



**Mississippi Academic Assessment Program (MAAP)**

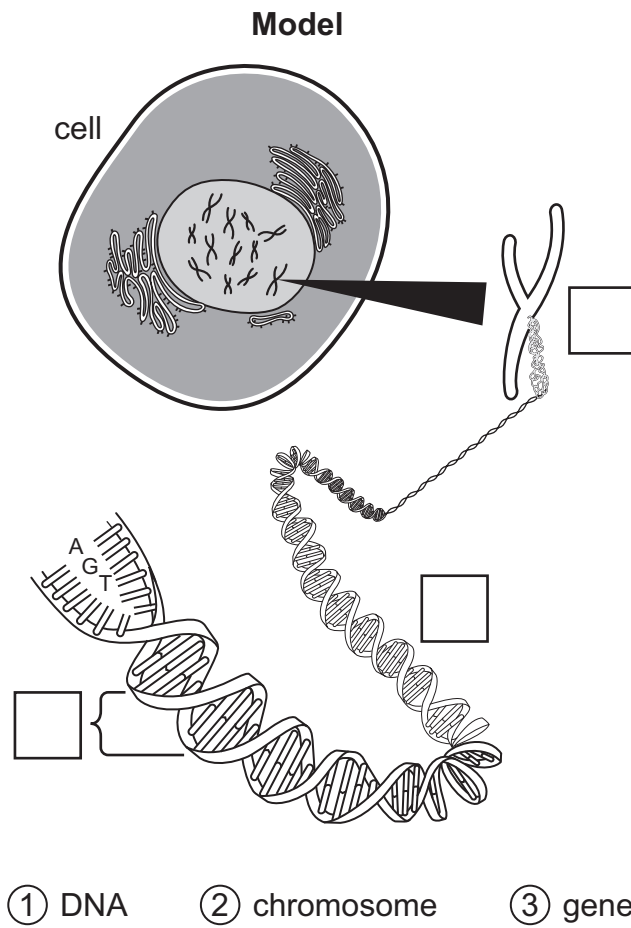
**Science  
Grade  
8**

**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.**

1. Some scientists study asteroids that could potentially impact Earth. Which mechanism could be used to **best** protect against this type of possible natural hazard?
  - A. satellites to calculate the mass and acceleration of asteroids
  - B. Doppler radar to measure the direction and speed of asteroids
  - C. rockets to push asteroids and change their direction and speed
  - D. probes to land on asteroids and detect their mass and acceleration

2. Record the number of each label in the boxes to **best** complete the model.



Use the scenario to answer the next two questions.

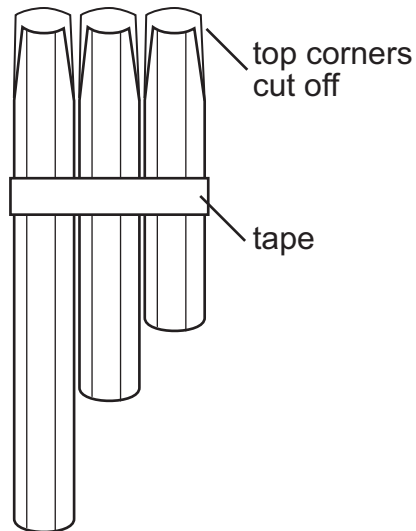
### **Straw Horn**

A student is investigating the properties of sound waves and light waves. To learn more about sound, the student constructs a straw horn following the procedure below.

#### **Procedure**

1. Collect three plastic straws and cut them to three different lengths.
2. Flatten the top end of each straw and cut off the top corners of each straw.
3. Tape the three straws together.
4. Blow air downward into each straw and listen to the sound.

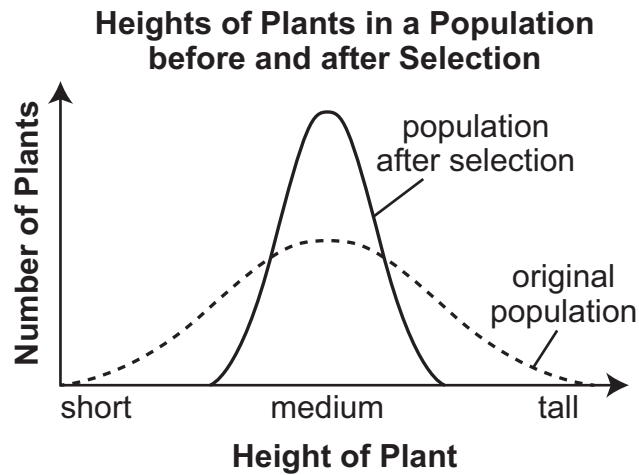
#### **Straw Horn**



3. The student observes that the shorter straws produce sounds with a higher pitch. Which set of information identifies and explains the characteristic of sound that the student observes?
- A. **Characteristic:** amplitude  
**Explanation:** Sounds with higher pitches have greater amplitudes.
  - B. **Characteristic:** amplitude  
**Explanation:** Sounds with lower pitches have greater amplitudes.
  - C. **Characteristic:** frequency  
**Explanation:** Sounds with lower pitches have greater frequencies.
  - D. **Characteristic:** frequency  
**Explanation:** Sounds with higher pitches have greater frequencies.

4. The student wants to investigate how sound waves from the straw horn interact with different materials. Which wave property should be tested, and which method should be used to test it?
- A. **Wave property:** absorption  
**Method:** playing the straw horn in a room with hard surfaces and a room with soft surfaces
  - B. **Wave property:** absorption  
**Method:** making several sounds from straws of different lengths
  - C. **Wave property:** pitch  
**Method:** playing the straw horn in a room with hard surfaces and a room with soft surfaces
  - D. **Wave property:** pitch  
**Method:** making several sounds from straws of different lengths

5. The graph shows the distribution of plant heights in an original population and also in the population after natural selection.



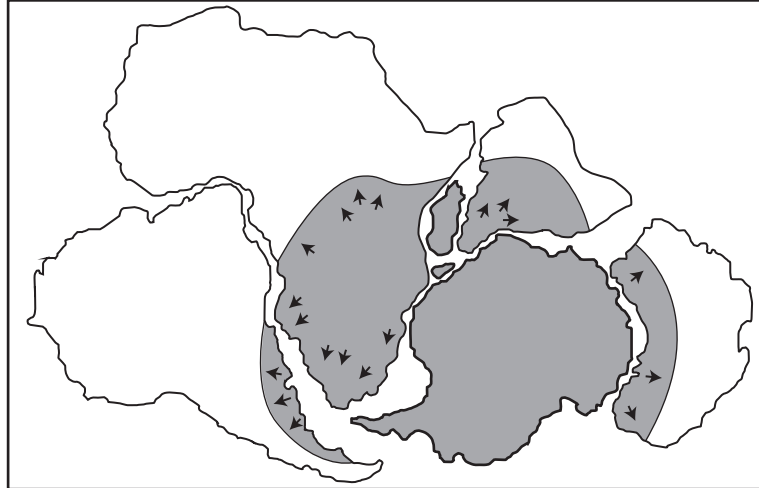
The plant population grew in an area with high winds and many organisms that feed on short vegetation. Which statement **best** explains the change in the plant population after selection?

- A. Plants with narrow stems were more likely to survive than plants with wide stems.
- B. Medium-height plants were favored by conditions that harmed tall and short plants.
- C. Ground-feeding organisms favored short plants, resulting in a taller plant population overall.
- D. High winds reduced the survival rate of tall plants, resulting in a greater range of plant heights.



6. The first map shows areas covered by glaciers 300 million years ago. The arrows show the directions of the glacial movement based on evidence from scratches in the continental bedrock. The present-day positions of the continents are shown in the second map.

**Glacial Coverage and Continent Position  
300 Million Years Ago**



**Present-Day Continent Positions**



Circle a word or phrase in each set of parentheses to form the conclusion that is **best** supported by the maps.

The scratches on the bedrock suggest that the ( landmasses / oceans ) were once connected nearer to the South Pole, and the ice flowed from ( several different locations / a central location / low latitudes to higher latitudes ).

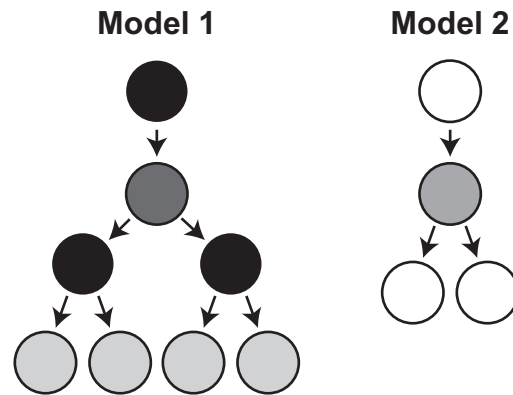
7. A student builds a simple guitar using rubber bands and a cardboard box. Plucking the rubber bands results in sound waves. Which step would **best** help the student investigate the effect of changing the resonance of the sound waves?
- A. adding more rubber bands to the guitar
  - B. adding color patterns to the outside of the box
  - C. using more force when plucking the rubber bands
  - D. building a similar guitar using a larger or smaller box

8. Acid rain occurs when chemical pollution in the atmosphere reacts with atmospheric chemicals. This type of pollution is mainly released by burning fossil fuels to generate electricity, to power vehicles and heavy equipment, and to run industries such as manufacturing and oil refining.

Circle a phrase in each set of parentheses to correctly explain one way humans could reduce the impact of acid rain on Earth's ecosystems.

Increased ( use of public transportation / recycling of metals / water conservation measures / consumption of farmed seafood ) would reduce the impact of acid rain by reducing ( the amount of pollutants released by vehicles / reliance on nonrenewable resources / the pollution of water sources / the effect of pollution on aquatic ecosystems ).

9. The models represent two reproduction processes.



Select the **three** terms listed that describe **only** Model 1.

- A. mitosis
- B. meiosis
- C. sexual reproduction
- D. asexual reproduction
- E. offspring different from parent
- F. offspring the same as parent

10. A population of birds lives in an ecosystem containing plants that produce different-sized seeds. There is genetic diversity among the individual birds in the population. The table shows the different genetic combinations determining sizes of bird beaks.

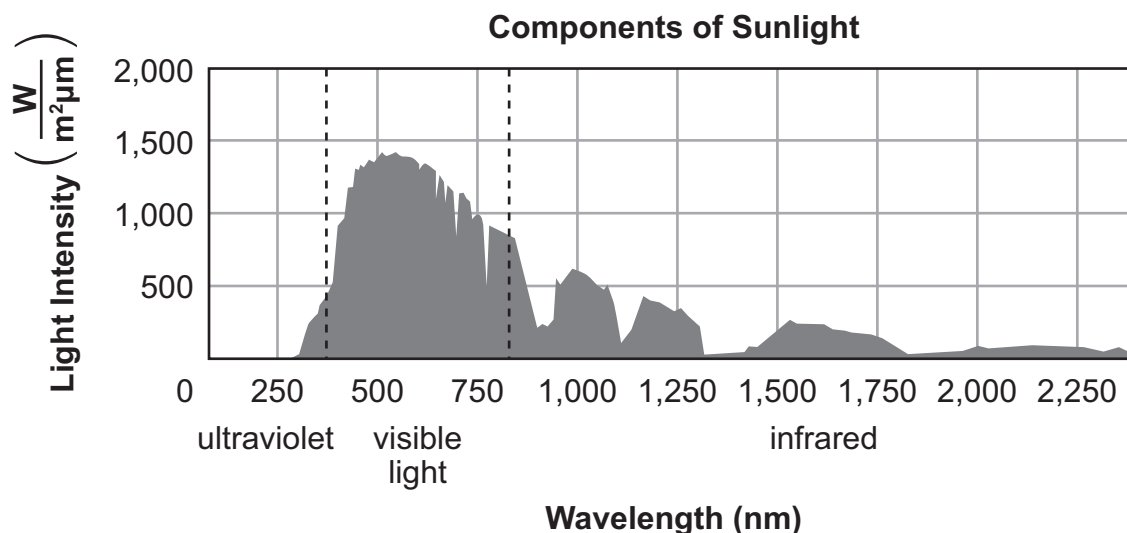
**Bird Information**

<b>Genetic Combination</b>	<b>Beak Appearance</b>	<b>Food Source</b>
BB	large and wide beak	large-sized seeds
Bb	medium and wide beak	medium-sized seeds
bb	small and narrow beak	small-sized seeds

After a long drought (period without rain) in the ecosystem, only plants with small-sized seeds are able to produce seeds. Which statement describes the effect that the drought would **most likely** have on the genetic diversity in the bird population?

- A. Individuals with BB would be less likely to survive because their food source would be less available.
- B. Individuals with BB would be more likely to survive because they can fill their beaks with many small seeds.
- C. Individuals with Bb would be more likely to survive because they can consume large-sized and small-sized seeds.
- D. Individuals with bb would be less likely to survive because their food source has less energy than large-size seeds.

11. Solar photovoltaic (PV) cells capture sunlight to produce electrical energy. The graph shows the components of sunlight reaching Earth's surface.



The table shows three types of PV cells and the wavelengths of light absorbed for electrical production.

PV Cell Type	Wavelengths Absorbed (nanometers)	Energy Produced ( $\text{W}/\text{m}^2 \times \mu\text{m}$ )
blue-absorbing	300–675	900
green-absorbing	400–825	500
red-absorbing	550–950	100

Which statement explains which PV cells would **most likely** produce more energy from sunlight?

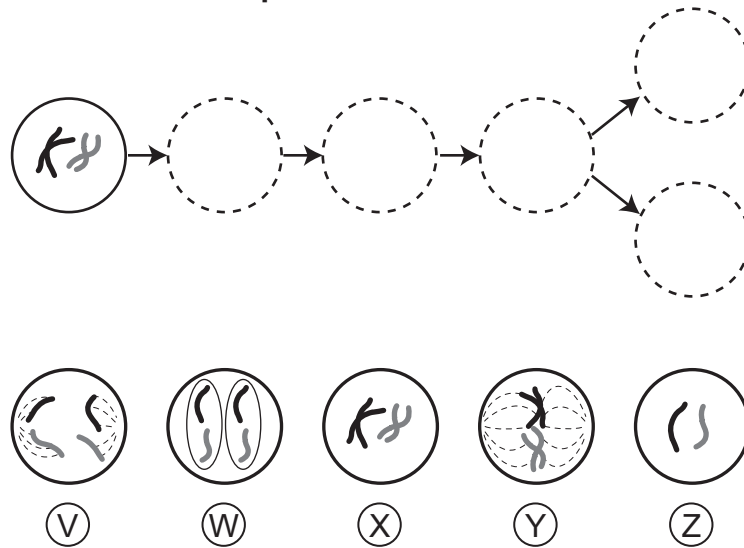
- A. Blue-absorbing PV cells would produce more energy because infrared light wavelengths are most of the energy in sunlight and produce more energy from sunlight.
- B. Red-absorbing PV cells would produce more energy because infrared light wavelengths are most of the energy in sunlight and produce more energy from sunlight.
- C. Blue-absorbing PV cells would produce more energy because blue-light wavelengths contain more energy than other wavelengths and produce more energy from sunlight.
- D. Red-absorbing PV cells would produce more energy because blue-light wavelengths contain more energy than other wavelengths and produce more energy from sunlight.

12. **Part A:** Circle a word or phrase in each set of parentheses to correctly complete the statement about the process of mitosis.

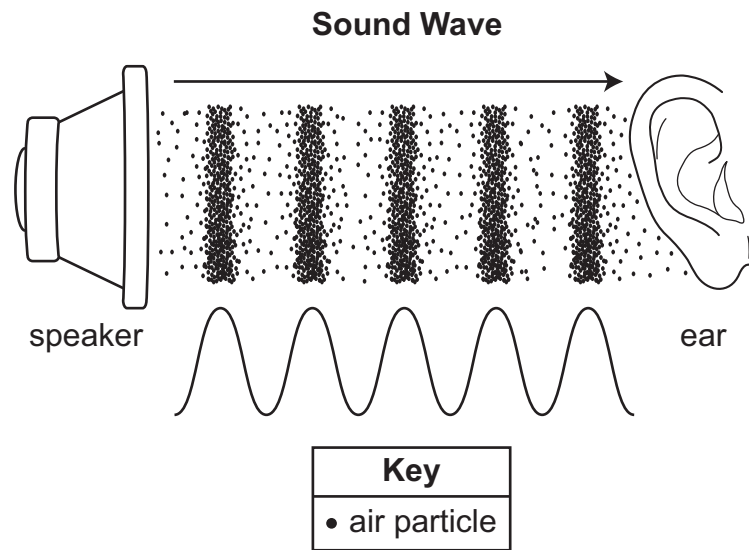
Mitosis is a form of ( sexual / asexual ) reproduction that produces daughter cells with genetic information that is ( identical to / modified by / different from ) the parent cell.

**Part B:** A model of mitosis is shown below beginning with the prophase stage. Record the letter of a cell stage in each circle to correctly complete the model of mitosis. Some cell stages may be used more than once and some may not be used at all.

**Incomplete Model of Mitosis**



13. The model represents a sound wave.

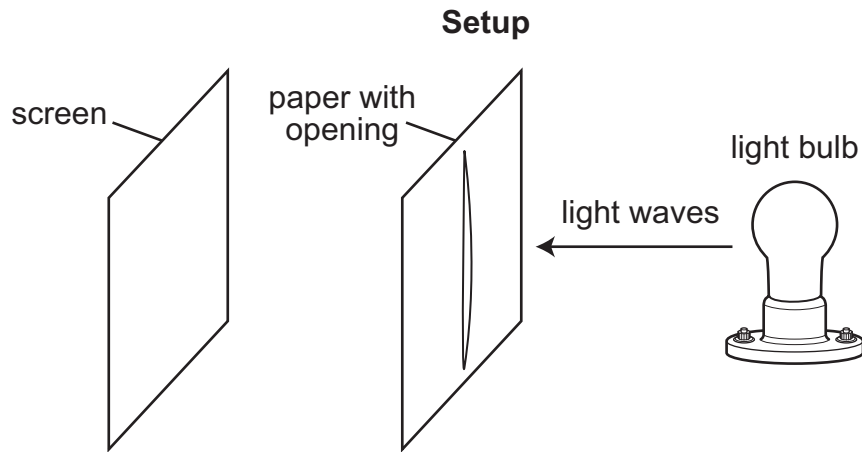


Which statement **best** describes the relationship between matter and energy in a sound wave?

- A. Particles of matter transform into energy to produce a sound wave.
- B. Energy in a sound wave moves particles of matter from one place to another.
- C. Energy in a sound wave transfers between particles of matter in a repeating pattern.
- D. Particles of matter are transformed into other types of matter by energy in a sound wave.



14. A light source sends light waves through a small opening in a piece of paper to a screen. The diagram shows the setup.

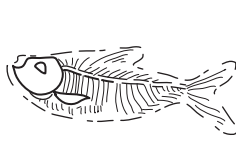


Circle a word or phrase in each set of parentheses to describe the **most likely** effect that the opening in the paper will have on the light waves.

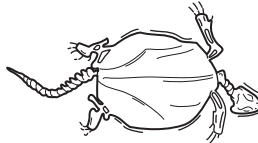
The light waves will be diffracted by the opening in the paper, causing the light waves to  
( cancel out / come together / spread out ) and appear ( brighter / dimmer / equally bright ).

15. Students are studying fossilized animals from the bottom of an ancient lake. The students make drawings of the fossilized animals.

**Student Drawings**



fossilized  
animal 1



fossilized  
animal 2



fossilized  
animal 3

One student claims that the fossilized animals are related to living animals. Which statement **best** supports the student's claim?

- A. The fossilized animals have body sizes that are similar to the body sizes of living animals.
- B. The fossilized animals are made of rocky materials that are similar to those in the bones of living animals.
- C. The fossilized animals have body shapes and parts that are similar to the body shapes and parts of living animals.
- D. The fossilized animals show signs of having once lived in habitats that are similar to the habitats of living animals.

16. A student uses three different-sized metal container lids to produce sounds. The student has the three metal lid sizes shown in the table.

**Setup**

<b>Trial Number</b>	<b>Lid Size (cm)</b>
1	30
2	45
3	60

**Part A:** The student strikes the 45-cm lid to produce a sound. If the student wants to produce a higher-pitched sound, which method should the student **most likely** use?

- A. striking the same lid with more force
- B. striking the 60-cm lid with the same amount of force
- C. striking the 30-cm lid with the same amount of force
- D. striking the same lid with the same force but from farther away

**Part B:** Which sound wave characteristic changes the **most** between each trial?

- A. crest
- B. shape
- C. amplitude
- D. frequency

17. Planaria are flatworms that reproduce asexually. Catfish reproduce sexually. Which statement **best** compares planaria and catfish?
- A. Planaria have offspring that are genetically different, and catfish have offspring that are identical.
  - B. Planaria require less time to produce offspring, and catfish require more time to produce offspring.
  - C. Planaria produce offspring one at a time, and catfish produce large numbers of offspring at one time.
  - D. Planaria require large amounts of energy to produce offspring and catfish require little energy to produce offspring.

18. Major volcanic eruptions are examples of extreme events that leave behind the remains of living organisms that may form into rock layers. Scientists can use these rock layers to determine which organisms were alive at different times on Earth.

Which statement describes the **most likely** location of a rock layer containing fossils of organisms living immediately **before** an extreme event occurred?

- A. All the rock layers near the volcanic eruption layer will contain fossils of organisms living immediately before the eruption occurred.
- B. All the rock layers beneath the volcanic eruption layer will contain fossils of organisms living immediately before the eruption occurred.
- C. The rock layer directly above the volcanic eruption layer will contain fossils of organisms living immediately before the eruption occurred.
- D. The rock layer directly beneath the volcanic eruption layer will contain fossils of organisms living immediately before the eruption occurred.

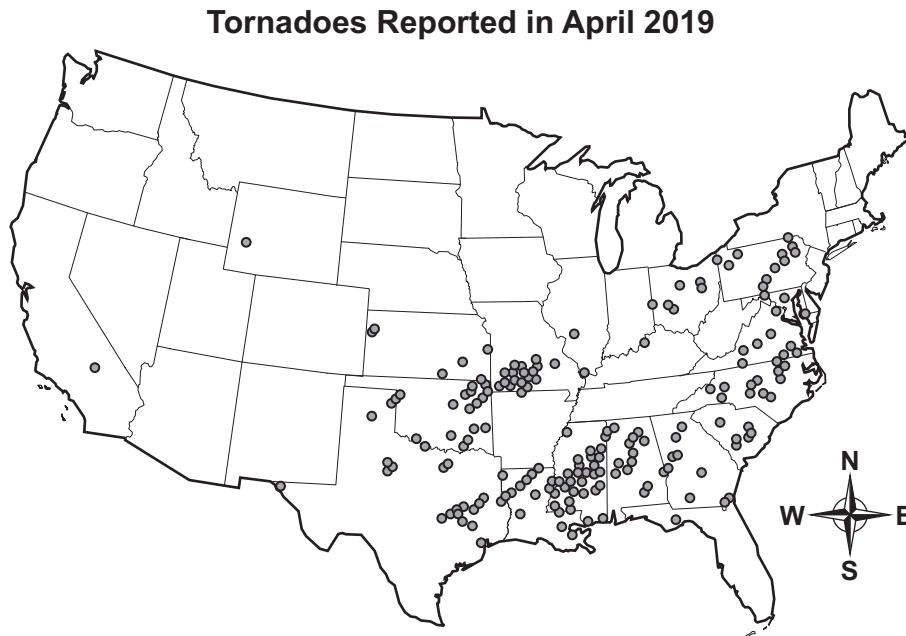
19. Different geologic processes build and break apart Earth's surface at different rates. Record the process labels in the table to represent the **most likely** speeds and results of the geologic processes.

	Destructive Force	Constructive Force
short period of time		
long period of time		

- Ⓐ mudslide
- Ⓑ sedimentation
- Ⓒ volcanic eruption
- Ⓓ wind erosion

20. Arctic hares are adapted to live in cold environments such as the Arctic. Scientific studies indicate that human activities contribute to a rise in the average global air temperature, resulting in a decrease in Arctic snow cover. Which statement explains how the changing arctic environment will **most likely** affect the population of arctic hares in winter?
- A. The population will increase because environmental factors will increase the availability of food for hares.
  - B. The population will increase because genetic factors will increase the number of hares that survive and reproduce.
  - C. The population will decrease because environmental factors will reduce the ability of hares to hide from predators.
  - D. The population will decrease because genetic factors will reduce the ability of hares to survive in a warmer environment.

21. A student observes the map showing the tornadoes that were reported in April of 2019.



Which impact would the student **most likely** observe in locations with reported tornadoes?

- A. increased soil loss and desertification
- B. increased damage to buildings, structures, and trees
- C. decreased access to water storage and water bodies
- D. decreased amount of dry land near rivers and streams

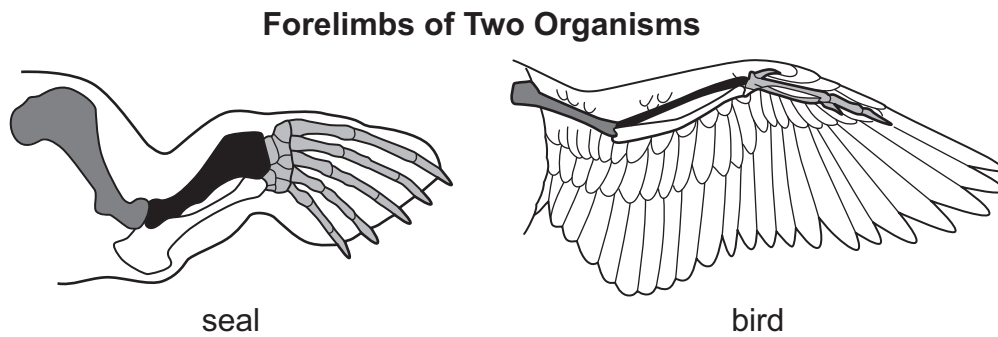


22. The Cretaceous-Tertiary (K-Pg) event occurred about 65.5 million years ago. The causes are not completely known, but over fifty percent of all plants and animals went extinct. Evidence shows that Earth experienced a massive heat event that triggered fires, volcanic eruptions, and earthquakes. These activities released large amounts of debris into the air. The debris blocked the sunlight and caused Earth's surface temperature to become much cooler.

Which type of organisms would have **most likely** survived this event?

- A. Organisms that were able to eat only plants on land survived over time.
- B. Organisms that were able to grow very large on land survived over time.
- C. Organisms that were able to use sunlight to heat their bodies survived over time.
- D. Organisms that were able to hide and to store energy to keep warm survived over time.

23. The drawing represents the forelimbs of a seal and a bird.



Which statement **best** describes the relationship of these organisms?

- A. The structures are analogous; the organisms have a common ancestor.
- B. The structures are homologous; the organisms have a common ancestor.
- C. The structures are analogous; the organisms do not have a common ancestor.
- D. The structures are homologous; the organisms do not have a common ancestor.

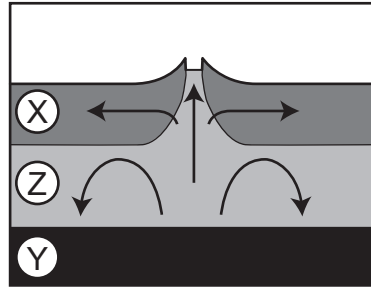
- 24.** A student is investigating the transmission of sound waves and light waves through different mediums. The student tests sound wave and light wave transmission within a glass jar with air, without air, and with water.

Select the boxes to represent the mediums that will transmit sound waves and light waves.

	With Air	Without Air	With Water
sound waves			
light waves			

25. A student is studying a diagram of a tectonic plate boundary.

**Tectonic Plate Boundary**



Circle a word in each set of parentheses to **best** describe the movement of the tectonic plates in the diagram.

**Part A:** The tectonic plates move across Earth's surface due to

( convection / conduction / radiation ) from materials in Earth's ( core / mantle / crust ) layer.

**Part B:** Record the letter that **best** represents the location of the layer of Earth identified in Part A.

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**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 located 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 2021.

Item Number	Performance Objective	DOK Level	Item Type	Correct Answer
1	(E.8.9B.3) Using an engineering design process, create mechanisms to improve community resilience, which safeguard against natural hazards (e.g., building restrictions in flood or tidal zones, regional watershed management, Firewise construction).*	2	Multiple Choice	C
2	(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	Technology Enhanced	See Answer Key
3	(P.8.6.4) Use scientific processes to plan and conduct controlled investigations to conclude sound is a wave phenomenon that is characterized by amplitude and frequency.	2	Multiple Choice	D
4	(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	A
5	(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.	2	Multiple Choice	B
6	(E.8.9A.2) Explore and debate theories of plate tectonics to form conclusions about past and current movements of rocks at Earth's surface throughout history.	2	Technology Enhanced	See Answer Key
7	(P.8.6.5) Conduct scientific investigations that describe the behavior of sound when resonance changes (e.g., waves in a stretched string and design of musical instruments).	2	Multiple Choice	D
8	(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	Technology Enhanced	See Answer Key
9	(L.8.2A.4) Engage in discussion using models and evidence to explain that sexual reproduction produces offspring that have a new combination of genetic information different from either parent.	2	Multiple Choice	B, C, E
10	(L.8.4B.2) Construct written and verbal explanations to describe how genetic variations of traits in a population increase some organisms' probability of surviving and reproducing in a specific environment.	2	Multiple Choice	A
11	(P.8.6.2) Investigate research-based mechanisms for capturing and converting wave energy (frequency, amplitude, wavelength, and speed) into electrical energy.	3	Multiple Choice	C
12	(L.8.2A.2) Create a diagram of mitosis and explain its role in asexual reproduction, which results in offspring with identical genetic information.	2	Technology Enhanced	See Answer Key
13	(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	Multiple Choice	C
14	(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
15	(E.8.7.3) Construct and analyze scientific arguments to support claims that most fossil evidence is an indication of the diversity of life that was present on Earth and that relationships exist between past and current life forms.	2	Multiple Choice	C

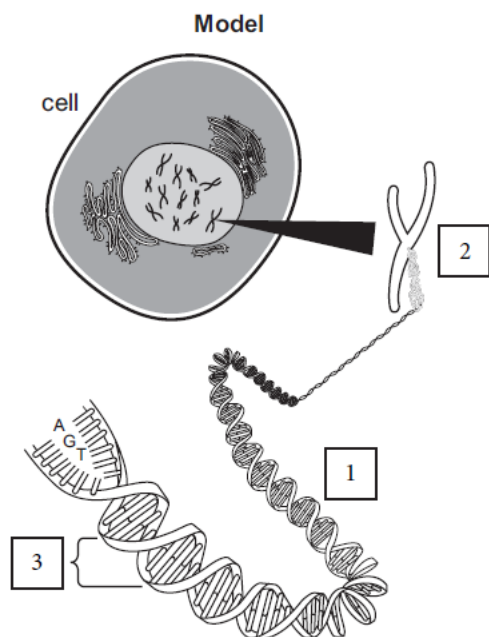
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<b>Item Number</b>	<b>Performance Objective</b>	<b>DOK Level</b>	<b>Item Type</b>	<b>Correct Answer</b>
16	(P.8.6.4) Use scientific processes to plan and conduct controlled investigations to conclude sound is a wave phenomenon that is characterized by amplitude and frequency.	2	Multiple Choice	Part A: C Part B: D
17	(L.8.2A.5) Compare and contrast advantages and disadvantages of asexual and sexual reproduction.	2	Multiple Choice	B
18	(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	D
19	(E.8.9A.4) Research and assess the credibility of scientific ideas to debate and discuss how Earth's constructive and destructive processes have changed Earth's surface at varying time and spatial scales.	2	Technology Enhanced	See Answer Key
20	(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	C
21	(E.8.9B.1) Research and map various types of natural hazards to determine their impact on society.	2	Multiple Choice	B
22	(E.8.7.4) Use research and evidence to document how evolution has been shaped both gradually and through mass extinction by Earth's varying geological conditions (e.g., climate change, meteor impacts, and volcanic eruptions).	2	Multiple Choice	D
23	(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	Multiple Choice	B
24	(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	Technology Enhanced	See Answer Key
25	(E.8.9A1) Investigate and explain how the flow of Earth's internal energy drives the cycling of matter through convection currents between Earth's surface and the deep interior causing plate movements.	2	Technology Enhanced	See Answer Key

Mississippi Academic Assessment Program  
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Technology Enhanced Items  
Answer Key

Item #2



Item #6

The scratches on the bedrock suggest that the (landmasses / oceans ) were once connected nearer to the South Pole, and the ice flowed from ( several different locations / a central location / low latitudes to higher latitudes ).

Item #8

Increased (use of public transportation / recycling of metals / water conservation measures / consumption of farmed seafood ) would reduce the impact of acid rain by reducing (the amount of pollutants released by vehicles / reliance on nonrenewable resources / the pollution of water sources / the effect of pollution on aquatic ecosystems ).

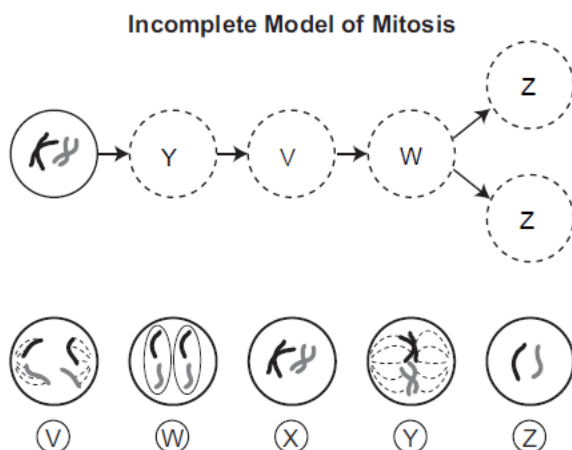
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**Item #12**

Part A:

Mitosis is a form of ( sexual / asexual ) reproduction that produces daughter cells with genetic information that is ( identical to / modified by / different from ) the parent cell.

Part B:



**Item #14**

The light waves will be diffracted by the opening in the paper, causing the light waves to ( cancel out / come together / spread out ) and appear ( brighter / dimmer / equally bright ).

**Item #19**

	Destructive Force	Constructive Force
short period of time	mudslide (A)	wind erosion (D)
long period of time	volcanic eruption (C)	sedimentation (B)

**Item #24**

	With Air	Without Air	With Water
sound waves	X		X
light waves	X	X	X



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Item #25

**Part A:** The tectonic plates move across Earth's surface due to

(convection) / conduction / radiation ) from materials in Earth's ( core / (mantle) / crust ) layer.



**Part B:** Record the letter that **best** represents the location of the layer of Earth identified in Part A.

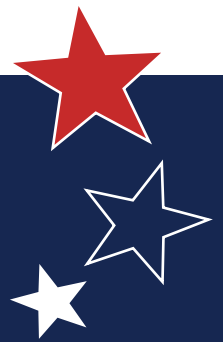
                      
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# Science Practice Test

Grade 8



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