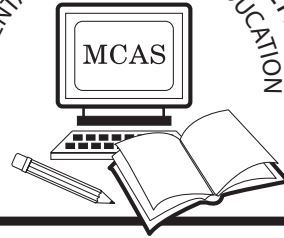


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MASSACHUSETTS DEPARTMENT OF  
ELEMENTARY & SECONDARY EDUCATION



**MASSACHUSETTS  
COMPREHENSIVE  
ASSESSMENT  
SYSTEM**

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*Release of  
February 2009  
MCAS Biology  
Test Items*

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**April 2009  
Massachusetts Department of  
Elementary and Secondary Education**

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This document was prepared by the  
Massachusetts Department of Elementary and Secondary Education  
Mitchell D. Chester, Ed.D.  
Commissioner of Elementary and Secondary Education

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# *Foreword*

The vision of the Department of Elementary and Secondary Education is to work in partnership with policy makers, 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 2009, an MCAS test in Biology was administered in high schools across the state. In keeping with the Department's past practice of releasing all test items on which student results are based, all common questions from the February 2009 Biology test are included in this document.

The *Release of February 2009 MCAS Biology Test Items* is available only through the Department of Elementary and Secondary Education website at [www.doe.mass.edu/mcas/testitems.html](http://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 Report Summaries* and *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.

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# 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 2009 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 receives a *Test Item Analysis Report Summary* and a *Test Item Analysis Roster* for Biology. These reports provide data generated from student responses. Each report lists, for the school receiving the report, the names of all enrolled students who took the February 2009 Biology test, and shows how each student answered each common test item. The report 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 reports.

## Structure

Chapter II of this document contains information for the February 2009 Biology test. 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 2009 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.

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## II. February 2009 Biology Test

## February 2009 Biology Test

The February 2009 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](http://www.doe.mass.edu/frameworks/current.html).

In test item analysis reports and on the Subject Area Subscore pages of the MCAS *School Reports* and *District Reports*, 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.



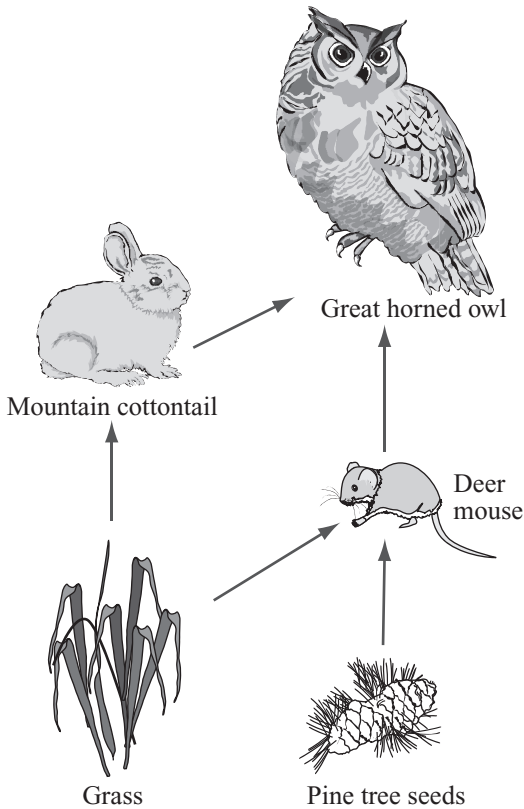
# Biology

## 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 A simple food web is shown below.



Which of the following is most likely to lead to the **greatest** decrease in the deer mouse population?

- A. an increase in the owl population
- B. an increase in the grass population
- C. an increase in the pine tree population
- D. an increase in the cottontail population

- 2 The table below lists the concentrations of water inside and outside a cell under four different conditions.

Condition	Water Concentration in Cell	Water Concentration in Environment
1	90%	95%
2	90%	100%
3	95%	90%
4	95%	95%

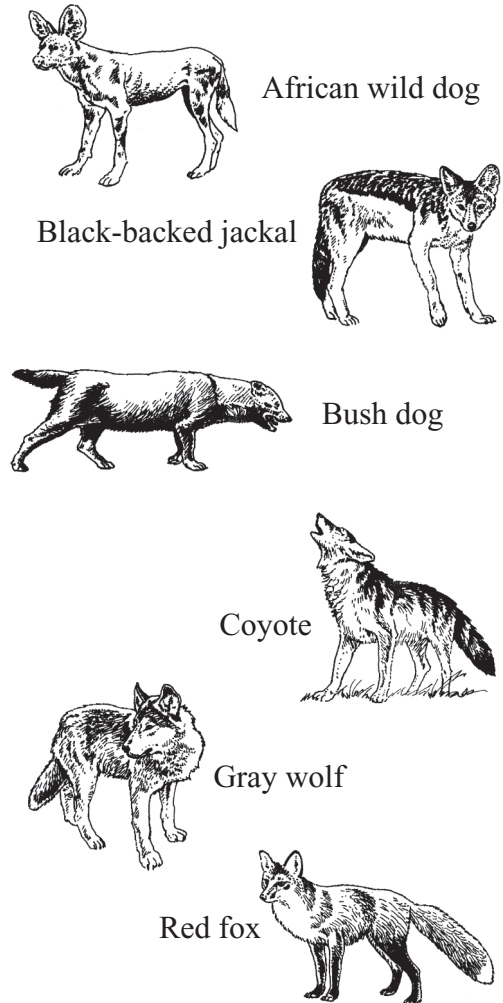
Under which condition will the cell experience a net loss of water to its environment?

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

3 In some pea plant experiments, Mendel studied the inheritance patterns of two characteristics at once, such as seed shape and seed color. He did this to determine which of the following?

- A. the process by which mutations occur
- B. where genes are located within chromosomes
- C. whether characteristics are inherited together or separately
- D. the number of crosses necessary to cause physical changes in inheritance patterns

4 The illustration below shows several wild canine species that descended from a common canine ancestor.



As a result of natural selection, canine biodiversity increased as all of these species developed from a common ancestor. Which of the following factors contributed **most** to the evolution of these diverse canine species?

- A. differences in environment
- B. selective breeding programs
- C. inheritance of learned behaviors
- D. interbreeding with unrelated species

- 5 When Lance goes jogging, his heart rate increases to pump blood faster and supply his muscles with more oxygen. Which of the following helps to maintain homeostasis in response to this increase in heart rate?
- A. an increase in digestion
  - B. an increase in respiration
  - C. a decrease in perspiration
  - D. a decrease in bone growth
- 6 A biologist looks at an organism through a microscope. Which of the following observations tells the biologist that the organism is eukaryotic?
- A. The organism is unicellular.
  - B. The organism moves with flagella.
  - C. The organism has a cell membrane.
  - D. The organism has membrane-bound organelles.

- 7 The table below provides classification information for four different mammals.

**Scientific Classification of Four Mammals**

<b>Classification Level</b>	<b>Mammal 1</b>	<b>Mammal 2</b>	<b>Mammal 3</b>	<b>Mammal 4</b>
<b>Order</b>	Rodentia	Lagomorpha	Rodentia	Rodentia
<b>Family</b>	Castoridae	Leporidae	Sciuridae	Sciuridae
<b>Genus</b>	<i>Castor</i>	<i>Sylvilagus</i>	<i>Sciurus</i>	<i>Sciurus</i>
<b>Species</b>	<i>canadensis</i>	<i>floridanus</i>	<i>niger</i>	<i>carolinensis</i>

Which of these mammals are most closely related to each other?

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

The following section focuses on inheritance patterns in a pedigree.

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

Earlobes may be free or attached, as shown in the illustrations below. The type of earlobe a person has is genetically determined. The allele for free earlobes (**E**) is dominant, while the allele for attached earlobes (**e**) is recessive.

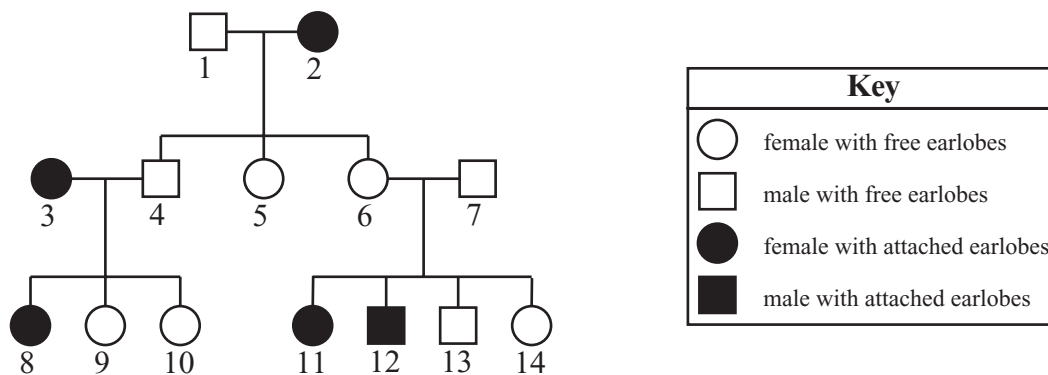
**Free earlobe**  
(dominant)



**Attached earlobe**  
(recessive)



The inheritance of the earlobe trait can be traced over several generations using a family tree called a pedigree. A pedigree for the earlobe trait is shown below.



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 encodes the genetic information for the earlobe trait?
- A. ATP
  - B. DNA
  - C. hormones
  - D. carbohydrates
- 9 If female #3 and male #4 were to have another child, what would be the probability of that child having attached earlobes?
- A.  $\frac{1}{4}$
  - B.  $\frac{1}{2}$
  - C.  $\frac{3}{4}$
  - D.  $\frac{1}{1}$
- 10 If female #11 has a child with a male who has attached earlobes, which of the following genotypes is possible for the child?
- A. **ee** only
  - B. **Ee** only
  - C. **EE** or **Ee**
  - D. **EE** or **ee**
- 11 Female #10 is heterozygous for the earlobe trait. Suppose she has five children with a male who is also heterozygous for the earlobe trait. Which of the following describes the **most likely** phenotypes of the five children?
- A. All of the children have free earlobes.
  - B. All of the children have attached earlobes.
  - C. Some of the children have free earlobes and some have attached earlobes.
  - D. The female children all have free earlobes and the male children all have attached earlobes.

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.

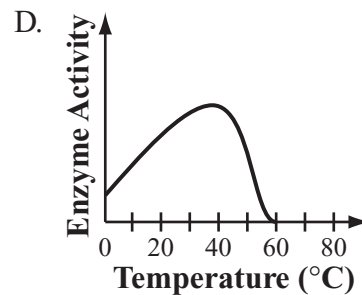
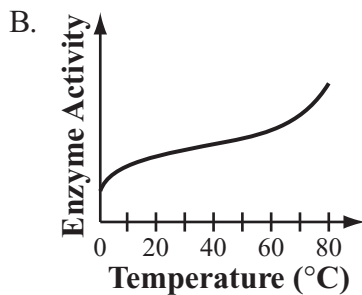
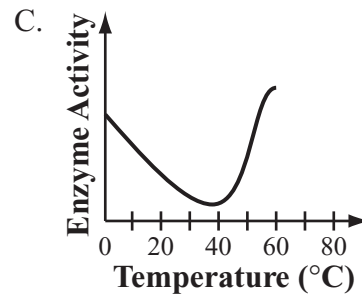
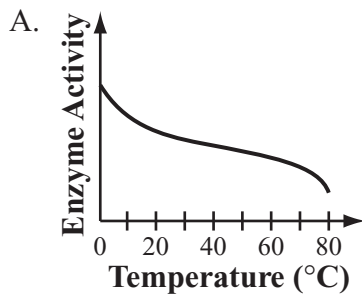
- 12** On a pedigree, it may not be possible to conclusively determine the genotype of every individual.
- a. Can the genotype of male #1 be conclusively determined based on the information given in the pedigree? Explain your answer.
  - b. Can the genotype of female #2 be conclusively determined based on the information given in the pedigree? Explain your answer.

You may use Punnett squares to support your answers to parts (a) and (b).

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 the human digestive system, the enzyme trypsin acts on proteins. The optimal temperature for the enzyme is approximately 40°C.

Which of the following graphs shows how the activity of the enzyme **most likely** relates to the temperature of the reaction environment?





- 14 Some scientists use molecular evidence to study evolution. One type of molecular evidence is the amino acid sequence of particular proteins in various species.

Which of the following **best** describes what the study of these sequences reveals about the species?

- A. The more similar the sequences are, the faster the species will coevolve.
- B. The more similar the sequences are, the more closely related the species are.
- C. The longer the sequences are, the earlier the species evolved in geologic history.
- D. The longer the sequences are, the more adapted the species are to their environments.

- 15 Which of the following occurs in meiosis but **not** in mitosis?

- A. Chromosomes coil and condense.
- B. Spindle fibers form across the cell.
- C. The nuclear membrane breaks down.
- D. Pairs of homologous chromosomes are separated.

- 16 Which of the following is **always** a result of immigration into a population?

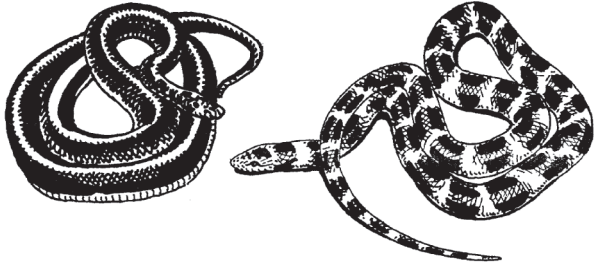
- A. New individuals are added to the population.
- B. Some individuals are forced to leave the population.
- C. The survival rate of the individuals in the population increases.
- D. The genetic diversity among the individuals in the population decreases.

- 17 A cell releases a chemical into the space surrounding it to communicate with nearby cells. Which of the following **must** occur for the communication to be successful?

- A. The chemical must be received by the nearby cells.
- B. The nearby cells must divide to produce more cells.
- C. The nearby cells must generate and send a nerve impulse.
- D. The same chemical signal must be produced within the nearby cells.

- 18 In 1861, a complete skeleton of an *Archaeopteryx* was discovered in limestone rocks that were 150 million years old. The fossils showed that this *Archaeopteryx* had a long bony tail, three claws on each wing, and a mouth full of teeth—which are all characteristics of dinosaurs—but it also had feathers on the long bony tail.
- This fossil evidence supports an evolutionary link between which two animal groups?
- A. fishes and birds
  - B. reptiles and birds
  - C. mammals and reptiles
  - D. amphibians and fishes
- 19 The answer to which of the following questions would be **most** useful in determining whether to classify an organism in kingdom Plantae or kingdom Animalia?
- A. Is the organism able to respond to stimuli?
  - B. Is the organism able to make its own food?
  - C. Is the organism unicellular or multicellular?
  - D. Is the organism made of cells with or without nuclei?
- 20 Which of the following describes DNA replication in eukaryotic cells?
- A. A copy of the DNA is made in the nucleus.
  - B. A molecule of RNA is produced from the DNA.
  - C. Each strand of DNA is combined with a strand of RNA.
  - D. Each strand of DNA is separated into a new chromosome.

- 21 The illustration below shows two snakes of the same species that have different striping.



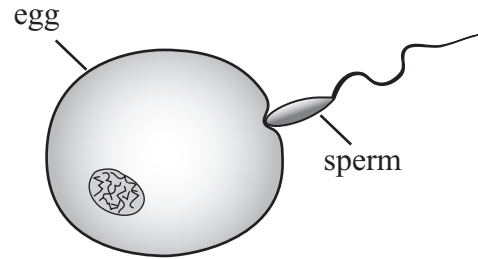
Lengthwise  
stripes

Crosswise  
stripes

California king snakes may exhibit different patterns of stripes. According to evolution by natural selection, which of the following is the **most likely** result if a snake-eating predator can more easily detect the snakes with the crosswise stripes?

- A. The percentages of snakes born of each type will not change.
- B. Snakes with lengthwise stripes will become more common.
- C. Snakes with crosswise stripes will learn to move faster.
- D. A new type of king snake with no stripes will emerge.

- 22 The figure below shows an egg cell and a sperm cell.



Which of the following is represented by this figure?

- A. the formation of a zygote
- B. mitotic division of nuclei
- C. the production of gametes
- D. translation of genetic information

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 A teacher displayed some nutrition fact labels for students to examine. Portions of the labels from two different foods are shown below.

**Food 1**

<b>Nutrition Facts</b>	
Serving Size 51 g	
<b>Amount per Serving</b>	
<b>Calories 50</b> <b>Calories from Fat 10</b>	
<hr/>	
<b>Total Fat</b>	1 g
<b>Cholesterol</b>	0.02 g
<b>Total Carbohydrate</b>	2 g
<b>Protein</b>	8 g

**Food 2**

<b>Nutrition Facts</b>	
Serving Size 57 g	
<b>Amount per Serving</b>	
<b>Calories 30</b> <b>Calories from Fat 0</b>	
<hr/>	
<b>Total Fat</b>	0 g
<b>Cholesterol</b>	0 g
<b>Total Carbohydrate</b>	8 g
<b>Protein</b>	0 g

- Identify the primary type of molecule found in food 1 **and** describe the molecular structure of this type of molecule.
- Identify the primary type of molecule found in food 2 **and** describe the molecular structure of this type of molecule.
- The teacher told the students that one of the foods is a type of fruit and the other is a type of meat. Identify which food is the fruit and which is the meat. Give evidence to support your answer.

# Biology

## SESSION 2

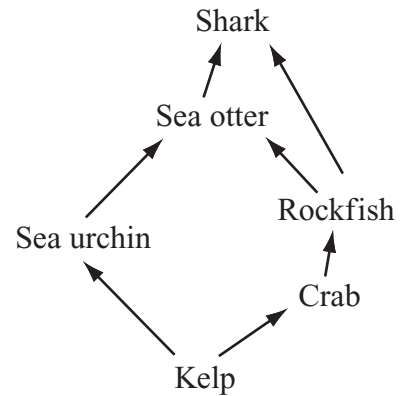
### DIRECTIONS

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 body systems is responsible for receiving stimuli from the environment and coordinating the body's response to these stimuli?

- A. respiratory system
- B. nervous system
- C. digestive system
- D. circulatory system

- 25 Part of a food web for a marine kelp forest is shown below.



Which of the following statements correctly describes the transfer of energy that **initially** enters this system?

- A. The sea urchin gets energy from the sea otter.
- B. The shark receives most of the energy that enters the ecosystem.
- C. The crab transfers less energy to the next trophic level than does the rockfish.
- D. The kelp converts energy into a form that can be used by other organisms.

- 26 The box below contains a statement about mutations.

In many cases throughout geologic history, if mutations in the genetic material of existing species had not occurred, new species would not have appeared.

Which of the following conclusions about mutations in the DNA sequence of a gene is **most** consistent with the statement?

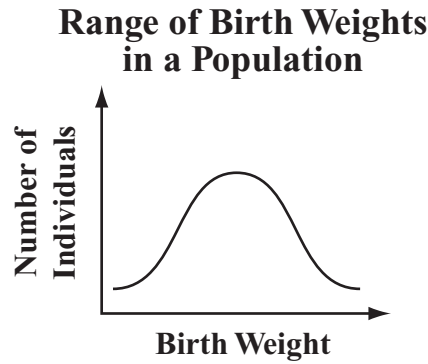
- A. Mutations are always rapidly occurring.
- B. Mutations are always beneficial.
- C. Mutations are the only way new species arise.
- D. Mutations are an important mechanism for the evolution of new species.

- 27 Organism A is eukaryotic, is unicellular, and lacks a cell wall. Organism B is eukaryotic, is multicellular, has a cell wall, and contains chloroplasts.

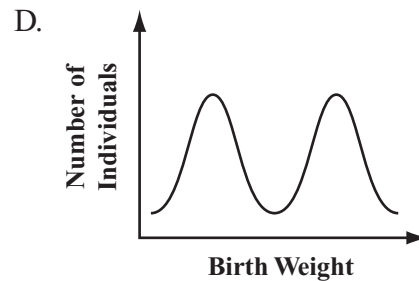
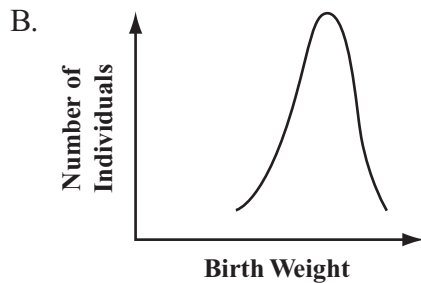
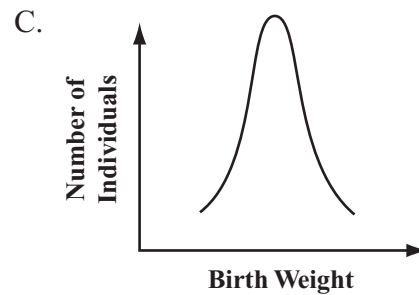
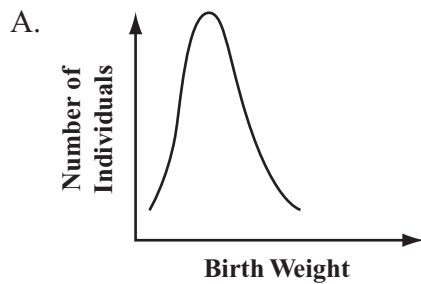
In which kingdoms should these organisms be classified?

- A. organism A in Protista and organism B in Fungi
  - B. organism A in Protista and organism B in Plantae
  - C. organism A in Animalia and organism B in Fungi
  - D. organism A in Animalia and organism B in Plantae
- 28 Atherosclerosis is a condition in which substances such as fats and cholesterol are deposited on the inside walls of arteries, resulting in a decrease in the internal diameter of the arteries. This directly interferes with which of the following processes in the body?
- A. the production of red blood cells
  - B. the delivery of oxygen to body tissues
  - C. the release of insulin to regulate blood sugar
  - D. the transmission of nerve impulses to the heart

- 29 The graph below represents the range of birth weights for offspring in a mammal population.



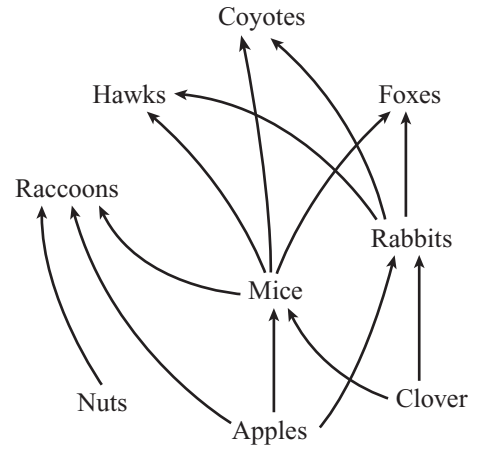
As is typical in many mammal populations, offspring with an average weight at birth have a higher survival rate than offspring with a very low or very high birth weight. Based on this information, which of the following graphs is the **best** prediction of what will happen to the range of birth weights in this population over time?



30 Both photosynthesis and cellular respiration involve all of the following **except**

- A. chlorophyll.
- B. glucose.
- C. oxygen.
- D. water.

31 The diagram below represents a food web.



Which of the following are consumers in this ecosystem?

- A. apples
- B. clover
- C. mice
- D. nuts



Question 32 is an open-response question.

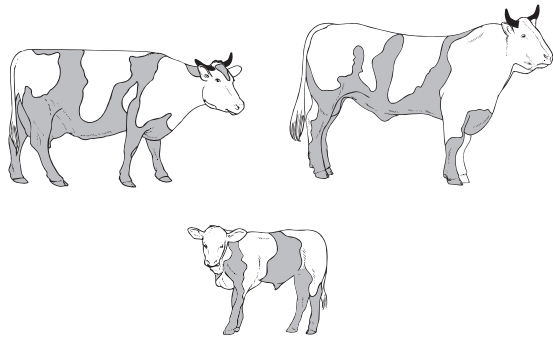
- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

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

- 32** The hormones glucagon and insulin are produced by the pancreas and regulate the amount of glucose in the blood. Glucagon stimulates liver cells to release glucose into the blood, whereas insulin stimulates body cells to absorb glucose from the blood.
- a. Describe and explain what will happen in the body to regulate the amount of glucose in the blood shortly after a person eats a sugary snack.
  - b. Describe and explain what will happen in the body to regulate the amount of glucose in the blood after a person has not eaten for several hours.
  - c. Discuss how your answers to parts (a) and (b) relate to the concept of homeostasis.

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 The pictures below show a cow and a bull and their calf. All three animals have coats of the same colors.



This calf developed from a zygote. During the development of this zygote, a mutation occurred in a coat color gene.

Which of the following **best** explains why the calf's phenotype is the same as its parents'?

- A. The mutation is not present in the parent animals.
- B. The mutated gene is passed on during reproduction.
- C. The mutated allele is dominant over the parental allele.
- D. The mutation does not affect the expression of the color trait.

- 34 Which of the following is one important difference between a virus and a bacterial cell?

- A. A virus is much larger in size than a bacterial cell.
- B. A virus always causes more severe disease than a bacterial cell.
- C. A virus can never reproduce on its own, but a bacterial cell can.
- D. A virus does not contain genetic material, but a bacterial cell does.

- 35 In which of the following ways do **most** plants obtain the nitrogen they need?

- A. They break down the proteins in dead animals.
- B. They absorb nitrogenous compounds from the soil.
- C. They take nitrogen gas directly from the atmosphere.
- D. They produce nitrogenous compounds in photosynthesis.

- 36 A gene in horses controls whether the horse has a white coat or a colored coat. A white female horse and a white male horse are the parents of a total of five female offspring. Three of these offspring have white coats. The other two offspring have colored coats.

The phenotypes of the horses suggest which of the following as the **most likely** pattern of inheritance for coat color?

- A. The allele for a white coat is dominant.
- B. The allele for a white coat is recessive.
- C. The allele for a white coat is sex-linked.
- D. The allele for a white coat is codominant.

- 37 The cells of the nasal cavity and the trachea are lined with cilia. Which of the following describes a purpose of the cilia?

- A. to cool air that is entering the respiratory system
- B. to help move trapped particles out of the respiratory system
- C. to help produce sound as air moves out of the respiratory system
- D. to increase the surface area for gas exchange in the respiratory system

- 38 Major natural events, such as volcanic eruptions, significantly change the environmental conditions of the areas where the events occur. What happens to local populations that are unable to adapt to the new conditions or to move to other areas?

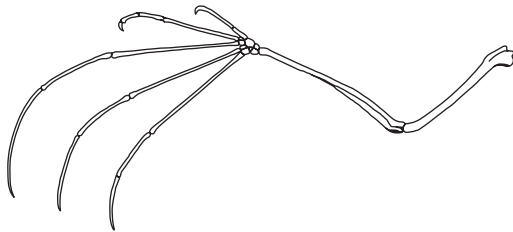
- A. They become extinct.
- B. They undergo rapid mutations.
- C. They develop a scavenger lifestyle until conditions change.
- D. They interbreed with the populations of other species that have remained there.

- 39 The bone structures of a porpoise flipper and a bat wing are shown below.

**Porpoise Flipper**



**Bat Wing**



Which of the following conclusions is **best** supported by the structure of each limb?

- A. The porpoise and bat share a common ancestor.
- B. The porpoise and bat limbs are adapted primarily for grasping.
- C. The porpoise and bat evolved relatively recently in geologic history.
- D. The porpoise and bat limbs are designed to support the entire weight of the animal.

- 40 In the synthesis phase (S phase) of the cell cycle, a body cell copies its DNA. This DNA replication occurs in preparation for which of the following processes?

- A. cellular respiration
- B. facilitated diffusion
- C. mitosis
- D. translation

- 41 Which of the following lists of elements contains the **most common** elements in organic compounds?

- A. calcium, iron, and potassium
- B. carbon, hydrogen, and oxygen
- C. chlorine, phosphorus, and sodium
- D. copper, magnesium, and sulfur

42 During one growing season, 5000 square meters of corn plants transpires approximately 1.85 million liters of water. The water lost from the plants via transpiration goes directly to which of the following?

- A. insects
- B. the soil
- C. streams
- D. the atmosphere

43 Black terns are a species of bird living in marshes, ponds, and marshy lakes. They feed on insects, fish, and crustaceans. They usually make their nests on loose, floating vegetation.

Which of the following environmental changes would **most likely** decrease the size of the black tern population?

- A. A competing bird population decreases in size.
- B. Fish species have a more successful breeding season than usual.
- C. A new plant species invades the environment and creates a dense cover of vegetation.
- D. Insect larvae experience lower than average rates of predation and survive to adulthood.

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 table below shows data from an insect population in 1995 and 1998. Insecticides were applied to this population each year from 1995 to 1998.

**Changes in an Insect Population's  
Resistance to Insecticide**

<b>Characteristic</b>	<b>Percent in Population in 1995</b>	<b>Percent in Population in 1998</b>
resistant	0.15	99.10
not resistant	99.85	0.90

- a. Based on the data in the table, describe the changes in the characteristics of the insect population between 1995 and 1998.
- b. Explain, in detail, how natural selection produced these changes in the insect population over this time.

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

- 45 Carbon moves through the environment via the carbon cycle. Some carbon exists as carbon dioxide in the atmosphere. Scientists believe that increased amounts of atmospheric carbon dioxide significantly contribute to the greenhouse effect and global warming.
- Identify **two** carbon cycle processes that add carbon dioxide to the atmosphere.
  - Identify **one** carbon cycle process that removes carbon dioxide from the atmosphere.
  - Describe **one** action that humans could take to reduce levels of carbon dioxide in the atmosphere. Explain how the action would reduce carbon dioxide levels.

**Biology**  
**February 2009 Released Items:**  
**Reporting Categories, Standards, and Correct Answers\***

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC)*
1	5	<i>Ecology</i>	6.3	A
2	5	<i>Biochemistry and Cell Biology</i>	2.1	C
3	6	<i>Genetics</i>	3.5	C
4	6	<i>Evolution and Biodiversity</i>	5.3	A
5	7	<i>Anatomy and Physiology</i>	4.8	B
6	7	<i>Biochemistry and Cell Biology</i>	2.2	D
7	8	<i>Evolution and Biodiversity</i>	5.2	D
8	10	<i>Genetics</i>	3.1	B
9	10	<i>Genetics</i>	3.6	B
10	10	<i>Genetics</i>	3.6	A
11	10	<i>Genetics</i>	3.6	C
12	11	<i>Genetics</i>	3.6	
13	12	<i>Biochemistry and Cell Biology</i>	1.3	D
14	13	<i>Evolution and Biodiversity</i>	5.1	B
15	13	<i>Biochemistry and Cell Biology</i>	2.7	D
16	13	<i>Ecology</i>	6.1	A
17	13	<i>Anatomy and Physiology</i>	4.7	A
18	14	<i>Evolution and Biodiversity</i>	5.1	B
19	14	<i>Biochemistry and Cell Biology</i>	2.3	B
20	14	<i>Genetics</i>	3.2	A
21	15	<i>Evolution and Biodiversity</i>	5.3	B
22	15	<i>Biochemistry and Cell Biology</i>	2.7	A
23	16	<i>Biochemistry and Cell Biology</i>	1.2	
24	17	<i>Anatomy and Physiology</i>	4.4	B
25	17	<i>Ecology</i>	6.3	D
26	18	<i>Evolution and Biodiversity</i>	5.1	D
27	18	<i>Biochemistry and Cell Biology</i>	2.3	B
28	18	<i>Anatomy and Physiology</i>	4.2	B
29	19	<i>Evolution and Biodiversity</i>	5.3	C
30	20	<i>Biochemistry and Cell Biology</i>	2.4	A
31	20	<i>Ecology</i>	6.3	C
32	21	<i>Anatomy and Physiology</i>	4.8	
33	22	<i>Genetics</i>	3.3	D
34	22	<i>Biochemistry and Cell Biology</i>	2.8	C
35	22	<i>Ecology</i>	6.4	B
36	23	<i>Genetics</i>	3.4	A
37	23	<i>Anatomy and Physiology</i>	4.3	B
38	23	<i>Ecology</i>	6.2	A
39	24	<i>Evolution and Biodiversity</i>	5.1	A
40	24	<i>Biochemistry and Cell Biology</i>	2.6	C
41	24	<i>Biochemistry and Cell Biology</i>	1.1	B
42	25	<i>Ecology</i>	6.4	D



**Biology**  
**February 2009 Released Items:**  
**Reporting Categories, Standards, and Correct Answers\***

<b>Item No.</b>	<b>Page No.</b>	<b>Reporting Category</b>	<b>Standard</b>	<b>Correct Answer (MC)*</b>
43	25	<i>Ecology</i>	6.2	C
44	26	<i>Evolution and Biodiversity</i>	5.3	
45	27	<i>Ecology</i>	6.4	

\* 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.