XVIII. Biology, High School

High School Biology Test

The spring 2017 high school Biology test was based on learning standards in the Biology content strand of the October 2006 version of the *Massachusetts Science and Technology/Engineering Curriculum Framework*. These learning standards appear on pages 54–58 of the 2006 framework, which is available on the Department website at www.doe.mass.edu/frameworks/archive.html. Massachusetts adopted a new curriculum framework in science and technology/engineering in 2016. A plan for transitioning the MCAS assessments to the new framework is available at www.doe.mass.edu/mcas/tdd/sci.html?section=resources.

Biology test results are reported under the following five MCAS reporting categories:

- Biochemistry and Cell Biology
- Genetics
- Anatomy and Physiology
- Ecology
- Evolution and Biodiversity

The table at the conclusion of this chapter indicates each item's reporting category and the framework learning standard it assesses. The correct answers for multiple-choice questions are also displayed in the table.

Test Sessions

The high school Biology test included two separate test sessions, which were administered on consecutive days. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

The high school Biology test was designed to be taken without the aid of a calculator. Students were allowed to have calculators with them during testing, but calculators were not needed to answer questions.

During both Biology test sessions, the use of bilingual word-to-word dictionaries was allowed for current and former English language learner students only. No other reference tools or materials were allowed.

Biology

SESSION 1

DIRECTIONS

This session contains twenty-one multiple-choice questions and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

1 Collagen is found in connective tissue throughout the human body. Collagen is made of three amino acid chains that are twisted around one another.

Which of the following **best** explains why collagen is classified as a protein?

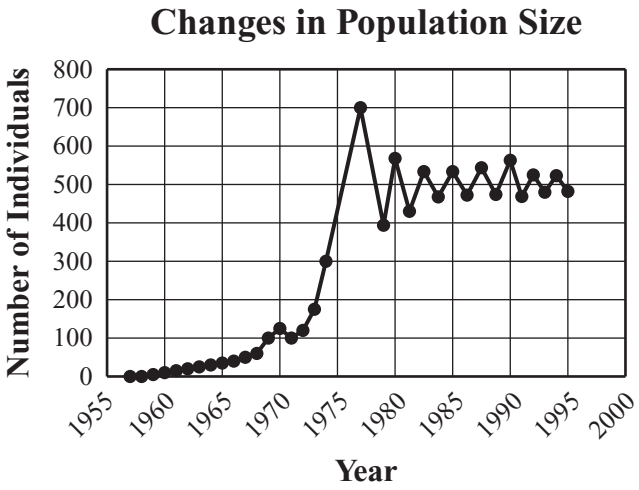
A. It is found in a tissue.

B. It is made up of amino acids.

C. It is made up of twisted chains.

D. It is found throughout the human body.

2 The graph below shows the changes in the population size of a mammal species introduced onto an isolated island in 1957.



Which of the following conclusions is **best** supported by the data?

A. Every year, more individuals were born than died.

B. A predator of this mammal was removed from the island in 1990.

C. The population decreases were the result of low immigration rates.

D. In the 1980s, the mammal's population size stayed around its carrying capacity.

3 In tigers, the allele for orange fur is dominant to the allele for white fur. If two heterozygous tigers mate and produce offspring, what is the probability of an individual offspring having white fur?

A. 0

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. 1

4 Information is detected by the eye and sent to the brain by which of the following structures?

A. blood vessels

B. sensory neurons

C. smooth muscle

D. spinal cord

5 A scientist is trying to determine how closely related two species of plants are. Which of the following would be **most** useful for the scientist to compare?

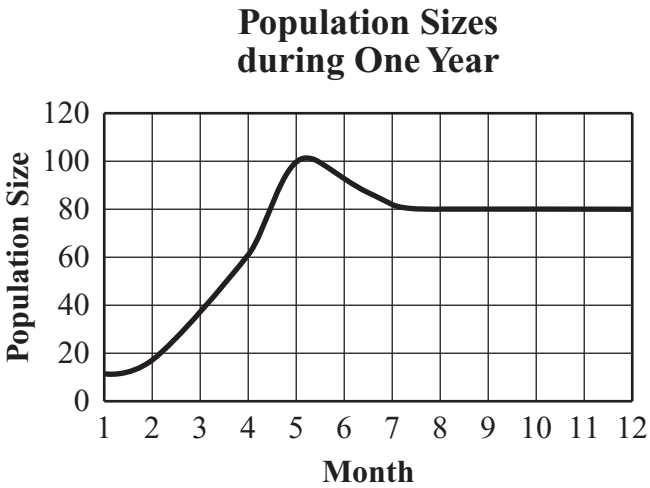
A. the root depths of the plants

B. the leaf structures of the plants

C. the genetic sequences of the plants

D. the nutrient requirements of the plants

6 The graph below shows changes that occurred in the size of a population of animals over a year.



Which of the following is **best** supported by the graph?

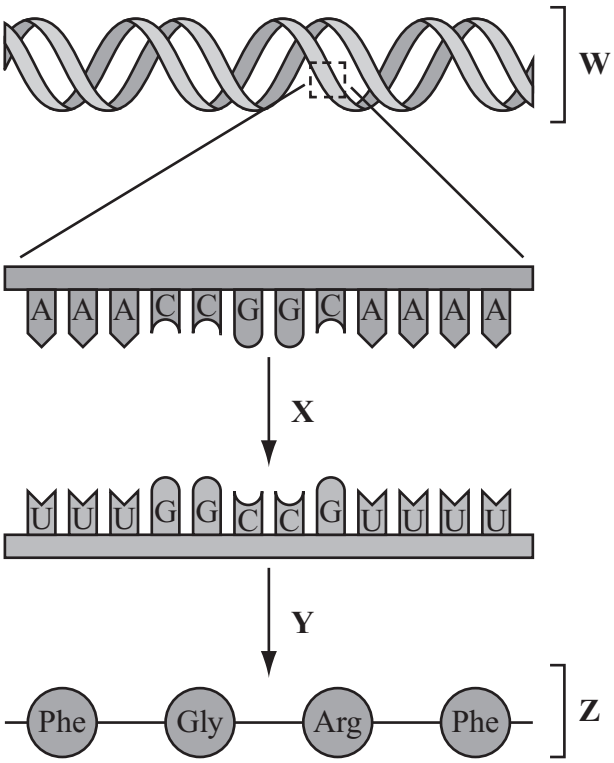
A. Between month 1 and month 5, the immigration rate was zero.

B. Between month 4 and month 6, a predator was introduced into the ecosystem and increased the death rate.

C. Between month 5 and month 7, the birth and emigration rates decreased and the death and immigration rates increased.

D. Between month 8 and month 12, the birth and immigration rates equaled the death and emigration rates.

7 The diagram below represents structures and processes involved in protein synthesis in an animal cell. Four parts of the diagram are labeled W, X, Y, and Z.



Which part of the diagram represents transcription?

A. part W

B. part X

C. part Y

D. part Z

The following section focuses on bacterial populations in the human body.

Read the information below and use it to answer the four multiple-choice questions and one open-response question that follow.

The human body contains diverse types of bacteria. Scientists estimate that the average healthy adult human body is home to at least 10,000 species of bacteria. In fact, there are about 10 times more bacterial cells than human cells in the human body.

Many bacterial populations are important to the normal functioning of human body systems. For example, some bacteria in the digestive system produce substances the human body cannot produce. These substances help the body break down and absorb nutrients. However, bacteria that help the human body in one location can cause serious illness if introduced to a different part of the body.

The table below includes information about two bacteria found in the human body.

Bacterium	Information
B. thetaiotaomicron	• typically lives in the small intestine • produces hundreds of enzymes that help break bonds in complex carbohydrates
S. epidermidis	• typically lives on skin • can cause serious infections if it enters the bloodstream • some populations of *S. epidermidis* have antibiotic resistance

Mark your answers to multiple-choice questions 8 through 11 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

8 *S. epidermidis* can sometimes infect wounds. The symptoms of the infection include swelling, pain, pus, skin that is warm to the touch, and redness at the infection site.

Based on the symptoms, which of these human body systems work together to restore homeostasis?

A. circulatory system and immune system
B. immune system and reproductive system
C. skeletal system and respiratory system
D. respiratory system and nervous system

9 Which of the following is a characteristic that distinguishes viruses from *B. thetaiotaomicron* and *S. epidermidis*?

A. Viruses lack mitochondria.
B. Viruses lack genetic material.
C. Viruses are unable to accumulate mutations.
D. Viruses are unable to reproduce outside of host cells.

10 Which of the following **best** explains how antibiotic resistance spreads through some populations of *S. epidermidis*?

A. All *S. epidermidis* cells exposed to antibiotics respond by developing mutations.
B. Some *S. epidermidis* cells exposed to antibiotics survive and pass their genes on to their offspring.
C. Exposure to antibiotics causes *S. epidermidis* cells to learn simple behaviors that help the cells survive.
D. Exposure to antibiotics causes an increase in the respiration rate of *S. epidermidis* cells living on the skin.

11 Which of the following describes one way *B. thetaiotaomicron* helps in digestion?

A. It breaks down lipids into fatty acids.
B. It breaks down proteins into amino acids.
C. It breaks down polysaccharides into simpler sugars.
D. It breaks down nucleic acids into nitrogenous bases.

Question 12 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 12 in the space provided in your Student Answer Booklet.

12 A population of *S. epidermidis* decreases the population sizes of other types of bacteria on the skin.

a. Describe one way decreasing the population sizes of other bacteria on the skin helps the *S. epidermidis* population.

b. Identify the process that *S. epidermidis* cells use to reproduce.

c. Describe **two** similarities between the process that skin cells use for cell division and the process that you identified in part (b).

When *S. epidermidis* moves from the skin into the body, it behaves like an invasive species entering a new ecosystem.

d. Will the *S. epidermidis* population size decrease, increase, or stay the same after the bacteria enter the body? Using your knowledge of invasive species, explain your answer.

Mark your answers to multiple-choice questions 13 through 22 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

13 A high respiratory rate usually indicates that a person's body needs more

A. antibodies.
B. carbon dioxide.
C. oxygen.
D. platelets.

14 A particular species of moth can have green or yellow scales on its wings. The scale color is controlled by a single gene with two alleles, the green allele and the yellow allele. When moths that are homozygous for green scales are mated with moths that are homozygous for yellow scales, 100% of the offspring have green scales.

Based on this information, how do the alleles for scale color interact?

A. The green allele is dominant to the yellow allele.
B. The green allele is recessive to the yellow allele.
C. The green allele and the yellow allele are codominant.
D. The green allele and the yellow allele are incompletely dominant.

15 The dusky rattlesnakes that live in the mountains of Mexico have a variety of color patterns, body shapes, and behaviors. A recent study of dusky rattlesnake DNA concluded that there is a lot of genetic diversity within the species.

Which of the following statements describes what **most likely** caused this great genetic diversity in dusky rattlesnakes?

A. Stable conditions decreased the population sizes of rattlesnakes.
B. Climate change caused some rattlesnake species to become extinct.
C. Rattlesnake populations inhabited various types of niches over time.
D. Environmental extremes caused rattlesnakes to reproduce more often.

16 The table below compares some characteristics of bacterial cells and animal cells.

	Bacterial Cell	Animal Cell
Cell Membrane	**?**	yes
Lysosomes	no	yes
Cell Wall	yes	**?**

Which of the following best completes the table?

A.

	Bacterial Cell	Animal Cell
Cell Membrane	**yes**	yes
Lysosomes	no	yes
Cell Wall	yes	**no**

B.

	Bacterial Cell	Animal Cell
Cell Membrane	**no**	yes
Lysosomes	no	yes
Cell Wall	yes	**no**

C.

	Bacterial Cell	Animal Cell
Cell Membrane	**no**	yes
Lysosomes	no	yes
Cell Wall	yes	**yes**

D.

	Bacterial Cell	Animal Cell
Cell Membrane	**yes**	yes
Lysosomes	no	yes
Cell Wall	yes	**yes**

17 Early explorers in the United States often observed huge flocks of passenger pigeons. In the 1800s, hunters began netting and shooting the birds in huge numbers to sell as food. In 1914, passenger pigeons were declared extinct when the last one died at the Cincinnati Zoo.

Which of the following best explains why passenger pigeons became extinct?

A. Humans consumed the passenger pigeons' main source of food.

B. Zookeepers did not understand how to keep passenger pigeons alive.

C. Hunters killed passenger pigeons faster than the pigeons could reproduce.

D. Passenger pigeon populations were so large that there was not enough food for them to survive.

18 A female *Hymenoepimecis* wasp will temporarily paralyze a spider and then lay an egg on the spider's abdomen. After the paralysis wears off, the spider resumes its normal activity. When the egg hatches, the larva grows by sucking its required nutrients from the spider.

What type of relationship exists between the spider and the *Hymenoepimecis* wasp?

A. commensalism

B. mutualism

C. parasitism

D. predator-prey

19 An aquarium contains two brine shrimp populations, *Artemia sinica* and *Artemia franciscana*. An individual from the *A. sinica* population and an individual from the *A. franciscana* population are unable to do which of the following?

A. grow under the same conditions

B. compete for the same food source

C. produce fertile offspring with each other

D. break down the same types of sugars for energy

20 Fossilized remains of prehistoric mastodons show anatomical similarities to modern-day elephants. These similarities provided the first evidence that mastodons were related to modern-day elephants.

Which of the following is the **best** additional evidence that mastodons were related to elephants?

A. Mastodons walked on four legs like modern-day elephants.

B. Mastodons ate a diet similar to that of modern-day elephants.

C. Mastodon fossils were found in the same area where modern-day elephants live.

D. Mastodon tissues contained protein sequences similar to those of modern-day elephants.

21 Which of the following processes removes carbon from the air and uses it to make organic compounds?

A. combustion

B. decomposition

C. photosynthesis

D. respiration

22 Lipids, carbohydrates, and DNA all exist in human cells as long molecular chains. Which of the following describes how DNA differs from lipids and carbohydrates?

A. Only DNA has carbon atoms.

B. Only DNA is found in the cytoplasm.

C. Only DNA is needed to create new cells.

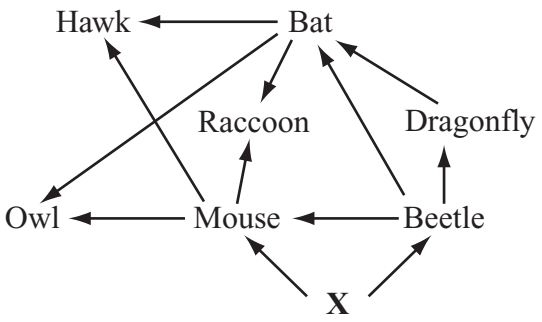
D. Only DNA contains genetic information.

Questions 23 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 23 in the space provided in your Student Answer Booklet.

23 A food web is shown below.



An organism in the food web is labeled X.

a. Identify **and** describe the ecological role of organism X in the food web.

b. Identify the organism in the food web whose population size would likely increase the most if the bat became extinct. Explain your answer.

There are many types of relationships between organisms, including competitive and predator-prey relationships.

c. Identify two organisms in the food web that have a competitive relationship. Explain your answer.

d. Identify two organisms in the food web that have a predator-prey relationship. Explain your answer.

Biology
SESSION 2

DIRECTIONS

This session contains nineteen multiple-choice questions and three open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet. You may work out solutions to multiple-choice questions in the test booklet.

24 Diatoms are marine organisms with unique cell walls that contain the element silicon. Which of the following are two common elements found in the cells of diatoms?

A. aluminum and magnesium

B. helium and hydrogen

C. mercury and neon

D. nitrogen and phosphorus

25 Each summer, up to 40% of the lobsters in a certain area lose one of their claws due to injury. By late fall, the missing claw usually begins to grow back.

Which of the following describes the process by which lobsters grow new claws?

A. Lysosomes fuse together to recycle matter to build a new claw.

B. Mitotic cell division adds new cells to rebuild the lobster's claw.

C. Facilitated diffusion moves body cells from the remaining claw to the new claw.

D. Cellular respiration creates nutrients to enlarge existing cells in the lobster's claw.

26 Some populations of Atlantic tomcod fish have an allele that makes the fish resistant to toxic pollutants called PCBs. Tomcod populations in several rivers were analyzed for the presence of this allele. Each river had varying levels of PCB pollution.

Which of the following results would **best** support the conclusion that natural selection is influencing the presence of this allele in the tomcod populations?

A. All of the tomcod in each of the rivers have this allele.

B. The percentage of tomcod with this allele remains the same from year to year in each river.

C. The rivers with high PCB levels have larger percentages of tomcod with this allele than the rivers without PCBs.

D. Eggs from tomcod without this allele can hatch in rivers with or without PCBs, and eggs from tomcod with this allele can only hatch in rivers without PCBs.

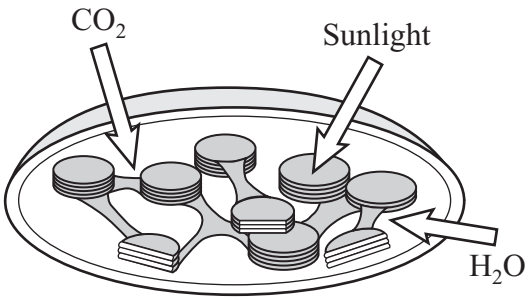
27 Which of the following best describes how enzymes affect chemical reactions?

A. They speed up the rate of reactions.
B. They change the reactants into ions.
C. They dissolve the products of reactions.
D. They take the place of one of the reactants.

28 Which of the following statements **best** explains why introduced species often threaten native species in an ecosystem?

A. Introduced species often have less genetic diversity than native species.
B. Introduced species often lack natural predators in their new environment.
C. Introduced species often form mutualistic relationships with native species.
D. Introduced species often cause short-term droughts in their new environment.

29 The diagram below shows a chloroplast and some of the components of the reactions that occur in chloroplasts.



Which of the following is a product of the reactions that take place in a chloroplast?

A. hydrogen gas
B. nitrate
C. oxygen gas
D. protein

30 For a new liver cell to form, DNA replication is necessary because it ensures that the newly formed cell has which of the following?

A. two copies of the original cell's DNA

B. an identical copy of the original cell's DNA

C. a rearranged copy of the original cell's DNA

D. only the best parts of the original cell's DNA

31 In which of the following ways does the plasma membrane regulate the entry of molecules into a cell?

A. The membrane allows only certain molecules to move into the cell.

B. The membrane destroys most molecules so that they do not enter the cell.

C. The membrane changes only certain molecules into ions before they move into the cell.

D. The membrane allows most molecules to transfer energy to the cell without entering the cell.

Question 32 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 32 in the space provided in your Student Answer Booklet.

32 The human skeletal system has many important functions, including movement. As a person ages, movement can become difficult. Ligaments become less elastic and cartilage is damaged.

a. Considering the function of ligaments, explain why less elastic ligaments could cause movement to be difficult.

b. Considering the function of cartilage, explain why damaged cartilage could cause movement to be difficult.

c. Identify **two** functions of the skeletal system besides movement.

Mark your answers to multiple-choice questions 33 through 43 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

33 A scientist is studying the inheritance of two genes, gene R and gene P, in dogs. Each gene is located on a different chromosome. Gene R has two alleles, **R** and **r**, and gene P has two alleles, **P** and **p**.

What are the expected probabilities for the genotypes of gametes produced by a dog with the genotype **RrPp**?

A. 50% **Rr** and 50% **Pp**

B. 50% **RP** and 50% **rp**

C. 50% **Rp**, 25% **rP**, and 25% **rp**

D. 25% **RP**, 25% **Rp**, 25% **rP**, and 25% **rp**

34 Red lionfish have been introduced into the Caribbean Sea and the Gulf of Mexico. The red lionfish are predators that compete with native fish for space and food, causing coral reef fish population sizes to decrease. Government and environmental groups are encouraging coastal communities to catch red lionfish and serve them at restaurants.

Which of the following best explains how catching and eating red lionfish could help preserve coral reefs?

A. Reef fish will learn that red lionfish are no longer dangerous.

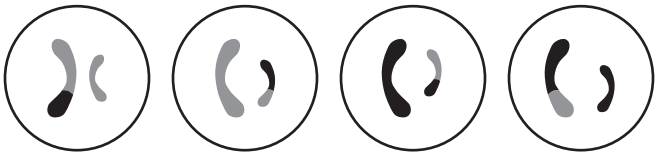
B. Red lionfish will return to their native habitats to avoid being caught.

C. Humans will fill the role of predator and control the red lionfish population.

D. Restaurants that serve red lionfish will attract more tourists to visit coral reefs.

35 The diagram below shows a parent cell and the daughter cells that are produced after the parent cell divides.

Parent cell



Daughter cells

Which of the following best describes the daughter cells?

A. They are a result of transcription.

B. They are a result of binary fission.

C. They have half the number of lipids that the parent cell has.

D. They have half the number of chromosomes that the parent cell has.

36 In humans, an X-linked recessive allele ($\mathbf{X^b}$) causes red-green colorblindness. Which of the following crosses could produce a female who is red-green colorblind?

A. $\mathbf{X^BX^B \times X^bY}$

B. $\mathbf{X^bX^b \times X^BY}$

C. $\mathbf{X^BX^b \times X^bY}$

D. $\mathbf{X^BX^b \times X^BY}$

37 Which of the following structures transmits nerve impulses between the brain and most motor and sensory neurons?

A. carotid artery

B. diaphragm

C. esophagus

D. spinal cord

38 A researcher observed army ants, which form colonies with one queen ant and many worker ants. The researcher observed worker ants moving from place to place to hunt and collect a variety of food for the colony. The queen ant was observed mating with a male ant from another ant colony. The queen produced many eggs after this mating.

Which of the following could help increase the genetic diversity in the colony of army ants?

A. the queen ant mating with the ant from a different colony

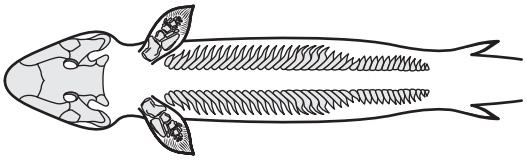
B. the worker ants collecting the food for the colony to eat

C. the worker ants moving from place to place

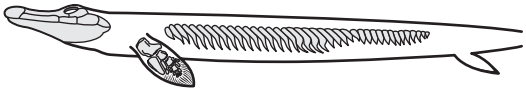
D. the queen ant eating a variety of food

39 Scientists discovered a 375-million-year-old fossil in Canada. The diagram below shows the top and side views of the fossil.

Top view



Side view



Which observation would **best** support the hypothesis that this organism was a transitional form between amphibians and fish?

A. The fossil has a long body, which both modern amphibians and modern fish have.

B. The fossil is larger than most modern amphibians, but smaller than most ancient fish.

C. The fossil has some body structures that are similar to amphibians and some body structures that are similar to fish.

D. The fossil was discovered near a lake, which shows that the organism needed water to reproduce, as do amphibians and fish.

40 In a cell, a phosphate group is added to ADP to form ATP. Which of the following **best** describes the importance of the formation of ATP?

A. It connects amino acids.

B. It provides energy for the cell.

C. It creates new polysaccharides.

D. It catalyzes chemical reactions.

41 Which of the following describes a mutation in a parent that could change the phenotype of its future offspring?

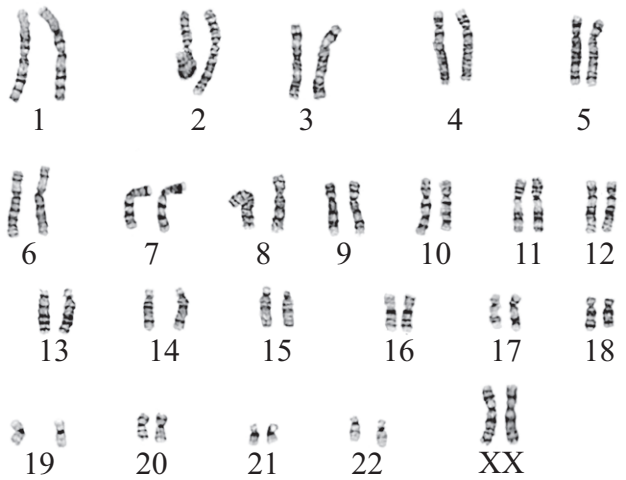
A. a mutation in the RNA of a skin cell

B. a mutation in the DNA of a liver cell

C. a mutation in the RNA of a brain cell

D. a mutation in the DNA of a sperm cell

42 The chromosomes of a human female are shown below. The chromosomes are arranged in pairs. The 23rd pair, labeled XX, is the sex chromosomes.



© Larry Phelps

Which of the following would the female normally pass on to her child?

A. all 46 of the chromosomes

B. 23 chromosomes, one from each pair

C. a random set of any 23 of the chromosomes

D. the first 11 chromosome pairs, plus one sex chromosome

43 The energy that primary consumers use for metabolism and growth comes **directly** from which of the following sources?

A. organic compounds synthesized by producers

B. organic compounds released by decomposers

C. organic compounds stored in carnivore tissues

D. organic compounds absorbed from the environment

Questions 44 and 45 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 44 in the space provided in your Student Answer Booklet.

44 A certain genetic disorder is caused by a single base mutation in the DNA of a certain gene. The mutation changes the amino acid glutamate (Glu) to aspartate (Asp).

a. Identify the type of macromolecule (carbohydrate, lipid, nucleic acid, protein) that changes when Glu changes to Asp. Explain your answer.

A portion of the amino acid sequence that includes this mutation is shown below.

Val-Ser-Ala-Arg-Asp

The sample of DNA below is being analyzed to determine if a patient has the genetic disorder.

3' **CAA-TCG-CGG-TCT-CTT** 5'

b. Determine the mRNA sequence from the patient's DNA sequence.

c. Using the information in the codon table below, determine the amino acid sequence that is coded for by the mRNA sequence you determined in part (b).

d. Determine whether the patient has the genetic disorder. Explain your answer.

First Base of mRNA Codon	Second Base of mRNA Codon: U	Second Base: C	Second Base: A	Second Base: G	Third Base of mRNA Codon
U	UUU Phe	UCU Ser	UAU Tyr	UGU Cys	U
	UUC Phe	UCC Ser	UAC Tyr	UGC Cys	C
	UUA Leu	UCA Ser	UAA STOP	UGA STOP	A
	UUG Leu	UCG Ser	UAG STOP	UGG Trp	G
C	CUU Leu	CCU Pro	CAU His	CGU Arg	U
	CUC Leu	CCC Pro	CAC His	CGC Arg	C
	CUA Leu	CCA Pro	CAA Gln	CGA Arg	A
	CUG Leu	CCG Pro	CAG Gln	CGG Arg	G
A	AUU Ile	ACU Thr	AAU Asn	AGU Ser	U
	AUC Ile	ACC Thr	AAC Asn	AGC Ser	C
	AUA Ile	ACA Thr	AAA Lys	AGA Arg	A
	AUG Met	ACG Thr	AAG Lys	AGG Arg	G
G	GUU Val	GCU Ala	GAU Asp	GGU Gly	U
	GUC Val	GCC Ala	GAC Asp	GGC Gly	C
	GUA Val	GCA Ala	GAA Glu	GGA Gly	A
	GUG Val	GCG Ala	GAG Glu	GGG Gly	G

Write your answer to question 45 in the space provided in your Student Answer Booklet.

45 Some plants in an area produce a toxin that protects them from being eaten by a variety of insect species. The toxin decreases reproductive rates in insects. Because of a genetic mutation, some fruit flies can detect the plant toxin and therefore avoid eating the plant.

a. Describe how the number of fruit flies in the population that can detect the toxin will most likely change over the next 25 years.

b. According to the mechanism of natural selection, explain how the change you described in part (a) will occur.

c. Based on the changes in the fruit fly population, describe what will most likely happen to the plants' production of the toxin. Explain your answer.

High School Biology
Spring 2017 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	2006 Standard	Correct Answer (MC)*
1	259	*Biochemistry and Cell Biology*	1.2	B
2	259	*Ecology*	6.1	D
3	260	*Genetics*	3.6	B
4	260	*Anatomy and Physiology*	4.4	B
5	260	*Evolution and Biodiversity*	5.1	C
6	261	*Ecology*	6.1	D
7	261	*Genetics*	3.2	B
8	263	*Anatomy and Physiology*	4.8	A
9	263	*Biochemistry and Cell Biology*	2.8	D
10	263	*Evolution and Biodiversity*	5.3	B
11	263	*Biochemistry and Cell Biology*	1.2	C
12	264	*Biochemistry and Cell Biology*	2.3	
13	265	*Anatomy and Physiology*	4.3	C
14	265	*Genetics*	3.4	A
15	265	*Evolution and Biodiversity*	5.3	C
16	266	*Biochemistry and Cell Biology*	2.2	A
17	267	*Ecology*	6.2	C
18	267	*Ecology*	6.3	C
19	267	*Evolution and Biodiversity*	5.2	C
20	268	*Evolution and Biodiversity*	5.1	D
21	268	*Ecology*	6.4	C
22	268	*Genetics*	3.1	D
23	269	*Ecology*	6.3	
24	270	*Biochemistry and Cell Biology*	1.1	D
25	270	*Biochemistry and Cell Biology*	2.6	B
26	270	*Evolution and Biodiversity*	5.1	C
27	271	*Biochemistry and Cell Biology*	1.3	A
28	271	*Ecology*	6.2	B
29	271	*Biochemistry and Cell Biology*	2.4	C
30	272	*Genetics*	3.2	B
31	272	*Biochemistry and Cell Biology*	2.1	A
32	273	*Anatomy and Physiology*	4.5	
33	274	*Genetics*	3.5	D
34	274	*Ecology*	6.2	C
35	275	*Biochemistry and Cell Biology*	2.7	D

Item No.	Page No.	Reporting Category	2006 Standard	Correct Answer (MC)*
36	275	*Genetics*	3.6	C
37	275	*Anatomy and Physiology*	4.4	D
38	276	*Evolution and Biodiversity*	5.3	A
39	276	*Evolution and Biodiversity*	5.1	C
40	277	*Biochemistry and Cell Biology*	2.5	B
41	277	*Genetics*	3.3	D
42	278	*Anatomy and Physiology*	4.6	B
43	278	*Ecology*	6.3	A
44	279	*Genetics*	3.3	
45	280	*Evolution and Biodiversity*	5.3	

* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by the shaded cells, will be posted to the Department's website later this year.