End of Course

ntroducing the

Virginia Standards of Learning

The complete set of items that appeared on the Spring 2000 Standards of Learning test taken by most public school students in Virginia is presented in the following pages. The intent of this release of these test questions is to provide parents and teachers additional information to accompany the Student Performance Report and/or the Parent Report.

The information accompanying each test question is broken into several components:

Reporting Category: Matches the score report and allows for identification of strengths and weaknesses indicated by student scores.

Standard of Learning: Presents the SOL used in developing the assessment question.

Builds On: Indicates what the student has studied in previous course work.

Instruction: Provides information for teachers to use as the SOL is incorporated into instruction.

The answer to each question can be found in the back of the booklet.

Virginia
Standards of Learning Assessments

Biology

End of Course

Reporting Category: Scientific Investigation

A. Standard of Learning: BIO.1 The student will plan and conduct investigations in which:

a) observations of living things are recorded in the lab and in the field.

Builds On: Work with observation and recording data begins with the first grade SOL and increases in complexity throughout the study of the science SOL.

A

1 **Field biologists often attach radio transmitters to highly mobile animals, which allows them to track an animal's movement. This information most often shows the animal's —**

A home range size
B ability to protect itself
C daily food consumption rate
D body temperature regulation

Instruction: Provide students an opportunity to investigate how radio transmitters are used to track an animal's movement.

Biology

End of Course

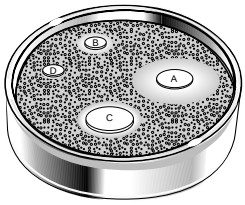
A. Standard of Learning: BIO.1 The student will plan and conduct investigations in which:

c) variables are defined and investigations are designed to test hypotheses.

Builds On: Work with variables begins in the grade 2 SOL and work with hypotheses begins in grade 3 SOL and continues to increase in complexity throughout the study of the science SOL.

A

2



Sarah designed an experiment to find out which mouthwash was most effective against some bacteria. She cut out four different circles from a paper towel and soaked each circle in a different mouthwash. She put the circles on a nutrient agar-coated Petri dish that was covered with bacteria commonly found in the mouth. She then incubated the plate for 24 hours. The picture shows the results of this test. Which of the following should Sarah do to improve her experiment?

F Use a smaller Petri dish
G Use different kinds of bacteria
H Use the same size paper circles for all mouthwashes
J Use the same type of mouthwash on each paper circle

3 **A field biologist studying a stream would find which of these *least* important?**

A The amount of dissolved oxygen in the stream
B The angle of sunlight hitting the top of the stream
C The type of minerals found in the stream
D The size of the fish population in the stream

Instruction: Provide students an opportunity to analyze an experiment to determine how to control the variable and to determine what variables are important for studying a stream.

Biology

End of Course

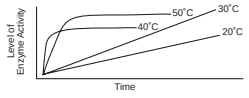
A. Standard of Learning: BIO.1 The student will plan and conduct investigations in which:

d) graphing and arithmetic calculations are used as tools in data analysis.

Builds On: Work with graphing begins with the first grade SOL and work with analysis of arithmetic calculations begins in the grade 4 SOL and increases in complexity throughout the study of the science SOL.

A

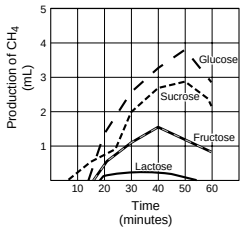
4 Activity of Enzyme at Different Temperatures



The graph shows the results of using an enzyme to break down a substance. What temperature will activate this enzyme most rapidly?

F 20°C
G 30°C
H 40°C
J 50°C

5



Many bacteria produce methane (CH_4) as a byproduct when they grow. A measured amount of methane-producing bacteria was placed in each of four test tubes, and one of four sugars (fructose, sucrose, lactose, glucose) was added to each tube. What conclusion can you draw from this graph?

A These bacteria cannot use lactose very efficiently.
B Growth is fastest with sucrose.
C All the sugars were used up after 40 minutes.
D At 60 minutes, all of the bacteria were dead.

Instruction: Provide students an opportunity to interpret a graph to determine the relationship between the variables and to draw a conclusion about the relationship of the variables.

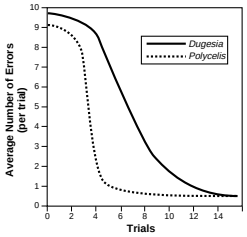
B. Standard of Learning: BIO.1 The student will plan and conduct investigations in which:

e) conclusions are formed based on recorded quantitative and qualitative data.

Builds On: Work with analysis of data to draw conclusions begins with the third grade SOL and continues to increase in complexity throughout the study of the science SOL.

B

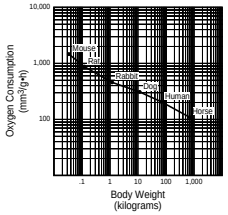
6 Learning Curve of Planaria



These data were collected during an experiment in which two species of planaria were trained to make left turns in a T-maze. Which conclusion is best supported by these data?

F *Polycelis* learns faster than *Dugesia*.
G *Dugesia* learned more information than *Polycelis*.
H *Polycelis* made more mistakes than *Dugesia*.
J *Dugesia* reacted faster than *Polycelis*.

7



The graph shows that an organism's oxygen consumption is related to its body mass. The conclusion supported by these data is that the larger organisms —

A need more water
B require less oxygen
C breathe faster
D move slowly

Instruction: Provide students an opportunity to make conclusions based on quantitative information displayed in a graph.

Biology

End of Course

A. Standard of Learning: BIO.1 The student will plan and conduct investigations in which:

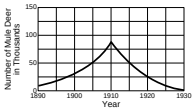
h) alternative explanations and models are recognized and analyzed.

Builds On: Work with recognition and analysis of data that are contradictory begins with the fourth grade SOL and increases in complexity throughout the study of the science SOL.

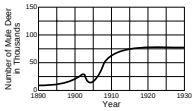
A

8 **In 1893, the Grand Canyon National Forest Reserve was home to an estimated 3,000 Rocky Mountain mule deer. Cattle, sheep, and horses also roamed the reserve. In 1906, government hunters killed off hundreds of mountain lions, coyotes, and bobcats when the area was set aside as the Grand Canyon National Game Preserve. The number of Rocky Mountain mule deer rose to over 100,000 by 1923. Which of these models best fits the population of the mule deer in the Grand Canyon National Game Preserve from 1893 to 1923?**

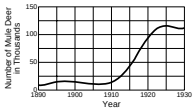
F



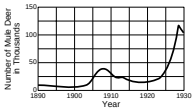
G



H



J



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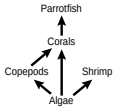


Ocean Food Web

Food webs are models used to show energy flow in ecosystems. In the above food web, what is the main source of energy for the copepods?

A Parrotfish
B Corals
C Algae
D Shrimp

Instruction: Provide students an opportunity to match a population description to a logical graph and to analyze a food web to determine a main source of energy for an animal.

Biology

End of Course

A. Standard of Learning: BIO.1 The student will plan and conduct investigations in which:

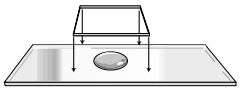
i) appropriate technology is used for gathering and analyzing data and communicating results.

Builds On: Work with appropriate scientific tools begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

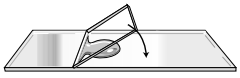
A

10 **The pictures below show a coverslip being lowered onto a microscope slide. Which method would prevent the formation of air bubbles and excess water along the coverslip edges?**

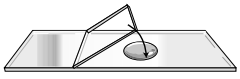
F



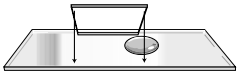
G



H



J



Instruction: Provide students an opportunity to place a coverslip on a slide properly to avoid air bubbles and excess water along the coverslip edges.

B. Standard of Learning: BIO.1 The student will plan and conduct investigations in which:

j) research is used based based on popular and scientific literature.

Builds On: Work with research in scientific literature begins with the sixth grade SOL and increases in complexity throughout the study of the science SOL.

B

11 **Which of these sources would be most appropriate to use for a research project investigating the effects of antibiotics on the disease-causing organism, *E. coli*?**

A *The Daily News* – a local newspaper
B *The Evening Report* – a national television news program
C *The Journal of Bacteriology* – a national professional journal
D *The World Today* – a weekly magazine of important events

Instruction: Provide students an opportunity to conduct research in scientific journals.

Biology

End of Course

Reporting Category: Life at the Molecular and Cellular Level

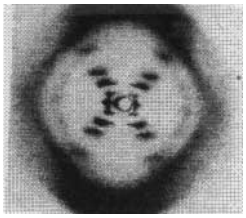
A. Standard of Learning: BIO.2 The student will investigate and understand the history of biological concepts. Key concepts include:

d) the evolution of the DNA model.

Builds On: Work with DNA begins with the Life Science SOL in the seventh grade and increases in complexity throughout the study of the science SOL.

A

12



X-ray Diffraction of DNA

Two researchers, Maurice Wilkins and Rosalind Franklin, used X-ray crystallography to make pictures of DNA such as the one above. The picture shows an X-ray diffraction pattern of DNA. This type of image helps show that DNA —

F is helical-shaped
G is very large
H is made of codons
J contains deoxyribose

Instruction: Provide students an opportunity to investigate and understand the composition of DNA.

B. Standard of Learning: BIO.3 The student will investigate and understand biochemical principles essential for life. Key concepts include:

a) water chemistry and its impact on life processes.

Builds On: Work with water chemistry begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

B

13 **Which property of water allows many land-dwelling organisms to maintain body temperature by eliminating excess heat?**

A Water's ability to evaporate
B Water's movement by capillary action
C Water's capacity to dissolve substances
D Water's formation of ions in solution

14 **If lakes were to freeze solid during the winter, the organisms in the lake would die. Which of these characteristics of water helps prevent permanent freezing of lakes?**

F Water freezes at 0°C.
G Ice floats when it freezes.
H Water becomes a solid as it freezes.
J Ice loses heat when it melts.

Instruction: Provide students an opportunity to investigate the characteristics of frozen water and to investigate the properties of water and their effect on body temperature of land-dwelling organisms.

Biology

End of Course

A. Standard of Learning: BIO.3 The student will investigate and understand biochemical principles essential for life. Key concepts include:

c) the nature of enzymes.

Builds On: Work with enzymes begins with the Life Science SOL in the sixth grade and increases in complexity throughout the study of the science SOL.

A

15 Pepsin is found in the human stomach and breaks down proteins to smaller peptides. What is pepsin?

A A mineral
B An enzyme
C A carbohydrate
D A vitamin

Instruction: Provide students an opportunity to investigate the role of enzymes in the human body.

B. Standard of Learning: BIO.3 The student will investigate and understand biochemical principles essential for life. Key concepts include:

d) the significance of and relationship between photosynthesis and respiration.

Builds On: Work with photosynthesis begins with the fourth grade SOL and increases in complexity throughout the study of the science SOL.

B

16 In plant cells, the organelles that conduct photosynthesis and the organelles that conduct cellular respiration are the —

F chloroplasts and chromoplasts
G chromoplasts and leukoplasts
H leukoplasts and mitochondria
J chloroplasts and mitochondria

Instruction: Provide students an opportunity to investigate the organelles that are a part of cellular respiration and photosynthesis.

Biology

End of Course

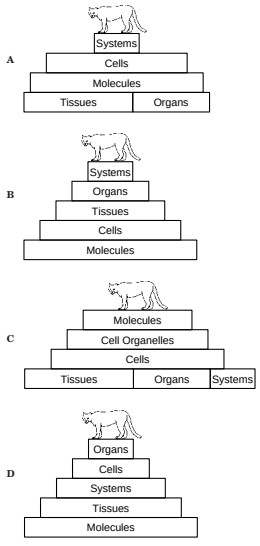
A. Standard of Learning: BIO.4 The student will investigate and understand relationships between cell structure and function. Key concepts include:

c) building analogies between the activities of a single cell and a whole organism.

Builds On: Work with cells begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

A

17 **Which of these shows the levels of organization of a mammal?**



Instruction: Provide students an opportunity to investigate the levels of organization of plants and animals.

B. Standard of Learning: BIO.4 The student will investigate and understand relationships between cell structure and function. Key concepts include:

d) modeling the cell membrane, cell communication, and cell recognition.

Builds On: Work with cells begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

B

18 **Which of the following is most responsible for protecting a cell against viral attack?**

F Nuclei
G Mitochondria
H Cytoplasm
J Cell membrane

Instruction: Provide students an opportunity to investigate the function of the cell membrane and how a virus attacks a cell.

Biology

End of Course

A. Standard of Learning: BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include:

a) cell division.

Builds On: Work with cells begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

A

19 Mature red blood cells have no nuclei. This means that they cannot —

A make copies of themselves
B transport substances
C use energy
D move

20 After cell division, a daughter cell will have properties like the parent cell because —

F enzymes control cell division
G DNA is replicated prior to cell division
H proteins are created when a cell divides
J chromosomes change structure when a cell divides

Instruction: Provide students an opportunity to investigate the relationship between the daughter cell and parent cell after cell division and to investigate the role of cell nuclei.

B. Standard of Learning: BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include:

b) sex cell formation.

Builds On: Work with cells and inheritance begins with the Life Science SOL in the seventh grade and increases in complexity throughout the study of the science SOL.

B

21 Which of these reduces the number of chromosomes in sex cells to one half?

A Chemosynthesis
B Cytokinesis
C Meiosis
D Metamorphism

Instruction: Provide students an opportunity to investigate meiosis and how the process forms sex cells.

Biology

End of Course

A. Standard of Learning: BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include:

c) cell specialization.

Builds On: Work with cells and inheritance begins with the Life Science SOL in seventh grade and increases in complexity throughout the study of the science SOL.

A

22 Mitochondria function most like —

F a pipeline
G a power plant
H a packaging plant
J an instruction book

23 Which organelle would be expected to be more plentiful in liver cells than in muscle cells?

A Mitochondrion
B Nucleus
C Golgi apparatus
D Plastid

Instruction: Provide students an opportunity to understand the function of mitochondria and the golgi apparatus in cells.

B. Standard of Learning: BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include:

e) effects of genetic recombination and mutation.

Builds On: Work with cells and inheritance begins with the Life Science SOL in seventh grade and increases in complexity throughout the study of the science SOL.

B

24 Mustard gas removes guanine from DNA. This can cause serious multiple deformities because guanine —

F is one of the nitrogenous bases of DNA
G forms all the connections between bases in DNA
H supports the structure of ribosomes
J produces energy for the transfer of genetic information

Instruction: Provide students an opportunity to investigate what happens when a major molecule section is removed from DNA.

Biology

End of Course

A. Standard of Learning: BIO.7 The student will investigate and understand bases for modern classification systems. Key concepts include:

e) comparison of DNA sequences in organisms.

Builds On: Work with classification of organisms begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

A

25 Ants are in the same order as wasps, but not in the same order as butterflies because ants are —

A comparable in size to wasps
B able to eat the same things as wasps
C related structurally to wasps
D found in the same environment as wasps

Instruction: Provide students an opportunity to compare species of different orders and their characteristics.

Reporting Category: Life at the Systems and Organisms Level

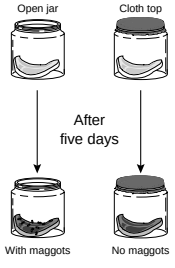
B. Standard of Learning: BIO.2 The student will investigate and understand the history of biological concepts. Key concepts include:

b) scientific explanations of the development of organisms through time.

Builds On: Work with research into the history of science begins in the sixth grade SOL and increases in complexity throughout the study of the science SOL.

B

26



This experiment was performed in the mid-1600s by Francesco Redi. He used it to show that organisms —

F can spontaneously generate
G need air to live
H come from preexisting organisms
J require food to survive

Instruction: Provide students an opportunity to investigate the concept of developing from pre-exisiting organisms.

Biology

End of Course

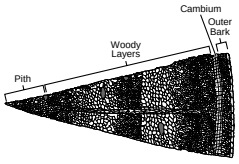
A. Standard of Learning: BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include:

a) how their structures are alike and different.

Builds On: Work with kingdoms begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

A

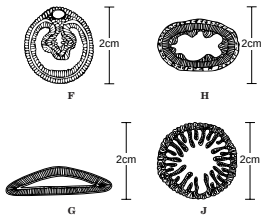
27



The picture shows a section of a woody stem. In what area does the growth of this stem occur?

A Woody layers
B Pith
C Cambium
D Outer bark

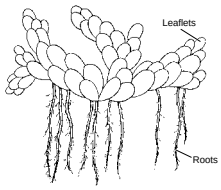
28 **The pictures below show the cross section of the intestines of different animals. Which intestine can absorb the *least* amount of food per centimeter of length of the intestine?**



29 **Amoeba is to pseudopod as paramecium is to —**

A vacuole
B cilium
C oral groove
D lysosome

30



Azolla caroliniana

The picture shows a fern that is sometimes used in an aquarium or outdoor pool to provide shade and a spawning medium for fish. To which kingdom does *Azolla caroliniana* belong?

F Monera
G Protista
H Fungi
J Plantae

Instruction: Provide students an opportunity to investigate the characteristics of the plant and protist kingdoms; to investigate the structure of a woody stem; and to investigate how the structure of the intestines affects the absorption of food.

Biology

End of Course

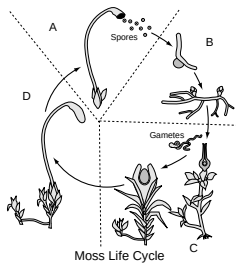
A. Standard of Learning: BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include:

b) comparison of their metabolic activities.

Builds On: Work with kingdoms begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

A

31



Moss Life Cycle

Which part of this life cycle is most like the reproductive process in animals?

A A
B B
C C
D D

Instruction: Provide students an opportunity to investigate the life cycle of moss and make comparisons to the reproductive process in animals.

B. Standard of Learning: BIO.5 The student will investigate and understand life functions of monerans, protists, fungi, plants, and animals, including humans. Key concepts include:

e) human health issues, human anatomy, body systems, and life functions.

Builds On: Work with body systems begins with the science SOL in Kindergarten and increases in complexity throughout the study of the science SOL.

B

32 **Which part of human blood is required for carrying oxygen from the lungs to body cells?**

F Plasma
G Platelets
H Red blood corpuscles
J White blood cells

Instruction: Provide students an opportunity to investigate functions of various parts of the blood.

Biology

End of Course

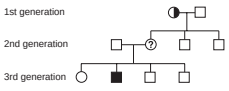
A. Standard of Learning: BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts include:

d) prediction of inheritance of traits based on the laws of heredity.

Builds On: Work with cells and inheritance begins with the science SOL in fifth grade and increases in complexity throughout the study of the science SOL.

A

33 Normal male ○ Normal female
■ Colorblind male ● Colorblind female
◑ Carrier female



Pedigree Chart Tracing Sex-linked Colorblindness in a Family

The female in the second generation *must* be —

A normal because her daughter is normal
B normal because the majority of her children are normal
C colorblind because her mother was a carrier
D a carrier because one of her sons is colorblind

34

	AL	Al	aL	al
AL	AALL	AALl	AaLL	AaLl
Al	AALl	AAll	AaLl	Aall
aL	AaLL	AaLl	aaLL	aaLl
al	AaLl	Aall	aaLl	aall

In holly trees, red fruit (A) are dominant to white fruit (a), and spiny leaves (L) are dominant to smooth leaves (l). According to this Punnett square, how many of the new holly trees from this cross could have white fruit and smooth leaves?

F None
G 1 out of 16
H 9 out of 16
J All

35 In turkeys, the dominant gene B results in black pigment throughout the feathers. Most of the feathers of homozygous recessive individuals have light edges. Heterozygous individuals have a few feathers with light edges. If two turkeys with mostly light-edged feathers are crossed, how many chicks would probably have only the black-pigmented feathers?

A All
B About one fourth
C About one half
D None

Instruction: Provide students an opportunity to investigate the heredity of simple dominant and recessive traits, to investigate and analyze a Punnett square for inherited traits, and to investigate and analyze a pedigree chart that includes sex-linked traits.

Biology

End of Course

A. Standard of Learning: BIO.7 The student will investigate and understand bases for modern classification systems. Key concepts include:

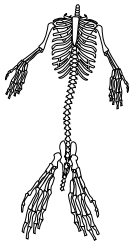
a) structural similarities in organisms.

Builds On: Work with kingdoms begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

A

36 *Tabloid News*

A fisherman in Lower California found the carcass of a whale. The man reported that the stomach contained the bones of a mermaid. He described the bones for the tabloid news artist, who drew the picture below. The artist left out the skull because the fisherman was unable to find it.



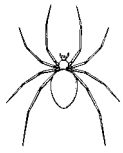
An expert should have been called in to identify the bones. The fisherman probably found bones of a large —

F mollusk, like a giant squid
G mammal, like a sea lion
H fish, like a sea bass
J crustacean, like a king crab

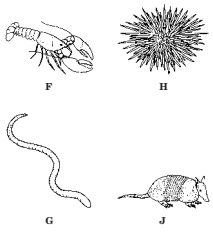
37 **Snakes have a reputation for being slimy, while actually their skin is cool and dry. A class of vertebrates that *does* have moist, mucous-covered skin is —**

A Aves
B Amphibia
C Mammalia
D Nematoda

38



This organism belongs to the same phylum as —



Instruction: Provide students an opportunity to investigate the similarities of the skeletal system of mammals, such as a sea lion; to investigate the skin characteristics of vertebrates, and to investigate and compare organisms within a phylum.

Biology

End of Course

Reporting Category: Interaction of Life Forms

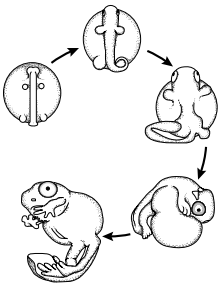
A. Standard of Learning: BIO.7 The student will investigate and understand bases for modern classification systems. Key concepts include:

c) comparison of developmental stages in different organisms.

Builds On: Work with the comparison of developmental stages in different organisms begins with the second grade SOL and increases in complexity throughout the study of the science SOL.

A

39



The diagram above shows the embryological development of *Eleutherodactylus coqui*. This animal is probably most closely related to the —

A domestic chicken
B bullfrog
C catfish
D king snake

Instruction: Provide students an opportunity to investigate the developmental stages of frogs and other small animals in the environment.

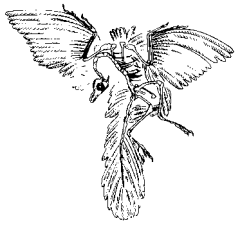
B. Standard of Learning: BIO.7 The student will investigate and understand bases for modern classification systems. Key concepts include:

b) fossil record interpretation.

Builds On: Work with kingdoms begins with the fifth grade SOL and increases in complexity throughout the study of the science SOL.

B

40



A paleontologist found this fossil. The paleontologist could say that this organism was a —

F mammal
G vertebrate
H plant
J protist

Instruction: Provide students an opportunity to investigate a diagram of fossils to classify it as a vertebrate.

Biology

End of Course

A. Standard of Learning: BIO.8 The student will investigate and understand how populations change through time. Key concepts include:

a) examining evidence found in fossil records.

Builds On: Work with changes that occur in populations begins with the second grade SOL and increases in complexity throughout the study of the science SOL.

B. Standard of Learning: BIO.8 The student will investigate and understand how populations change through time. Key concepts include:

b) investigating how variation of traits, reproductive strategies, and environmental pressures impact on the survival of populations.

Builds On: Work with changes that occur in populations begins with the second grade SOL and increases in complexity throughout the study of the science SOL.

A

41

Hyaenidae crocuta

The skull of the hyena is made for crushing bone. Which skull below belongs to a prehistoric bone-crushing animal?

A 

B 

C 

D 

Instruction: Provide students an opportunity to investigate a diagram or model of a skull to determine how teeth were utilized.

B

42 **The Haleakala silversword is a plant found in only one volcanic crater on the Hawaiian island of Maui. Species like the silversword, which are found *only* on one or a few small islands, are —**

F unrelated to other species
G at high risk for extinction
H tolerant of a broad range of temperatures
J highly resistant to disease

Instruction: Provide students an opportunity to investigate how plants and animals found only in one place are at high risk of extinction.

Biology

End of Course

A. Standard of Learning: BIO.8 The student will investigate and understand how populations change through time. Key concepts include:

d) exploring how new species emerge.

Builds On: Work with changes that occur in populations begins with the second grade SOL and increases in complexity throughout the study of the science SOL.

A

43 **New species can emerge *only* if there is a change in the —**

A surrounding environment
B reduction of variation in a population
C make-up of the gene pool
D migration of the population

Instruction: Provide students an opportunity to investigate how a change in the make-up of the gene pool is necessary for a new species to emerge.

Biology

End of Course

A. Standard of Learning: BIO.9 The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include:

a) interactions within and among populations including carrying capacities, limiting factors, and growth curves.

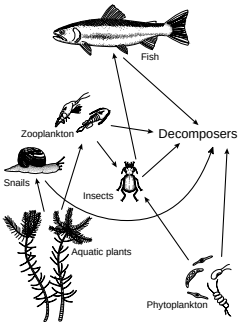
Builds On: Work with ecosystems begins with the third grade SOL and increases in complexity throughout the study of the science SOL.

A

44 **Which causes greater devastation of a dense population of rabbits than of a sparse rabbit population?**

F Forest fires
G Infectious diseases
H Weather changes
J Major floods

45

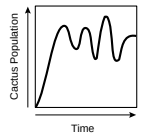


Which of these populations would probably *increase* if the zooplankton decreased?

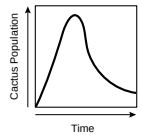
A Snail
B Fish
C Insects
D Aquatic plants

46 **Cactus was introduced to Australia and quickly spread over millions of acres of land. A parasitic moth which preyed on the cactus was then introduced. Which of the following best describes the population growth of the cactus?**

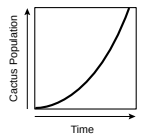
F



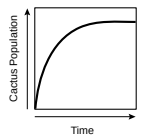
G



H



J



Instruction: Provide students an opportunity to investigate a food web to determine what population would increase when another population decreases; to analyze a growth curve to match given conditions between two variables; and to investigate the impact of infectious disease on a dense population.

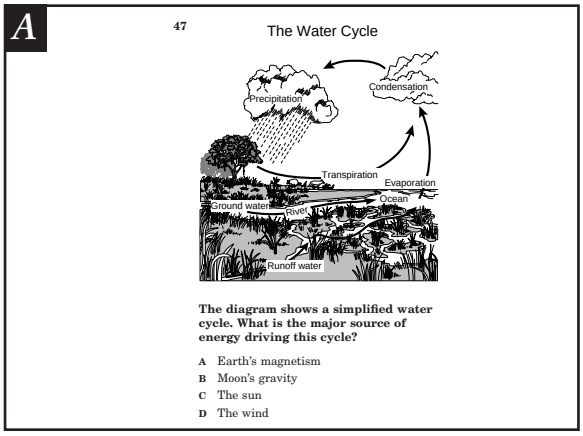
Biology

End of Course

A. Standard of Learning: BIO.9 The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include:

b) nutrient cycling with energy flow through ecosystems.

Builds On: Work with ecosystems begins with the third grade SOL and increases in complexity throughout the study of the science SOL.



Instruction: Provide students an opportunity to investigate the sun's role in the water cycle.

Biology

End of Course

A. Standard of Learning: BIO.9 The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include:

d) the effects of natural events and human influences on ecosystems; and analysis of local ecosystems.

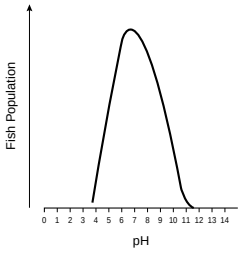
Builds On: Work with ecosystems begins with the third grade SOL and increases in complexity throughout the study of the science SOL.

A

48 **Sea otters eat mussels, abalone, sea urchins, and other shellfish. Sea otters were hunted to near-extinction in the early 1900s. What effect did this have on the shellfish?**

F They grew more rapidly.
G They reproduced more quickly.
H Their population increased.
J Their resistance to disease increased.

49



A lake has a normal pH of 7. Large amounts of acidic waste were dumped into the lake, changing the pH to 4. What will most likely happen?

A The fish will be more resistant to disease.
B The productivity of the pond will increase.
C The spawning rate of the fish will increase.
D The increased acidity will kill most of the fish.

50 **Which of these is *least* likely to cause secondary succession?**

F A fire in a forest
G Flooding of a river
H Clear cutting a forest
J Protecting predators

Instruction: Provide students an opportunity to investigate the effect of changing the pH of a lake on the fish population; to investigate secondary succession; and to investigate how the decrease of a predator population affects the organism it eats (prey).