Student Name _____

Teacher Name _____

School _____

System _____

Tennessee Comprehensive Assessment Program

Achievement Test ~ Grade 7

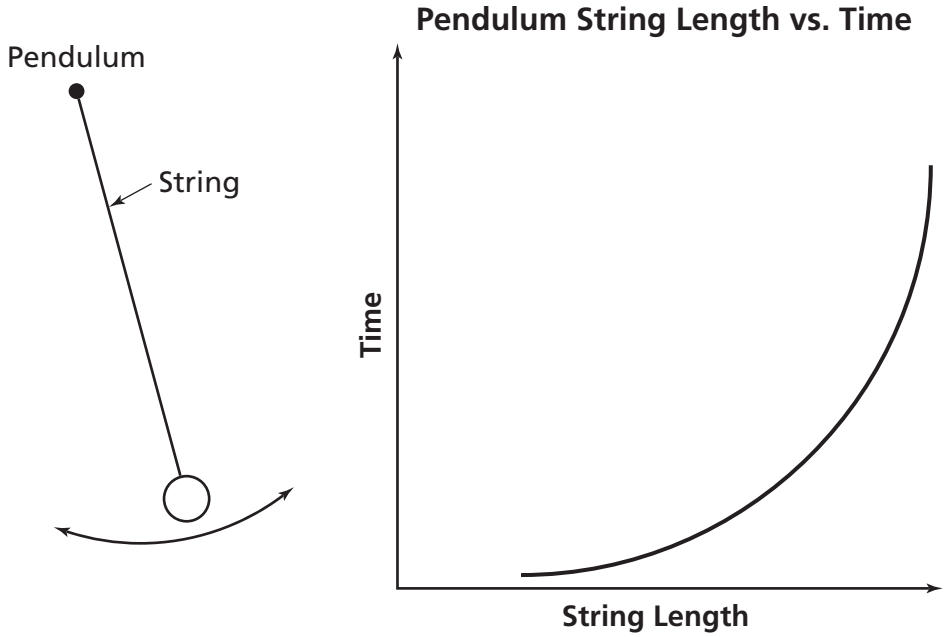
Item Sampler

Science

Reporting Category: **INQUIRY AND TECHNOLOGY & ENGINEERING**

Performance Indicator: **0707.INQ.4 Draw a conclusion that establishes a cause and effect relationship supported by evidence.**

1 **Students investigated pendulums. The students plotted a graph to show the relationship between different lengths of the string and the time it took the pendulum to complete one full swing.**



Which conclusion is <u>best</u> supported by the graph?

A The shorter the string, the fewer times the pendulum swings.

B The time it takes the pendulum to swing back and forth decreases over a period of time.

C The time it takes the pendulum to swing back and forth is unpredictable based on the length of the string.

D As the length of the string increases, the pendulum takes longer to swing back and forth each time.

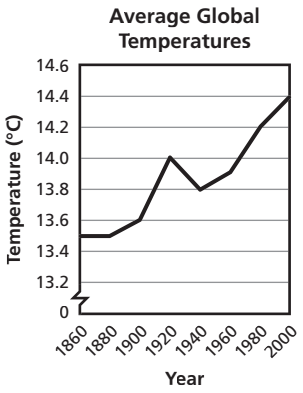
2 Students are studying average global temperatures over time. They review the data table below.

Average Global Temperatures

Year	Temperature (°C)
1860	13.5
1880	13.8
1900	13.7
1920	13.6
1940	13.8
1960	13.9
1980	14.0
2000	14.4

Which graph correctly displays these data?

F



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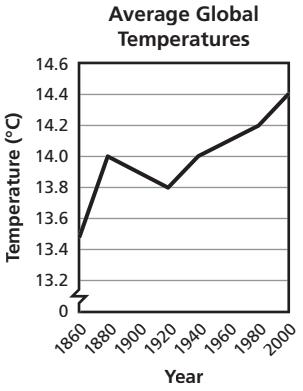

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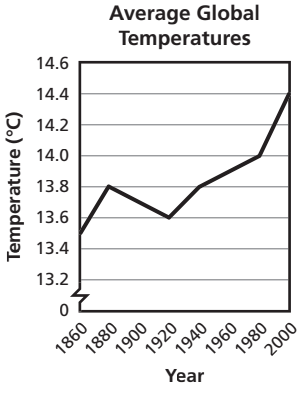

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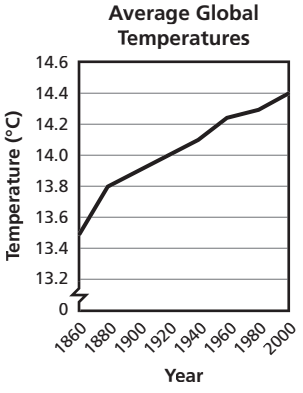

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Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0707.TE.2 Evaluate a protocol to determine if the engineering design process was successfully applied.

3 **Technicians plan to develop a new type of keyboard that will have alphabet letters in different positions from a standard keyboard. Which will best help the technicians decide if the new keyboard is an improvement over the standard one?**

A asking people their opinions of how they like standard keyboards

B analyzing the problems that people have using standard keyboards

C determining how much it will cost to make a new keyboard

D comparing the speeds at which people type on each style of keyboard

Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0707.TE.4 Differentiate between adaptive and assistive engineered products.

4 **A scientist is unable to speak or move most of the muscles in his body. This scientist uses his cheek to push buttons on a type of keyboard that translates the words into a computerized voice. Which of these best describes the scientist's device?**

F assistive, because the device makes the scientist famous

G assistive, because the device enables the scientist to communicate

H adaptive, because the scientist can use the device for other tasks

J adaptive, because the scientist can still move some parts of his body

Reporting Category: LIFE SCIENCE 1: Cells, Flow of Matter & Energy

Performance Indicator: 0707.1.1 Identify and describe the function of the major plant and animal cell organelles.

5 Which best describes the function of a ribosome?

A storing waste products

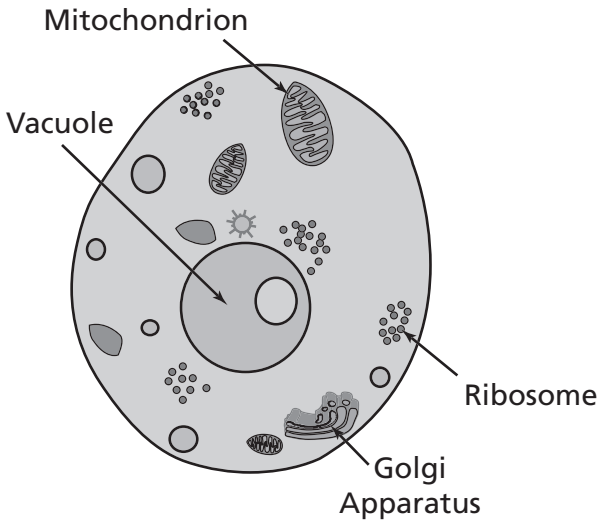
B manufacturing proteins

C digesting food particles

D providing support

Go On ▶

6 A student draws and labels the parts of an animal cell, as shown below.



What organelle is labeled incorrectly?

F Mitochondrion

G Golgi Apparatus

H Vacuole

J Ribosome

Reporting Category: LIFE SCIENCE 1: Cells, Flow of Matter & Energy

Performance Indicator: 0707.1.2 Interpret a chart to explain the integrated relationships that exist among cells, tissues, organs, and organ systems.

7 The chart shows some levels of organization in an organism.

Cell ⟶ Tissue ⟶ Organ ⟶ **?** ⟶ Organism

Which term best completes the chart?

A Organelle

B Organ System

C Muscle

D Chemical

Reporting Category: LIFE SCIENCE 1: Cells, Flow of Matter & Energy

Performance Indicator: 0707.1.3 Explain the basic functions of a major organ system.

8 **Which organ system is correctly matched with its main function?**

F The excretory system defends the body from disease-causing organisms.

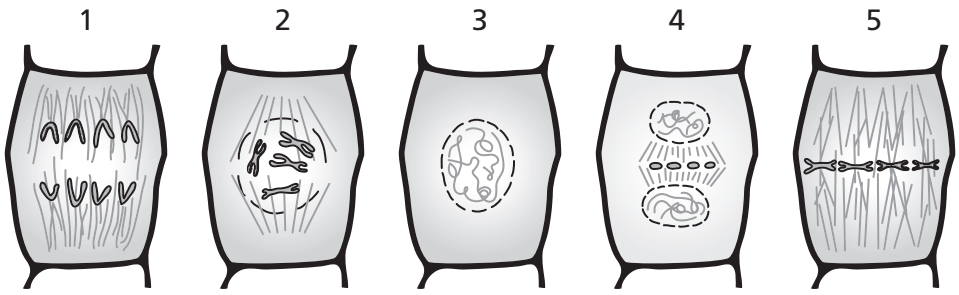
G The nervous system controls body responses to the environment.

H The skeletal system distributes energy throughout the body.

J The digestive system removes waste products from the body.

Go On ▶

9 Diagrams of a plant cell dividing are shown out of sequence.



What is the correct sequence of plant cell division?

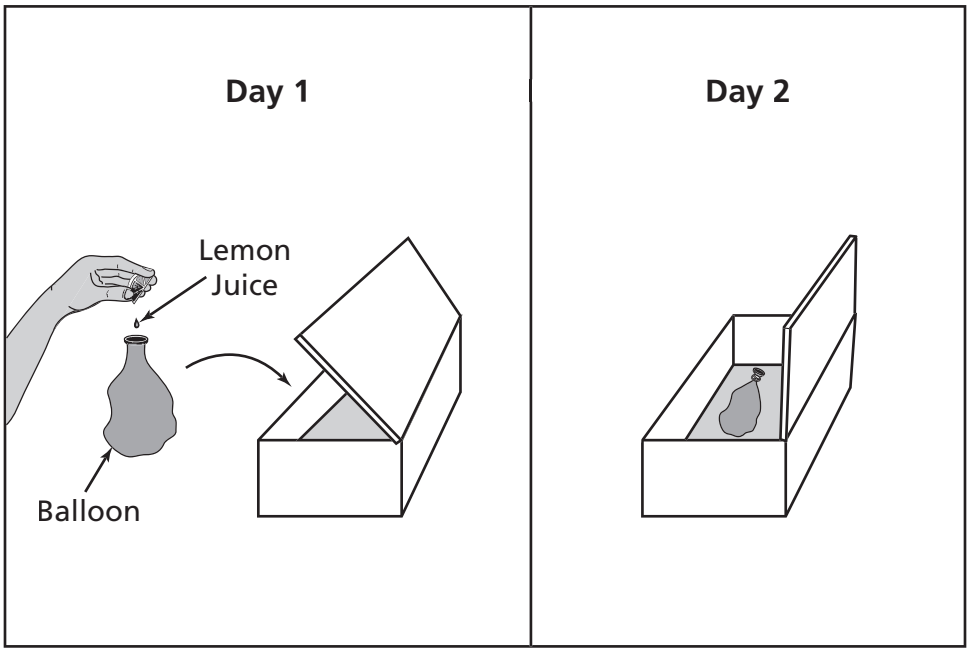
A 3, 2, 5, 1, 4

B 4, 3, 2, 1, 5

C 3, 4, 5, 1, 2

D 5, 1, 2, 4, 3

10 **A student put a few drops of lemon juice into an uninflated balloon. The student tied a knot in the balloon, placed it in a shoebox and covered it with a lid.**



The following day, the student opened the box and was able to smell lemon in the box. Through what process were molecules able to pass through the balloon?

F respiration

G fermentation

H diffusion

J radiation

Go On ▶

Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0707.INQ.2 Select tools and procedures needed to conduct a moderately complex experiment.

11 **Students were studying how temperature affects water movement. The students added drops of food coloring to different temperatures of water. They measured the rates at which the food coloring spread throughout the water. Which tools would best help the students complete their investigation?**

A beaker, thermometer, stopwatch

B meter stick, thermometer, beaker

C spring scale, thermometer, stopwatch

D graduated cylinder, thermometer, balance

Reporting Category: LIFE SCIENCE 1: Cells, Flow of Matter & Energy

Performance Indicator: 0707.3.1 Compare the chemical compounds that make up the reactants and products of photosynthesis and respiration.

12 **During photosynthesis, carbon dioxide (CO_2) and water (H_2O) react in the presence of sunlight to produce**

F oxygen (O_2) and carbon (C).

G glucose $(C_6H_{12}O_6)$ and carbon monoxide (CO).

H glucose $(C_6H_{12}O_6)$ and oxygen (O_2).

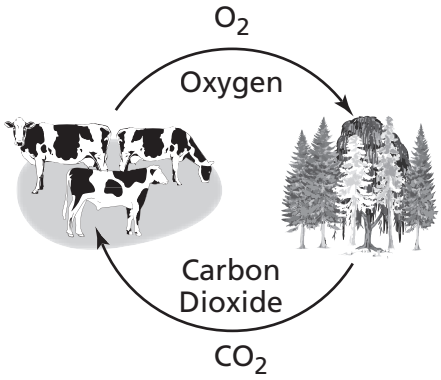
J hydrogen (H_2) and oxygen (O_2).

Reporting Category: LIFE SCIENCE 1: Cells, Flow of Matter & Energy

Performance Indicator: 0707.3.2 Interpret a diagram to explain how oxygen and carbon dioxide are exchanged between living things and the environment.

13 Which diagram best represents an exchange of gases between plants and animals?

A



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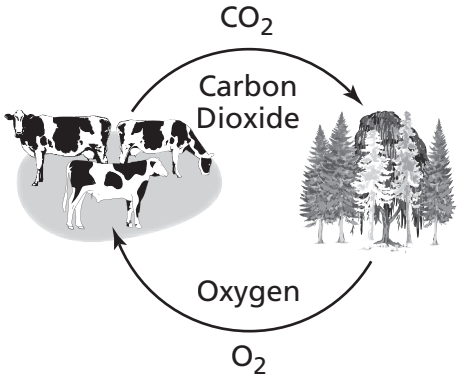

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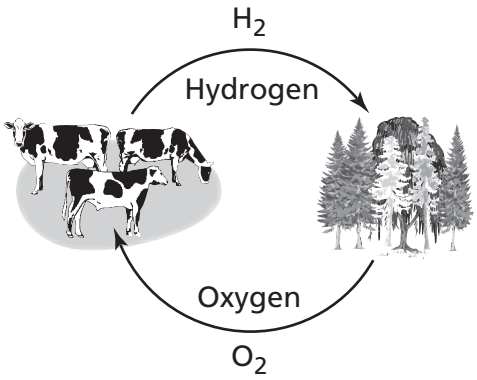

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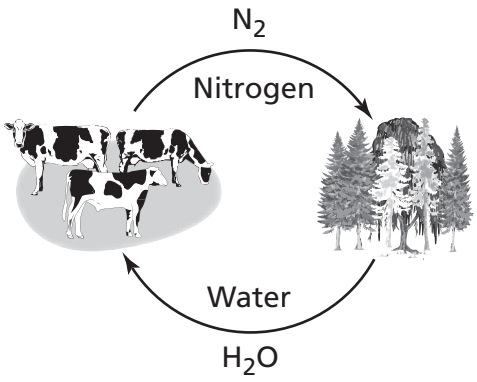
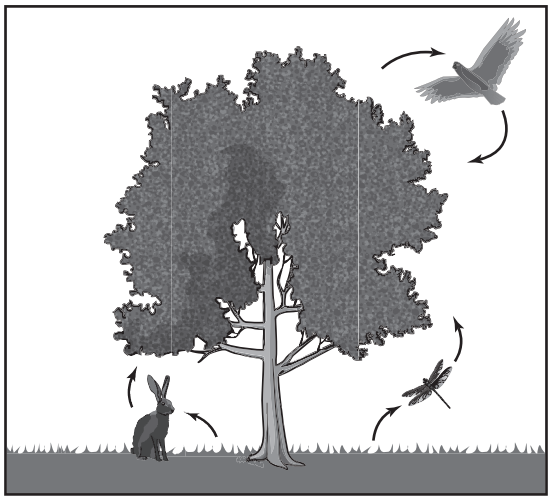


Go On ▶

Reporting Category: LIFE SCIENCE 1: Cells, Flow of Matter & Energy

Performance Indicator: 0707.3.2 Interpret a diagram to explain how oxygen and carbon dioxide are exchanged between living things and the environment.

14 The arrows in the diagram represent the exchange of gases between different organisms and the environment.



Which of the organisms must take in carbon dioxide to survive?

F bird

G insect

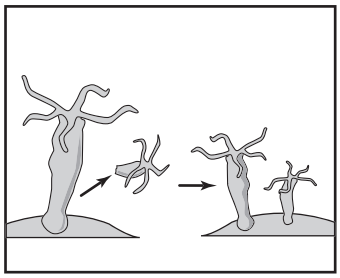
H tree

J rabbit

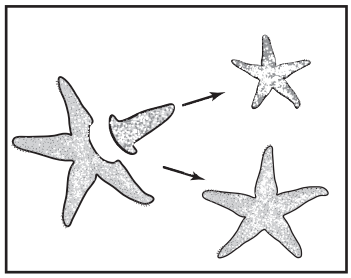
Reporting Category: LIFE SCIENCE 2: Heredity

Performance Indicator: 0707.4.1 Classify methods of reproduction as sexual or asexual.

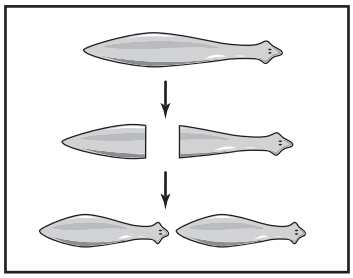
15 The diagrams represent the way that three different organisms reproduce.



Hydra



Sea Star



Planaria

Which of these classifies the reproductive method of all the organisms shown above?

A segmentation

B budding

C asexual reproduction

D sexual reproduction

Reporting Category: LIFE SCIENCE 2: Heredity

Performance Indicator: 0707.4.2 Match flower parts with their reproductive functions.

16 Which parts of a flower are most likely to attract pollinators?

F sepals

G petals

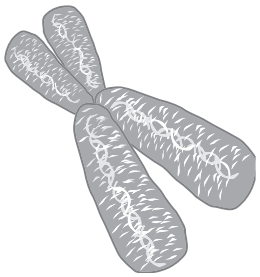
H anthers

J pistils

Go On ▶

17 **The image shows a chromosome.**

Chromosome



What is located on the chromosome?

A cells

B genes

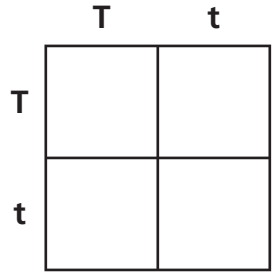
C enzymes

D organelles

Reporting Category: LIFE SCIENCE 2: Heredity

Performance Indicator: 0707.4.4 Interpret a Punnett square to predict possible genetic combinations passed from parents to offspring during sexual reproduction.

18 In pea plants, tall plants (T) are dominant to short plants (t). The cross of two heterozygous tall plants is shown in the Punnett square below.



What ratio describes the most probable phenotypes resulting from this cross?

F 4 tall : 0 short

G 3 tall : 1 short

H 2 tall : 2 short

J 1 tall : 3 short

Go On ▶

Reporting Category: EARTH AND SPACE SCIENCE: The Earth

Performance Indicator: 0707.7.1 Use a table of physical properties to classify minerals.

19 **Students were observing a green, odorless mineral, with no visible crystals. The mineral was very soft, with a slick feel. They compared its characteristics to the table below.**

Mineral Characteristics

Mineral	Most Common Colors	Hardness	Other Common Characteristics
Talc	Gray, green, white, silver	1	Soapy feel
Sulfur	Yellow, yellow-brown	1.5	Greasy feel, mild rotten egg smell
Halite	Colorless, white, pink, yellow, gray	2	Salty taste
Quartz	All colors	7	Six-sided prism-shaped crystal

Which of these were the students most likely observing?

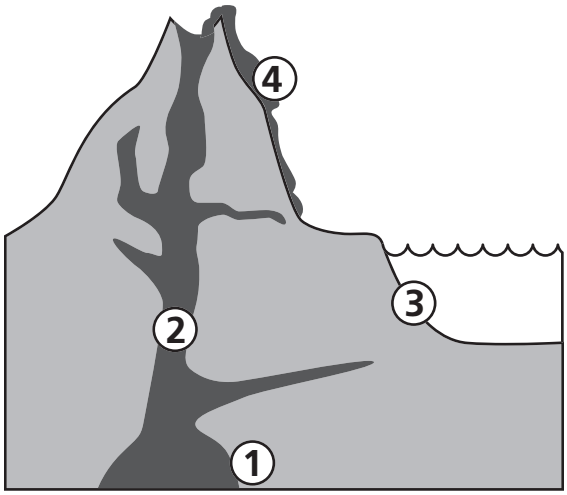
A Talc

B Sulfur

C Halite

D Quartz

20 Different locations are labeled on the diagram of the volcano.



Where would the <u>most</u> metamorphic rocks likely be located?

F 1

G 2

H 3

J 4

Go On ▶

Reporting Category: EARTH AND SPACE SCIENCE: The Earth

Performance Indicator: 0707.7.3 Identify the major processes that drive the rock cycle.

21 **Which best describes one way igneous rocks form?**

A Sedimentary rocks erode.

B Sedimentary rocks are compacted.

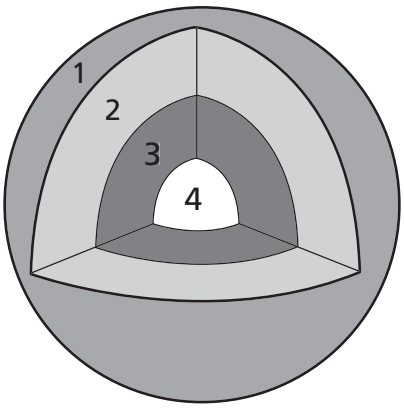
C Metamorphic rocks are melted, then cooled.

D Metamorphic rocks are deposited and cemented.

Reporting Category: EARTH AND SPACE SCIENCE: The Earth

Performance Indicator: 0707.7.4 Differentiate among the characteristics of the earth's three layers.

22 **A cross section of Earth is shown below.**



Which layer of Earth is made mostly of liquid metal?

F 1

G 2

H 3

J 4

Reporting Category: EARTH AND SPACE SCIENCE: The Earth

Performance Indicator: 0707.7.5 Recognize that lithospheric plates on the scale of continents and oceans continually move at rates of centimeters per year.

23 The Himalaya Mountains formed from a collision of the Indo-Australian plate with the Eurasian plate. Which best approximates the rate of movement of the Indo-Australian plate?

A 0.67 millimeter per year

B 6.7 centimeters per year

C 6.7 meters per year

D 67 meters per year

Reporting Category: EARTH AND SPACE SCIENCE: The Earth

Performance Indicator: 0707.7.6 Describe the relationship between plate movements and earthquakes, mountain building, volcanoes, and sea floor spreading.

24 Which geological feature was most likely formed when two lithospheric plates collided?

F Lake Michigan

G Grand Canyon

H Mississippi River delta

J Sierra Madre mountain range

Go On ▶

Reporting Category: EARTH AND SPACE SCIENCE: The Earth

Performance Indicator: 0707.7.7 Analyze and evaluate the impact of man's use of earth's land, water, and atmospheric resources.

25 Which is the most likely effect of a rise in global temperatures caused by human activities?

A rising sea levels

B more earthquakes

C fewer tropical storms

D increased soil erosion

Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0707.TE.3 Distinguish between the intended benefits and the unintended consequences of a new technology.

26 Which of these is the most likely unintended consequence of using ethanol made from corn as a replacement for gasoline in automobile engines?

F a reduction in the use of nonrenewable fuels

G lower emissions of sulfur and nitrogen compounds in auto exhaust

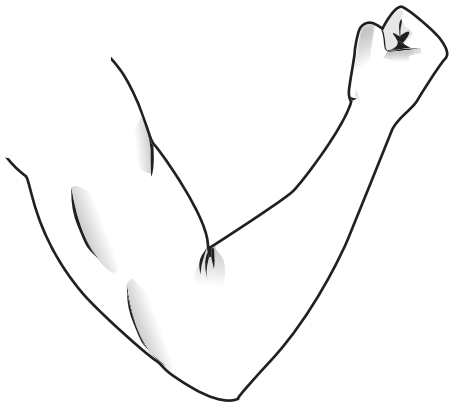
H a decrease in the amount of farmland available to produce food crops

J lower fuel costs for consumers

Reporting Category: PHYSICAL SCIENCE: Motion

Performance Indicator: 0707.11.1 Differentiate between the six simple machines.

27 A portion of a human arm works as a simple machine.



Which simple machine is most like a human arm?

A a lever

B a wedge

C an inclined plane

D a screw

Go On ▶

Reporting Category: PHYSICAL SCIENCE: Motion

Performance Indicator: 0707.11.2 Determine the amount of force needed to do work using different simple machines.

28 Use the equation below to solve the problem.

Force (F) = Work (w) ÷ Distance (d)

How much force was applied to a box that required 45 joules of work to push it up a 3-meter-long ramp?

F 15 newtons

G 42 newtons

H 48 newtons

J 135 newtons

Reporting Category: PHYSICAL SCIENCE: Motion

Performance Indicator: 0707.11.3 Apply proper equations to solve basic problems pertaining to distance, time, speed, and velocity.

29 Use the equation below to solve the problem.

$s = d \div t$

A student rode a bicycle 15 miles in 1.5 hours. What was the student's average speed?

A 10.0 miles per hour

B 13.5 miles per hour

C 16.5 miles per hour

D 22.5 miles per hour

Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0707.INQ.5 Identify a faulty interpretation of data that is due to bias or experimental error.

30 **A student rolled a toy car down a ramp and timed how long it took to reach the bottom. After one trial, the student doubled the height of the ramp and added sandpaper to its surface. The student conducted three more trials. After reviewing the data, the student concluded the height of the ramp had no effect on the speed that the car traveled. Which is the most likely reason this conclusion is flawed?**

F More trials were needed during the investigation.

G The student misunderstood how to calculate speed.

H A control should have been added to the investigation.

J Too many variables were changed during the investigation.

Reporting Category: PHYSICAL SCIENCE: Motion

Performance Indicator: 0707.11.4 Identify and explain how Newton's laws of motion relate to the movement of objects.

31 **An equation is shown in the box below.**

$F = ma$

Which statement best describes the variables in this equation?

A An object at rest tends to stay at rest.

B For every action there is an equal and opposite reaction.

C An object will only accelerate if an unbalanced force acts upon it.

D The acceleration of an object depends upon the force acting upon it and its mass.

Go On ▶

Reporting Category: PHYSICAL SCIENCE: Motion

Performance Indicator: 0707.11.4 Identify and explain how Newton's laws of motion relate to the movement of objects.

32 **Which example best describes Newton's third law of motion?**

F When a glass slid across a table, it spilled water when it stopped suddenly.

G An engine used less work to move a lighter car than when it moved a heavier car.

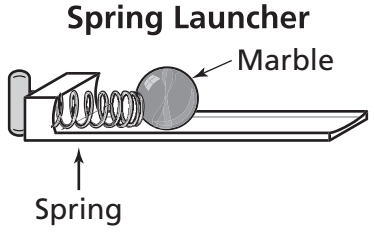
H When a passenger stepped from a boat to the shore, the boat moved away from the shore.

J A bowling ball rolled in a straight path when it was thrown towards bowling pins.

Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0707.INQ.1 Design a simple experimental procedure with an identified control and appropriate variables.

33 **Students put a spring launcher on a wooden floor. The students applied different amounts of force on a marble with the spring. They used a meter stick to measure how far the marble rolled.**



What is the dependent variable in this investigation?

A mass of the marble

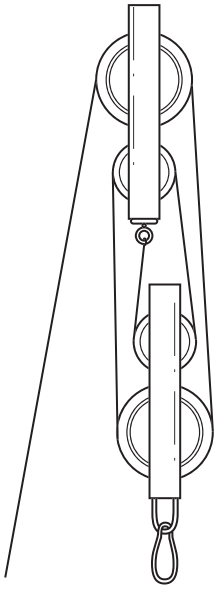
B amount of friction from the floor

C amount of stretch in the spring

D distance traveled by the marble

34 **Engineers built a prototype of a new pulley system. They wanted to determine the maximum weight the pulley can lift safely.**

Pulley System



Which is the <u>best</u> way for the engineers to test the weight limits of the pulley system?

F hang objects with different volumes from the pulleys

G hang objects with different shapes from the pulleys

H raise objects with increasing densities on the pulleys

J raise objects with increasing masses on the pulleys

Go On ▶

Reporting Category: PHYSICAL SCIENCE: Motion

Performance Indicator: 0707.11.5 Compare and contrast the different parts of a wave.

35 As a wavelength decreases, the crests of the wave

A become wider.

B become shorter.

C get closer together.

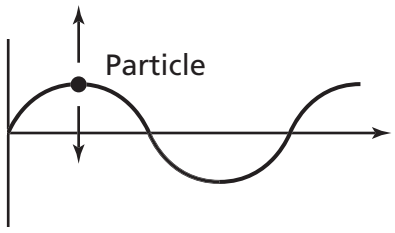
D get farther apart.

Reporting Category: PHYSICAL SCIENCE: Motion

Performance Indicator: 0707.11.6 Differentiate between transverse and longitudinal waves in terms of how they are produced and transmitted.

36 Which diagram best represents particle movement in a transverse wave?

F



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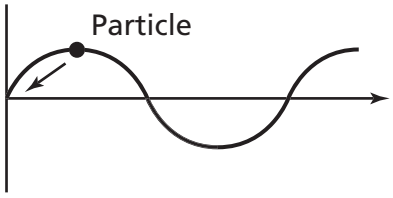

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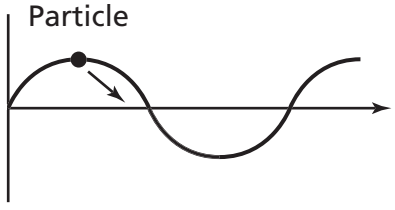

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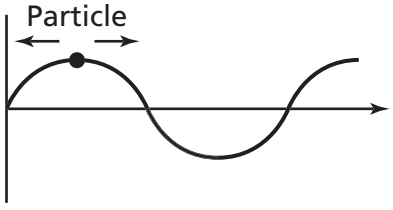

STOP

Science
Answer Key

1	D
2	G
3	D
4	G
5	B
6	H
7	B
8	G
9	A

10	H
11	A
12	H
13	B
14	H
15	C
16	G
17	B
18	G

19	A
20	F
21	C
22	H
23	B
24	J
25	A
26	H
27	A

28	F
29	A
30	J
31	D
32	H
33	D
34	J
35	C
36	F

Tennessee Comprehensive Assessment Program

Achievement Test ~ Grade 7

Item Sampler

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