



Mississippi Academic Assessment Program (MAAP)

**Science
Grade
8**

PRACTICE TEST

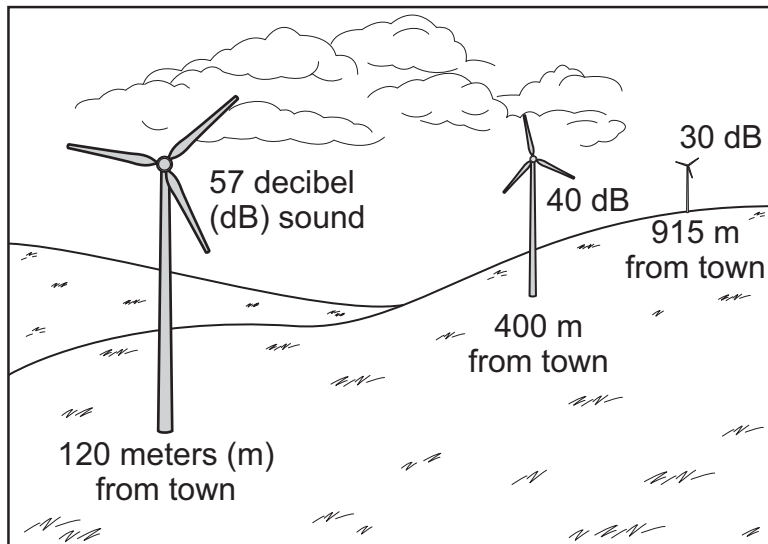
The Science Grade 8 Practice Test is a useful tool for Mississippi educators to use in preparing students for the format of the Mississippi Academic Assessment Program for Science. The items were written and aligned to the 2018 Mississippi College- and Career-Readiness Standards for Science. **This document contains 25 science grade 8 items.**

Use the scenario to answer the next two questions.

Wind Turbines

Wind turbines transform wind energy into electricity. Using wind for energy is one way to replace the use of fossil fuels and other energy sources similar to fossil fuels. However, wind turbines can be dangerous to birds and produce noise pollution. The diagram shows the levels of sound heard in a town with turbines spaced at different distances from the town.

Turbine Sound Heard by Distance from Town



1. **Part A:** Circle a claim that describes the relationship between wind turbines and human dependency on the use of nonrenewable resources.

Claim

- A. Wind turbines allow humans to become less dependent on nonrenewable resources.
B. Wind turbines cause humans to become more dependent on nonrenewable resources.

Part B: Circle a supporting statement that **best** defends the claim.

Supporting Statement

- A. Wind turbines use a renewable energy resource to generate electricity.
B. Wind turbines use a nonrenewable energy resource to generate electricity.

2. In some windy locations, a group of wind turbines may be built near each other. These are known as wind farms. Which pair of statements **best** describes a disadvantage and an advantage of building a wind farm instead of a single wind turbine?

A. **Disadvantage:** A wind farm uses more nonrenewable energy than a single wind turbine uses.

Advantage: A wind farm can be built close to towns that need electricity.

B. **Disadvantage:** A wind farm produces less electricity than a single wind turbine produces.

Advantage: A wind farm can easily be built in locations far from birds.

C. **Disadvantage:** A wind farm is more dangerous to birds than a single wind turbine.

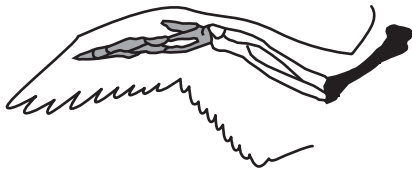
Advantage: A wind farm produces enough sound to keep birds away.

D. **Disadvantage:** A wind farm produces more noise pollution than a single wind turbine produces.

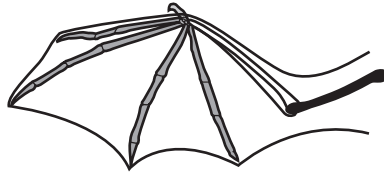
Advantage: A wind farm produces a greater amount of electricity than a single wind turbine produces.

3. The diagram shows bone structures that demonstrate some evolutionary relationships between organisms.

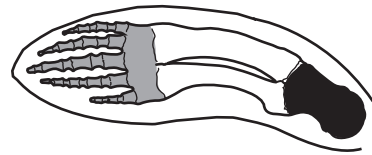
Bone Structures in the Limbs of Three Organisms



bird



bat



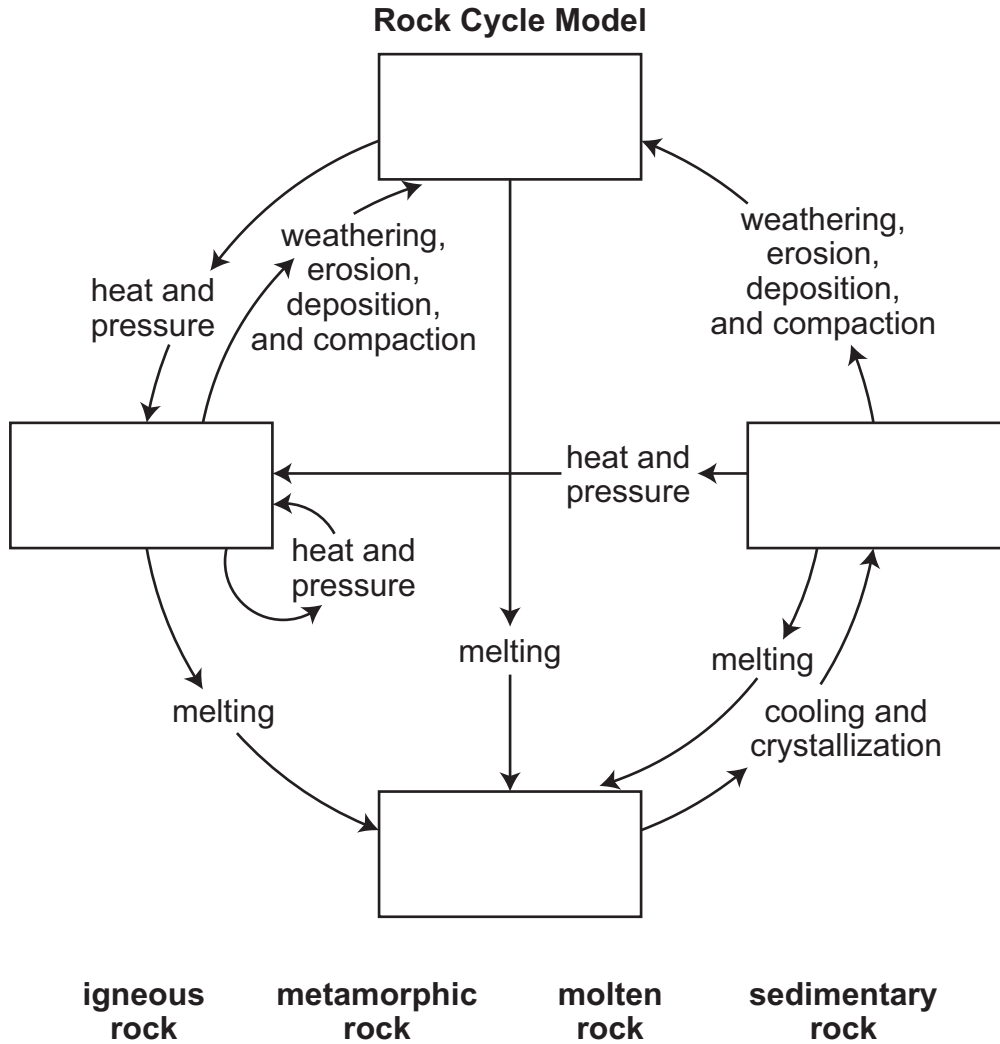
seal

Add checkmarks to the chart to classify the structural/functional similarities between the pair of organisms as analogous and/or homologous. You may add more than one checkmark in each row.

	Analogous	Homologous
bird and bat		
bat and seal		

4. The incomplete model shows the processes involved in the rock cycle.

Part A: Write the rock types in the correct boxes to complete the model.



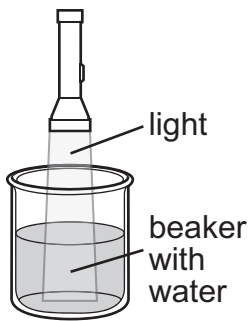
Part B: Circle the rock type that correctly completes the statement.

(Igneous / Metamorphic / Sedimentary) rock is **best** for the formation of fossils in the fossil record.

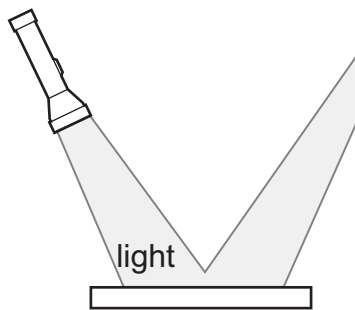
5. A student is preparing investigations to demonstrate behaviors of light waves. The diagrams show the setup for each investigation.

Write the number of each investigation setup diagram in the box that labels the behavior it **best** demonstrates.

Reflection	Refraction	Transmission



1



2

step 1

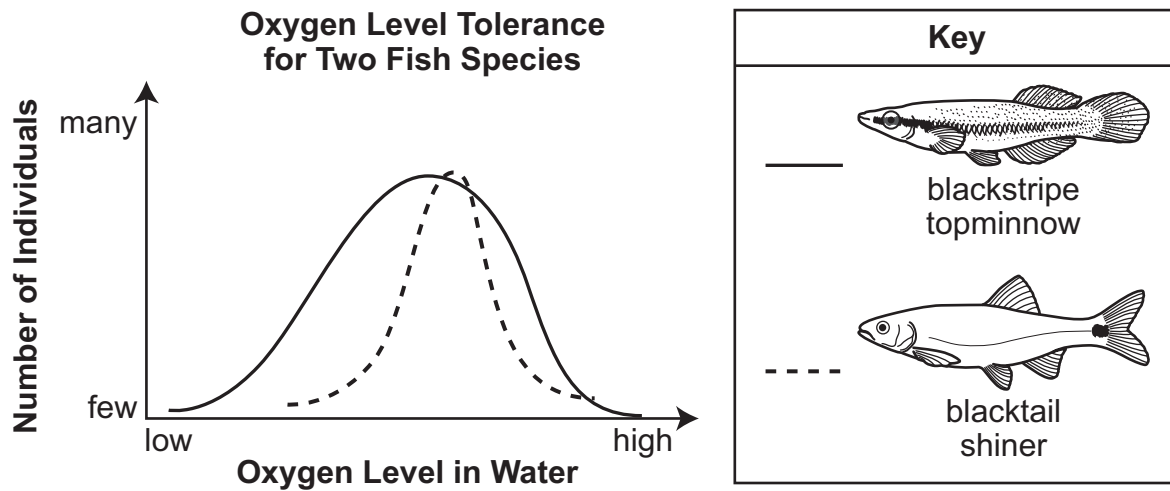


step 2



3

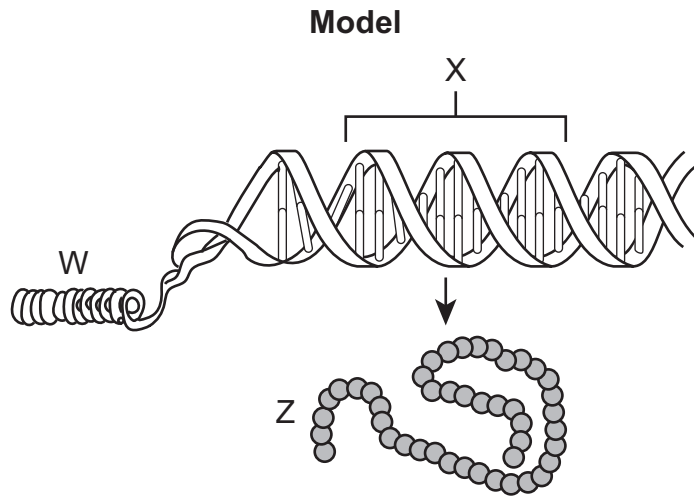
6. The graph shows how two fish species tolerate different oxygen levels in water.



Which argument about fish survival is **best** supported by the evidence shown in the graph?

- A. The blacktail shiner can survive any oxygen level in its environment.
- B. The blackstripe topminnow can survive any oxygen level in its environment.
- C. The blackstripe topminnow is better able to survive a wide range of oxygen levels in its environment than the blacktail shiner.
- D. The blacktail shiner is better able to survive a wide range of oxygen levels in its environment than the blackstripe topminnow.

7. The diagram shows relationships between certain structures within cells.



Which chart correctly identifies these structures and the relationships between them?

A.

Label	Identification	Statement
W	gene	A chromosome unravels to form proteins, which then reorganize to form genes.
X	chromosome	
Z	protein	

B.

Label	Identification	Statement
W	chromosome	A chromosome is composed of genes, which direct the formation of specific proteins.
X	gene	
Z	protein	

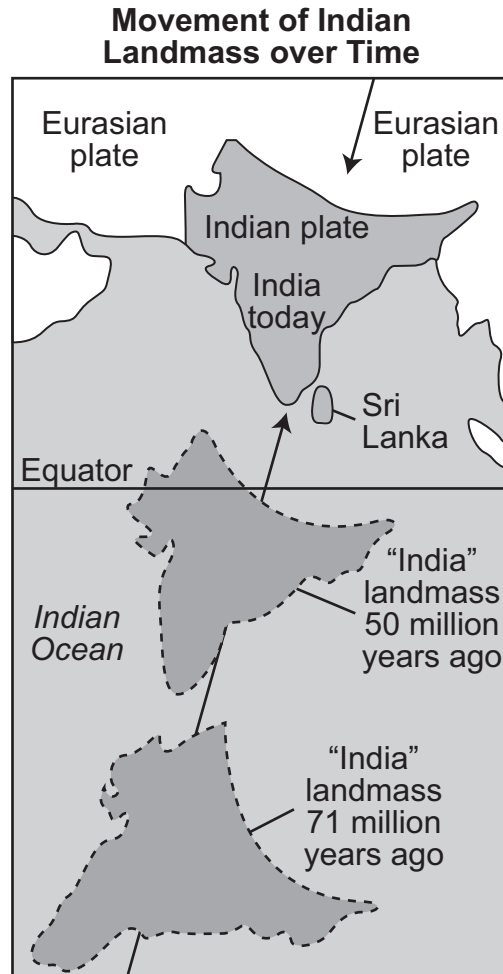
C.

Label	Identification	Statement
W	chromosome	Proteins instruct the organization of genes, which coil to form chromosomes.
X	gene	
Z	protein	

D.

Label	Identification	Statement
W	protein	Proteins form by combining sections of chromosomes, which are made of genes.
X	chromosome	
Z	gene	

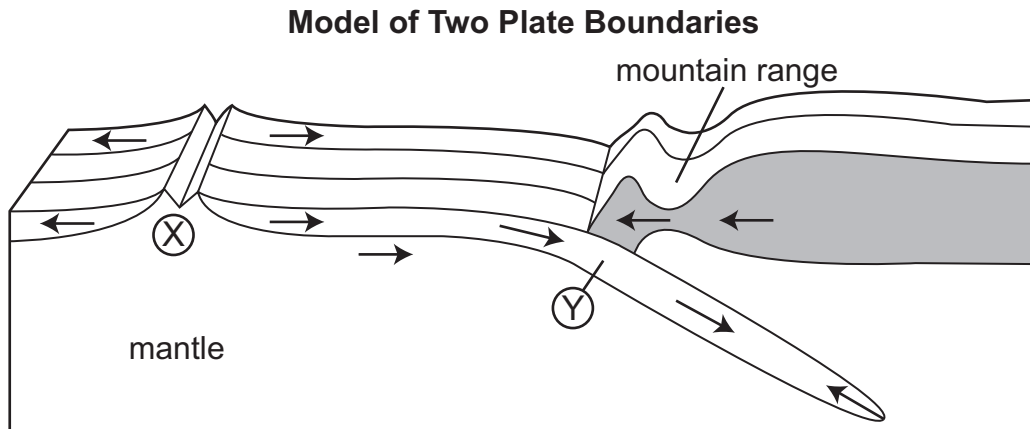
8. The map shows the movement of the Indian landmass over the past 71 million years.



Which observation would provide the **best** evidence of the northward movement of India?

- A. a change in water level in the Indian Ocean
- B. a large rift between the Indian plate and the Eurasian plate
- C. the formation of the island of Sri Lanka in the Indian Ocean
- D. the presence of a mountain range where the Indian plate meets the Eurasian plate

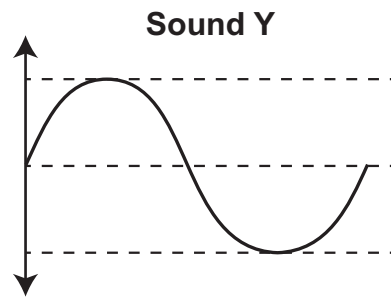
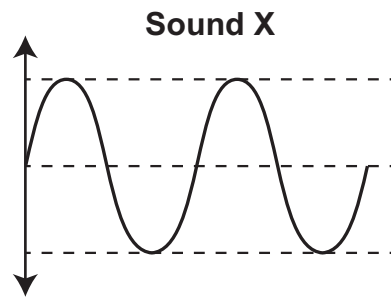
9. A student is developing a model of two tectonic plate boundaries.



The model is incomplete. Which set of information identifies the labels the student should use to complete the model and describes a process shown in the model?

- A. **Label X:** divergent plate boundary
Label Y: convergent plate boundary
Description: New crust is being formed at location X.
- B. **Label X:** convergent plate boundary
Label Y: divergent plate boundary
Description: New crust is being formed at location Y.
- C. **Label X:** divergent plate boundary
Label Y: convergent plate boundary
Description: Crust is being recycled by Earth's mantle at location X.
- D. **Label X:** convergent plate boundary
Label Y: divergent plate boundary
Description: Crust is being recycled by Earth's mantle at location Y.

10. A student is comparing two sound waves.



Circle two phrases that correctly compare the wavelength and the energy of the two sound waves.

The wavelength of sound wave X is (longer than / shorter than / equal to) the wavelength of sound wave Y.

Therefore, sound wave X has (more energy than / less energy than / the same amount of energy as) sound wave Y.

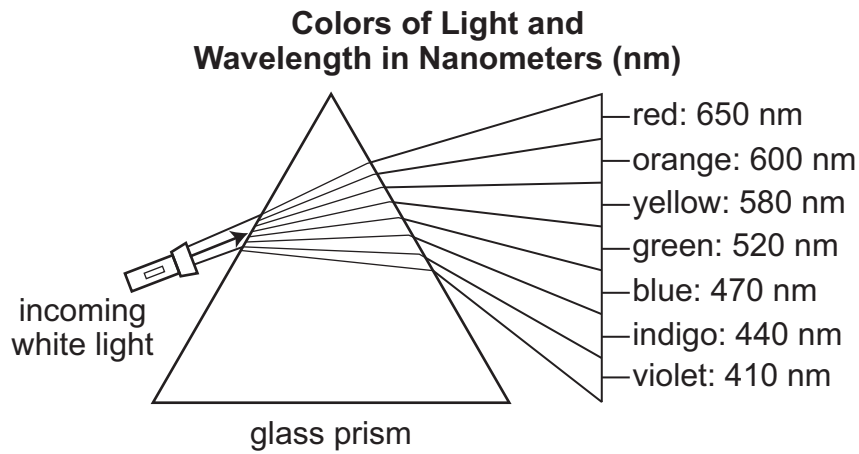
Use the scenario to answer the next two questions.

Prism Investigation

Students in a science class conducted an investigation using a prism. The students reported the following observation.

White light goes into the prism on the left side and comes out on the right side of the prism as seven different colors.

The drawing shows their observations and the wavelength of each color of light.



11. Circle one word in each set of parentheses to construct a statement about which color of light exiting the prism has the most energy.

The color (red / orange / yellow / green / blue / indigo / violet) has the most energy, as it has the (longest / shortest) wavelength.

12. Which statement **best** describes the behavior of the different colors of light exiting the prism after the white light shines on it?
- A. The different colors of light reflect at the same angle.
 - B. The different colors of light reflect at different angles.
 - C. The different colors of light refract at the same angle.
 - D. The different colors of light refract at different angles.

13. Deforestation is the clearing or removal of forest land for use by humans for other purposes. Deforestation is common in areas that are used to raise cattle and grow crops. Which set of information describes the **best** way humans could reduce this impact on the environment?
- A. **Proposal:** Make new products by recycling parts of the trees that are removed.
Explanation: This proposal would decrease the amount of forest land used for cattle and crops.
 - B. **Proposal:** Make new products by recycling the parts of trees that are removed.
Explanation: This proposal would decrease the amount of trash placed in landfills every year.
 - C. **Proposal:** Reduce the consumption of meat and dairy products.
Explanation: This proposal would increase the amount of forest land used for cattle and crops.
 - D. **Proposal:** Reduce the consumption of meat and dairy products.
Explanation: This proposal would increase the amount of trash placed in landfills every year.

14. Standard solar cells use a thick layer of silicon, an abundant metalloid in Earth’s crust. Engineers are developing new solar cells using perovskite—a mineral-based material. The chart shows some advantages and disadvantages of the use of perovskite solar cells.

Advantages and Disadvantages to Perovskite Solar Cells

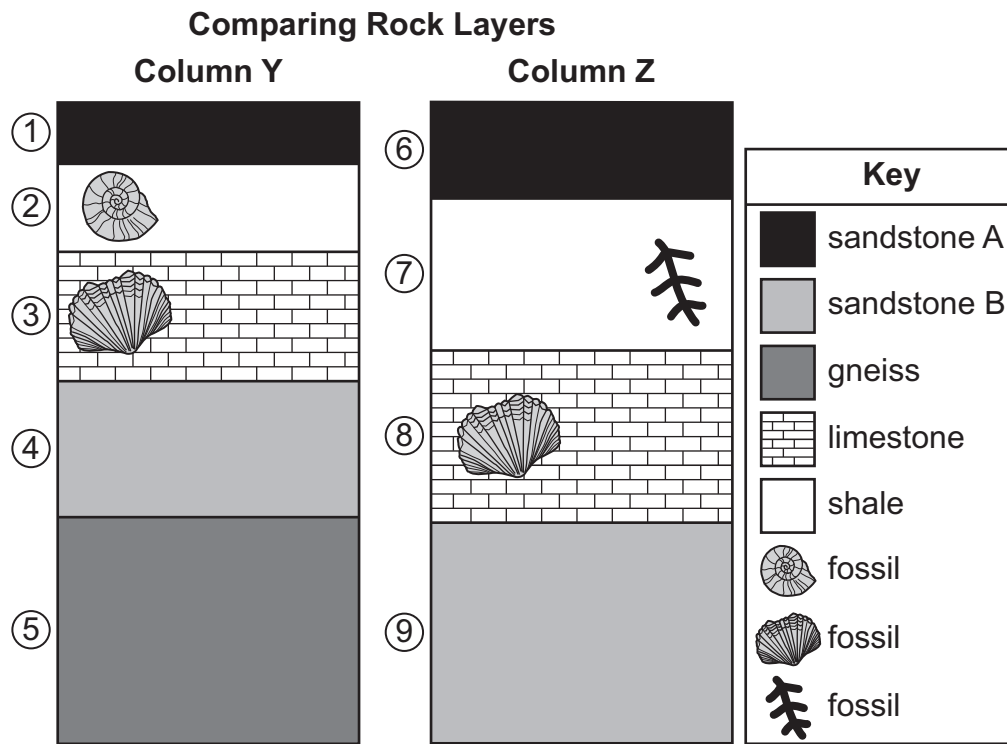
Advantages	Disadvantages
<ul style="list-style-type: none">• Perovskite is inexpensive and cheaper than silicon• Perovskite has a broad range of light absorption• A thin film of perovskite can absorb light more efficiently than a thicker layer of silicon.	<ul style="list-style-type: none">• Perovskite has low durability, especially in wet and hot conditions.• Perovskite material is toxic in nature.• Large-scale production of perovskite is still being developed.

A community in Albuquerque, New Mexico, is considering installing perovskite solar cells on the rooftops of 1,000 homes. On average the area has 280 sunny days per year; the U.S. average is 205 sunny days per year. Albuquerque averages 11 inches of rain per year. The U.S. average is 39 inches of rain per year.

Which decision about whether to install perovskite solar cells is **best** supported by this evidence?

- A. Because the climate of the area is wet and hot, perovskite should not be used.
- B. Because the material is unlikely to harm the environment, perovskite should be used.
- C. Because the product cannot be immediately mass-produced, perovskite should not be used.
- D. Because the area has fewer sunny days than the U.S. average, perovskite should be used.

15. The diagram shows two rock columns from different locations in the same state.



Which rock layers are **most likely** the same age?

- A. layers 5 and 9
- B. layers 1 and 7
- C. layers 3 and 8
- D. layers 2 and 6

16. Students in a science class set up an investigation to model soil formation by following the steps listed below.

Investigation Steps

- Place four cubes of sugar into a glass jar and place a lid on the jar.
- Shake the jar for 30 seconds.
- Record observations about how the sugar cubes have changed.
- Shake the jar for two more minutes.
- Record observations about how the sugar cubes have changed.

Which observations were **most likely** made, and which research question were the students **most likely** testing during this investigation?

- A. **Observation 1:** The cubes broke down into smaller chunks.
Observation 2: The smaller chunks broke down into a powder.
Research Question: How does chemical weathering of rock produce soils?
- B. **Observation 1:** The cubes became larger as particles moved closer together.
Observation 2: The cubes broke down into smaller chunks.
Research Question: How does chemical weathering of rock produce soils?
- C. **Observation 1:** The cubes broke down into smaller chunks.
Observation 2: The smaller chunks broke down into a powder.
Research Question: How does physical weathering of rock produce soils?
- D. **Observation 1:** The cubes became larger as particles moved closer together.
Observation 2: The cubes broke down into smaller chunks.
Research Question: How does physical weathering of rock produce soils?

17. The incomplete model represents part of the water cycle.

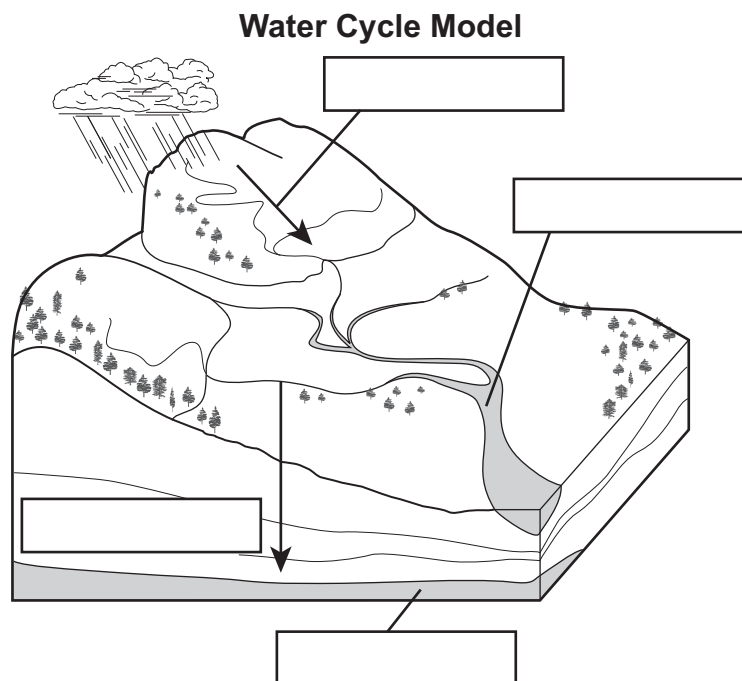
Part A: Write the correct label in each box on the model to identify four parts of the water cycle.

infiltration

runoff

groundwater

surface water



Part B: Circle one process in each set of parentheses to describe the relationships between parts of the water cycle.

Precipitation may (run off / infiltrate) to become surface water.

Surface water may (run off / infiltrate) to become groundwater.

18. Circle one set of words in each pair of parentheses to construct an explanation about the transfer of genetic information during meiosis.

During meiosis, a parent cell first replicates its genetic information and then exchanges sections of DNA before dividing (one time / two times), producing (two haploid / four haploid / four diploid) daughter cells that are genetically (similar to / different than) the parent cell.

19. While studying about reproduction in organisms, a student made the following list.

Title?

- produces genetic diversity
- allows for disease resistance
- offers a chance to reduce or remove undesirable traits from a species

Which title for the list is **most** accurate?

- A. Advantages of Sexual Reproduction
- B. Advantages of Asexual Reproduction
- C. Disadvantages of Sexual Reproduction
- D. Disadvantages of Asexual Reproduction

20. A student researching Gregor Mendel recorded the following notes about the scientist.

Notes about Gregor Mendel's Work

- When a yellow pea plant is bred with a green pea plant, the generation 1 offspring are 100% yellow.
- When the generation 1 offspring are bred, the generation 2 offspring are 25% green.
- Mendel described the green pea plant color as “recessive” and the yellow pea plant color as “dominant.”

Which statement **best** explains a concept of heredity that is supported by Mendel's findings?

- A. The environment in which plants are grown affects their appearance.
- B. Recessive traits are more likely to be expressed than dominant traits.
- C. The appearance of certain traits is predictable and is controlled by genes.
- D. Crossing pea plants in the wild produces results without observable patterns.

21. In rock pocket mice, fur color is mostly controlled by a single gene. In these mice, dark fur (D) is dominant to light fur (d). The Punnett square shows a cross between a rock pocket mouse with dark-colored fur and a rock pocket mouse with light-colored fur.

Part A: In the Punnett square below, write a checkmark in the cell or cells that represent offspring that would be homozygous for light-colored fur.

**Rock Pocket Mouse
Punnett Square**

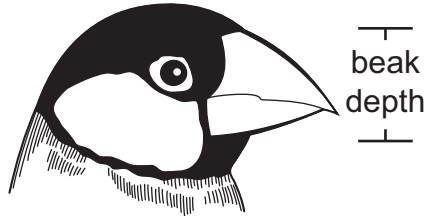
	D	d
d		
d		

Part B: Write the percentage of rock pocket mice offspring with light-colored fur represented by this cross on the line.

Percentage of rock pocket mouse offspring with light-colored fur: _____%

22. The medium ground finch is a bird common to the Galapagos Islands. The bird uses its beak to crush and eat seeds from plants. Small, soft seeds are easier for the medium ground finch to crush. However, the plants that produce small seeds do not grow well during seasons with low precipitation amounts. Instead, the medium ground finches with larger beak depths are better able to crush large seeds which are available during these dry seasons.

**Medium Ground
Finch Beak Depth**

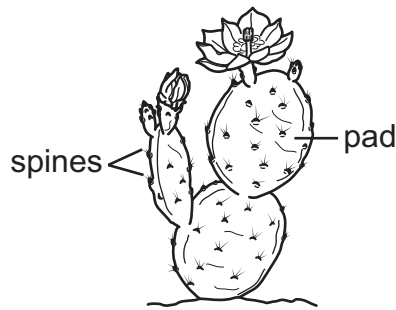


Which statement is the **most likely** explanation for a relationship between beak depths and environmental factors?

- A. Genetics determines medium ground finch beak depths and rainfall has no effect on the birds.
- B. Rainfall has no effect on medium ground finch beak depths because seed production is abundant.
- C. Smaller beak depths are more beneficial during dry seasons since medium ground finches prefer small seeds.
- D. Larger beak depths give some medium ground finches a feeding advantage to consume larger seeds during dry seasons.

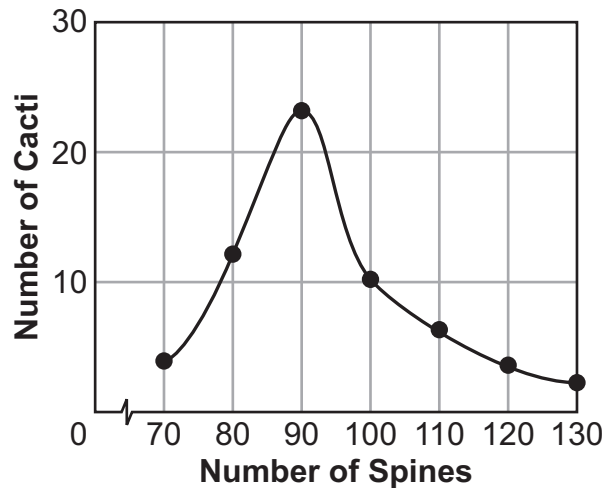
23. Cacti are plants that live in desert habitats. The drawing shows a prickly pear cactus and its spines.

Prickly Pear Cactus Plant



The number of spines varies among a population of prickly pear cacti. A hoofed mammal called a javelina feeds on prickly pear cacti. Javelinas can be harmed by the spines on the cactus plants, so they are selective about which plants they feed on. The graph below represents the number of cacti with different numbers of spines **before** the javelinas moved into the area.

Spine Coverage in Prickly Pear Cacti

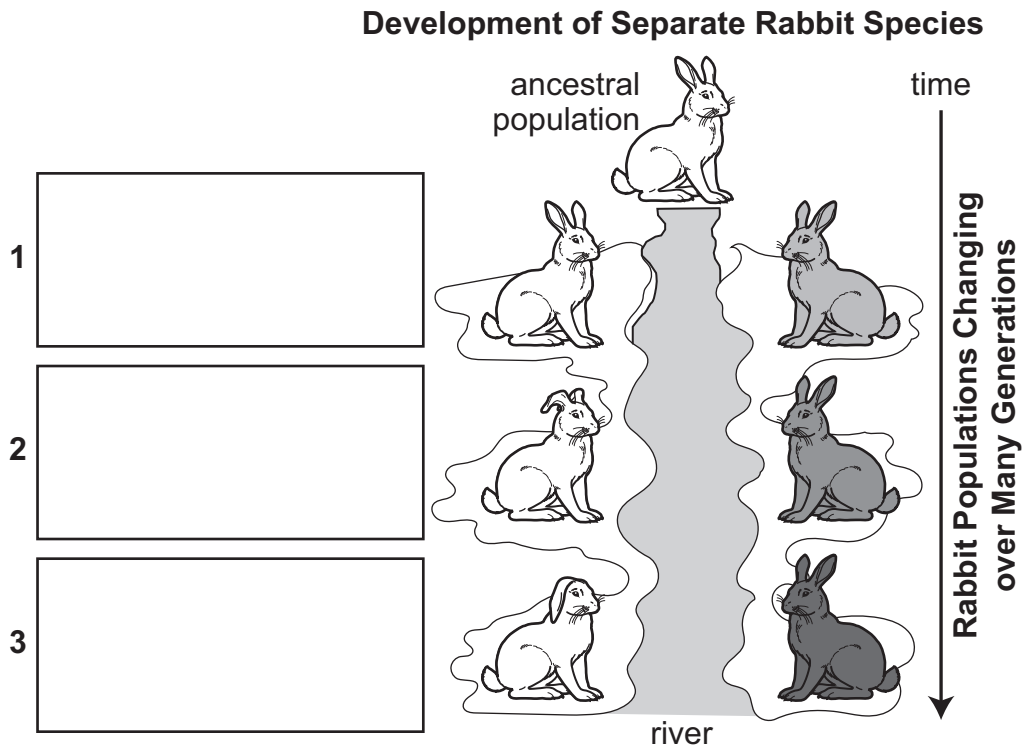


Circle one word or set of words in each pair of parentheses to provide an argument and supporting evidence about the effect of the javelinas on the prickly pear cactus population **after** they are introduced to this area.

Argument: The number of cacti with (fewer than 90 spines / more than 90 spines) would (decrease / increase).

Evidence: As javelinas start feeding on the cacti, they will select the cacti with (fewer spines / more spines) first, leaving cacti with (fewer spines / more spines) to survive and reproduce.

24. The diagram represents how one ancestor population of rabbits became separate species over time. Write the text from below the diagram in the three boxes in the model to represent the steps that led to this speciation.

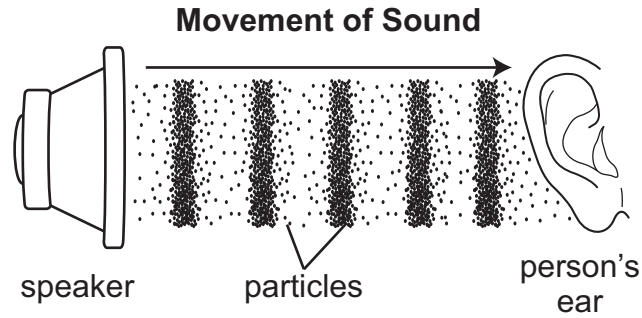


Mutations and natural selection operate to form two subspecies.

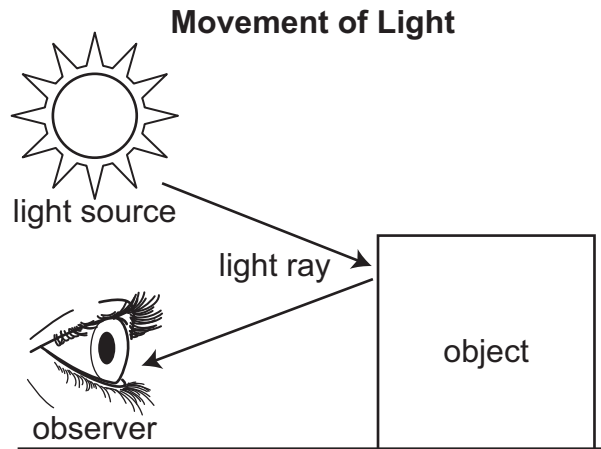
Reproductive isolation produces two species.

Populations are geographically isolated.

25. The diagram represents the movement of sound from music playing through a speaker to a person's ear.



The next diagram represents the movement of light from a source to an object and then to an observer.



Which statement **best** explains which type of energy shown needs a medium through which to travel?

- A. Sound needs to travel through a medium because the energy is produced by a speaker.
- B. Light needs to travel through a medium because it involves the movement of light rays.
- C. Sound needs to travel through a medium because it involves the movement of particles.
- D. Light needs to travel through a medium because the energy is moved in two directions.

Mississippi Academic Assessment Program

SCIENCE

Grade 8

Practice Test

The information for each item, including the performance objective, DOK level, item type, and correct answer, is in this document. The items appear in the order as shown in the table.

Note: The item types are representative of items that will appear in administrations starting in Spring 2019.

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
1	E.8.10.1 Read and evaluate scientific information about advancements in renewable and nonrenewable resources. Propose and defend ways to decrease national and global dependency on nonrenewable resources.	3	Technology Enhanced	See Answer Key
2	E.8.10.3 Using scientific data, debate the societal advantages and disadvantages of technological advancements in renewable energy sources.	2	Multiple Choice	D
3	L.8.4B.4 Analyze displays of pictorial data to compare and contrast embryological and homologous/analogous structures across multiple species to identify evolutionary relationships.	2	Technology Enhanced	See Answer Key
4	E.8.7.2 Create a model of the processes involved in the rock cycle and relate it to the fossil record.	3	Technology Enhanced	See Answer Key
5	P.8.6.3 Conduct simple investigations about the performance of waves to describe their behavior (e.g., refraction, reflection, transmission, and absorption) as they interact with various materials (e.g., lenses, mirrors, and prisms).	2	Technology Enhanced	See Answer Key
6	L.8.2B.1 Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.	3	Multiple Choice	C
7	L.8.2C.1 Communicate through diagrams that chromosomes contain many distinct genes and that each gene holds the instructions for the production of specific proteins, which in turn affects the traits of the individual (not to include transcription or translation).	2	Multiple Choice	B
8	E.8.9A.3 Map land and water patterns from various time periods and use rocks and fossils to report evidence of how Earth's plates have moved great distances, collided, and spread apart.	2	Multiple Choice	D
9	E.8.9A.5 Use models that demonstrate convergent and divergent plate movements that are responsible for most landforms and the distribution of most rocks and minerals within Earth's crust.	3	Multiple Choice	A
10	P.8.6.1 Collect, organize, and interpret data about the characteristics of sound and light waves to construct explanations about the relationship between matter and energy.	2	Technology Enhanced	See Answer Key

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Practice Test

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Note: The item types are representative of items that will appear in administrations starting in Spring 2019.

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
11	(P.8.6.1) Collect, organize, and interpret data about the characteristics of sound and light waves to construct explanations about the relationship between matter and energy.	2	Technology Enhanced	See Answer Key
12	(P.8.6.3) Conduct simple investigations about the performance of waves to describe their behavior (e.g., refraction, reflection, transmission, and absorption) as they interact with various materials (e.g., lenses, mirrors, and prisms).	2	Multiple Choice	D
13	(E.8.10.2) Create and defend a proposal for reducing the environmental effects humans have on Earth (e.g., population increases, consumer demands, chemical pollution, deforestation, and change in average annual temperature).	2	Multiple Choice	B
14	(E.8.10.3) Using scientific data, debate the societal advantages and disadvantages of technological advancements in renewable energy sources.	3	Multiple Choice	C
15	(E.8.7.1) Use scientific evidence to create a timeline of Earth's history that depicts relative dates from index fossil records and layers of rock (strata).	2	Multiple Choice	C
16	(E.8.9A.6) Design and conduct investigations to evaluate the chemical and physical processes involved in the formation of soils.	3	Multiple Choice	C
17	(E.8.9A.7) Explain the interconnected relationship between surface water and groundwater.	2	Technology Enhanced	See Answer Key
18	(L.8.2A.3) Construct explanations of how genetic information is transferred during meiosis.	2	Technology Enhanced	See Answer Key
19	(L.8.2A.5) Compare and contrast advantages and disadvantages of asexual and sexual reproduction.	2	Multiple Choice	A
20	(L.8.2B.2) Use various scientific resources to research and support the historical findings of Gregor Mendel to explain the basic principles of heredity.	2	Multiple Choice	C
21	(L.8.2B.3) Use mathematical and computational thinking to analyze data and make predictions about the outcome of specific genetic crosses (monohybrid Punnett Squares) involving simple dominant/recessive traits.	3	Technology Enhanced	See Answer Key
22	(L.8.4A.2) Investigate to construct explanations about natural selection that connect growth, survival, and reproduction to genetic factors, environmental factors, food intake, and interactions with other organisms.	2	Multiple Choice	D
23	(L.8.4B.1) Analyze and interpret data (e.g. pictures, graphs) to explain how natural selection may lead to increases and decreases of specific traits in populations over time.	3	Technology Enhanced	See Answer Key
24	(L.8.4B.3) Obtain and evaluate scientific information to explain that separated populations, that remain separated, can evolve through mutations to become a new species (speciation).	2	Technology Enhanced	See Answer Key
25	(P.8.6.8) Compare and contrast the behavior of sound and light waves to determine which types of waves need a medium for transmission.	2	Multiple Choice	C

Item Number 1

Part A: Circle a claim that describes the relationship between wind turbines and human dependency on the use of nonrenewable resources.

Claim

- A. Wind turbines allow humans to become less dependent on nonrenewable resources.
- B. Wind turbines cause humans to become more dependent on nonrenewable resources.

Part B: Circle a supporting statement that **best** defends the claim.

Supporting Statement

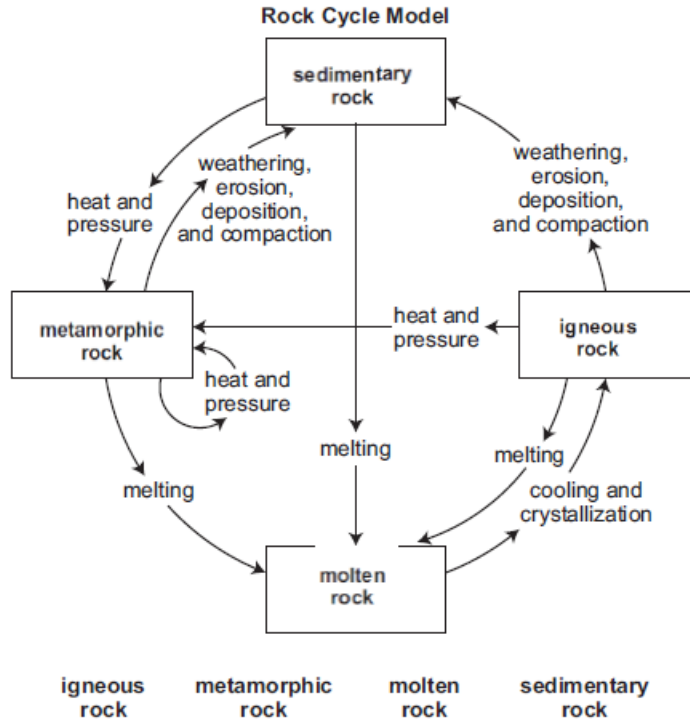
- A. Wind turbines use a renewable energy resource to generate electricity.
- B. Wind turbines use a nonrenewable energy resource to generate electricity.

Item Number 3

	Analogous	Homologous
bird and bat	✓	✓
bat and seal		✓

Item Number 4

Part A: Write the rock types in the correct boxes to complete the model.

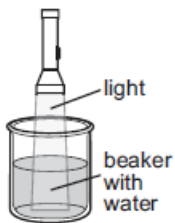


Part B: Circle the rock type that correctly completes the statement.

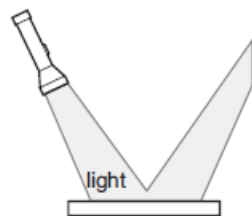
(Igneous / Metamorphic / Sedimentary) rock is best for the formation of fossils in the fossil record.

Item Number 5

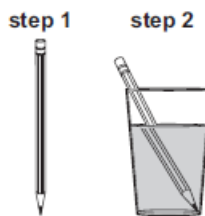
Reflection	Refraction	Transmission
2	3	1



1



2



3

Item Number 10

The wavelength of sound wave X is (longer than / shorter than / equal to) the wavelength of sound wave Y.

Therefore, sound wave X has (more energy than / less energy than / the same amount of energy as) sound wave Y.

Item Number 11

The color (red / orange / yellow / green / blue / indigo / violet) has the most energy, as it has the (longest / shortest) wavelength.

Item Number 17

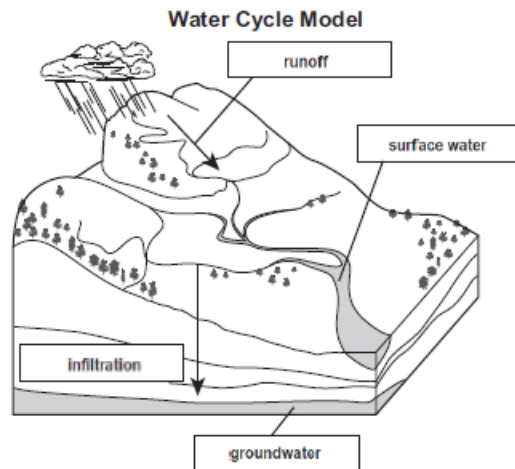
Part A: Write the correct label in each box on the model to identify four parts of the water cycle.

infiltration

runoff

groundwater

surface water



Part B: Circle one process in each set of parentheses to describe the relationships between parts of the water cycle.

Precipitation may (run off / infiltrate) to become surface water.

Surface water may (run off / infiltrate) to become groundwater.

Item Number 18

During meiosis, a parent cell first replicates its genetic information and then exchanges sections of DNA before dividing (one time / two times), producing (two haploid / four haploid / four diploid) daughter cells that are genetically (similar to / different than) the parent cell.

Item Number 21

Part A: In the Punnett square below, write a checkmark in the cell or cells that represent offspring that would be homozygous for light-colored fur.

**Rock Pocket Mouse
Punnett Square**

	D	d
d		✓
d		✓

Part B: Write the percentage of rock pocket mice offspring with light-colored fur represented by this cross on the line.

Percentage of rock pocket mouse offspring with light-colored fur: 50 %

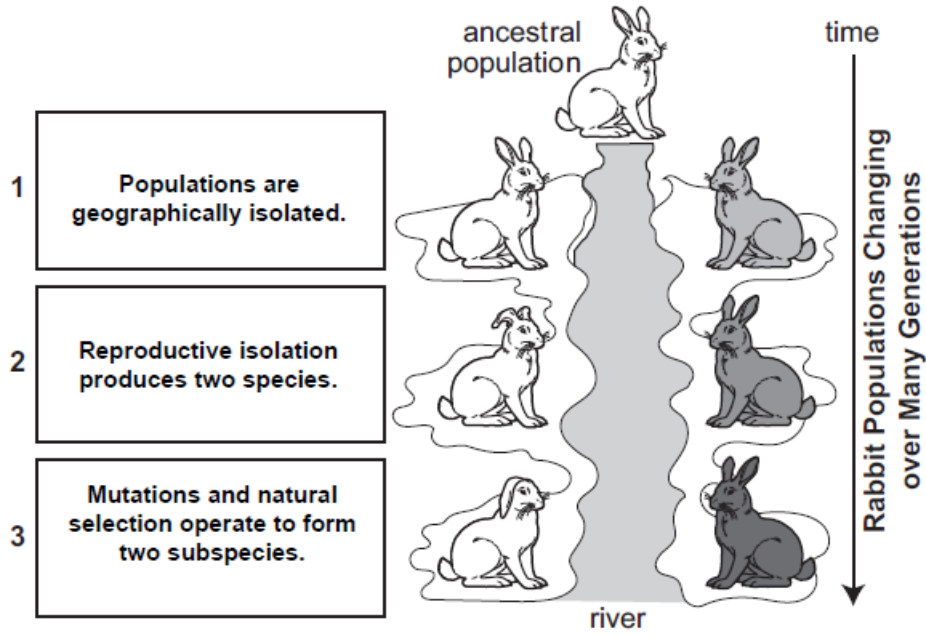
Item Number 23

Argument: The number of cacti with (fewer than 90 spines / more than 90 spines) would (decrease / increase).

Evidence: As javelinas start feeding on the cacti, they will select the cacti with (fewer spines / more spines) first, leaving cacti with (fewer spines / more spines) to survive and reproduce.

Item Number 24

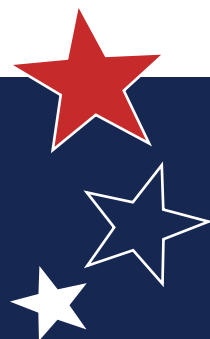
Development of Separate Rabbit Species



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Science Practice Test

Grade 8



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