

Student Name _____

Teacher Name _____

School _____

System _____



TENNESSEE

Tennessee Comprehensive Assessment Program Achievement Test ~ Grade 8 Item Sampler



Science



Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0807.INQ.1 Design a simple experimental procedure with an identified control and appropriate variables.

- 1** A student designs an experiment to determine how surface type affects the amount of force needed to roll a ball 20 meters. What is the independent variable?
- A** the lengths of the surfaces
 - B** the force needed to roll the ball
 - C** the type of surfaces used
 - D** the type of ball chosen

Go On ►

2 The table below shows data used to calculate the speed of 4 identical toy cars moving down a ramp.

Table of Toy Car Trials

Car Color	Trial 1 Time (seconds)	Trial 2 Time (seconds)	Distance (centimeters)	Timer
Red	31	39	300	Student 1
Blue	30	33	300	Student 2
Yellow	37	40	300	Student 3
Green	33	28	300	Student 4

Which part of the experiment is most likely the source of error in this investigation?

- F** Car Color
- G** Car Type
- H** Distance
- J** Timer

Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

Performance Indicator: 0807.TE.2 Evaluate a protocol to determine if the engineering design process was successfully applied.

3 A technology company has identified the need for smaller, longer-lasting batteries to use in hybrid vehicles. What would be the first step engineers would take to design and produce an improved battery?

- A** test the new battery
- B** reshape the existing battery
- C** research current battery technology
- D** build a prototype battery

Reporting Category: INQUIRY AND TECHNOLOGY & ENGINEERING

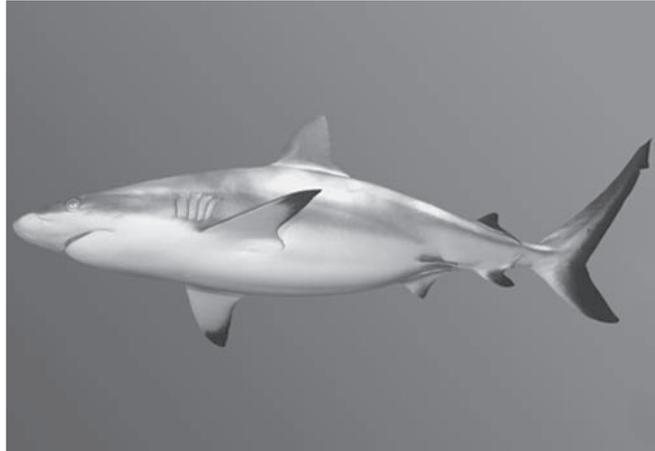
Performance Indicator: 0807.TE.4 Differentiate between adaptive and assistive engineered products.

4 Which of these best describes why an artificial arm is considered an assistive engineered product?

- F** It is an adaptation of an earlier technology.
- G** It helps a person with a disability overcome a handicap.
- H** It resembles a human body part.
- J** It causes a permanent change to an organism.

Go On ►

5 An organism like the one shown in the picture below is caught in a net.



© Cbpix/Dreamstime #5569552

Classification Key

- 1a. The organism has feathers Class Aves
- 1b. The organism has no feathers..... Go to 2

- 2a. The organism has no hair Go to 3
- 2b. The organism has hair or hair-like structures.... Go to 4

- 3a. The organism has gills.....Class Chondrichthyes
- 3b. The organism has lungs..... Class Reptilia

- 4a. The organism has four legs Class Mammalia
- 4b. The organism has six legs Class Insecta

Using the classification key above, identify the organism’s class.

- A** Class Insecta
- B** Class Reptilia
- C** Class Mammalia
- D** Class Chondrichthyes

Reporting Category: LIFE SCIENCE: Biodiversity & Change

Performance Indicator: 0807.5.2 Analyze structural, behavioral, and physiological adaptations to predict which populations are likely to survive in a particular environment.

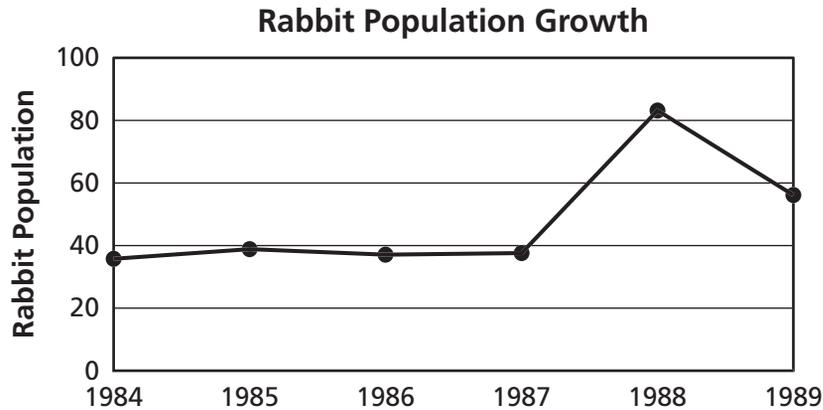
6 Which population would best be adapted to maneuver in a rocky, mountainous region?

- F** a population of organisms with hooves
- G** a population of organisms with thick fur
- H** a population of organisms with gills
- J** a population of organisms with moist skin

Go On ►

Performance Indicator: 0807.5.3 Analyze data on levels of variation within a population to make predictions about survival under particular environmental conditions.

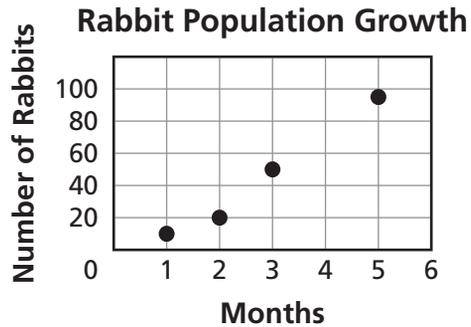
7 The graph below illustrates the growth of a rabbit population.



Which most likely occurred between 1987 and 1988?

- A** There was a decrease in available amount of food.
- B** There was an increase in competition.
- C** There was a decrease in the predator population.
- D** There was an illness among the population.

- 8** The graph shows a rabbit population that has increased due to the lack of predators.



Which table correctly displays the population data?

Rabbit Population

Months	Population
1	5
2	50
3	60
5	85

F

Rabbit Population

Months	Population
1	10
2	15
3	35
5	75

H

Rabbit Population

Months	Population
1	10
2	20
3	50
5	95

G

Rabbit Population

Months	Population
1	20
2	30
3	75
5	120

J

Reporting Category: LIFE SCIENCE: Biodiversity & Change

Performance Indicator: 0807.TE.3 Distinguish between the intended benefits and the unintended consequences of a new technology.

9 Ethanol, often produced from corn, is being added to gasoline in an attempt to reduce the amount of fossil fuel usage. Which is an unintended consequence of ethanol use?

- A** cost of corn products increases
- B** improvement in gas mileage
- C** conservation of fossil fuels
- D** improved health of environment

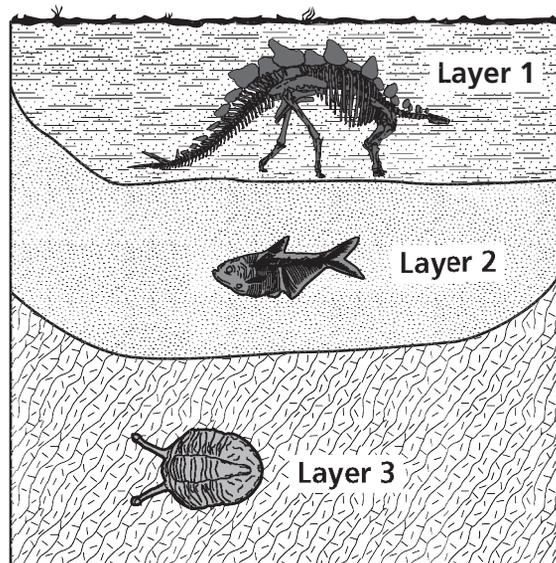
Reporting Category: LIFE SCIENCE: Biodiversity & Change

Performance Indicator: 0807.5.4 Identify several reasons for the importance of maintaining the earth's biodiversity.

10 The clear-cutting of forests due to urban development will most likely result in

- F** decreased forest biodiversity.
- G** increased oxygen production.
- H** decreased urban populations.
- J** increased organism diversity.

11 The diagram below shows three substrate layers with fossils.



Which statement is best supported by the diagram?

- A** The fossil in Layer 1 is older than the fossil in Layer 2.
- B** The fossil in Layer 3 is older than the fossil in Layer 2.
- C** The fossils in Layers 2 and 3 are from closely related organisms.
- D** The fossils in Layers 1 and 3 are from closely related organisms.

Reporting Category: PHYSICAL SCIENCE 1: Chemical Reactions

Performance Indicator: 0807.9.2 Identify the common outcome of all chemical changes.

12 A new substance is usually formed when two or more substances combine and form new

F protons.

G chemical bonds.

H physical shapes.

J electrons.

Reporting Category: PHYSICAL SCIENCE 1: Chemical Reactions

Performance Indicator: 0807.9.3 Classify common substances as elements or compounds based on their symbols or formulas.

13 Which is classified as an element?

- A NaCl
- B CO₂
- C Na
- D H₂O

Reporting Category: PHYSICAL SCIENCE 1: Chemical Reactions

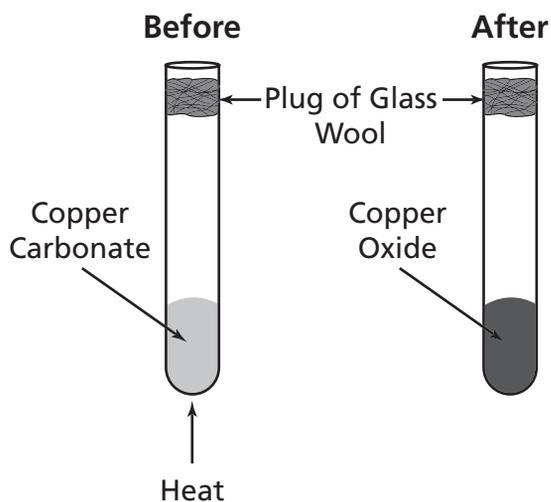
Performance Indicator: 0807.9.4 Differentiate between a mixture and a compound.

14 Which combination of substances is a compound?

- F salt and water stirred in a glass
- G food coloring in frosting
- H peanut butter and jelly sandwich
- J sulfur dioxide and water forming acid rain

Go On ►

15 Copper carbonate being heated in a test tube is shown in the diagram below.



Which statement best describes what happened in this experiment?

- A** Copper carbonate reacted with the glass wool, causing a physical change.
- B** Copper carbonate decomposed when heated, causing a chemical change.
- C** Copper oxide reacted with the glass wool, causing a physical change.
- D** Copper oxide decomposed when heated, causing a chemical change.

16 The steps used to determine the mass of sugar dissolved in a beaker of water are shown in the table below.

Table of Lab Steps

1. Find the mass of the sugar crystals on the wax paper
2. Boil the sugar water solution in the beaker
3. Scrape the sugar crystals out onto the wax paper
4. Find the mass of a piece of wax paper
5. Subtract the mass of the wax paper from the total mass
6. Wait until all the water has evaporated to collect the sugar crystals

Which correct sequence of steps should a student follow?

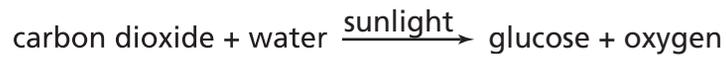
F 1, 2, 5, 3, 4, 6

G 1, 4, 6, 5, 3, 2

H 2, 3, 6, 5, 1, 4

J 2, 6, 4, 3, 1, 5

17 The equation below illustrates the reaction that occurs in chloroplasts during photosynthesis.

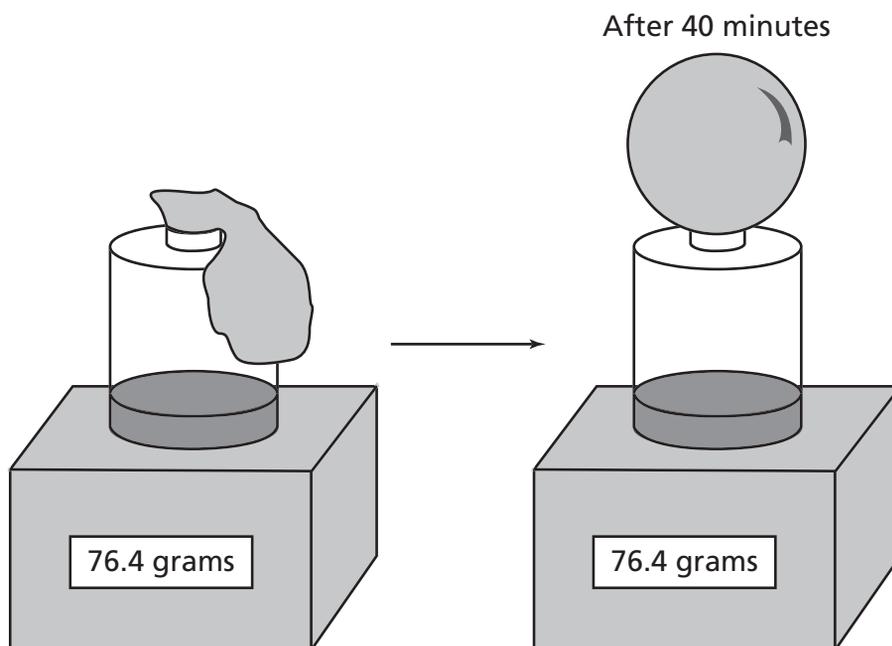


Which is a product of photosynthesis?

- A carbon dioxide
- B water
- C sunlight
- D oxygen

Performance Indicator: 0807.9.11 Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass).

- 18** A student adds 5 grams of baking soda to 50 grams of vinegar in a container and quickly attaches a balloon to the top of the bottle. The student's investigation is shown below.



What occurred in this investigation?

- F** The reaction produces heat, which causes the plastic of the balloon to soften and change shape.
- G** The reaction in the container produces gas, which causes the balloon to inflate.
- H** The outside air pressure pushes on the container and forces air inside the balloon.
- J** The air molecules from the container move into the balloon and form a solid substance.

Reporting Category: PHYSICAL SCIENCE 1: Chemical Reactions

Performance Indicator: 0807.9.11 Recognize that in a chemical reaction the mass of the reactants is equal to the mass of the products (Law of Conservation of Mass).

19 Which sample equation best illustrates the law of conservation of mass?

- A** 12 grams reactant X + 10 grams reactant Y \rightarrow 2 grams product Z
- B** 5 grams reactant E + 5 grams reactant F \rightarrow 20 grams product G + 5 grams product H
- C** 4 grams reactant U + 3 grams reactant V \rightarrow 7 grams product W
- D** 10 grams reactant Q + 9 grams reactant R \rightarrow 90 grams product S + 90 grams product T

Reporting Category: PHYSICAL SCIENCE 1: Chemical Reactions

Performance Indicator: 0807.9.12 Identify the basic properties of acids and bases.

20 Which is the pH of a weak acid?

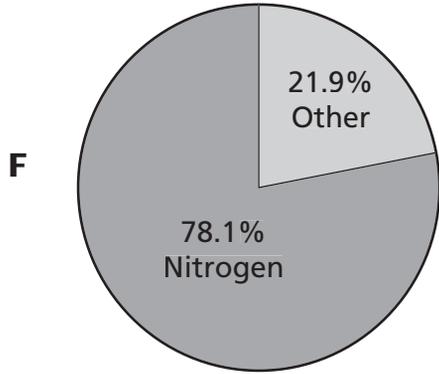
- F** 9.1
- G** 8.2
- H** 7.0
- J** 6.5

21 A glass of ice water is on a table in a room where the room's air temperature is 20 degrees Celsius. What do the drinking glass, ice, water, and air all have in common?

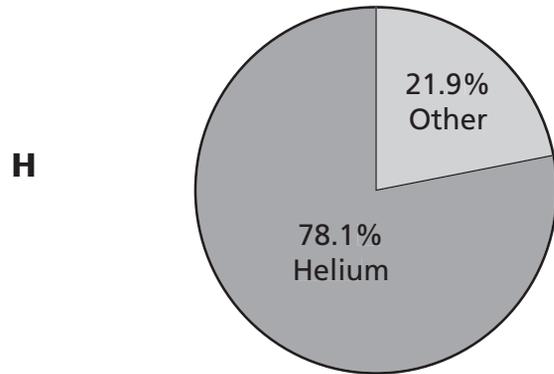
- A** All four are in a solid state.
- B** All four are at the same volume.
- C** All four are at their freezing points.
- D** All four are made of atoms.

22 Which circle graph correctly identifies the percentage makeup of the atmosphere of Earth?

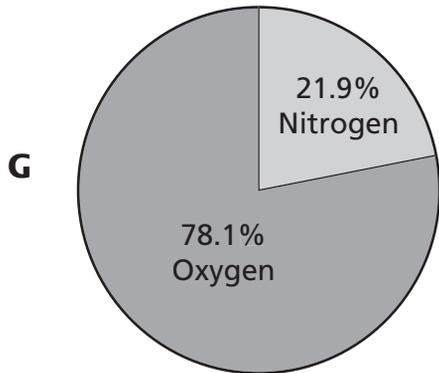
The Atmosphere of Earth



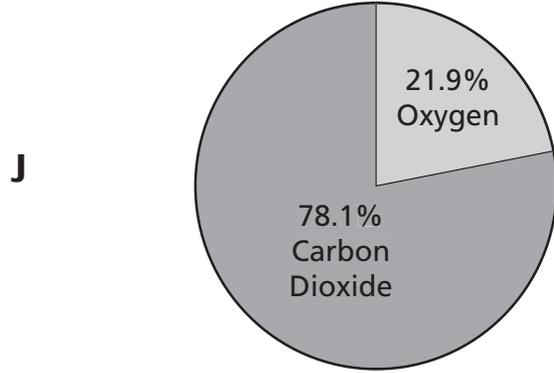
The Atmosphere of Earth



The Atmosphere of Earth

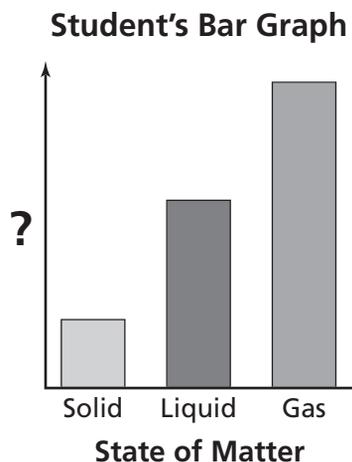


The Atmosphere of Earth



23

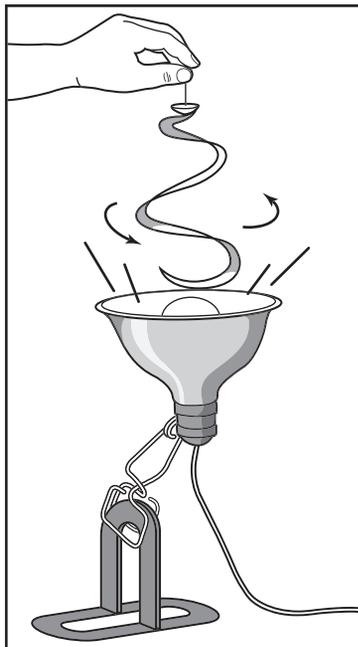
A student created this bar graph to show how the physical state of matter is related to another factor.



Which of these is the most appropriate label for the graph's vertical axis?

- A** weight
- B** shape
- C** speed of particle
- D** electrical charge

24 When the lamp below is switched on, the paper will spin.



Which most likely causes the paper to spin?

- F** warm air rising
- G** warm paper expanding
- H** cool air sinking
- J** cool light bulb expanding

25

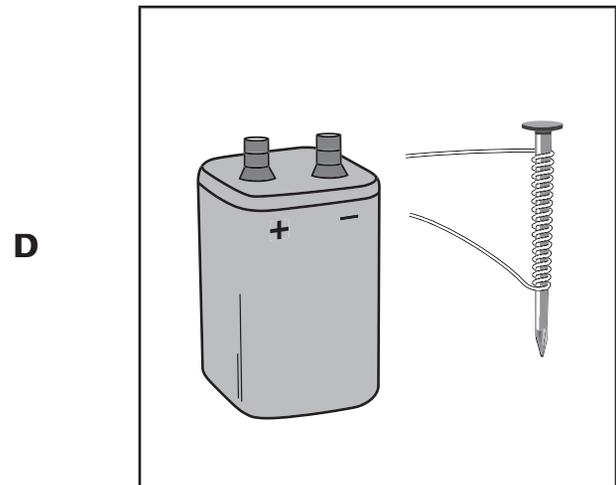
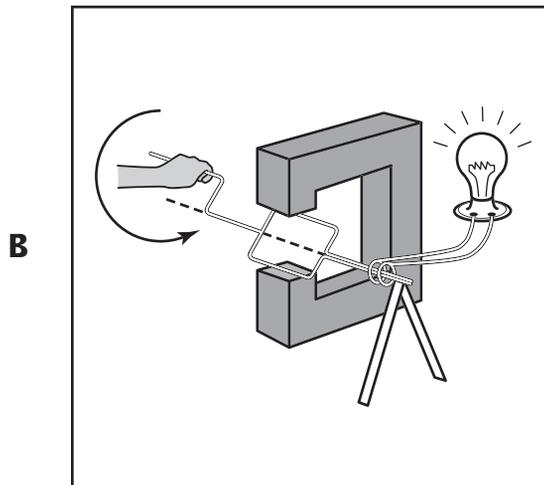
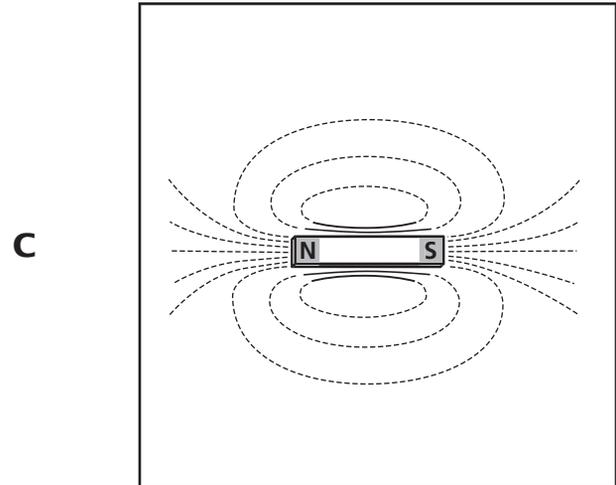
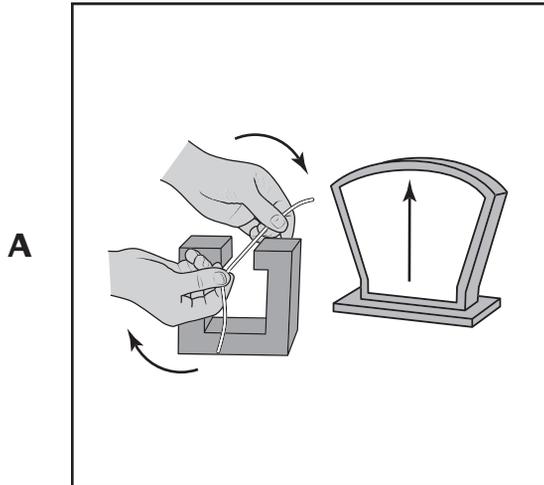
A student is given an object and is asked to identify its density. The object has a volume of 3 cubic centimeters and a mass of 6 grams.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$
$$D = \frac{m}{V}$$

Using the formula above, what is the density of the object?

- A** 2 grams/cubic centimeter
- B** 3 grams/cubic centimeter
- C** 6 grams/cubic centimeter
- D** 9 grams/cubic centimeter

27 Which diagram best identifies how an electric current is produced?



Reporting Category: PHYSICAL SCIENCE 3: Forces of Nature

Performance Indicator: 0807.12.1 Recognize that electricity can be produced using a magnet and wire coil.

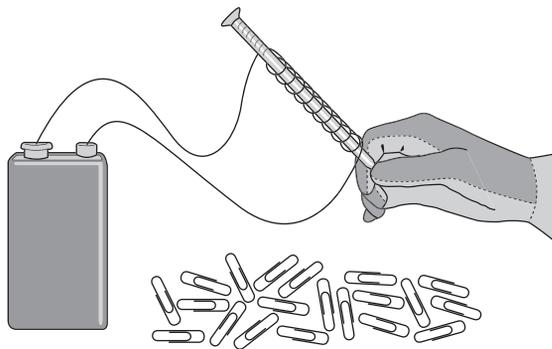
28 Which is generated when a bar magnet is moved through a wire coil?

- F** electric current
- G** mechanical energy
- H** thermal energy
- J** gravitational field

Reporting Category: PHYSICAL SCIENCE 3: Forces of Nature

Performance Indicator: 0807.12.2 Describe the basic principles of an electromagnet.

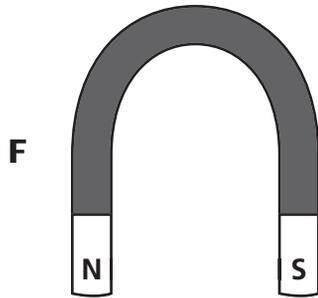
29 A diagram is shown below.



What device is the diagram representing?

- A** a barometer
- B** a bar magnet
- C** an electromagnet
- D** an electric scale

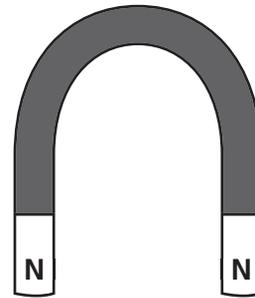
30 Which magnet below would provide the best example for the magnetic poles and magnetic fields of Earth?



H



J



Reporting Category: PHYSICAL SCIENCE 3: Forces of Nature

Performance Indicator: 0807.12.4 Distinguish between mass and weight using appropriate measuring instruments and units.

31 Which of these is best used to measure weight in newtons?

- A** spring scale
- B** triple beam balance
- C** double pan balance
- D** simple lever

Reporting Category: PHYSICAL SCIENCE 3: Forces of Nature

Performance Indicator: 0807.TE.1 Identify the tools and procedures needed to test the design features of a prototype.

32 Students are to build a model bridge using toothpicks and wood glue. The design of the bridge must support a specific weight and measure 20 centimeters long. Which tools would best help determine if the model bridge meets the design requirements?

- F** ruler, weights, and string
- G** string, beaker, and water
- H** hammer, string, and nails
- J** pliers, saw, and string

Reporting Category: PHYSICAL SCIENCE 3: Forces of Nature

Performance Indicator: 0807.12.5 Determine the relationship among the mass of objects, the distance between these objects, and the amount of gravitational attraction.

33 When will the gravitational attraction be greatest between two baseballs, each with the same mass?

- A** when they are 10 meters apart
- B** when they are 1 meter apart
- C** when they are 5 meters apart
- D** when they are 20 meters apart

Reporting Category: PHYSICAL SCIENCE 3: Forces of Nature

Performance Indicator: 0807.12.6 Illustrate how gravity controls the motion of objects in the solar system.

34 Which of these keeps a moon in orbit around a planet?

- F** shape
- G** composition
- H** size
- J** gravity

Science Answer Key

1	C
2	J
3	C
4	G
5	D
6	F
7	C
8	G
9	A

10	F
11	B
12	G
13	C
14	J
15	B
16	J
17	D
18	G

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

28	F
29	C
30	H
31	A
32	F
33	B
34	J



Tennessee Comprehensive Assessment Program

Achievement Test ~ Grade 8

Item Sampler