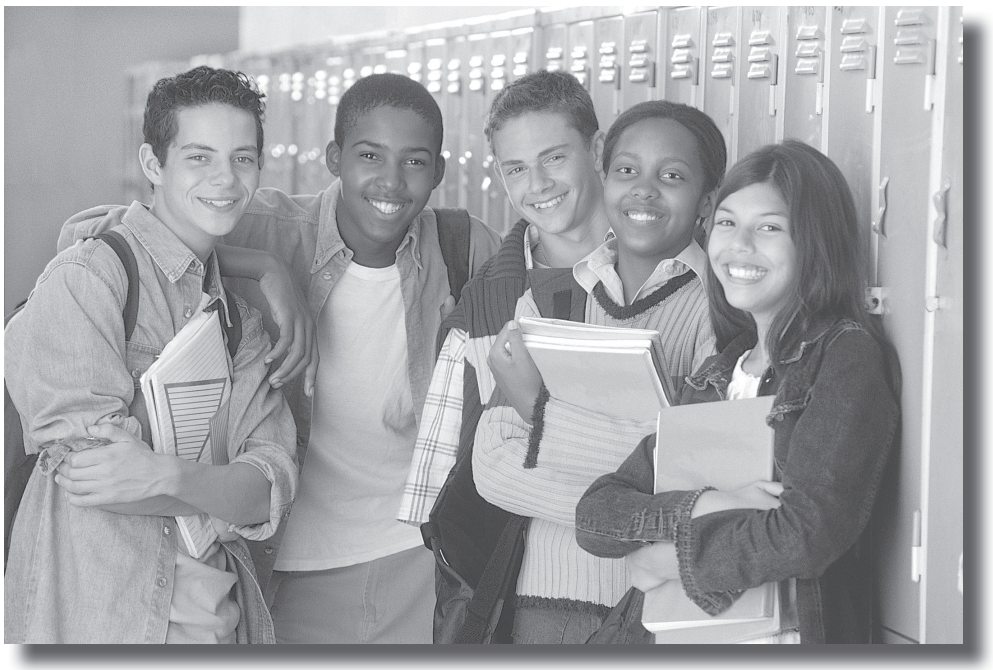
Pennsylvania PSSA 2016 Grade 8 Science

Exam & Answer Key Materials
Pages 2 - 33

pennsylvania
DEPARTMENT OF EDUCATION

The Pennsylvania System of School Assessment

Science
Item and Scoring Sampler



2016–2017
Grade 8

Pennsylvania Department of Education Bureau of Curriculum, Assessment and Instruction—September 2016

SCIENCE TEST DIRECTIONS

On the following pages are the Science questions. There are two types of questions.

Multiple-Choice Questions

Some questions will ask you to select an answer from among four choices. These questions will be found in your test booklet.

For the multiple-choice questions:

- Read each question, and choose the best answer.
- Record your choice in the answer booklet.
- Only one of the answers provided is the correct response.

Open-Ended Questions

Other questions will require you to write your response. These questions will be found in your answer booklet.

For the open-ended questions:

- Be sure to read the directions carefully.
- If the question asks you to do two tasks, be sure to complete both tasks.
- If the question asks you to compare, be sure to compare. Also, if the question asks you to explain, describe, or identify, be sure to explain, describe, or identify.

GENERAL DESCRIPTION OF SCORING GUIDELINES FOR SCIENCE OPEN-ENDED ITEMS

2 POINTS

- The response demonstrates a *thorough* understanding of the scientific content, concepts, and procedures required by the task(s).
- The response provides a clear, complete, and correct response as required by the task(s). The response may contain a minor blemish or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

1 POINT

- The response demonstrates a *partial* understanding of the scientific content, concepts, and procedures required by the task(s).
- The response is somewhat correct with *partial* understanding of the required scientific content, concepts, and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

0 POINTS

- The response provides *insufficient* evidence to demonstrate any understanding of the scientific content, concepts, and procedures as required by the task(s) for that grade level.
- The response may show only information copied or rephrased from the question or *insufficient* correct information to receive a score of 1.

MULTIPLE-CHOICE QUESTIONS

1. Which health concern is **most** associated with areas containing a high density of factories and vehicles with gas-burning engines?

A. increased sensitivity to solar radiation

B. bacterial infections in the digestive tract

C. asthma and other breathing-related issues

D. weakened resistance to infections and viruses

Item Information	
Alignment	S8.A.1.2.2
Answer Key	C
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
12%	8%	74%	6%

Option Annotations

A. Increased sensitivity to solar radiation is most likely in areas of high altitude or where ozone has been reduced by chlorofluorocarbon (CFC) pollution.

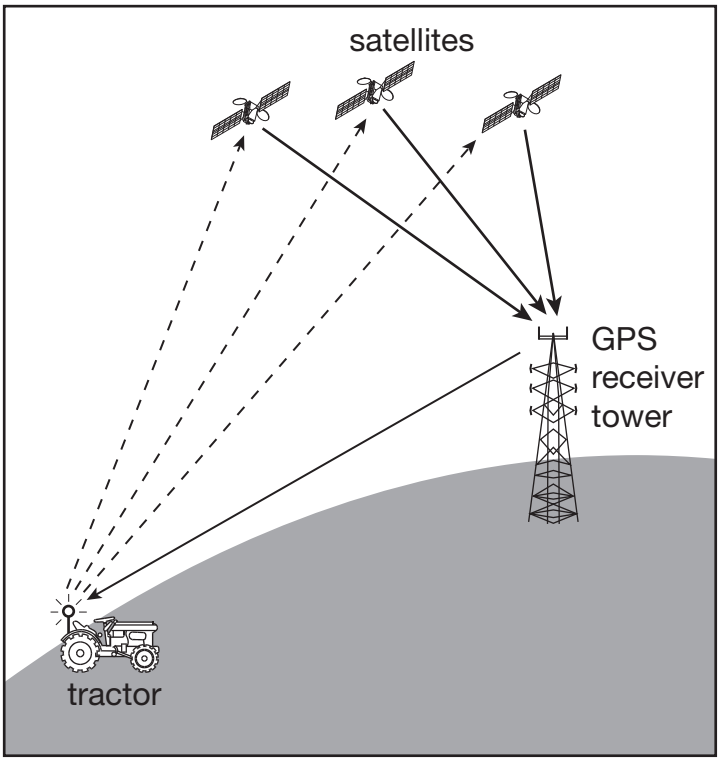
B. Bacterial infections in the digestive tract are most likely in areas with inadequate water filtration and treatment.

C. Key: Respiratory concerns are most likely in areas with airborne pollutants from factory and vehicle combustion.

D. Weakened resistance to infections and viruses is most likely related to overuse of antibiotics.

Use the diagram below to answer question 2.

Global Positioning System



2. Many tractors are now equipped with Global Positioning System (GPS) technology. How does agriculture **most likely** benefit from the use of GPS technology?

A. GPS technology enables farmers to communicate with one another.

B. GPS technology offers farmers a way to eliminate the use of insecticides.

C. Farmers can more easily maintain water and nutrient levels in the soil.

D. Farmers can more effectively map field boundaries and pest infestations.

Item Information	
Alignment	S8.A.1.2.3
Answer Key	D
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
9%	9%	8%	74%

Option Annotations

A. GPS is a mapping technology; cellular phones enable farmers to communicate with one another.

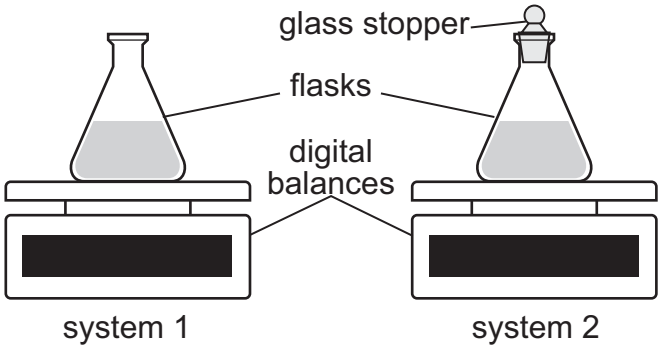
B. GPS technology enables farmers to map areas of insecticide coverage but not to eliminate insecticide use.

C. Soil sensors can be used to monitor water and nutrient levels in soil, but this is not a function of GPS.

D. Key: GPS is a mapping technology that can be used to map farm field boundaries and areas with specific concerns.

Use the information below to answer question 3.

Two Systems



System Data

Time (min)	Mass of System 1 (g)	Mass of System 2 (g)
0	16.60	16.66
1	16.57	16.65
2	16.54	16.66
3	16.51	16.67
4	16.47	16.66
5	16.43	16.66

3. The diagram shows two different systems. Each system contains a flask holding a liquid. Which uncontrolled variable is **most likely** causing the reduction in mass in system 1?

A. evaporation of the liquid

B. air dissolving in the liquid

C. water condensing on the outside of the flask

D. human error measuring the mass of the liquid

Item Information	
Alignment	S8.A.1.3.3
Answer Key	A
Depth of Knowledge	3

***p*-values**			
A	**B**	**C**	**D**
70%	12%	11%	7%

Option Annotations

A. Key: The flask in system 1 lacks a glass stopper, which allows mass to escape as a gas during evaporation.
B. Solids, not gases (like air), dissolve into liquids.
C. The mass of the flask is decreasing; condensation would cause the mass to increase.
D. The mass decreases in a nearly regular pattern each minute, suggesting that human error is not the cause.

4. A scientist heated 100.0 mL of a liquid solution and measured its volume as it became warmer. Which measurement scale should the scientist use to describe the amount of heat in the solution?

A. mass

B. length

C. distance

D. temperature

Item Information	
Alignment	S8.A.2.1.1
Answer Key	D
Depth of Knowledge	1

***p*-values**			
A	**B**	**C**	**D**
15%	4%	3%	77%

Option Annotations

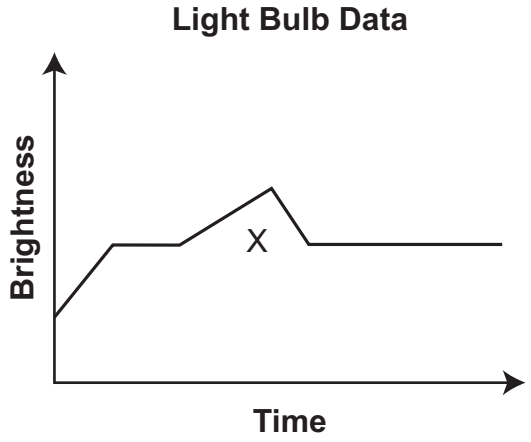
A. Mass describes an object's resistance to changing its state of motion when subject to a force.

B. Length describes a one-dimensional measurement of an object from end to end.

C. Distance is a numerical scale describing how far apart two objects are from one another.

D. Key: Temperature is a scale used to describe the amount of heat in a solid, liquid, or gas.

Use the graph below to answer question 5.



5. A student measured the brightness of a light bulb over time. Which event **most likely** occurred at point X?

A. The light bulb burned out.

B. The light bulb's color changed.

C. The light bulb became unplugged.

D. The light bulb's power source surged.

Item Information	
Alignment	S8.A.2.1.4
Answer Key	D
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
13%	9%	6%	72%

Option Annotations

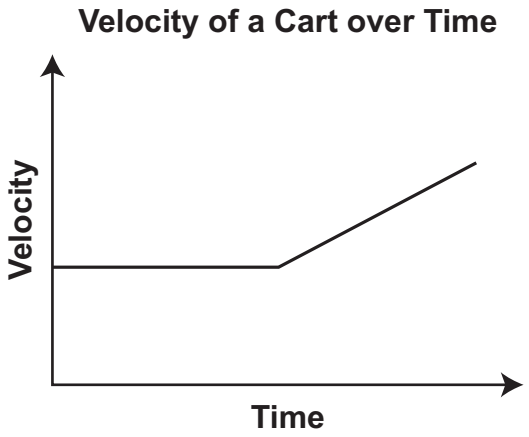
A. If the light bulb burned out, the brightness value would dip, instead of peak, at point X.

B. The graph communicates data about the brightness of the light bulb not the color.

C. If the light bulb was unplugged, the brightness value would go to zero, instead of peak, at point X.

D. Key: The graph shows an increase in brightness at point X, suggesting a surge in power to the light bulb.

Use the graph below to answer question 6.



6. Two opposing forces acted on a wheeled cart during an investigation. The graph shows the velocity of the cart over time. Which conclusion is **best** supported by the data shown in the graph?

A. The forces acting on the cart were consistently balanced.

B. The forces acting on the cart were consistently unbalanced.

C. The forces acting on the cart were balanced and then became unbalanced.

D. The forces acting on the cart were unbalanced and then became balanced.

Item Information	
Alignment	S8.A.2.1.5
Answer Key	C
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
6%	6%	84%	5%

Option Annotations

A. Consistently balanced forces (constant velocity) would be shown by a horizontal line for the entire graphed time.

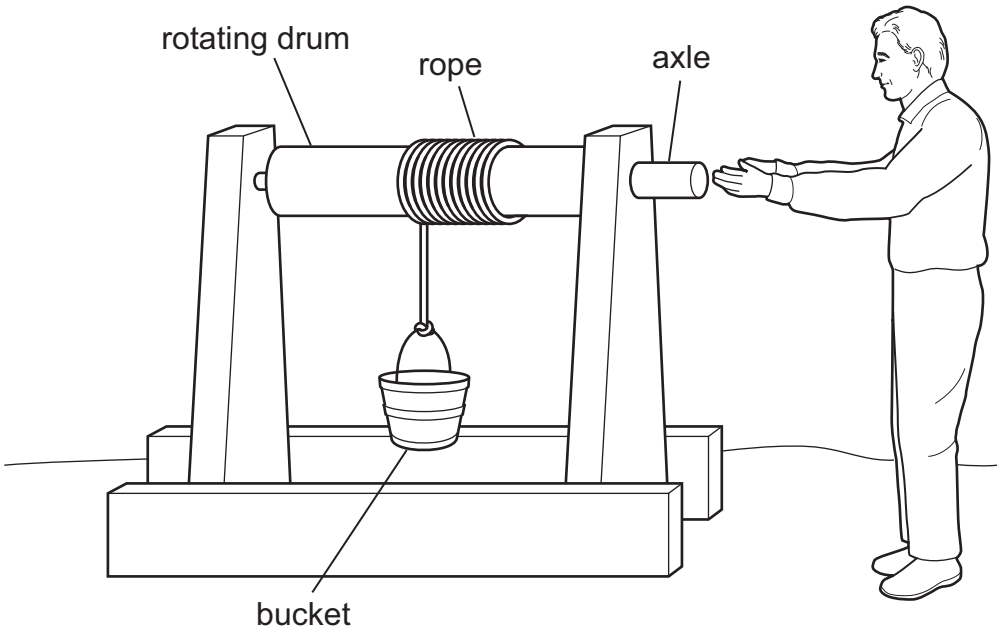
B. Consistently unbalanced forces would be shown by a diagonal up line or a diagonal down line for the entire graphed time.

C. Key: The horizontal part of the line represents when forces acting on the cart were balanced, and the diagonal part of the line represents when velocity was changing due to unbalanced forces.

D. The graph shows that forces acting on the cart were balanced and then became unbalanced.

Use the diagram below to answer question 7.

Windlass



7. The diagram shows a windlass that has just been built to get water from a well. Which statement **best** describes a flaw in the design of this system that will make drawing water difficult?

A. A crank is missing from the end of the axle.

B. A chain should be used in place of the rope.

C. The bucket lacks a lid to help prevent spilling.

D. The diameter of the rotating drum is too small.

Item Information	
Alignment	S8.A.2.1.6
Answer Key	A
Depth of Knowledge	3

***p*-values**			
A	**B**	**C**	**D**
87%	5%	5%	4%

Option Annotations

A. Key: Lacking a crank is a flaw because a crank allows the user to secure a firm grasp while turning the axle.

B. Using a rope is not a flaw because the rope is smoother than a chain and will not rust when exposed to water.

C. Lacking a lid is not a flaw because a lid would prevent the well water from entering the bucket.

D. The diameter of the existing drum is not a flaw because a larger diameter drum would cause the bucket to be lowered and raised more rapidly and increase the potential for spills.

8. A person needs to lift a very heavy object. The person cannot produce enough force to lift the object without help. Which technology would help the person lift the object?

A. a barometer

B. a micrometer

C. a hydraulic piston

D. a reflecting telescope

Item Information	
Alignment	S8.A.2.2.3
Answer Key	C
Depth of Knowledge	2

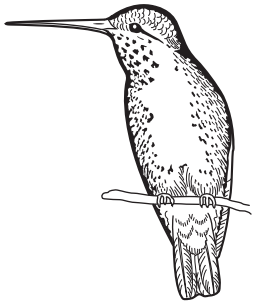
***p*-values**			
A	**B**	**C**	**D**
13%	7%	77%	3%

Option Annotations

A. A barometer is used to measure air pressure.
B. A micrometer is used to accurately measure extremely small distances or thicknesses.
C. Key: A hydraulic piston applies pressure onto a fluid at one point, and that pressure is exerted equally over a larger area, multiplying the force to lift a heavy object.
D. A reflecting telescope uses one or more mirrors to observe distant objects.

Use the drawing below to answer question 9.

Bird



9. How does this bird **most likely** obtain its food?

A. It uses its feet to catch fish in rivers.

B. It uses its feet to gather berries from bushes.

C. It uses its beak to crack seeds with hard shells.

D. It uses its beak to collect nectar from inside flowers.

Item Information	
Alignment	S8.B.1.1.1
Answer Key	D
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
4%	4%	19%	73%

Option Annotations

A. This bird lacks large, strong talons that are used to catch fish.

B. The feet on this bird are small and are attached to short legs adapted for perching; this bird's feet are not adapted for gathering berries.

C. A short, thick beak is an adaptation for cracking seeds with hard shells; this bird has a long, thin beak.

D. Key: This long, thin, straw-like beak is designed to reach deep into flowers to collect nectar.

10. Some arctic species of mammals grow white fur only in winter. How does this seasonal response **most likely** help these arctic mammals survive?

A. It helps them keep warm.

B. It helps them find a mate.

C. It helps them reduce their overall energy needs.

D. It helps them avoid being seen by predators and prey.

Item Information	
Alignment	S8.B.3.2.3
Answer Key	D
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
23%	2%	3%	71%

Option Annotations

A. White fur reflects more sunlight energy than dark fur does, so its main benefit is not warmth.

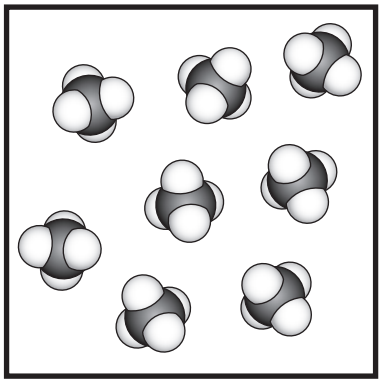
B. White fur helps arctic mammals blend into their winter habitat, which may reduce their ability to find a mate.

C. White fur reflects more sunlight energy than dark fur does, so it may contribute to an increase in overall energy needs.

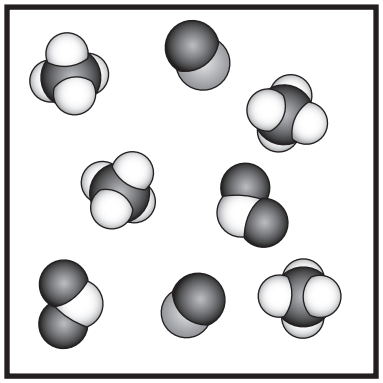
D. Key: White fur helps arctic mammals blend into their winter habitat, which prevents their being observed by predators and prey.

11. Which drawing **best** represents a mixture?

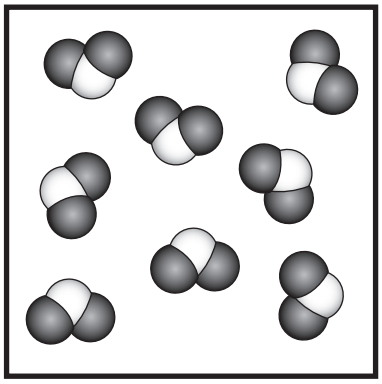
A.



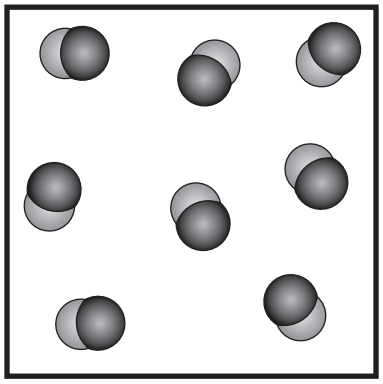
B.



C.



D.



Item Information	
Alignment	S8.C.1.1.1
Answer Key	B
Depth of Knowledge	2

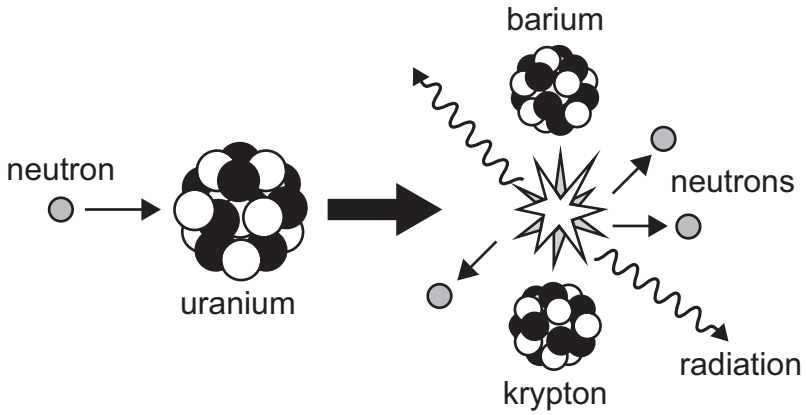
***p*-values**			
A	**B**	**C**	**D**
10%	73%	8%	8%

Option Annotations

A. This drawing shows eight molecules of the same compound.
B. Key: This drawing shows a total of eight molecules, which form a mixture composed of three different compounds.
C. This drawing shows eight molecules of the same compound.
D. This drawing shows eight molecules of the same compound.

Use the diagram below to answer question 12.

Energy Process



12. The diagram shows a process that acts as a source of energy. Which form of energy, contained within the uranium atom, does this process use?

A. sound energy

B. nuclear energy

C. electrical energy

D. mechanical energy

Item Information	
Alignment	S8.C.2.1.1
Answer Key	B
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
9%	70%	15%	6%

Option Annotations

A. Sound energy, which travels in waves, is produced when a force causes an object to vibrate—not by splitting an atom.

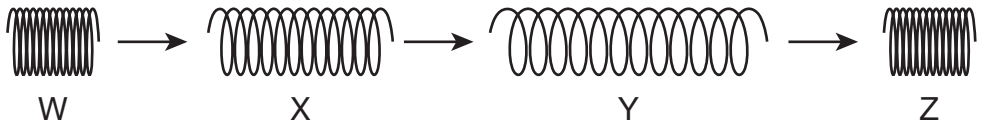
B. Key: Nuclear energy is produced when a neutron splits an atom into smaller parts, releasing free neutrons and radiation.

C. Electrical energy is caused by moving electric charges that are often transferred to the surroundings as light or heat.

D. Mechanical energy includes both potential and kinetic energy and is related to an object's motion or position.

Use the diagram below to answer question 13.

Stretching a Spring



13. A spring is stretched and then released as shown in the diagram. Which statement accurately describes changes in its potential or kinetic energy during this process?

A. Its kinetic energy decreases throughout the entire process.

B. Its kinetic energy is constant throughout the entire process.

C. Its potential energy decreases until step Y and then increases.

D. Its potential energy increases until step Y and then decreases.

Item Information	
Alignment	S8.C.3.1.2
Answer Key	D
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
6%	10%	22%	61%

Option Annotations

A. Kinetic energy is energy of motion, which is constant when the spring is still in steps W and Z.

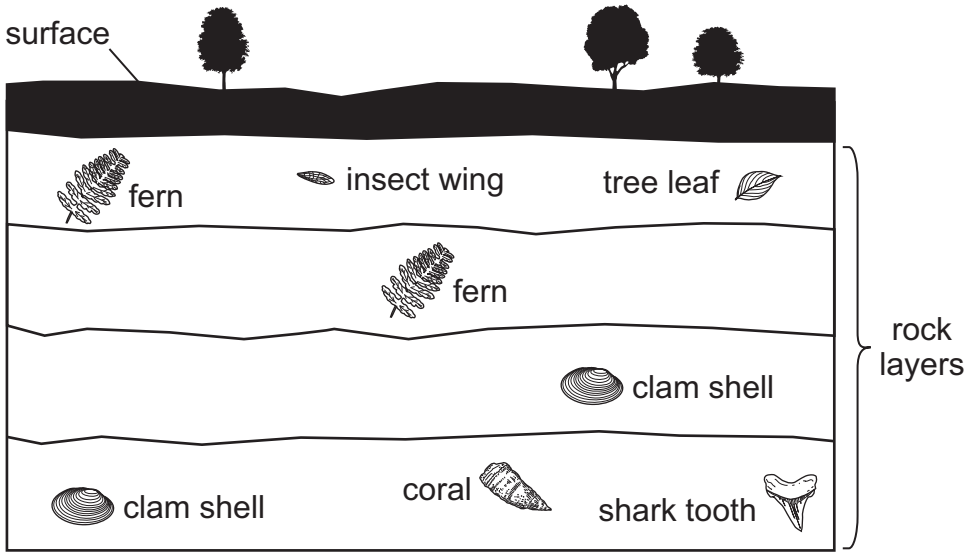
B. Kinetic energy is energy of motion, which changes as the spring is stretched.

C. Potential energy is stored energy, and it increases through step Y as the spring changes shape.

D. Key: Elastic potential energy increases as the spring expands (through step Y) but decreases when the spring is released.

Use the diagram below to answer question 14.

Rock Layers with Fossils



14. The diagram shows an area where fossils were discovered in different rock layers. Which sequence **best** represents how the environment in this area changed over time?

A. ocean ⟶ dry land

B. dry land ⟶ ocean

C. ocean ⟶ dry land ⟶ ocean

D. dry land ⟶ ocean ⟶ dry land

Item Information	
Alignment	S8.D.1.1.4
Answer Key	A
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
69%	14%	7%	10%

Option Annotations

A. Key: The bottom layers are the oldest, and they contain fossils of ocean organisms; the top layers are youngest, and they contain fossils of land plants.
B. The dry land fossils are youngest, and the fossils of ocean organisms are buried deep in the oldest layers.
C. This area transitioned from ocean and to dry land only.
D. This area transitioned from ocean and to dry land only.

15. Which statement **best** describes the roles of snow and rain in the water cycle?

A. They are both precipitation, but snow generally evaporates more quickly.

B. They are both precipitation, but snow generally takes longer to run off and rejoin groundwater.

C. Rain is precipitation but snow is a condensate, so they occupy different positions in the water cycle.

D. Snow is precipitation but rain is a product of transpiration, so they occupy different positions in the water cycle.

Item Information	
Alignment	S8.D.1.3.1
Answer Key	B
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
8%	70%	15%	6%

Option Annotations

A. Rain generally evaporates more quickly than snow because evaporation occurs more quickly at higher temperatures.
B. Key: Snow generally takes longer to run off and rejoin groundwater because it must melt before infiltrating the soil.
C. Rain and snow are both forms of precipitation.
D. Snow and rain are both forms of precipitation.

16. Which characteristic of the Sun primarily determines the orbits of planets in our solar system?

A. large volume
B. strong gravitational field
C. mostly made of hydrogen
D. high surface temperatures

Item Information	
Alignment	S8.D.3.1.2
Answer Key	B
Depth of Knowledge	2

***p*-values**			
A	**B**	**C**	**D**
8%	75%	6%	12%

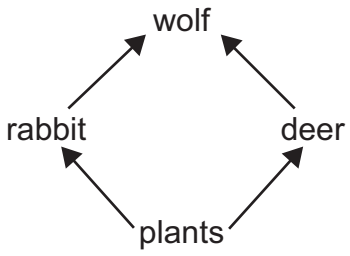
Option Annotations

A. The Sun's large volume contributes to its gravitational field, which is the primary factor affecting planetary orbits.
B. Key: The Sun's strong gravitational field is the primary factor maintaining the planetary orbits in our solar system.
C. The Sun's hydrogen composition affects the Sun's mass and its process of generating energy.
D. The high surface temperature of the Sun affects the amount of heat received by planets in the solar system.

OPEN-ENDED ITEM

Use the food web below to answer question 17.

Food Web



17. A student drew a basic food web of a forest ecosystem.

Part A: Describe what the arrows represent in the food web.

Part B: Explain why the ecosystem supports fewer wolves than deer.

SCORING GUIDE

#17 ITEM INFORMATION

Alignment	S8.B.3.1.1	**Depth of Knowledge**	3	**Mean Score**	0.88

ITEM-SPECIFIC SCORING GUIDELINE

Score	Description
2	The response demonstrates a *thorough* understanding of how to explain the flow of energy through an ecosystem (e.g., food chains, food webs) by • describing what the arrows represent in the food web **AND** • explaining why the ecosystem supports fewer gray wolves than deer. The response is clear, complete, and correct.
1	The response demonstrates a *partial* understanding of how to explain the flow of energy through an ecosystem (e.g., food chains, food webs) by • describing what the arrows represent in the food web **OR** • explaining why the ecosystem supports fewer gray wolves than deer. The response may contain some work that is incomplete or unclear.
0	The response provides *insufficient* evidence to demonstrate any understanding of the concept being tested.

Note: No deductions should be taken for misspelled words or grammatical errors.

Responses that will receive credit (responses are not limited to these examples):

Part A (1 point):

- the transfer of energy in the food web
- the direction that energy moves through organisms in an environment
- the arrow points from the organism being consumed to the organism consuming
- any other response that correctly describes what the arrows represent in a food web

Part B (1 point):

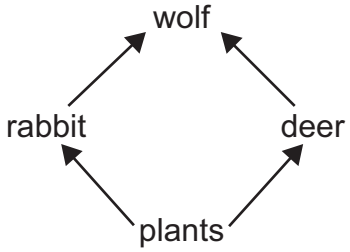
- Energy is lost to the environment at each level of the food web. This results in less energy being available to support top consumers like wolves.
- Deer are herbivores (a lower level on the food web) and gray wolves are carnivores (a higher level on the food web). Since energy is lost to the environment at each level of transfer, there is less energy available for gray wolves than for deer.
- At each level in the food web, there is a transfer of only about 10% of the original energy and 90% goes back to the environment. As a result, there is less energy available to support organisms at the higher end of the food web (i.e., top carnivores like gray wolves).

STUDENT RESPONSE

RESPONSE SCORE: 2 POINTS

Use the food web below to answer question 17.

Food Web



17. A student drew a basic food web of a forest ecosystem.

Part A: Describe what the arrows represent in the food web.

The flow of energy.

Part B: Explain why the ecosystem supports fewer wolves than deer.

The deer eat the plants. The plants have the most energy, giving a great amount of energy to the deer. The wolves eat the deer which have less energy than the plants giving the wolves less energy than the plants gave the deer.

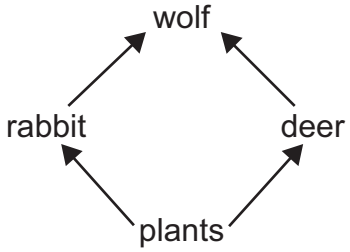
The response demonstrates a *thorough* understanding of how to explain the flow of energy through an ecosystem by correctly completing both tasks. The response describes what the arrows represent in the food web (*"the flow of energy"*) and explains why the ecosystem supports fewer wolves than deer (*"plants have the most energy, giving a great amount of energy to the deer. . . . wolves eat the deer which have less energy than the plants"*). The response is clear, complete, and correct.

STUDENT RESPONSE

RESPONSE SCORE: 1 POINT

Use the food web below to answer question 17.

Food Web



17. A student drew a basic food web of a forest ecosystem.

Part A: Describe what the arrows represent in the food web.

The arrows are pointing from a certain type of organism to whatever eats it. This is also showing how the energy is transferred and what the energy has to pass through.

Part B: Explain why the ecosystem supports fewer wolves than deer.

The ecosystem supports fewer wolves than deer because the deer are more important because they help keep the wolves alive and the wolves don't help anything to stay alive.

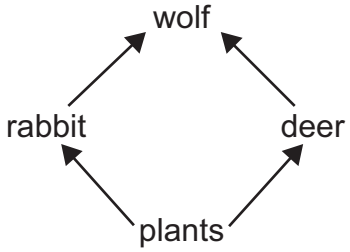
The response demonstrates a *partial* understanding of how to explain the flow of energy through an ecosystem by correctly completing one task. The response describes what the arrows represent in the food web (*"The arrows are pointing from a certain type of organism to whatever eats it"*) **or** (*"showing how the energy is transferred and what the energy has to pass through"*); both are correct for credit. The response fails to correctly explain why the ecosystem supports fewer wolves than deer. The response contains some work that is incomplete or unclear.

STUDENT RESPONSE

RESPONSE SCORE: 0 POINTS

Use the food web below to answer question 17.

Food Web



17. A student drew a basic food web of a forest ecosystem.

Part A: Describe what the arrows represent in the food web.

The arrows represent that the Food web contains plants, rabbit and deer, and then the wolf.

Part B: Explain why the ecosystem supports fewer wolves than deer.

The ecosystem supports fewer wolves than deer because wolves are very vicous and the deer don't do much harm as the wolves do.

The response provides *insufficient* evidence to demonstrate any understanding of how to explain the flow of energy through an ecosystem. The response (*"the food web contains plants, rabbit . . . then the wolf"*) does not describe what the arrows represent in the food web. The response *"don't do much harm as the wolves do"* fails to correctly explain why the ecosystem supports fewer wolves than deer.

OPEN-ENDED ITEM

18. Antibiotics and vaccinations are used by many people around the world to treat and prevent illnesses.

Describe a possible positive effect and a possible negative effect of the widespread use of antibiotics or vaccinations.

Positive Effect: _____

_____

_____

_____

_____

_____

Negative Effect: _____

_____

_____

_____

_____

_____

SCORING GUIDE

#18 ITEM INFORMATION

Alignment	S8.A.1.2.1	**Depth of Knowledge**	2	**Mean Score**	1.17

ITEM-SPECIFIC SCORING GUIDELINE

Score	Description
2	The response demonstrates a *thorough* understanding of how to describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments (e.g., air/space travel, genetic engineering, nuclear fission/fusion, artificial intelligence, lasers, organ transplants) by • describing a possible positive effect **AND** • describing a possible negative effect of the widespread use of antibiotics or vaccinations. The response is clear, complete, and correct.
1	The response demonstrates a *partial* understanding of how to describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments (e.g., air/space travel, genetic engineering, nuclear fission/fusion, artificial intelligence, lasers, organ transplants) by • describing a possible positive effect **OR** • describing a possible negative effect of the widespread use of antibiotics or vaccinations. The response may contain some work that is incomplete or unclear.
0	The response provides *insufficient* evidence to demonstrate any understanding of the concept being tested.

Note: No deductions should be taken for misspelled words or grammatical errors.

Responses that will receive credit (responses are not limited to these examples):

Positive Effect (1 point):

- management and possible elimination of illnesses or diseases
- the decreased risk of a pandemic
- the management of bacteria that can harm humans

Negative Effect (1 point):

- unpredicted illness to some people taking the vaccine, which can result in stricter regulations and higher costs for vaccine production
- bacterial resistance to these antibiotics through random mutations in people's chromosomal DNA, leading to the evolution of extremely strong strains of bacteria that are difficult to manage
- inability of humans to develop immunity to pathogens for which we use antibiotics to control

STUDENT RESPONSE

RESPONSE SCORE: 2 POINTS

Question 18
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Line Guide

Item ID

Antibiotics and vaccinations are used by many people around the world to treat and prevent illnesses.

Describe a possible positive effect and a possible negative effect of the widespread use of antibiotics or vaccinations.

Positive Effect:

EQ

One positive effect of the widespread use of antibiotics or vaccinations is we could eliminate entire types of illnesses.

121 / 1000

Negative Effect:

EQ

One negative effect of the widespread use of antibiotics and vaccinations is come bacteria may become immune to the antibiotic and vaccinations.

144 / 1000

Review/End Test | Pause | Flag | Options

The response demonstrates a *thorough* understanding of how to describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments by correctly completing both tasks. The response describes a possible positive effect of the widespread use of antibiotics or vaccinations (*"could eliminate entire types of illnesses"*) and a possible negative effect (*"come bacteria may become immune to the antibiotic and vaccinations"*). The response is clear, complete, and correct.

STUDENT RESPONSE

RESPONSE SCORE: 1 POINT

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Line Guide

Item ID

Antibiotics and vaccinations are used by many people around the world to treat and prevent illnesses.

Describe a possible positive effect and a possible negative effect of the widespread use of antibiotics or vaccinations.

Positive Effect:

more people can live healthier life by using them to treat illnesses or prevent them.

85 / 1000

Negative Effect:

as more people use them, demand gets higher leading to forest being cut down to make factories.

95 / 1000

Review/End Test | Pause | Flag | Options

The response demonstrates a *partial* understanding of how to describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments by correctly completing one task. The response describes a possible positive effect of the widespread use of antibiotics or vaccinations (*"people can live healthier life by using them to treat illnesses or prevent them"*). The response fails to correctly describe a possible negative effect of the widespread use of antibiotics or vaccinations. Cutting down forests to make factories is not an acceptable negative effect. The response contains some work that is incomplete or unclear.

STUDENT RESPONSE

RESPONSE SCORE: 0 POINTS

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Line Guide

Item ID

Antibiotics and vaccinations are used by many people around the world to treat and prevent illnesses.

Describe a possible positive effect and a possible negative effect of the widespread use of antibiotics or vaccinations.

Positive Effect:

EQ

We can see if we can cure it.

29 / 1000

Negative Effect:

EQ

That it can seriously harm someone.

35 / 1000

Review/End Test | Pause | Flag | Options

The response provides *insufficient* evidence to demonstrate any understanding of how to describe the positive and negative, intended and unintended, effects of specific scientific results or technological developments. The response (*"We can see if we can cure it"*) is too vague to earn credit as a possible positive effect of the widespread use of antibiotics or vaccinations, and the response (*"it can seriously harm someone"*) is too vague to earn credit as a possible negative effect of the widespread use of antibiotics or vaccinations.

SAMPLE ITEM SUMMARY

MULTIPLE-CHOICE

Sample Number	Alignment	Answer Key	Depth of Knowledge	*p*-values			
				A	B	C	D
1	S8.A.1.2.2	C	2	12%	8%	74%	6%
2	S8.A.1.2.3	D	2	9%	9%	8%	74%
3	S8.A.1.3.3	A	3	70%	12%	11%	7%
4	S8.A.2.1.1	D	1	15%	4%	3%	77%
5	S8.A.2.1.4	D	2	13%	9%	6%	72%
6	S8.A.2.1.5	C	2	6%	6%	84%	5%
7	S8.A.2.1.6	A	3	87%	5%	5%	4%
8	S8.A.2.2.3	C	2	13%	7%	77%	3%
9	S8.B.1.1.1	D	2	4%	4%	19%	73%
10	S8.B.3.2.3	D	2	23%	2%	3%	71%
11	S8.C.1.1.1	B	2	10%	73%	8%	8%
12	S8.C.2.1.1	B	2	9%	70%	15%	6%
13	S8.C.3.1.2	D	2	6%	10%	22%	61%
14	S8.D.1.1.4	A	2	69%	14%	7%	10%
15	S8.D.1.3.1	B	2	8%	70%	15%	6%
16	S8.D.3.1.2	B	2	8%	75%	6%	12%

OPEN-ENDED

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
17	S8.B.3.1.1	2	3	0.88
18	S8.A.1.2.1	2	2	1.17