



Massachusetts Department of
ELEMENTARY & SECONDARY
EDUCATION

*Release of
February 2011
MCAS Biology
Test Items*

**April 2011
Massachusetts Department of
Elementary and Secondary Education**



This document was prepared by the
Massachusetts Department of Elementary and Secondary Education
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Commissioner

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Commissioner's Foreword

Dear Colleagues:

The vision of the Department of Elementary and Secondary Education is to work in partnership with policymakers, communities, parents, school districts, and students to build a system that will prepare all students to succeed as productive and contributing members of our democratic society and the global economy. To assist in the achievement of this vision, the Department regularly releases MCAS test items to provide information regarding the kinds of knowledge and skills that students are expected to demonstrate. In February 2011, an MCAS test in Biology was administered in high schools across the state. All test questions on which student results are based for the February 2011 Biology test are included in this document.

The *Release of February 2011 MCAS Biology Test Items* is available only through the Department website at www.doe.mass.edu/mcas/testitems.html. The test items can be easily printed from this site. The Department encourages local educators to use the relevant sections of this document together with their *Test Item Analysis Rosters* as guides for planning changes in curriculum and instruction that may be needed to ensure that schools and districts make regular progress in improving student performance.

Thank you for your support as we work together to strengthen education for our students in Massachusetts.

Sincerely,

Mitchell D. Chester, Ed.D.

Commissioner of Elementary and Secondary Education

I. Document Purpose and Structure

Document Purpose and Structure

Purpose

The purpose of this document is to share with educators and the public all of the test items from the February 2011 MCAS Biology test on which student results are based. Local educators will be able to use this information to identify strengths and weaknesses in their curriculum and instruction, and to guide the changes necessary to more effectively meet their students' needs.

This document is also intended to be used by school and district personnel as a companion document to the test item analysis reports. Each school in which a February Biology test was administered can access electronically a *Test Item Analysis Roster* for Biology. The roster provides data generated from student responses. The roster lists, for the school accessing the roster, the names of all enrolled students who took the February 2011 Biology test, and shows how each student answered each common test question (item) and the number of points earned on each constructed-response item. The roster also labels each item as multiple-choice or open-response and identifies the item's MCAS reporting category. Item numbers in this document correlate directly to the "Item Numbers" in the test item analysis roster.

Structure

Chapter II of this document contains information for the February 2011 Biology test and has three main sections. The **first section** introduces the chapter by identifying the Massachusetts curriculum framework content strand assessed by the Biology MCAS test, as well as the MCAS reporting categories under which test results are reported to schools and districts. The first section also provides the Web address for the *Science and Technology/Engineering Curriculum Framework* and the page numbers on which the learning standards assessed by the test items in the chapter can be found. In addition, there is a brief overview of the test (number of test sessions, types of items, reference materials allowed, and cross-referencing information).

The **second section** contains the test items used to generate February 2011 MCAS student results for Biology. The test items in this document are shown in the same order and basic format in which they were presented in the test booklet.

The **final section** of the chapter is a table that cross-references each item with its MCAS reporting category and with the framework standard it assesses. Correct answers to multiple-choice questions are also listed in the table.

Materials presented in this document are **not** formatted **exactly** as they appeared in student test booklets. For example, in order to present items most efficiently in this document, the following modifications have been made:

- Some fonts and/or font sizes may have been changed and/or reduced.
- Some graphics may have been reduced in size from their appearance in student test booklets; however, they maintain the same proportions in each case.
- All references to page numbers in answer booklets have been deleted from the directions that accompany test items.

II. February 2011 Biology Test

February 2011 Biology Test

The February 2011 high school MCAS Biology test was based on learning standards in the Biology content strand of the Massachusetts *Science and Technology/Engineering Curriculum Framework* (2006). These learning standards appear on pages 54–58 of the *Framework*.

The *Science and Technology/Engineering Curriculum Framework* is available on the Department website at www.doe.mass.edu/frameworks/current.html.

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

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

Test Sessions

The MCAS 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.

The use of bilingual word-to-word dictionaries was allowed for current and former limited English proficient students only, during both Biology test sessions. No other reference tools or materials were allowed.

Cross-Reference Information

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.

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.

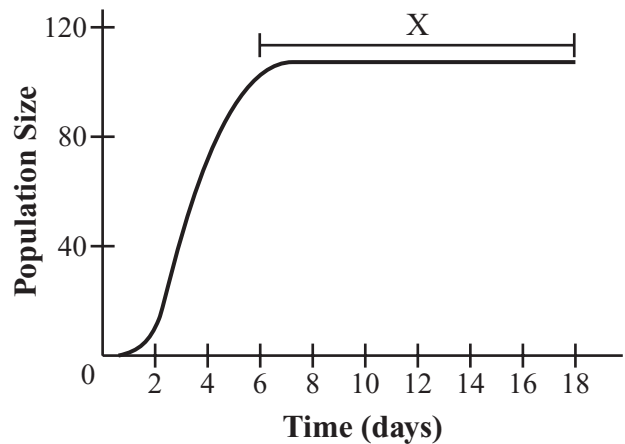
1 Prokaryotes are structurally simple organisms that have existed for over two billion years. Which of the following are prokaryotes?

- A. bacteria
- B. fungi
- C. plants
- D. protists

2 Which of the following **best** explains why tropical insects may be at greater risk for extinction from global warming than insects from higher latitudes?

- A. Many tropical insects lay eggs year-round.
- B. Tropical insects include more pollinator species.
- C. Many tropical insects are herbivores rather than carnivores.
- D. Tropical insects have narrower ranges of tolerance for temperature changes.

3 The graph below shows population growth for paramecia kept under laboratory conditions for 18 days.



Which of the following statements explains what is happening in the region of the curve labeled “X”?

- A. The population’s birthrate is zero.
- B. The paramecia are in water that is too warm.
- C. The paramecia have used up their food supply.
- D. The population’s birthrate equals the death rate.

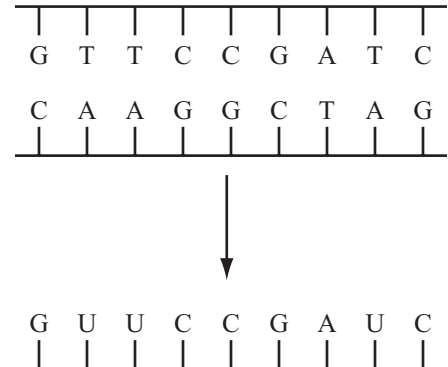
4 The fungus *Penicillium* reproduces asexually and forms genetically identical spores. Which of the following processes does *Penicillium* use to form its spores?

- A. fertilization
- B. mitosis
- C. osmosis
- D. transcription

5 Cellular respiration, decomposition, combustion, and photosynthesis are processes that drive which of the following cycles in ecosystems?

- A. the carbon cycle
- B. the nitrogen cycle
- C. the phosphorus cycle
- D. the water cycle

6 The diagram below represents the beginning and end products of a process that occurs in the nucleus of a cell.



Which process does the diagram represent?

- A. recombination
- B. replication
- C. transcription
- D. translation

7 Four students researched the classifications of the following eight whales:

- killer whale, *Orcinus orca*
- gray whale, *Eschrichtius robustus*
- humpback whale, *Megaptera novaeangliae*
- pygmy right whale, *Caperea marginata*
- fin whale, *Balaenoptera physalus*
- minke whale, *Balaenoptera acutorostrata*
- North Atlantic right whale, *Eubalaena glacialis*
- bowhead whale, *Balaena mysticetus*

The students were asked which two whales are most closely related and why. The table below summarizes the students' answers.

Student	Whales Most Closely Related	Reason
1	killer whale and gray whale	They are both mammals.
2	humpback whale and pygmy right whale	They are both whales.
3	fin whale and minke whale	They are both in the same genus.
4	North Atlantic right whale and bowhead whale	They are both in the same family.

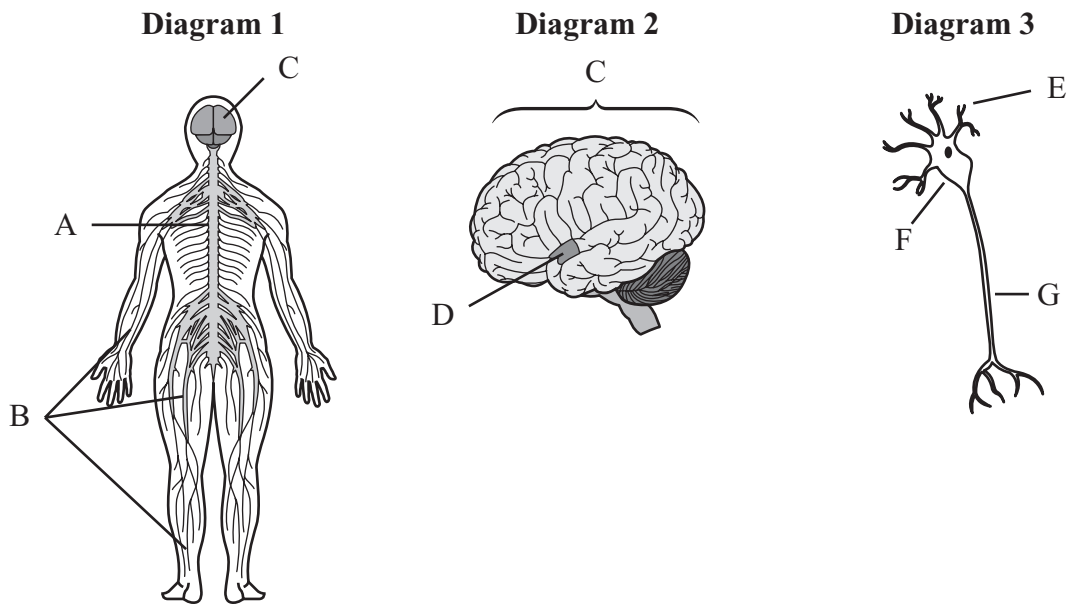
Based on the classifications, which student gave the correct answer to the question?

- A. student 1
- B. student 2
- C. student 3
- D. student 4

The following section focuses on the human nervous system.

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

The diagrams below illustrate different levels of organization in the human nervous system. An understanding of how the nervous system works at its various levels helps doctors explain normal body functions and make proper diagnoses when patients are sick.



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 Which of the following statements **best** describes the role of structure C in the nervous system?
- A. Structure C is the basic unit of the nervous system.
 - B. Structure C produces reflex responses in the arms and legs.
 - C. Structure C is the main center for sensory and motor processing.
 - D. Structure C transmits impulses from sense organs to the central nervous system.
- 9 Which of the following body systems provides protection for structures A and C?
- A. circulatory system
 - B. muscular system
 - C. nervous system
 - D. skeletal system
- 10 Which of the following would be the **most likely** effect of severe injury to the lower region of structure A?
- A. loss of sight
 - B. paralysis of the legs
 - C. restricted blood flow
 - D. slowed reflexes in the arms
- 11 Structure D is the hypothalamus. The hypothalamus has both nervous and endocrine functions.
- In which of the following ways does nervous system communication differ from endocrine system communication?
- A. The nervous system uses electrochemical signals for communication, whereas the endocrine system uses hormones.
 - B. Nervous system communication occurs slowly, whereas endocrine system communication occurs quickly.
 - C. The nervous system sends messages along myelinated axons to communicate, whereas the endocrine system sends messages along unmyelinated axons.
 - D. Nervous system communication controls only voluntary functions, whereas endocrine system communication controls only involuntary functions.

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 The nervous system interacts with other body systems to maintain homeostasis.
- a. Describe how the nervous and respiratory systems interact to maintain homeostasis when a person exercises. Explain how this interaction maintains homeostasis.
 - b. Describe how the nervous and muscular systems interact to maintain homeostasis when a person's body temperature drops. Explain how this interaction maintains body temperature.

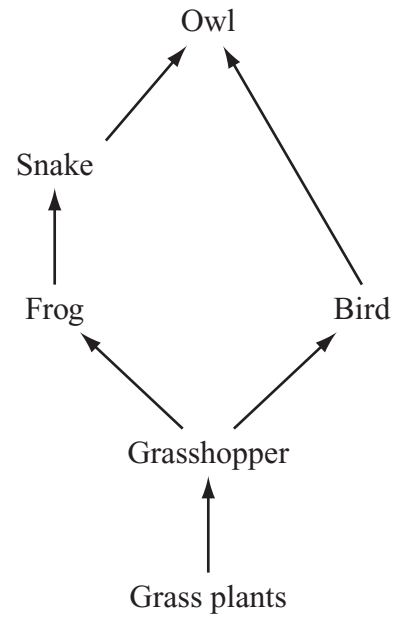
Mark your answers to multiple-choice questions 13 through 22 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet, but you may work out solutions to multiple-choice questions in the test booklet.

- 13 In humans, freckles are encoded by a dominant allele. An individual woman is heterozygous for freckles.

According to the law of segregation, which of the following would apply to a child of this woman?

- A. The child must inherit the dominant allele for freckles.
- B. The child must inherit the recessive allele for freckles.
- C. The child has an equal chance of inheriting the dominant allele or the recessive allele for freckles from her mother.
- D. The child has a greater chance of inheriting the dominant allele than the recessive allele for freckles from her mother.

- 14 A partial food web is shown below.

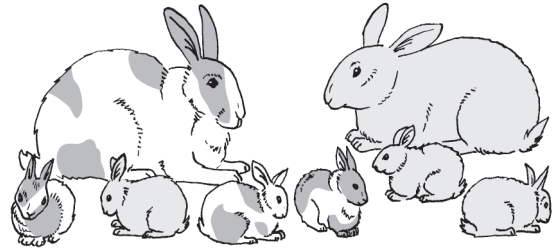


Which of the following will **most likely** happen if the frog population decreases?

- A. Owls will have no source of food.
- B. The snake population will increase.
- C. Birds will have less competition for food.
- D. The grasshopper population will go extinct.

- 15 Which of the following **best** describes the composition of a nucleotide?
- A. a pair of six-carbon rings attached to each other
 - B. a carbon atom joined to hydrogen and three functional groups
 - C. a chain of carbon atoms with a carboxyl group bonded to one end
 - D. a five-carbon sugar attached to a phosphate group and a nitrogenous base
- 16 A variety of respiratory diseases in humans can be caused by adenoviruses. Which of the following describes the structure of an adenovirus?
- A. a prokaryotic cell that is propelled by a flagellum
 - B. a nucleic acid core that is surrounded by a protein coat
 - C. a set of ribosomes that is held together by microtubules
 - D. a single cell that contains a plasma membrane and a circular chromosome

- 17 The illustration below shows two adult rabbits and their offspring.



In rabbits, the allele for spots (**R**) is dominant to the allele for solid color (**r**). What is the **most likely** genotype of the parent rabbits in the illustration?

- A. **rr** × **rr**
- B. **Rr** × **rr**
- C. **Rr** × **Rr**
- D. **RR** × **rr**

- 18 Spines and thorns on plants look similar, and both provide protection from herbivores. However, not all plants with spines or thorns have descended from a recent common ancestor. Spines are modified leaves, and thorns are modified stems.

Which of the following statements **best** describes how this information provides evidence for evolution?

- A. It shows that different organisms sometimes look alike.
- B. It shows that herbivores are the strongest selection force on organisms.
- C. It shows that a variety of structures can be effective in protecting an organism from herbivores.
- D. It shows that environmental pressures can cause unrelated organisms to change in similar ways.

- 19 Which of the following **most likely** results in a decrease in a blackbird population?

- A. birth
- B. emigration
- C. immigration
- D. mutualism

- 20 The table below provides information about nutrition and cellular structure for organisms in different kingdoms.

Kingdom	Nutrition	Nucleus	Unicellular or Multicellular
Fungi	heterotrophic	yes	unicellular and multicellular
Plantae	autotrophic	yes	multicellular
Animalia	?	?	?

What information **best** completes the table?

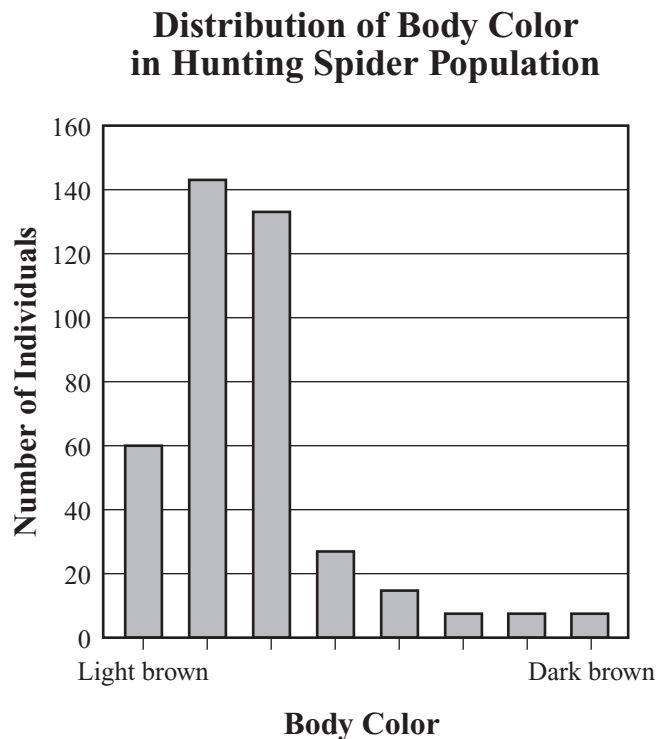
- A. autotrophic, no, unicellular
B. autotrophic, yes, multicellular
C. heterotrophic, no, unicellular
D. heterotrophic, yes, multicellular
-
- 21 Which of the following roles do nitrogen-fixing bacteria serve in the nitrogen cycle?
- A. They concentrate nitrogen in the atmosphere.
B. They absorb nitrogen from the wastes of animals.
C. They convert nitrogen into a form that plants can use.
D. They release nitrogen from the bodies of decaying organisms.
- 22 A laboratory technique called polymerase chain reaction (PCR) produces millions of copies of a DNA molecule in only a few hours. PCR is most similar to which of the following cellular processes?
- A. mitosis
B. replication
C. transcription
D. translocation

Question 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 In contrast to web-building spiders, hunting spiders spend most of their time on the ground hunting prey. In a population of hunting spiders, a range of body colors from light brown to dark brown is observed. The graph below shows the distribution of body color in this particular spider population.



- a. Describe the most likely appearance of the ground on which the spiders live and hunt. Explain your answer.

Suppose the spiders' main prey begins to dwell primarily on dark vegetation rather than on the ground.

- b. What will most likely happen to the distribution of body color in the spider population over the next 50 years? Make a graph in your Student Answer Booklet to show the expected distribution, and 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 Which of the following is the main reason that humans need to include carbohydrates in their diet?
- A. Carbohydrates are broken down in cells for energy.
 - B. Carbohydrates combine to form many different proteins.
 - C. Carbohydrates act as catalysts to speed up chemical reactions.
 - D. Carbohydrates are the building blocks for cell growth and repair.
- 25 In pea plants, the allele for purple flowers (**P**) is dominant to the allele for white flowers (**p**).
- A plant that is heterozygous for purple flowers is crossed with a plant with white flowers. What percentage of the offspring plants are expected to have purple flowers?
- A. 25%
 - B. 50%
 - C. 75%
 - D. 100%
- 26 Which of the following statements applies to **all** forms of sexual reproduction?
- A. All offspring from a mating look exactly the same.
 - B. Offspring receive genetic material from two gametes.
 - C. Offspring completely develop inside the mother's body before birth.
 - D. All offspring are born with their organs and senses fully developed.
- 27 A researcher is comparing amino acid sequences for the protein hemoglobin from several primate species. What does the degree of similarity in sequences among the primate species indicate about these species?
- A. how closely related they are
 - B. how frequently they interbreed
 - C. how rapidly they can evolve in the future
 - D. how efficient their circulatory systems are

- 28 In Asia, human population growth and land development have fragmented forest habitats. Because of this fragmentation, tigers have become geographically isolated in small populations, and the tigers repeatedly mate within the same small population of tigers.

Which of the following is the **most likely** impact this isolation will have on tiger populations?

- A. Genetic diversity of each tiger population will decrease, threatening survival.
- B. Adaptation of each tiger population to its present environment will occur rapidly.
- C. The tigers in each population will breed more often, increasing population size.
- D. The tigers in each population will mate with closely related species to maximize breeding success.

- 29 A student is looking at a picture of a cell taken through a microscope. The presence of which of the following would indicate that the cell is eukaryotic?

- A. cytoplasm
- B. DNA
- C. nucleus
- D. plasma membrane

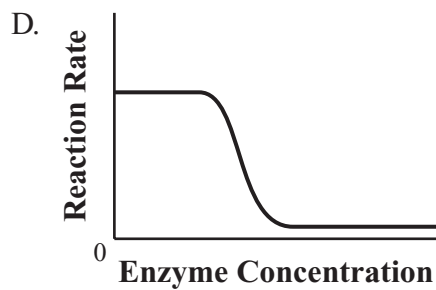
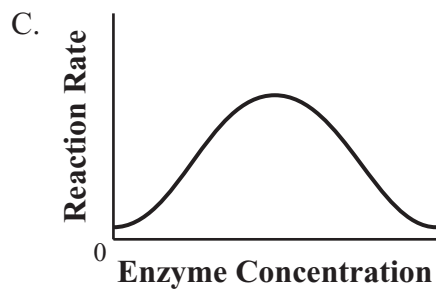
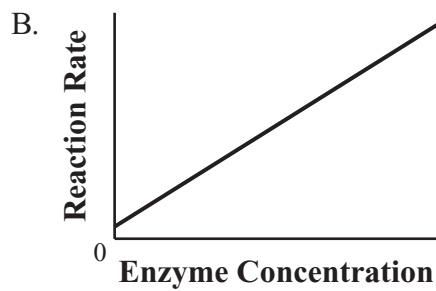
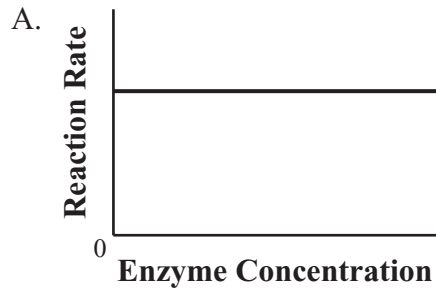
- 30 Huntington's disease (HD) is a hereditary disease that destroys brain cells. In individuals with HD, the functioning of a specific protein is altered, and this leads to the disease's effects.

Which of the following is the **most likely** cause of the altered protein function in individuals with HD?

- A. a mutation in the DNA sequence that codes for the protein
- B. an increase in the amount of fat rather than protein in the diet
- C. a decrease in the amount of glucose and amino acids in the blood
- D. a structural abnormality in the endoplasmic reticulum of brain cells

- 31 A student is investigating how reaction rate changes over a range of enzyme concentrations. The student uses excess reactants.

Which of the following graphs **best** represents the relationship between enzyme concentration and reaction rate?



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 In rabbits, a gene controlling fur color has four alleles. The four alleles and the phenotypes they produce are listed in the table below.

Allele	Phenotype
R	black fur
r^h	Himalayan: white fur with colored tips of ears, nose, tail, and legs
r^{ch}	chinchilla: light gray fur on entire body
r	white fur

The alleles are listed in order of their dominance. The **R** allele is dominant to **r^h**, **r^{ch}**, and **r**. The **r^h** allele is dominant to **r^{ch}** and **r**. The **r^{ch}** allele is dominant to **r**.

- Gina has a rabbit with genotype **r^hr**. Identify the phenotype of Gina's rabbit.
- Identify **all** possible genotypes for a black rabbit.

Gina breeds her rabbit with a black rabbit. The phenotype ratio of the offspring of Gina's rabbit and the black rabbit is 2 black : 1 Himalayan : 1 chinchilla.

- Identify the genotype of the black rabbit in this cross. Support your answer by drawing the Punnett square for the cross.

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 Scientists recovered the body of a woolly mammoth from the frozen soil of Siberia. The DNA sequence of the woolly mammoth was very similar to the DNA sequence of the African elephant.
- Which of the following conclusions is **best** supported by this information?
- A. African elephants evolved directly from woolly mammoths.
 - B. The woolly mammoth and the African elephant have a common ancestor.
 - C. Woolly mammoths had the same number of chromosomes as African elephants.
 - D. The woolly mammoth and the African elephant should be classified as the same species.

- 34 The ecological relationship between a hawk and a rabbit is the same type of relationship as that between
- A. a tick and a deer.
 - B. a frog and an insect.
 - C. a mouse and a chipmunk.
 - D. a bee and a flowering plant.

- 35 Hemophilia is an X-linked recessive condition in which blood does not clot properly. Queen Victoria of England had one allele for hemophilia.

Which of the following statements describes the **most likely** pattern for the occurrence of hemophilia in Queen Victoria's descendants?

- A. All of Queen Victoria's children had hemophilia.
- B. All of Queen Victoria's children were carriers for hemophilia.
- C. Female descendants of Queen Victoria could not pass on the gene for hemophilia.
- D. More male descendants than female descendants of Queen Victoria had hemophilia.

- 36 Which of the following characteristics is **most useful** when classifying a eukaryote into a kingdom?

- A. how the organism feeds
- B. how the organism moves
- C. the organism's color and mass
- D. the organism's form and structure

- 37 In which of the following ways do producers in an ecosystem obtain energy?

- A. by consuming other producers
- B. by living parasitically on animals
- C. by using sunlight to make sugars
- D. by breaking down dead organisms

- 38 Amino acids, sugars, and ions move across the cell membrane. Their movement from a region of high concentration to a region of low concentration is accomplished by special proteins in the membrane.

Which of the following terms applies to this type of cell transport?

- A. active transport
- B. facilitated diffusion
- C. osmosis
- D. transcription

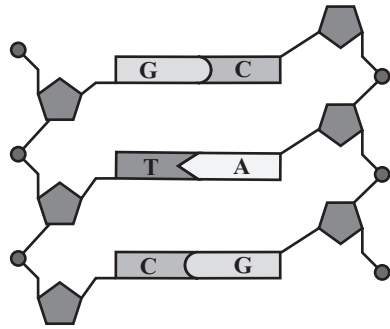
- 39 Two populations of fruit flies both belong to the genus *Drosophila*. The fruit flies are able to successfully mate within their own populations, but males from one population are unable to mate and produce offspring with females from the other population.

Based on this information, which of the following statements could describe the fruit flies in the two populations?

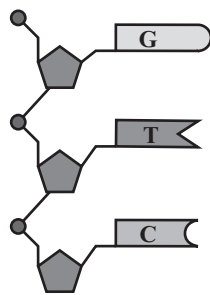
- A. They are classified as different orders.
- B. They are classified in different classes.
- C. They are classified as different species.
- D. They are classified in different kingdoms.

40 Which of the following models **most** accurately represents the structure of DNA?

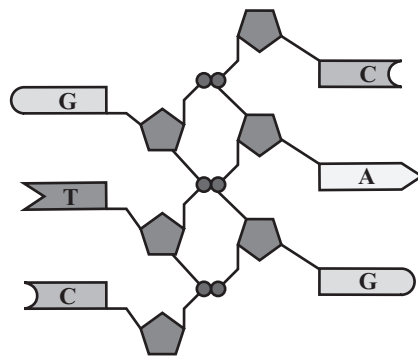
A.



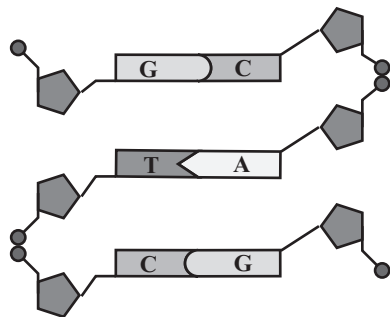
B.



C.



D.



41 Acetylcholine is an important chemical signal in the nervous system. Once acetylcholine is released, it is quickly broken down into other chemicals because of the activity of cholinesterase. Cholinesterase is which of the following?

- A. a hormone
- B. a lipid
- C. an enzyme
- D. an organelle

42 In periods of hot, dry weather, the pores on the leaf surfaces of most plants close in order to reduce water loss during the day. When these pores are closed, plants cannot take in carbon dioxide.

As a direct result, the rate of which of the following processes decreases?

- A. cellular respiration
- B. mitosis
- C. nitrogen fixation
- D. photosynthesis

43 *Odontomachus bauri* is a species of ant that has a trap jaw that shuts rapidly. This jaw system evolved from basic mouth parts that all ants have, but the jaw is longer, the joint is a different shape, and the muscles are larger.

Which of the following statements **best** explains why this trap-jaw trait evolved?

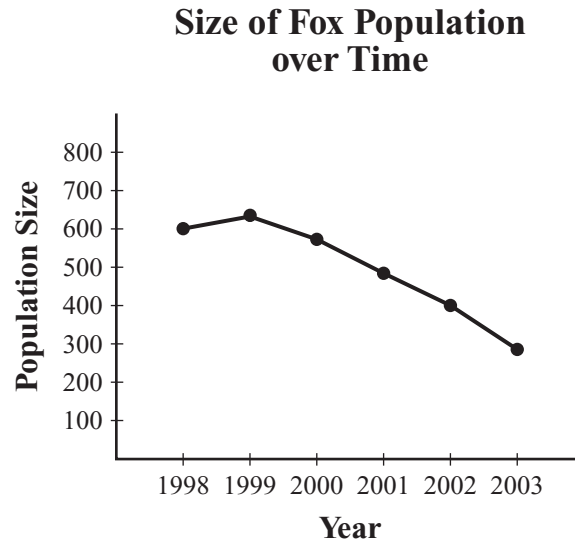
- A. The trap jaw increases the ants' body mass.
- B. The trap jaw allows the ants to eat only one kind of food.
- C. The trap jaw is the ants' only means of species recognition.
- D. The trap jaw increases the ants' chances of survival and reproduction.

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 The graph below shows the changes in the size of a fox population over time.



- Identify **three** different factors that could have caused the overall decrease in the fox population.
- Explain, in detail, how **each** factor you identified in part (a) would have caused the decrease.

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

- 45 Fruit flies have eight chromosomes in their body cells. Fruit flies produce gametes for reproduction by meiosis.
- In your Student Answer Booklet, draw and label a fruit fly sperm cell, a fruit fly egg cell, and the cell that results from the fertilization process. Clearly show the number of chromosomes in **each** cell's nucleus.
 - Summarize what happens at the chromosome level as a result of fertilization.
 - Describe what will occur in the step immediately after fertilization.

Biology
February 2011 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	5	<i>Biochemistry and Cell Biology</i>	2.2	A
2	5	<i>Ecology</i>	6.2	D
3	5	<i>Ecology</i>	6.1	D
4	6	<i>Biochemistry and Cell Biology</i>	2.6	B
5	6	<i>Ecology</i>	6.4	A
6	6	<i>Genetics</i>	3.2	C
7	7	<i>Evolution and Biodiversity</i>	5.2	C
8	9	<i>Anatomy and Physiology</i>	4.4	C
9	9	<i>Anatomy and Physiology</i>	4.5	D
10	9	<i>Anatomy and Physiology</i>	4.4	B
11	9	<i>Anatomy and Physiology</i>	4.7	A
12	10	<i>Anatomy and Physiology</i>	4.8	
13	11	<i>Genetics</i>	3.5	C
14	11	<i>Ecology</i>	6.3	C
15	12	<i>Biochemistry and Cell Biology</i>	1.2	D
16	12	<i>Biochemistry and Cell Biology</i>	2.8	B
17	12	<i>Genetics</i>	3.6	B
18	13	<i>Evolution and Biodiversity</i>	5.1	D
19	13	<i>Ecology</i>	6.1	B
20	14	<i>Biochemistry and Cell Biology</i>	2.3	D
21	14	<i>Ecology</i>	6.4	C
22	14	<i>Genetics</i>	3.2	B
23	15	<i>Evolution and Biodiversity</i>	5.3	
24	16	<i>Biochemistry and Cell Biology</i>	1.2	A
25	16	<i>Genetics</i>	3.6	B
26	16	<i>Anatomy and Physiology</i>	4.6	B
27	16	<i>Evolution and Biodiversity</i>	5.1	A
28	17	<i>Evolution and Biodiversity</i>	5.3	A
29	17	<i>Biochemistry and Cell Biology</i>	2.2	C
30	17	<i>Genetics</i>	3.3	A
31	18	<i>Biochemistry and Cell Biology</i>	1.3	B
32	19	<i>Genetics</i>	3.4	
33	20	<i>Evolution and Biodiversity</i>	5.1	B
34	20	<i>Ecology</i>	6.3	B
35	21	<i>Genetics</i>	3.4	D
36	21	<i>Evolution and Biodiversity</i>	5.2	D
37	21	<i>Ecology</i>	6.3	C
38	22	<i>Biochemistry and Cell Biology</i>	2.1	B
39	22	<i>Evolution and Biodiversity</i>	5.2	C
40	23	<i>Genetics</i>	3.1	A
41	23	<i>Biochemistry and Cell Biology</i>	1.3	C
42	24	<i>Biochemistry and Cell Biology</i>	2.4	D

Biology
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Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
43	24	<i>Evolution and Biodiversity</i>	5.3	D
44	25	<i>Ecology</i>	6.2	
45	26	<i>Biochemistry and Cell Biology</i>	2.7	

* Answers are provided here for multiple-choice items only. Each open-response item has its own set of scoring guidelines, which allow for valid alternate interpretations and responses.