

THE UNIVERSITY OF THE STATE OF NEW YORK

# GRADE 4

## ELEMENTARY-LEVEL SCIENCE TEST

### WRITTEN TEST

JUNE 3, 2019

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.

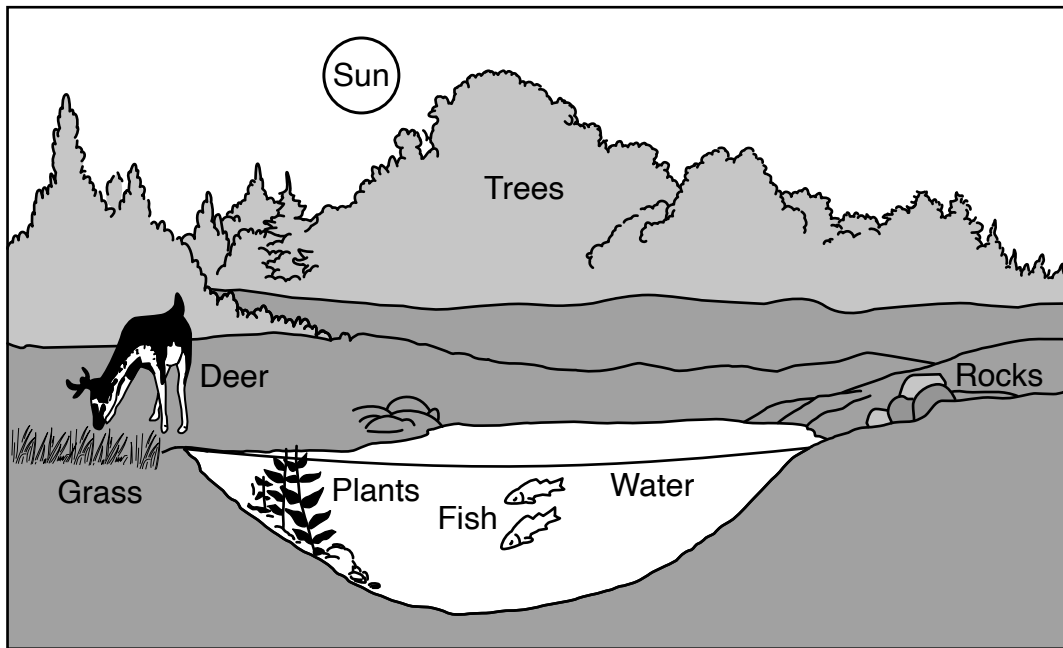
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THE STATE EDUCATION DEPARTMENT  
ALBANY, NEW YORK 12234

## Part I

1 The diagram below shows a pond near a forest.



(Not drawn to scale)

Which two objects labeled in the diagram are *nonliving*?

- A fish and plants
- B grass and deer
- C rocks and water
- D trees and Sun

2 Which process causes a giraffe to become taller?

- A reproduction
- B growth
- C decomposition
- D movement

3 A basic need of both plants and animals is

- A soil
- B light
- C shelter
- D water

4 An example of an inherited trait is

- A riding a bicycle
- B having a broken arm
- C having brown eyes
- D living in New York State

5 The diagram below shows a mature parent plant.



Which young plant is most likely the offspring of this mature parent plant?



A



B



C



D

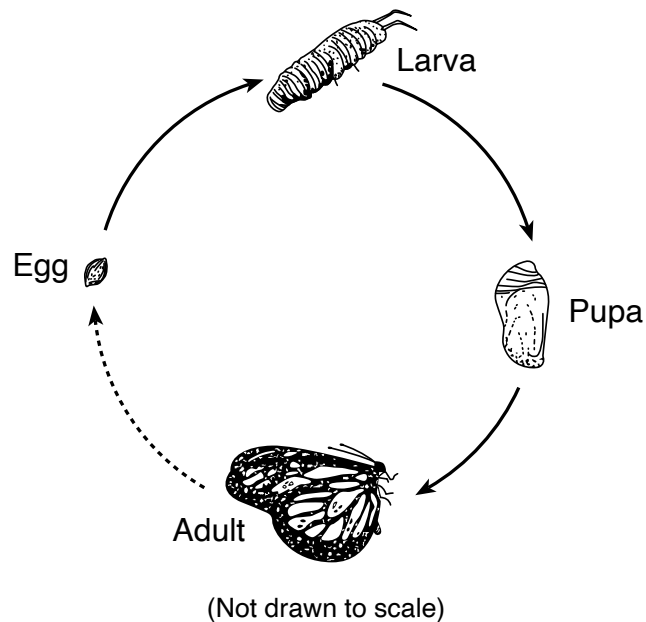
6 Which plant structure makes seeds?

- A stem
- B flower
- C roots
- D leaf

7 Whales have thick blubber to help keep them warm in cold ocean waters and protect them from injury. The blubber of a whale is

- A an adaptation to its environment
- B a characteristic used to attract a mate
- C a body structure common to all organisms
- D a waste product that needs to be eliminated

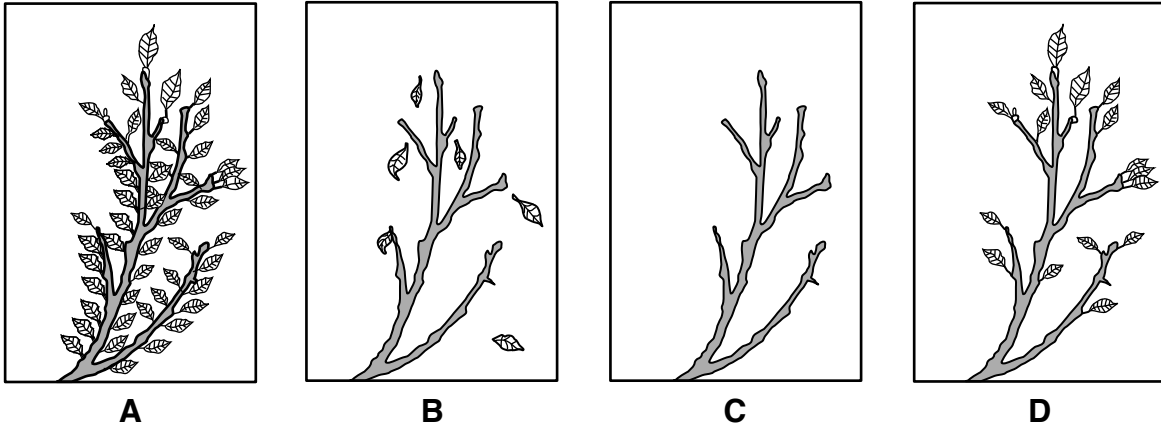
8 The diagram below shows the development of a butterfly.



This sequence of changes is called

- A hibernation
- B migration
- C a life span
- D a life cycle

- 9 The diagrams below show the same branch from a tree in New York State during each of the four seasons.

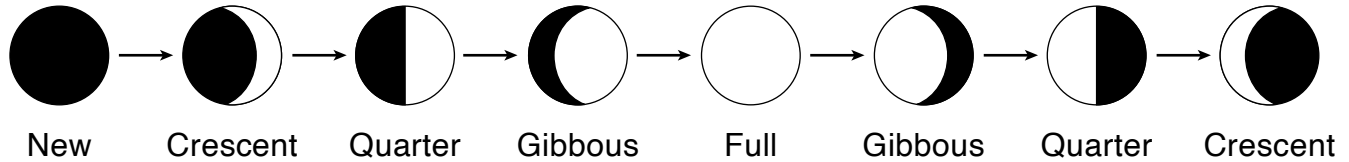


If students took a field trip during January, which diagram would most likely represent what the branches on most trees would look like in New York State?

- A A
  - B B
  - C C
  - D D
- 10 As the length of daylight shortens and the temperatures cool, geese and some other birds fly south from New York State. This behavioral change is known as
- A communicating
  - B hunting
  - C migration
  - D hibernation
- 11 In which example is the organism defending itself?
- A A fox smells food.
  - B An owl sees a mouse.
  - C A bee lands on a colorful flower.
  - D A skunk produces an odor.

- 12** Animals that eat other animals for food are classified as
- A decomposers
  - B predators
  - C producers
  - D prey
- 13** Warmer temperatures can cause a deer to rub against trees to remove clumps of heavy fur. This behavior is helping the deer to
- A reproduce
  - B feel cooler
  - C store fat
  - D camouflage itself
- 14** Which sequence shows the order of energy flow in a food chain?
- A Sun → rabbit → grass → owl
  - B grass → rabbit → owl → Sun
  - C Sun → grass → rabbit → owl
  - D owl → rabbit → grass → Sun
- 15** When a beaver senses a predator approaching, it slaps its tail on the surface of the water. This action is an example of an animal using a body part to
- A find food
  - B attract a mate
  - C build a shelter
  - D communicate information
- 16** How long does it take for Earth to complete one path around the Sun?
- A one day
  - B one week
  - C one month
  - D one year

- 17** The diagram below shows the changing appearance of an object in space as viewed by an observer in New York State.



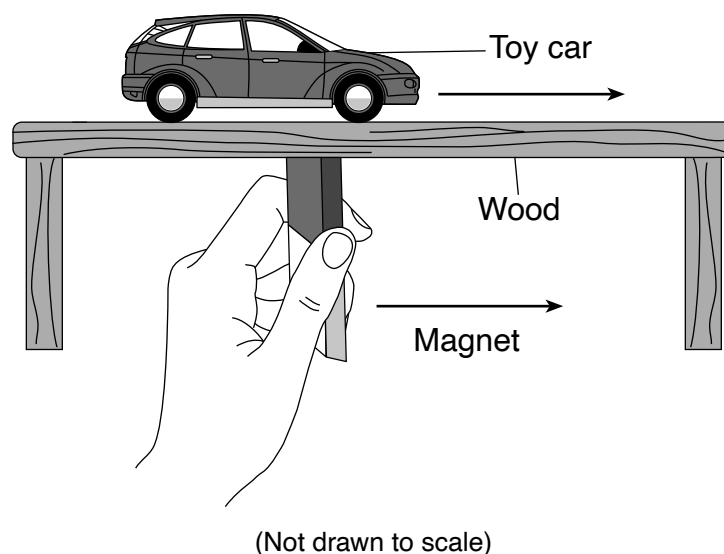
The diagram shows the changing appearance of

- A the Moon as it revolves around Earth
  - B Earth as it revolves around the Moon
  - C the Sun as it revolves around Earth
  - D Earth as it revolves around the Sun
- 18** Which process causes a wet towel to become dry?
- A condensation
  - B evaporation
  - C precipitation
  - D deposition
- 19** Hard, light-colored, and smooth are observations that describe a
- A glass marble
  - B rain cloud
  - C cat's fur
  - D cotton ball
- 20** A student drops a button and a nickel, and they both fall to the floor. What causes both of these items to fall to the floor?
- A magnetism
  - B electricity
  - C sound
  - D gravity

**21** Which tool would be used to find the weight of a balloon that is filled with water?

- A graduated cylinder
- B metric ruler
- C spring scale
- D thermometer

**22** The diagram below shows a student using a magnet to move a toy car across a table made of wood.



In order for the car to be moved by the magnet, the car must contain which material?

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

**23** Ice is solid water that has

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



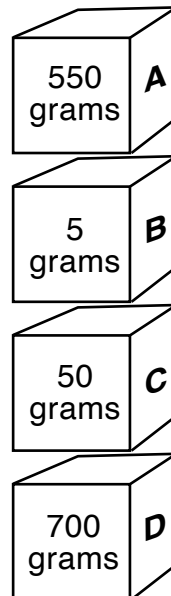
**24** Which color of shirt would absorb the most sunlight?

- A white
- B yellow
- C pink
- D black

**25** Which statement best describes how energy can be ***harmful***?

- A A fire burns down a house.
- B Electricity heats an oven.
- C A lamp lights a house.
- D An alarm clock wakes up a sleeping person.

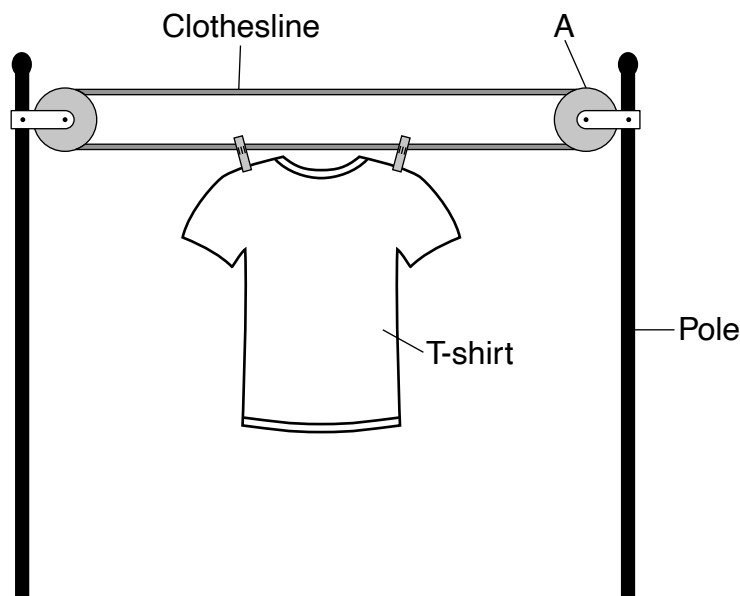
**26** The diagram below shows four boxes labeled *A*, *B*, *C*, and *D*. The mass of each box is shown.



Which box is **under** the box with a mass of 50 grams?

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

- 27** It is harder to push a box up a ramp with a rough surface than up one with a smooth surface because the rough surface provides more
- A motion
  - B friction
  - C gravity
  - D magnetism
- 28** A boy can see his face when he looks into a mirror. Which physical property of the mirror makes this happen?
- A reflectiveness
  - B temperature
  - C flexibility
  - D volume
- 29** The diagram below shows a T-shirt hanging on a clothesline. Letter A represents a simple machine.



Which type of simple machine is represented by letter A?

- A lever
- B balance
- C pulley
- D inclined plane

**30** A student is writing a report about a famous scientist and author, and records the following information.

1. Rachel Carson was born in 1907.
2. She went to school in Pennsylvania.
3. She is the author of the most important book about the environment ever written.
4. Rachel Carson was 11 years old when her first story appeared in a magazine.

Which piece of information is an opinion?

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

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## Part II

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

- 31** A student predicted that all objects with a mass greater than 9 grams (g) will sink in water. After finding the masses of four objects, the student placed each object in a pan of water to determine if it would sink or float. The results of the experiment are shown in the data table below.

**Data Table**

Object	Mass (g)	Sank or Floated in Water
small rock	10 g	sank
wooden block	16 g	floated
iron nail	2 g	sank
plastic ball	1 g	floated

Based on the results shown in the data table, the student's original prediction that all objects with a mass greater than 9 g would sink was incorrect.

Describe the evidence from the data table that proves that the prediction was ***incorrect***. [1]

Evidence: \_\_\_\_\_

\_\_\_\_\_

- 32** Students in a class take turns measuring the mass of the classroom pet bird. Each student fills out a record card for the bird's mass in grams (g). These record cards are shown below.

Date: 9/29
Mass of bird: 20 g

Date: 9/15
Mass of bird: 15 g

Date: 9/22
Mass of bird: 15 g

Date: 9/8
Mass of bird: 10 g

Organize the data from the record cards to show how the mass of the bird changed over time, and enter them in the table below. The data in the first column are shown. [1]

<b>Date</b>	9/8			
<b>Mass of bird (g)</b>	10			

Base your answers to questions 33 and 34 on the data table below and on your knowledge of science. The data table shows some average monthly air temperatures, in degrees Fahrenheit (°F), at the Albany Airport for three years.

**Some Average Monthly Air Temperatures at Albany Airport  
for Three Years (°F)**

Month	2006	2007	2008
January	32	28	28
March	36	32	34
May	58	61	56
July	75	71	74
September	61	65	64
November	45	38	40

- 33** Identify the month with the highest average monthly air temperature for the three years. [1]

\_\_\_\_\_

- 34** Estimate the most likely average air temperature for April 2008. [1]

\_\_\_\_\_ °F

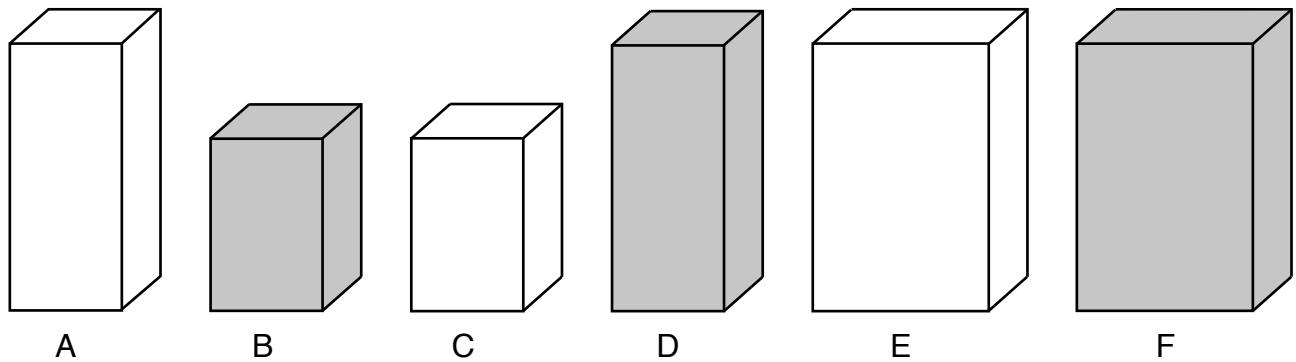
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**35** Give **one** reason why eating a balanced diet is important for good health in humans. [1]

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**36** The diagram below shows six boxes, labeled *A* through *F*.

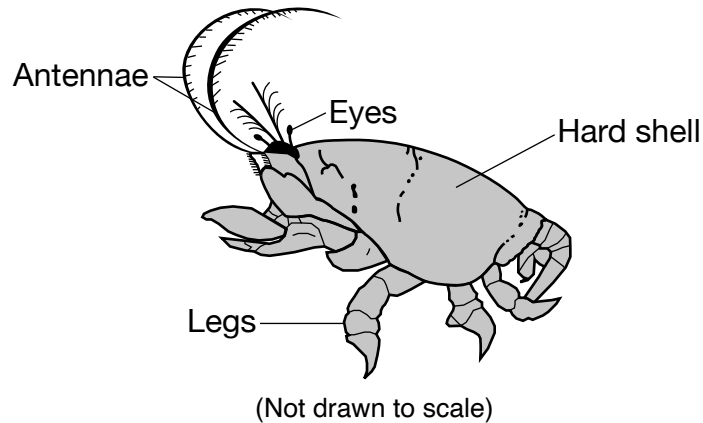


Sort the boxes into two groups according to their height (how tall they are) by placing the letter of each box in the correct column of the chart below. [1]

Short	Tall

Base your answers to questions 37 and 38 on the information and diagram below, and on your knowledge of science.

The common sand crab lives within the breaking waves of sandy beaches. To feed, it quickly burrows backwards into the sand with its powerful legs, and leaves only its feather-like antennae sticking out to remove small food particles from the water of the waves.



**37** Explain how the antennae could help the sand crab survive in its environment. [1]

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**38** The shell of the sand crab is light brown in color. Describe how this could help the sand crab to survive in this environment. [1]

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**39** The diagram below shows some birds with their nest.



Each spring, many birds spend time looking for the best places to build their nests. Describe **one** reason why this is an important task for the birds. [1]

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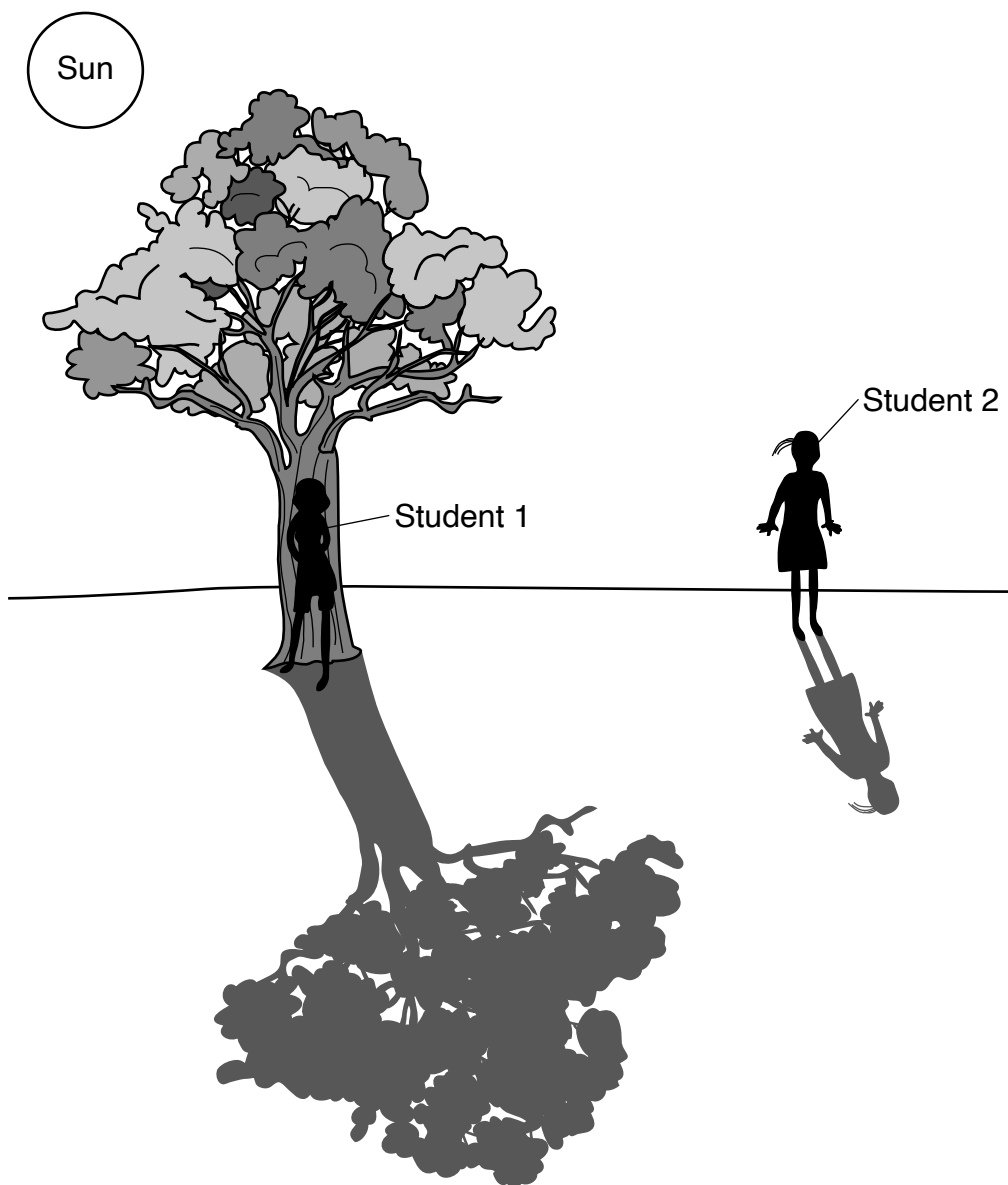
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**40** In large cities, people are beginning to plant vegetable gardens on the roofs of their apartment buildings. Explain how these gardens may be helpful to the people living in these areas. [1]

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Base your answers to questions 41 and 42 on the diagram below and on your knowledge of science. The diagram shows two students outside on a sunny day. Student 1 notices that she can **not** see her shadow. Student 2 notices that she can see her shadow.



(Not drawn to scale)

**41** Explain why student 1 can ***not*** see her shadow, even though student 2 can see her shadow. [1]

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**42** Describe **one** way student 2's body might respond if she continued to stay in this sunny location. [1]

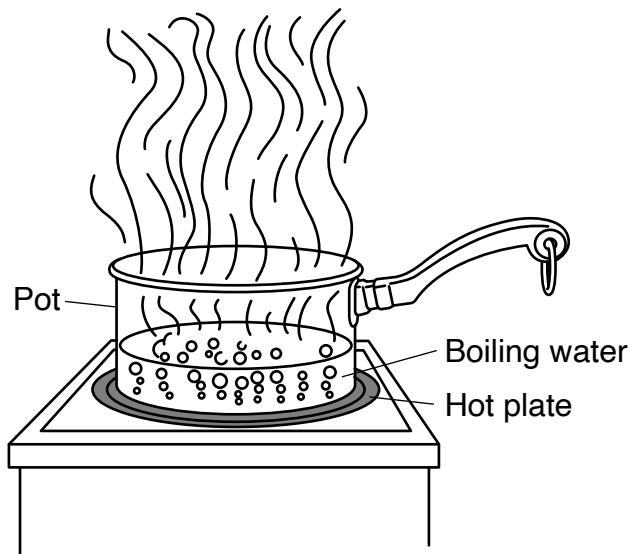
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Base your answers to questions 43 and 44 on the information below and on your knowledge of science. The diagram shows a pot of boiling water on a hot plate.



**43** Identify the type of energy that is directly causing the water to boil. [1]

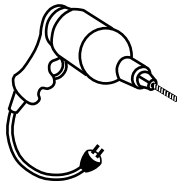
\_\_\_\_\_ **energy**

**44** The handle on the pot is **not** made out of metal. Identify **one** material that the handle could be made out of so that it could be safe to touch. [1]

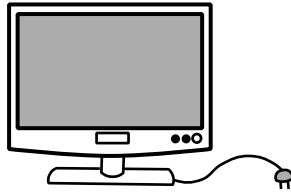
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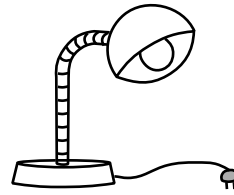
- 45** The diagrams below show three objects that use the same type of energy: a drill, a television, and a lamp.



Drill



Television



Lamp

(Not drawn to scale)

Identify the main form of energy used by all three objects. [1]

\_\_\_\_\_ **energy**

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**Grade 4 Elementary-Level Science Test****June 2019 Written Test****Answer Key: Part I (Multiple-Choice Questions)**

**Note:** All schools (public, nonpublic, and charter) administering the **Grade 4 Elementary-Level Science Test** in the 2018–2019 school year 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.

Test	Date	Question Number	Correct Response	Question Type	Credit	Weight
Grade 4 ELS	June '19	1	C	MC	1	1
Grade 4 ELS	June '19	2	B	MC	1	1
Grade 4 ELS	June '19	3	D	MC	1	1
Grade 4 ELS	June '19	4	C	MC	1	1
Grade 4 ELS	June '19	5	A	MC	1	1
Grade 4 ELS	June '19	6	B	MC	1	1
Grade 4 ELS	June '19	7	A	MC	1	1
Grade 4 ELS	June '19	8	D	MC	1	1
Grade 4 ELS	June '19	9	C	MC	1	1
Grade 4 ELS	June '19	10	C	MC	1	1
Grade 4 ELS	June '19	11	D	MC	1	1
Grade 4 ELS	June '19	12	B	MC	1	1
Grade 4 ELS	June '19	13	B	MC	1	1
Grade 4 ELS	June '19	14	C	MC	1	1
Grade 4 ELS	June '19	15	D	MC	1	1
Grade 4 ELS	June '19	16	D	MC	1	1
Grade 4 ELS	June '19	17	A	MC	1	1
Grade 4 ELS	June '19	18	B	MC	1	1
Grade 4 ELS	June '19	19	A	MC	1	1
Grade 4 ELS	June '19	20	D	MC	1	1
Grade 4 ELS	June '19	21	C	MC	1	1
Grade 4 ELS	June '19	22	B	MC	1	1
Grade 4 ELS	June '19	23	A	MC	1	1
Grade 4 ELS	June '19	24	D	MC	1	1
Grade 4 ELS	June '19	25	A	MC	1	1
Grade 4 ELS	June '19	26	D	MC	1	1
Grade 4 ELS	June '19	27	B	MC	1	1
Grade 4 ELS	June '19	28	A	MC	1	1
Grade 4 ELS	June '19	29	C	MC	1	1
Grade 4 ELS	June '19	30	C	MC	1	1

**Key**

MC = Multiple-choice question

**31** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The 16-g wood block floated instead of sank.
- A 2-g iron nail sank instead of floated.
- One object with a mass greater than 9 grams floats.
- The wooden block floated even though it was more than 9 g.
- The iron nail's mass is less than 9 g and it sank.

**Note:** Do *not* allow credit for responses such as “wood floats” *or* “metal sinks” *or* “the wooden block floated.” These responses only refer to the material from which the object is made, and do *not* address mass, as stated in the hypothesis.

**32** [1] Allow 1 credit for entering correct data in *all three* unshaded columns.

**Example of a 1-credit response:**

Date	9/8	9/15	9/22	9/29
Mass of bird (g)	10	15	15	20

**Note:** Do *not* accept dates and masses that are correctly matched but *not* in chronological order.

**33** [1] Allow 1 credit for July.

**34** [1] Allow 1 credit for any value greater than 34°F but less than 56°F.

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

- so you get the proper nutrients
- helps control weight
- keeps the heart and other internal organs functioning correctly
- builds strong muscles and bones
- to not become overweight
- to live a long life
- to make you strong
- Eating only one type of food may not give a person all the required nutrients.

**Note:** Do *not* allow credit for “to maintain good health” *or* “to stay healthy” because this is implied in the question.

**36** [1] Allow 1 credit if the objects are sorted as shown below.

Short	Tall
B C	A D E F

**Note:** Allow credit if the letters are in a different order; e.g., *F, D, A, E*.

**37** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- sense food
- remove food from the water
- filter food from the water
- sense predators/prey

**38** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The shell color can camouflage the crab on the sandy beach.
- The color of its shell can help it to hide from predators.
- It looks like the sand, and predators will not see it.

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

- to provide a place to lay their eggs and raise their young
- to provide a shelter for the young
- to provide a safe area away from predators
- a safe place to sleep
- access to food/water
- enough space for baby birds to grow and thrive

**Note:** Do *not* allow credit for “to provide a home to live in” because the purpose of the nest is to protect and raise the offspring, not to be a home for birds.



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

- They can use the vegetables for food.
- They can save money on food.
- cool and/or trap heat for the buildings
- creating a green/usable space that they didn't have
- to provide healthier/fresh food
- Plants provide oxygen.
- Plants remove carbon dioxide from the atmosphere.

**Note:** Do *not* allow credit for “it gets more sun/water,” as this helps the plants, not the people.

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

- The tree is blocking the sunlight from student 1.
- The shadow of the tree is covering student 1.
- She is shaded by the tree.
- She is behind the tree, out of the Sun.

**42** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- perspire/sweat
- sunburn/turn red
- suntan
- get hotter/temperature increase
- get thirsty

**43** [1] Allow 1 credit for heat energy *or* thermal energy.

**44** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- wood
- plastic
- rubber
- silicone
- glass

**45** [1] Allow 1 credit for electrical, electric, *or* electricity.