

Mississippi Academic Assessment Program

**SCIENCE
Grade 8
OTT Answer Key**

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 the Grade 8 science test.

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
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

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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
26	(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
27	(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
28	(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

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29	(E.8.9B.1) Research and map various types of natural hazards to determine their impact on society.	2	Multiple Choice	B
30	(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
31	(L.8.2A.1) Obtain and communicate information about the relationship of genes, chromosomes, and DNA, and construct explanations comparing their relationship to inherited characteristics.	1	Multiple Choice	D
32	(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	Technology Enhanced	See Answer Key
33	(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	Technology Enhanced	See Answer Key
34	(P.8.6.6) Obtain and evaluate scientific information to explain the relationship between seeing color and the transmission, absorption, or reflection of light waves by various materials.	2	Multiple Choice	A
35	(E.8.10.4) Using an engineering design process, develop a system to capture and distribute thermal energy that makes renewable energy more readily available and reduces human impact on the environment (e.g., building solar water heaters, conserving home energy).*	2	Technology Enhanced	See Answer Key
36	(E.8.9B.2) Compare and contrast technologies that predict natural hazards to identify which types of technologies are most effective.	2	Technology Enhanced	See Answer Key
37	(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
38	(L.8.2B.4) Debate the ethics of artificial selection (selective breeding, genetic engineering) and the societal impacts of humans changing the inheritance of desired traits in organisms.	2	Multiple Choice	B
39	(P.8.6.7) Research the historical significance of wave technology to explain how digitized tools have evolved to encode and transmit information (e.g., telegraph, cell phones, and wireless computer networks).	2	Multiple Choice	B
40	(L.8.2C.2) Construct scientific arguments from evidence to support claims about the potentially harmful, beneficial, or neutral effects of genetic mutations on organisms.	2	Technology Enhanced	See Answer Key

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Grade 8 OTT Technology Enhanced Answers

Item 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

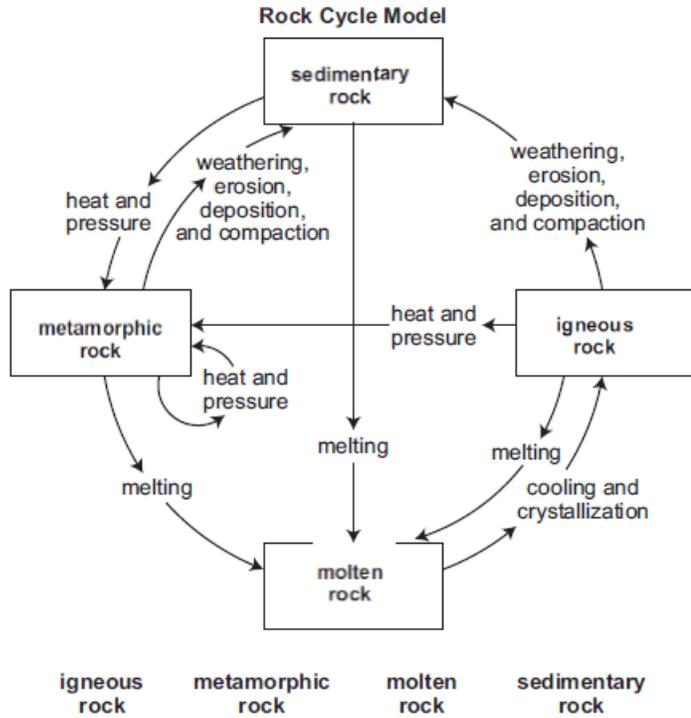
- A. Wind turbines use a renewable energy resource to generate electricity.
- B. Wind turbines use a nonrenewable energy resource to generate electricity.

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.

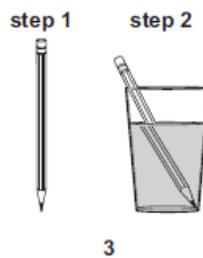
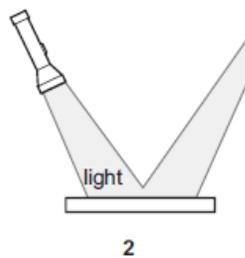
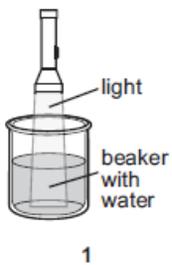


Part B: Circle the rock type that correctly completes the statement.

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

Item Number 5

Reflection	Refraction	Transmission
2	3	1



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

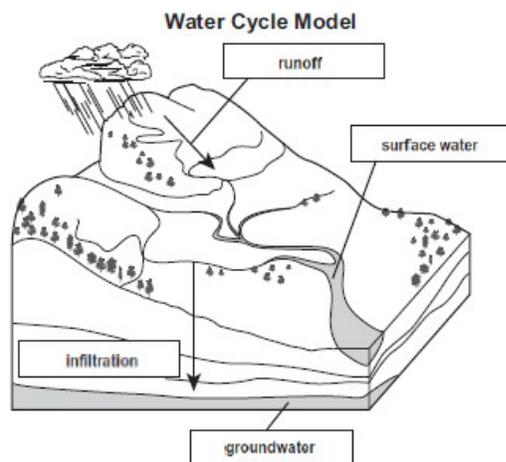
Part A: Write the correct label in each box on the model to identify four parts of the water cycle.

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 %

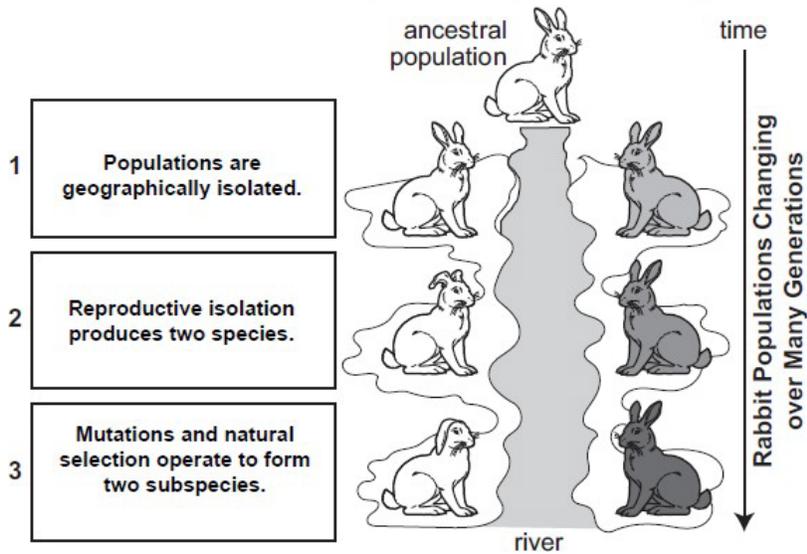
Item Number 23

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



Item 27 – Answer

- mitosis
- meiosis
- sexual reproduction
- asexual reproduction
- offspring different from parent
- offspring the same as parent

Item 28 – Answer

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

Item 30 – Answer

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

Item 32 – Answer

Part A:

The results observed in generation 1 best support the principle of (independent assortment / dominance / the segregation of alleles).

The generation 2 pea plants that have white flowers are (heterozygous / homozygous).

Part B: A

Item 33 – Answer

Part A:

youngest
B
A
D
C
oldest

Part B: D

Part B: D

youngest
bird
amphibian
fish
crinoid
oldest

Item 35 – Answer

Examples of Solar Energy to Heat Buildings

Passive Solar Energy	Active Solar Energy
2, 3	1, 4

Examples of Solar Energy to Heat Buildings

Passive Solar Energy	Active Solar Energy
Large glass window panes allow light to pass through them and into a room. Clay bricks on the outside of a building absorb and release heat slowly over time.	Air is forced across coils with heated water and blown into a room. Heated water is pumped from a container through small tubes beneath the flooring.

Item 36 - Answer

Predicting Volcanic Eruptions	
Instrument	Description
portable seismometer	The instrument is placed on surfaces around a volcano to measure earthquake vibrations caused by magma movements.
tiltmeter	The instrument is placed on the surface to measure changes in surface tilt potentially caused by movements of magma.
thermal imaging	Measurements are taken of ground temperatures from a helicopter.
correlation spectrometer (COSPEC)	The instrument sits atop a tripod to collect gas samples from volcanic vents.
Global Positioning System (GPS)	Multiple GPS receivers are placed on surfaces around a volcano to measure changes in surface tilt potentially caused by movements of magma.

Item 37 – Answer

Part A:

The Himalayan mountain range started forming when the Indian subcontinent began colliding with the Eurasian Plate. The mountain range is currently increasing in height.

Part B: C

Item 40 – Answer

A mutation in the bacteria likely benefits the bacteria, and harms the person with the infection. This situation will likely make treating the bacterial infection more difficult in the future.