

THE UNIVERSITY OF THE STATE OF NEW YORK

GRADE 4

ELEMENTARY-LEVEL SCIENCE TEST

WRITTEN TEST

JUNE 5, 2017

Student Name _____

School Name _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

The test has two parts. Parts I and II are in this test booklet.

Part I contains 30 multiple-choice questions. Record your answers to these questions on the separate answer sheet. Use only a No. 2 pencil on your answer sheet.

Part II consists of 15 open-ended questions. Write your answers to Part II in this test booklet.

You will have as much time as you need to answer the questions.

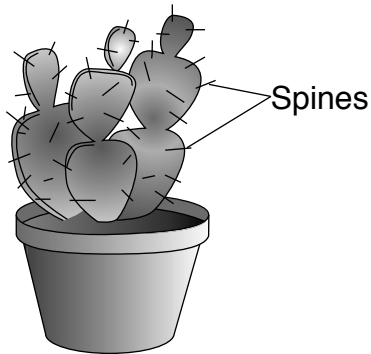
DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

Part I

1 Which object is a ***nonliving*** thing that is made by humans?

- A a fish
- B a rock
- C a green plant
- D a metal container

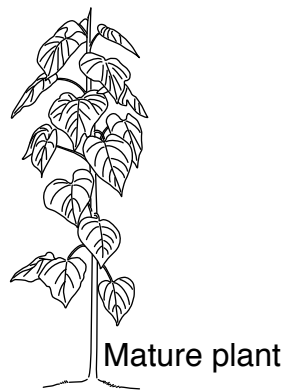
2 The diagram below shows a cactus plant with spines.



The spines help the cactus plant to survive by

- A making seeds
- B storing water
- C producing food from sunlight
- D protecting it from animals

3 The diagram below shows a mature plant.



Which young plant is most likely an offspring of this mature plant?



A



B



C

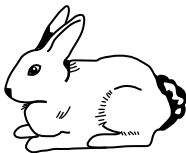


D

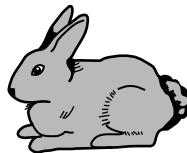
4 In order to grow and thrive, all animals need water, air, and

- A food
- B sunlight
- C soil
- D offspring

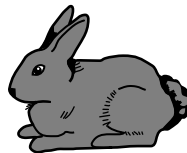
5 The diagrams below show four rabbits. Which rabbit would have the best chance of survival in a snowy environment?



A



B

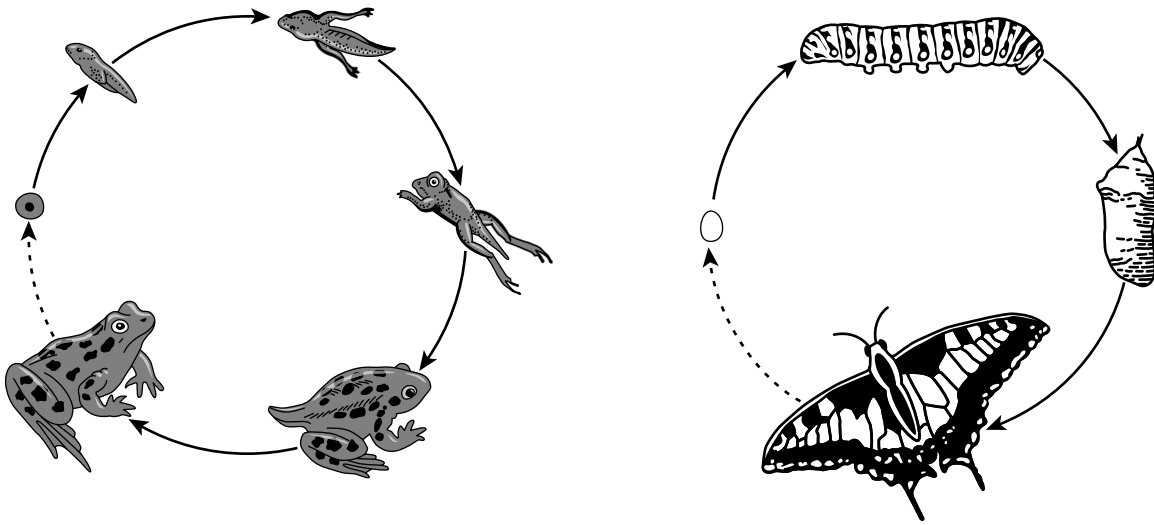


C



D

6 The diagrams below show the life cycles of a frog and a butterfly.



(Not drawn to scale)

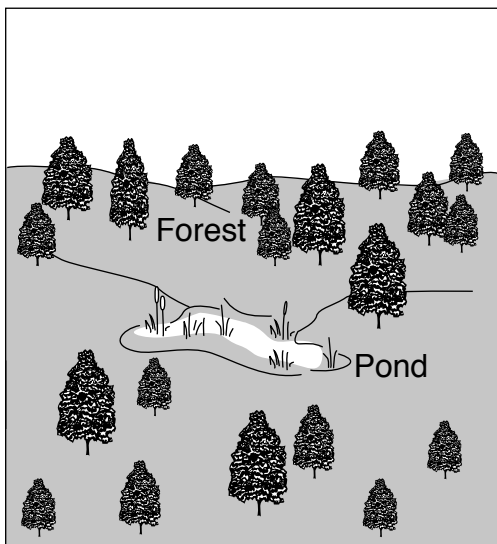
Based on the diagrams, which statement is correct?

- A Frogs have shorter life spans than butterflies.
 - B Reproduction occurs in frogs, but not in butterflies.
 - C Frogs have more offspring than butterflies.
 - D Frogs and butterflies each have their own stages of development.
- 7 Some animals can identify a mate by its bright colors. Which body structure is needed to sense color?
- A tongue
 - B skin
 - C eye
 - D ear
- 8 Which example shows an animal adapting to a seasonal change in its environment?
- A a fox hunting rabbits
 - B a goose migrating south
 - C a dog chasing cats
 - D a bat flying at night

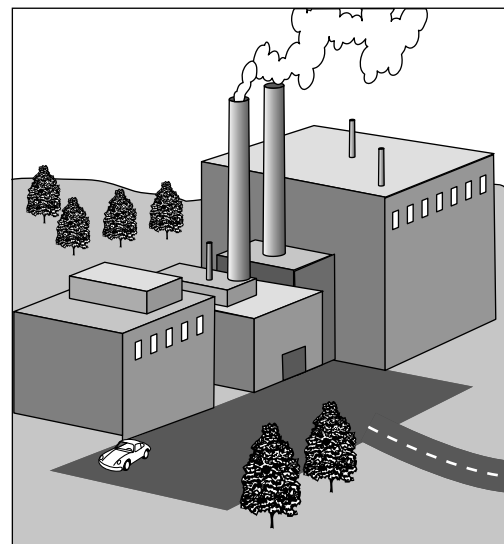
9 What happens to some animals as the seasons change from winter to summer in New York State?

- A Their fur becomes thicker.
- B Their fur color changes to white.
- C They shed more fur.
- D They begin to hibernate.

10 The diagrams below show a forest area before and after a factory was built there.



Area Before

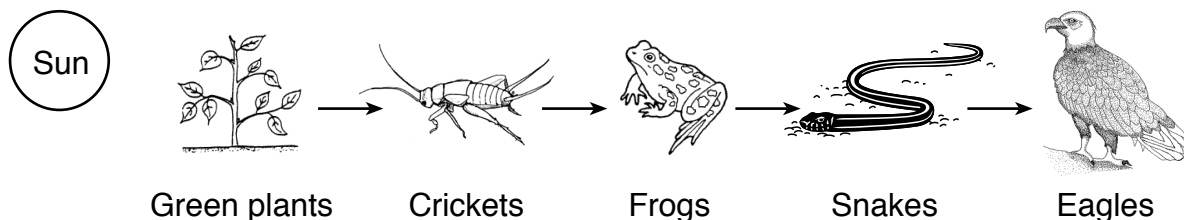


Area After

Building the factory in this area most likely caused an increase in

- A air pollution
- B natural habitats
- C open space
- D available water

Base your answers to questions 11 through 13 on the diagram of a food chain below and on your knowledge of science.



11 Which organisms are producers?

- A crickets
- B eagles
- C frogs
- D green plants

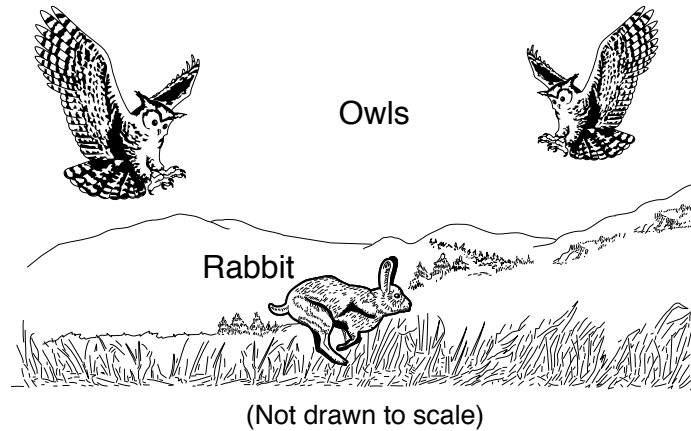
12 If the number of frogs ***decreases***, which population will most likely increase?

- A eagles
- B snakes
- C crickets
- D green plants

13 In which order is energy transferred through a food chain?

- A Sun → plants → animals
- B Sun → animals → plants
- C plants → Sun → animals
- D plants → animals → Sun

14 The diagram below shows two owls and a rabbit.



Which interaction between the owls is shown in the diagram?

- A reproduction
- B competition
- C migration
- D hibernation

15 Which list includes three weather conditions?

- A windy, cloudy, and winter
- B cold, morning, and rainy
- C cloudy, cold, and windy
- D rainy, summer, and evening

16 Forest fires can have **both** negative and positive effects. One possible **positive** effect of a forest fire is

- A more space for new plants
- B more competition for food
- C higher air temperature
- D pollution from smoke

17 How long does it take for Earth to revolve around the Sun one time?

- A a day
- B a week
- C a month
- D a year

18 The pictures below show the same area before and after water was released from a dam.



Before

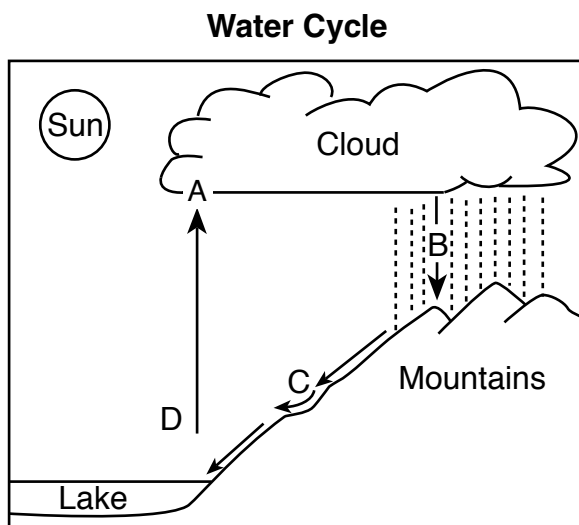


After

Which process happened more quickly because the water was released from the dam?

- A erosion
- B germination
- C precipitation
- D decomposition

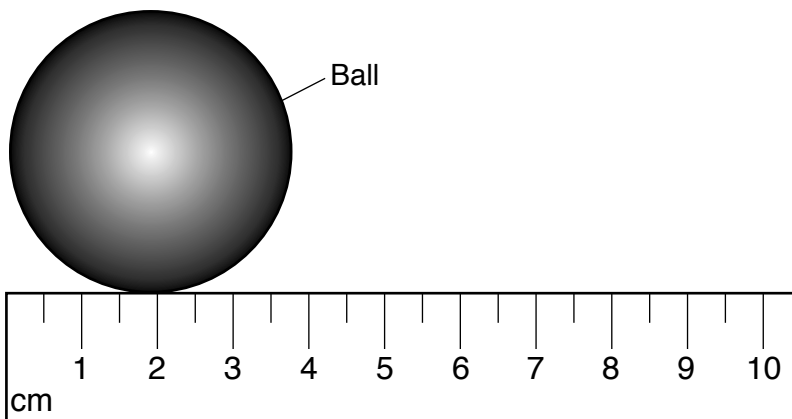
- 19** The diagram below shows the water cycle. Four processes in the cycle are labeled A through D.



Which letter best represents runoff?

- A A
- B B
- C C
- D D

- 20** The diagram below shows a ball being measured with a metric ruler.



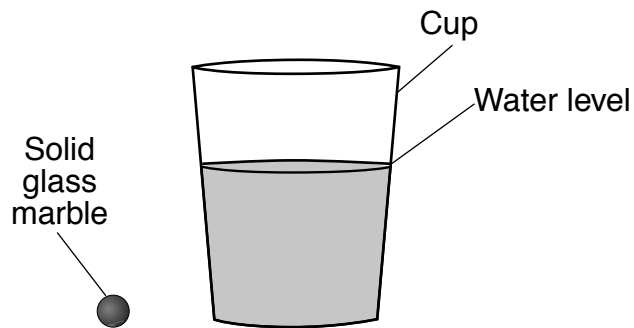
Which property of the ball is being measured with the ruler?

- A weight
- B width
- C magnetism
- D temperature

21 Which object will reflect the most light?

- A black shirt
- B pink flower
- C shiny can
- D dull rock

22 The diagram below shows a solid glass marble and a cup with water in it.



When the marble is placed into the cup of water, the marble most likely will

- A float
- B sink
- C change color
- D get smaller

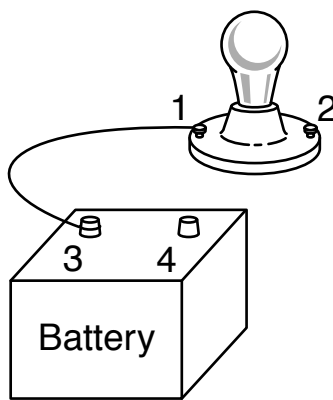
23 A student removes a tray of ice cubes from a freezer on a warm day. The water in the tray is solid and cold. The student forgets to put the tray back into the freezer. The next day, the water in the tray most likely would be

- A liquid and warmer
- B liquid and colder
- C solid and warmer
- D solid and colder

24 Which two characteristics describe a gas?

- A no definite shape, but a definite volume
- B no definite shape and no definite volume
- C a definite shape and a definite volume
- D a definite shape, but no definite volume

25 The diagram below shows an open circuit. The bulb is ***not*** lit. Four places in the circuit are labeled 1, 2, 3, and 4. One wire has been connected between 1 and 3.



In order to light the bulb, another wire should be connected between

- A 1 and 2
- B 1 and 4
- C 2 and 3
- D 2 and 4

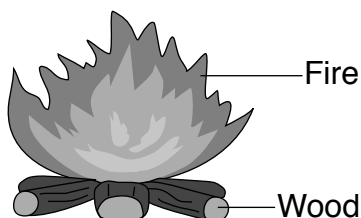
26 Which material is the best conductor of electricity?

- A rubber
- B plastic
- C metal
- D glass

27 Which force produces heat as the tires of a school bus rub against the road?

- A electricity
- B friction
- C gravity
- D magnetism

28 The diagram below shows a wood fire burning.



Which form of energy does the wood contain so that the fire will burn?

- A chemical
- B electrical
- C mechanical
- D sound

- 29** Protein in foods helps the body to grow. The chart below shows the amount of protein per serving in four foods.

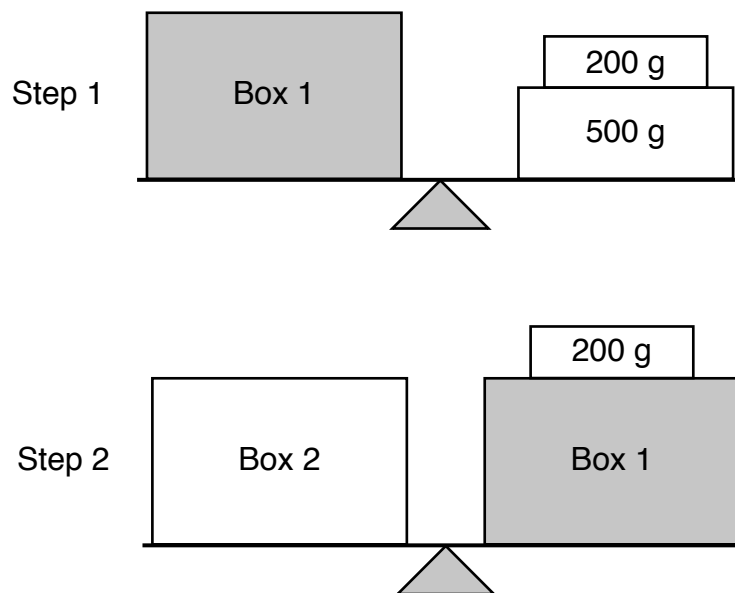
Amount of Protein in Four Foods

Food	Grams of Protein per Serving (g)
chicken	25
milk	10
veggie burger	14
hard-boiled egg	6

How much protein is in a meal of one glass of milk and one veggie burger?

- A 20 g
- B 24 g
- C 31 g
- D 35 g

- 30** The diagrams below show how a student found the masses of Box 1 and Box 2 in two steps. The student used a balance, one 200-g mass, and one 500-g mass.



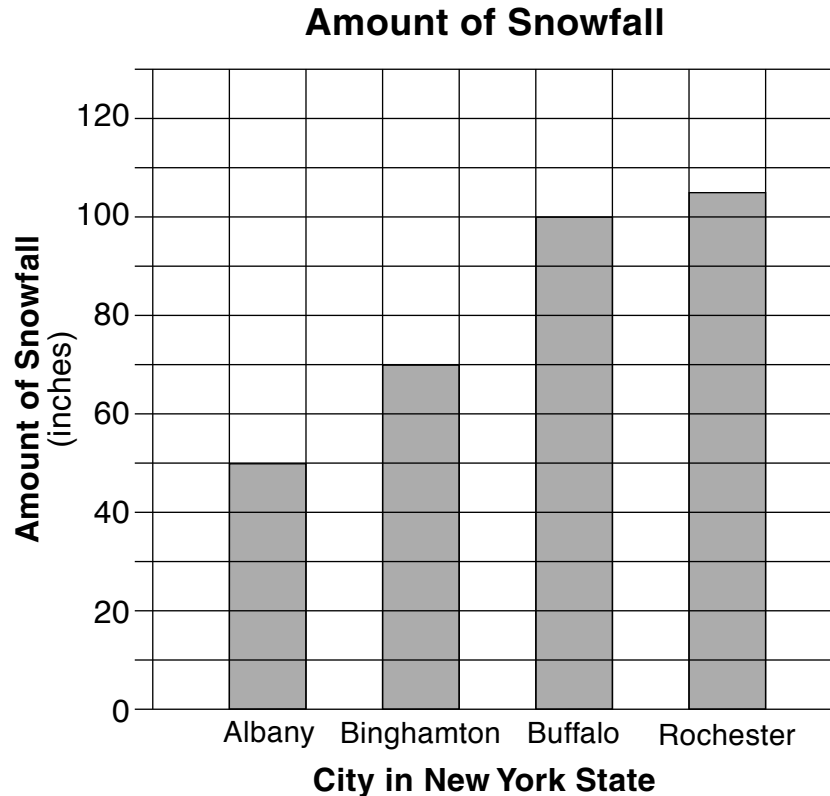
What is the mass of Box 2?

- A 200 g
- B 500 g
- C 700 g
- D 900 g

Part II

Directions (31–45): Record your answers in the space provided below each question.

- 31** The graph below shows the total amount of snowfall that was measured during one winter in four cities in New York State.



Using the data from the bar graph, complete the data table below to show the amount of snowfall measured in each of the four cities. [1]

Amount of Snowfall	
City in New York State	Amount of Snowfall (inches)
Albany	
Binghamton	
Buffalo	
Rochester	

- 32** A student's observations of four different rocks, *A*, *B*, *C*, and *D*, are shown below.

Rock A – length is 7 cm – texture is smooth – mass is 26 g	Rock B – mass is 17 g – length is 3 cm – texture is bumpy	Rock C – texture is rough – mass is 32 g – length is 5 cm	Rock D – length is 4 cm – mass is 8 g – texture is smooth
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Complete the data table below by organizing the student's observations of the rocks. The observations of rock *A* are organized in the first row. [1]

Data Table

Rock	Observation of Rock		
	Length (cm)	Mass (g)	Texture
A	7	26	smooth
B			
C			
D			

- 33** After a hike, a student recorded the four statements below in a science notebook.

Statement 1: It was fun to hike.

Statement 2: The leaves were green.

Statement 3: It rained at the end of the hike.

Statement 4: The rocks were difficult to climb.

Identify the numbers of the two statements that are fact, ***not*** opinion. [1]

Statements _____ and _____

Base your answers to questions 34 and 35 on the passage below and on your knowledge of science.

Tigers in Danger

One hundred years ago, there were 100,000 tigers living in the wild. Today, there are only about 3,000. Humans have caused the decrease in the tiger population. Some people eat the same foods that tigers eat, so tigers have to compete with people for food like deer and wild pigs. Also, people have destroyed much of the tigers' habitat by cutting down forests and constructing buildings and houses.

Some people have created tiger preserves, which are areas where tigers can live safely. Others are working on saving the forests and the prey that tigers depend on to live.

Source: Debnam, Betty, "The Mini Page"
Schenectady Gazette, Jan. 15–21, 2011 (adapted)

34 Identify **two** animals from the passage that are prey for tigers. [1]

_____ and _____

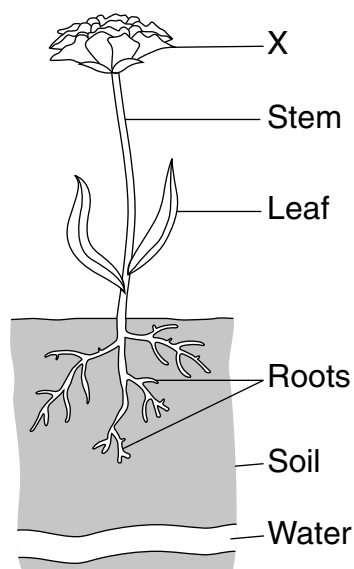
35 Describe **one** way that humans are **helping** tigers. [1]

36 Describe **one** way that a plant's seeds are dispersed (spread). [1]

37 The chart below shows four human characteristics. Complete the chart by circling whether each characteristic is learned or inherited. The circle for reading a book is shown. [1]

Characteristic	Learned or Inherited
reading a book	<input checked="" type="radio"/> learned or <input type="radio"/> inherited
brown eyes	<input type="radio"/> learned or <input type="radio"/> inherited
long legs	<input type="radio"/> learned or <input type="radio"/> inherited
jumping rope	<input type="radio"/> learned or <input type="radio"/> inherited

Base your answers to questions 38 and 39 on the diagram below and on your knowledge of science. The diagram shows a plant. Four of its structures are labeled. The soil and water used by the plant are also labeled.



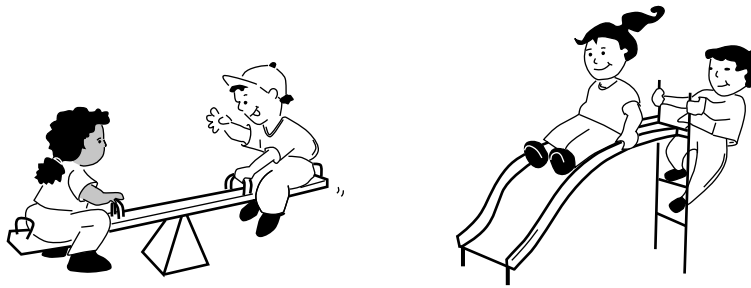
38 Identify plant structure *X* and describe the function of that structure. [1]

Structure *X*: _____

Function of structure *X*: _____

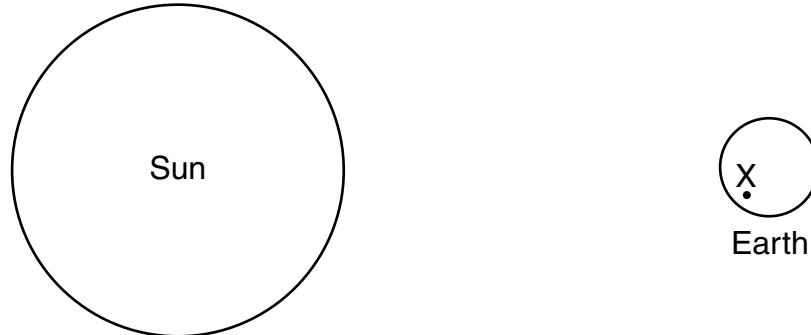
39 Explain how the plant might adapt to more easily reach the water shown in the diagram. [1]

40 The diagram below shows students on a playground.



How does playing on the playground every day help the students stay healthy? [1]

41 The diagram below shows the Sun and Earth in space. A location on Earth is labeled X.



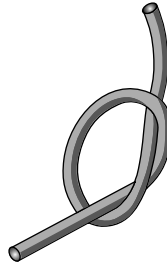
(Not drawn to scale)

Explain why it is day at location X. [1]

- 42** Pictures *A*, *B*, *C*, and *D* below show four properties of objects that can be observed or measured.



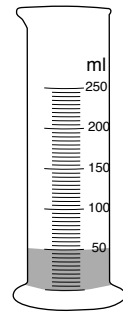
A



B



C

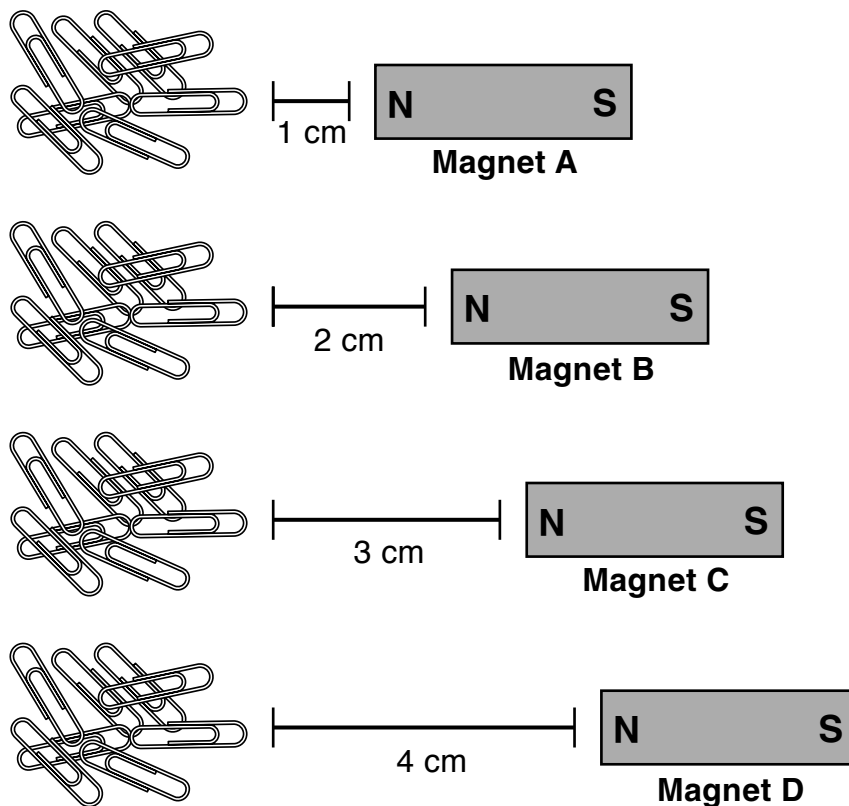


D

Complete the chart below by placing the letter of the picture next to the property it shows. The picture that shows reflectiveness of light is shown. [1]

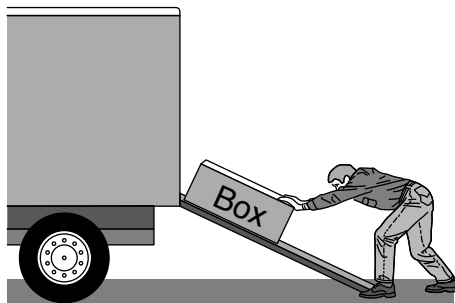
Property	Diagram
reflectiveness of light	<i>A</i>
volume	
flexibility	
temperature	

- 43 The diagrams below show four identical magnets, *A*, *B*, *C*, and *D*. The magnets were placed at different distances from four identical piles of metal paper clips.



A student predicts that magnet *C* will attract the most paper clips. Explain why the student's prediction is ***not*** correct. [1]

Base your answers to questions 44 and 45 on the diagram below and on your knowledge of science. The diagram represents a person using a simple machine to move a box into a truck.



44 Identify the simple machine that is being used to help move the box. [1]

45 Identify **one** force that is acting on the box as it is being moved into the truck. [1]

GRADE 4

ELEMENTARY-LEVEL SCIENCE TEST

JUNE 2017 WRITTEN TEST

FOR TEACHERS ONLY

SCORING KEY AND RATING GUIDE

Note: All schools (public, nonpublic, and charter) administering the Grade 4 Elementary-Level Science Test are required to make arrangements to obtain answer sheets and associated scanning services from a Regional Information Center (RIC) or a large-city scanning center. These centers will scan and score the answer sheets according to the following criteria:

1. One credit will be awarded for each correct response.
2. Credit will not be allowed if two or more answers have been marked for the same question.
3. The raw score for Part I will be determined by counting the number of correct responses.

For information only, correct responses are listed in the chart below.

Question Number	Correct Response	Question Number	Correct Response	Question Number	Correct Response
1	D	11	D	21	C
2	D	12	C	22	B
3	B	13	A	23	A
4	A	14	B	24	B
5	A	15	C	25	D
6	D	16	A	26	C
7	C	17	D	27	B
8	B	18	A	28	A
9	C	19	C	29	B
10	A	20	B	30	D

- 31 [1] Allow 1 credit for an acceptable response in *all four* rows of the data table as shown below.

Amount of Snowfall

City in New York State	Amount of Snowfall (inches)
Albany	50
Binghamton	70
Buffalo	100
Rochester	any value from 104 to 106

- 32 [1] Allow 1 credit for *all nine* correct responses in the unshaded rows as shown in the table below.

Data Table

Rock	Observation of Rock		
	Length (cm)	Mass (g)	Texture
A	7	26	smooth
B	3	17	bumpy
C	5	32	rough
D	4	8	smooth

- 33 [1] Allow 1 credit for *two* acceptable responses. Acceptable responses are:

- 2 and 3
- three and two

Note: Allow credit if the student circled the correct responses in the question instead of writing it in the answer spaces.
Allow credit if the student wrote correct statements instead of numbers on the answer spaces.

34 [1] Allow 1 credit for deer *and* wild pigs/pigs.

35 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- setting up preserves
- saving forests
- saving the tigers' food/prey
- giving them safe homes

36 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- They are blown by wind.
- carried by water
- Animals carry the seeds on their fur.
- Animals eat the seeds and then eliminate them.
- Humans plant the seeds.
- They drop to the ground.
- wind
- water

37 [1] Allow 1 credit for circling the correct response in *all three* unshaded rows of the chart as shown.

Characteristic	Learned <i>or</i> Inherited
reading a book	<input checked="" type="radio"/> learned <i>or</i> <input type="radio"/> inherited
brown eyes	<input type="radio"/> learned <i>or</i> <input checked="" type="radio"/> inherited
long legs	<input type="radio"/> learned <i>or</i> <input checked="" type="radio"/> inherited
jumping rope	<input checked="" type="radio"/> learned <i>or</i> <input type="radio"/> inherited

- 38 [1] Allow 1 credit for flower or petal for Structure X *and* describing the function of that structure. Acceptable responses include, but are not limited to:

Structure X	Function of Structure X
Flower	<ul style="list-style-type: none">— spread/disperse seeds— produces fruit that contains seeds for reproduction— holds pollen— produces nectar— produces pollen— makes/holds seeds— reproduce/reproduction— attracts insects/bugs/bees— makes food for animals— protects reproductive organs
Petal	<ul style="list-style-type: none">— holds pollen— helps plant reproduce— attracts insects/bugs/bees— protects reproductive organs

- 39 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The roots will grow down toward the water.
- The roots can grow longer.
- The roots go deeper into the ground.
- Grow bigger roots.
- The plant needs to grow longer to reach the water.
- roots need to grow

40 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- They get exercise./stay fit/keep active
- It strengthens their muscles.
- They get vitamin D.
- helps lose/maintain weight
- helps them burn Calories
- increases heart rate/blood flow
- They get fresh air by going outside.

Note: Acceptable responses must refer to bodily health, not just movement.

41 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Location X is facing the Sun.
- The Sun is shining on/hitting point X.
- X is on the side of Earth lit by the Sun.

Note: Do *not* allow credit for “X is close to the Sun” (does not address movement of Earth for day/night); “Earth turns/spins/rotates” (does not explain point X receiving sunlight); “Sun is facing the Earth” (the Sun always faces Earth).

42 [1] Allow 1 credit for a correct response in *all three* unshaded rows of the chart as shown.

Property	Diagram
reflectiveness of light	A
volume	D
flexibility	B
temperature	C

43 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Magnet C is 3 cm away. Magnet A will attract more because the paper clips are 1 cm away.
- because the farther away the magnet is, the less paperclips will attract to the magnet
- The closest magnet will have the greatest force of attraction.
- because magnet A is closest to most of the paper clips
- Magnet C is not the closest to the clips.
- As distance increases, the force of attraction decreases.

44 [1] Allow 1 credit for inclined plane *or* ramp.

45 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- gravity
- friction
- force of person pushing the box/push
- mechanical force
- resistance