of nitrogen bases in the DNA remains the same. The only difference is the presence of methyl groups turning the gene off.

— They can be reversed.

58 [1] Allow 1 credit for explaining why the number of predators that feed exclusively on scorpions would *decrease* over time and justify your answer. Acceptable responses include, but are not limited to:

— The predators would decrease because they have more competition, since more animals would be able to eat the scorpions.

— The number of predators would decrease because they would consume many of the scorpions and would not have enough food.

— The predators would die of starvation. Their number would decrease because they ate most of their food.

59 [1] Allow 1 credit for identifying the original source as mutation/genetic recombination.

60 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The brown color will increase in frequency because humans will pick the yellow ones before they can reproduce.

— There will be more brown flowers because they will blend in with the rocks and survive and reproduce while the yellow ones will be picked and die.

— Brown will increase since they will pass on their genes while the yellow will be picked and not reproduce.

61 [1] Allow 1 credit for stating one argument to justify continued efforts to preserve this species. Acceptable responses include, but are not limited to:

— The herb is a medicine that could be useful, so we should try to grow it instead of direct-harvesting it from the environment.

— One reason to try and grow the herb is to maintain biodiversity so it doesn't become extinct.

— The plant has value for humans, so we should try to preserve it by cultivating it.

62 [1] Allow 1 credit for selecting food chain (a) and supporting the answer. Acceptable responses include, but are not limited to:

— Food chain (a) because it has four feeding levels. Energy is transferred to the environment at each level.

— Energy is transferred as heat to the environment at each feeding level and is no longer available to the organisms. Food chain (a) has the most levels and would have the least energy available for the last consumer.

63 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The uterus supports the internal development of the embryo/fetus.

— The uterus is the organ to which the placenta attaches.

— The embryo/fetus develops in the uterus.

64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The immune system might attack the transplanted organ because it is interpreted as foreign.

— The immune system would attack the uterus because antigens on the transplanted organ would activate an immune response.

— The woman could make antibodies or white blood cells that attack the organ if she doesn't take certain drugs to prevent this.

65 [1] Allow 1 credit for making a claim about how human actions have affected biodiversity, and supporting the claim with evidence from the graph. Acceptable responses include, but are not limited to:

— Biodiversity has declined because the number of species extinctions has increased as the human population increased and destroyed habitats.

— As the increasing human population used resources required by other species, biodiversity decreased as extinctions increased.

— An increase in human population has lead to more deforestation, resulting in an increase in extinction, as shown in the graph.

66 [1] Allow 1 credit for explaining why the pancreas would secrete more hormone a short time later and supporting the answer. Acceptable responses include, but are not limited to:

— The starchy snack will be broken down into sugar that would be absorbed into the blood, causing high blood sugar. This would cause the pancreas to secrete more hormone to lower the blood sugar.

— Starch will be broken down into sugar, and insulin will be released due to the blood sugar level increase.

67 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Energy is needed to move *A* across the membrane. Without nutrients, energy is not available.

— Active transport requires energy, which is supplied by nutrients used to make ATP. Without nutrients, ATP will not be available.

— Energy from nutrients is stored in ATP, which is needed to move material *A* across the membrane.

— Without nutrients, the cell will not have the energy to carry out active transport, which is needed to move *A* across the cell membrane.

— If there is a lack of energy from nutrients, the cell will not transport *A* into the cell.

68 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The mitochondria make energy available for life functions. Without this energy, an organism would die.

— The mitochondria convert energy stored in food to usable energy for the organism.

— Respiration takes place in the mitochondria, and energy is made available for use by the organism.

69 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The chart shows that the children are only affected when the mother has mutated mitochondrial DNA.

— The chart shows that when the father has the disease, it is not passed on to his children.

70 [1] Allow 1 credit for liver cells and supporting the answer. Acceptable responses include, but are not limited to:

— Liver cells may be most affected since they contain the most mitochondria.

— Liver cells could be most affected since they contain more mitochondria than the other cells listed.

71 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The loss of ice or sea-level rise could be reduced.

— The severity of storms could be reduced.

— Climate change could be slowed.

— It could have a positive effect on climate change.

72 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Without reducing carbon emissions, the planet will still continue to warm up.

— More carbon emissions will continue to warm the planet, and more particles will need to be sprayed into the upper atmosphere.

— This technology only tries to cool the planet, but doesn't address how to prevent it from warming up in the first place.

— This technology doesn't address increased CO_2 in oceans, which leads to ocean acidification.

— Continually adding chemicals to the atmosphere could damage the ozone layer.

Part D

73 3

74 2

75 4

76 1

77 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— DNA sequences/protein comparisons could show relatedness of these species.
— Using additional forms of evidence would provide more reliability.

78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Finding the average pulse rate is more valid.
— You may not get the same number every time.
— decreases the effect of sampling error

79 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— amount of food available to them
— predators in the area
— climate and temperature of the area
— temperature of the peninsula (environment)

80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The pulse rates would be higher.
— There might be more variation in pulse rates.

81 4

82 2

83 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— chromatography
— Test to see if the plants make the same enzymes or proteins.
— Test for the presence of a particular enzyme/enzyme, *M*.
— Compare the amino acid sequence of a protein produced by all plants.

84 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Respiratory system
— The breathing rate would increase.

Skin/integumentary system/excretory system
— They would sweat more.

Muscular system
— Muscle cells would be using more energy.

85 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Two species do not compete for food.
— The island has both plant food and animal food.
— The two species have different beaks for different types of food.

The *Chart for Determining the Final Examination Score for the January 2025 Regents Examination in Living Environment* will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations on the day of the examination. Conversion charts provided for previous administrations of the Regents Examination in Living Environment 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.

Map to Core Curriculum (Operational)

January 2025 Living Environment

Standards	Question Numbers			
	Part A 1–30	**Part B–1 31–43**	**Part B–2 44–55**	**Part C 56–72**
Standard 1 — Analysis, Inquiry and Design				
Key Idea 1				
Key Idea 2				
Key Idea 3		36, 40	47, 48, 49	70
Appendix A (Laboratory Checklist)		31	45, 46	
Standard 4				
Key Idea 1	11, 18, 19, 21, 25	34, 37, 42	52	58, 67, 68
Key Idea 2	1, 22	33		56, 57, 69
Key Idea 3	4, 7, 12, 14, 20	43	44	59, 60
Key Idea 4	16, 23, 26, 28, 29		50, 51	63
Key Idea 5	2	32, 35, 39	53, 54, 55	64, 66
Key Idea 6	3, 8, 10, 13, 17, 24, 27, 30			61, 62
Key Idea 7	5, 6, 9, 15	38, 41		65, 71, 72

Part D 73–85	
Lab 1	75, 76, 77, 82, 83
Lab 2	74, 78, 80, 84
Lab 3	73, 79, 81, 85
Lab 5	

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

Regents Examination in Living Environment – January 2025

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

Raw Score	Scale Score
85	**100**
84	**98**
83	**97**
82	**97**
81	**96**
80	**95**
79	**94**
78	**93**
77	**93**
76	**92**
75	**91**
74	**91**
73	**90**
72	**89**
71	**88**
70	**88**
69	**87**
68	**86**
67	**86**
66	**85**
65	**84**
64	**84**
63	**83**
62	**82**
61	**82**
60	**81**
59	**80**
58	**80**
57	**79**

Raw Score	Scale Score
56	**78**
55	**77**
54	**77**
53	**76**
52	**75**
51	**74**
50	**74**
49	**73**
48	**72**
47	**71**
46	**70**
45	**69**
44	**68**
43	**67**
42	**66**
41	**65**
40	**64**
39	**63**
38	**62**
37	**61**
36	**60**
35	**59**
34	**58**
33	**56**
32	**55**
31	**54**
30	**52**
29	**51**
28	**50**

Raw Score	Scale Score
27	**48**
26	**47**
25	**45**
24	**44**
23	**42**
22	**41**
21	**39**
20	**38**
19	**36**
18	**34**
17	**33**
16	**31**
15	**29**
14	**28**
13	**26**
12	**24**
11	**22**
10	**20**
9	**18**
8	**16**
7	**14**
6	**12**
5	**10**
4	**9**
3	**6**
2	**4**
1	**2**
0	**0**

To determine the student's final examination 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 Living Environment.