

Question 37
Benchmark A
Spring 2005

For many years scientists debated whether viruses should be considered living organisms.

Which statement could a scientist use to support the position that viruses are **not** living?

- A. Viruses have genes encoded in DNA.
- B. Viruses require a host cell in order to reproduce.
- C. Viruses infect both plant and animal cells.
- D. Viruses replicate to produce more viruses.

Question 3
Benchmark A
9th Practice Test

The feature that identifies an organism as a prokaryote is

- A. the presence of ribosomes.
- B. the absence of chlorophyll.
- C. the presence of a cell membrane.
- D. the absence of a nuclear membrane.

Question 38
Benchmark B
Spring 2005

38. What gas does the process of photosynthesis release into the atmosphere?

- A. carbon dioxide
- B. hydrogen
- C. nitrogen
- D. oxygen

Question 19
Benchmark B
9th Practice Test

What energy transformation occurs in green plants during photosynthesis?

- A. Thermal energy is converted to electrical energy.
- B. Thermal energy is converted to light energy.
- C. Chemical energy is converted to mechanical energy.
- D. Light energy is converted to chemical energy.

Question 11
Benchmark C
Spring 2005

In the genetic pedigree, person U and her husband are considering having another child.

What is the percent chance that this child will develop sickle cell disease?

- A. 25%
- B. 50%
- C. 75%
- D. 100%

Question 12
Benchmark C
Spring 2005

Draw a Punnett square or comparable diagram for the couple in the first generation of the pedigree. Use **B** to represent the allele for normal red blood cells and **b** to represent the allele for sickle cell disease. How do the couple's actual children compare to the expected results shown in your Punnett square? Respond in the space provided in your **Answer Document**. (4 points)

Question 13
Benchmark C
Spring 2005

Although sickle cell disease has negative effects on those who suffer from it, the allele is widespread in many parts of the world. This is because in areas where malaria is a significant danger, the sickle cell allele

- A. ceases to cause symptoms.
- B. attacks the parasite that causes malaria.
- C. spreads rapidly in people weakened by malaria.
- D. conveys a health advantage to those who carry the allele.

Question 14
Benchmark C
Spring 2005

Which person on the pedigree could not pass the allele for sickle cell disease to his/her offspring?

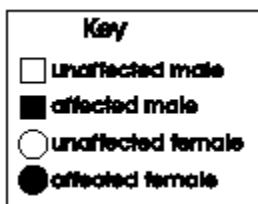
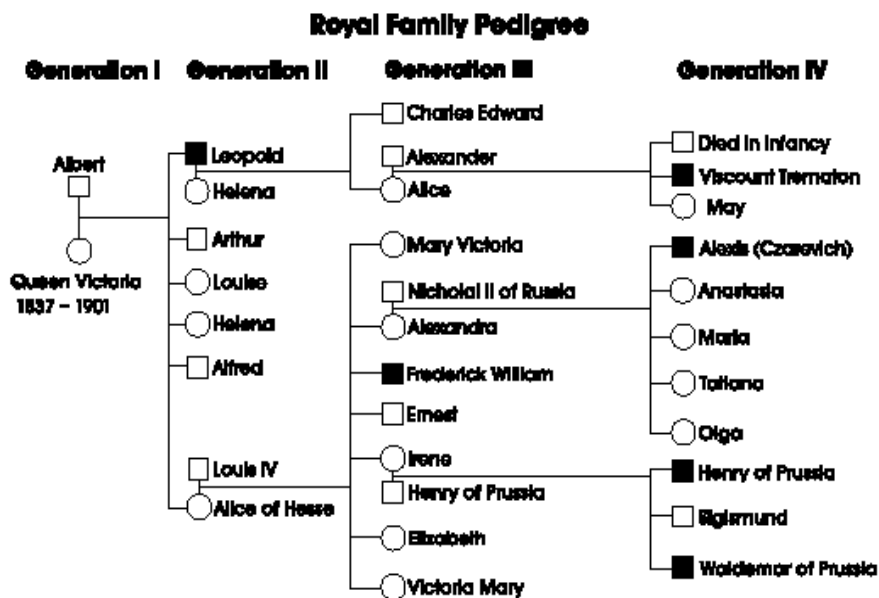
- A. V
- B. X
- C. Y
- D. Z

Question 29
Benchmark C
9th Practice Test

Hemophilia in the Family

Hemophilia is a disease characterized by excessive bleeding because the blood clots very slowly. This phenotype results from a sex-linked recessive allele which is located on the X chromosome. A male (XY) can only receive the hemophilia allele from his mother (XX). Since males have only one X chromosome, they have a 50% chance of having hemophilia if their mother is a carrier.

The following diagram shows part of the British royal family's pedigree. All hemophilic males are represented by shaded squares and normal males by unshaded squares. Females are represented by circles, and female carriers of hemophilia are not identified.



Use to answer questions 29 through 32

Question 29

Benchmark C
9th Practice Test

In generation IV, Alexis has hemophilia. If Alexis married a woman who was a carrier of the hemophilia allele, which proportion of his children (including both males and females) would be expected to have hemophilia?

- A. 25%
- B. 50%
- C. 75%
- D. 100%

Question 30
Benchmark C
9th Practice Test

Some human traits are sex-linked but are inherited on the Y chromosome, unlike hemophilia, which is inherited on the X chromosome. If a man carrying a dominant allele for a disease gene on his Y chromosome has eight children, four boys and four girls, predict the gender and proportion of his offspring that will have the disease gene. Explain how this type of inheritance differs from sex-linked inheritance from a father affected with an X-linked disease. Respond in the space provided in your **Answer Document**. (2 points)

Question 31

Benchmark C
9th Practice Test

Which set of grandparent-parent-child relatives must have all had at least one hemophilia allele on an X chromosome?

- A. Albert-Helena-Alice
- B. Louis IV-Irene-Sigismund
- C. Leopold-Alice-Viscount Trematon
- D. Queen Victoria-Leopold-Charles Edward

Question 32
Benchmark C
9th Practice Test

Irene and Henry of Prussia (generation III) do **not** have hemophilia, yet two of their three offspring are hemophilic. What must be true regarding the genotypes of Irene and Henry?

- A. Irene carries the allele on both X chromosomes, but Henry does not.
- B. Irene and Henry both carry the allele on one of their X chromosomes.
- C. Irene carries the allele on one of her X chromosomes, but Henry does not.
- D. Irene carries the allele on one of her X chromosomes and Henry carries the allele on his Y chromosome.

Question 17

Benchmark D
9th Practice Test

Two processes that allow cells to release energy from food are

- A. mitosis and meiosis.
- B. excretion and diffusion.
- C. fermentation and cellular respiration.
- D. osmosis and spontaneous generation.

Question 14
Benchmark E
9th Practice Test

A student is constructing a classification scheme to explain the biological relationships between common local animals. What characteristic would be most helpful to the student in classifying the animals?

- A. eye color
- B. body covering
- C. performs respiration
- D. performs photosynthesis

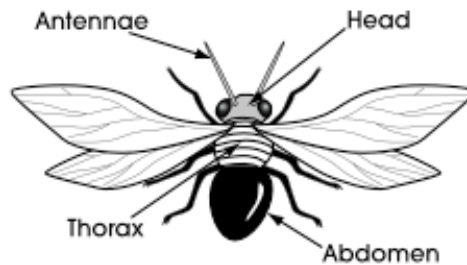
Question 43
Benchmark E
Spring 2005

43. The chart below is a taxonomic key for the fictitious insect genus *Problematica*.

Characteristics of the Genus *Problematica*

1	Thorax and abdomen entirely black	<i>Problematica alva</i>
	Thorax striped and abdomen black	Go to 2
2	Antennae curled	<i>Problematica brancus</i>
	Antennae straight	Go to 3
3	Wings longer than body	<i>Problematica cantrellis</i>
	Wings shorter than body	Go to 4
4	Wings white	<i>Problematica differensis</i>
	Wings black	<i>Problematica fortunatas</i>

A student has been asked to identify the following insect.



To which species does the insect belong?

- A. *Problematica alva*
- B. *Problematica brancus*
- C. *Problematica cantrellis*
- D. *Problematica differensis*

Question 9
Benchmark F
9th Practice Test

A scientist observes that Douglas fir trees survive better than broadleaf species such as big-leaf maple in a certain area. Which is the best explanation for her observation?

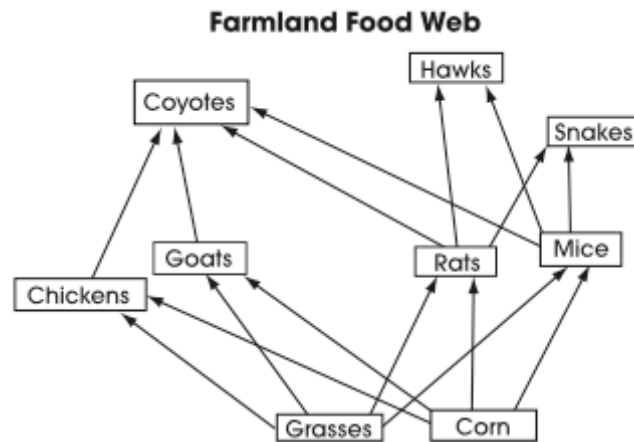
- A. Big-leaf maple trees require less soil moisture than Douglas fir trees.
- B. Douglas fir trees are better at conserving water than big-leaf maple trees.
- C. Douglas fir trees and big-leaf maple trees are often found in overlapping habitats.
- D. The big-leaf maple trees are experiencing competition with California Bay trees.

Question 34
Benchmark F
9th Practice Test

A population of deer existed for centuries in a hilly region of England. The landowners decided to introduce sheep into the same area. Deer and sheep eat some of the same kinds of plants. After the sheep were introduced, the deer population began to decline. How could the decline in the deer population be explained?

- A. Sheep competed with the deer.
- B. The sheep were smaller than the deer.
- C. The food web became too complex.
- D. Sheep are at a higher trophic level than deer.

Question 9
Benchmark F
Spring 2005



9. Many people who raise chickens and other small farm animals consider coyotes to be pests. These people have decreased the coyote population in many parts of the United States.

Which of these is likely a result of the decrease in the number of coyotes in the area?

- A. The mouse population has increased.
- B. The hawk population has decreased.
- C. The grass population has increased.
- D. The goat population has decreased.

Question 39
Benchmark J
Spring 2005

Aristotle was the first person to classify living organisms and did so using a two-kingdom system involving a plant group and an animal group. The system used today is much more useful to scientists because the two-kingdom system did **not**

- A. recognize the similarities within the plant group.
- B. separate living things based on characteristics and traits.
- C. allow for the placement of human beings in its classification.
- D. include many organisms such as those later discovered with microscopes.