

THE UNIVERSITY OF THE STATE OF NEW YORK

GRADE 4

ELEMENTARY-LEVEL SCIENCE TEST

WRITTEN TEST

JUNE 6, 2022

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

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Part I

- 1 An example of a learned behavior is
 - A breathing
 - B blinking
 - C growing
 - D reading

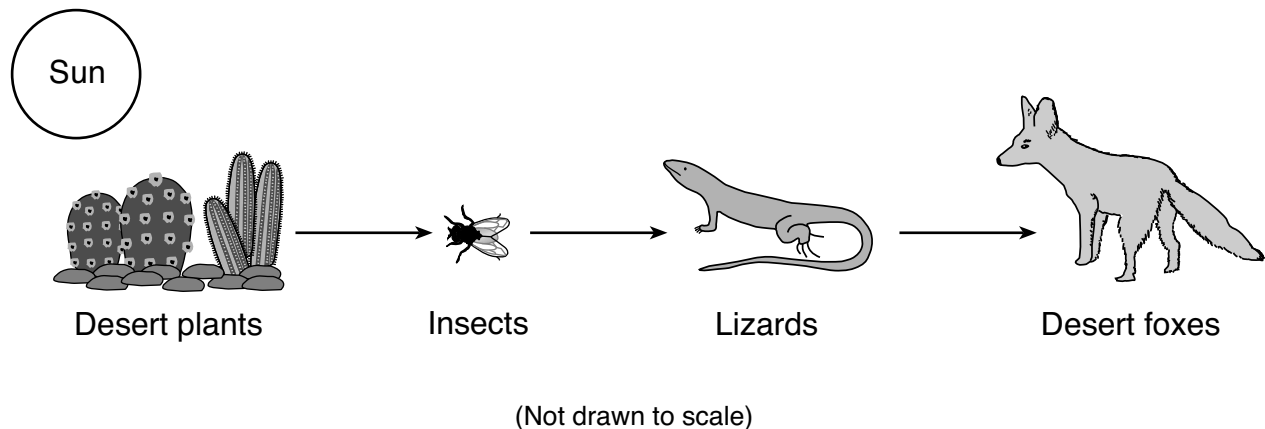
- 2 Some birds have colorful feathers for
 - A laying eggs
 - B building a nest
 - C attracting a mate
 - D finding food

- 3 Camels have wide, flat feet that prevent them from sinking into the sand. These structures best help the camel with
 - A growth
 - B movement
 - C reproduction
 - D coloration

- 4 Monarch butterflies fly south when the length of daylight decreases as winter approaches. This is an example of an organism
 - A migrating
 - B germinating
 - C escaping predators
 - D recycling nutrients

- 5** A turtle will be best camouflaged when it
- A swims quickly in the water
 - B blends in with its environment
 - C sits in the sunlight
 - D eats both plants and animals
- 6** The life span of an animal can be described as
- A the basic needs of an animal
 - B the time from birth to death
 - C how an animal changes
 - D traits that the animal passes on to its offspring
- 7** Animals get the energy needed for growth and repair by taking in
- A heat
 - B food
 - C water
 - D sunlight
- 8** Each year, buds and leaves begin to develop on trees. This is an example of trees responding to
- A gravity
 - B germination
 - C seed dispersal
 - D seasonal changes

Base your answers to questions 9 and 10 on the diagram below and on your knowledge of science. The diagram shows a desert food chain.



9 The producers in this food chain are the

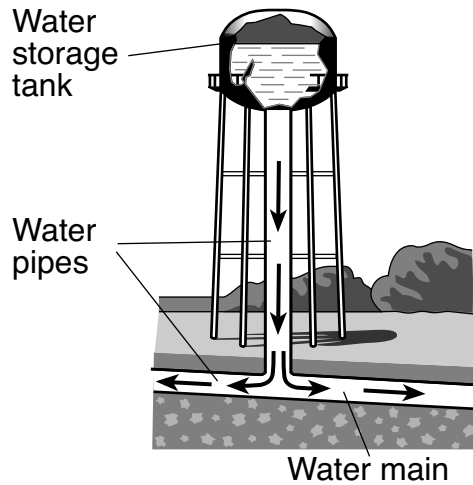
- A insects
- B lizards
- C desert foxes
- D desert plants

10 The arrow in this food chain that points to the lizard shows that lizards

- A receive energy from the insects
- B receive water from the desert foxes
- C provide food to the desert plants
- D provide mates for other lizards

- 11 A forest fire destroyed many plants in a forest. Some plants survived. The process that will allow the population of these plants to increase is
- A hibernation
 - B reproduction
 - C competition
 - D communication
- 12 The water cycle gets its energy from
- A Earth
 - B distant stars
 - C the Sun
 - D the Moon
- 13 Which human activity has the most *harmful* effect on the environment?
- A putting up solar panels
 - B building shelters for animals
 - C planting crops on farms
 - D spilling oil in a river
- 14 How many times does Earth spin on its axis in one week?
- A 1
 - B 7
 - C 30
 - D 365

- 15** The diagram below shows a water storage tank that supplies water for homes. Arrows show the directions in which the water flows through the pipes.



(Not drawn to scale)

Which force causes the water from the storage tank to flow down to the water pipes below it?

- A electricity
 - B magnetism
 - C gravity
 - D friction
- 16** In the morning, a student observed a puddle of water on the school playground. At the end of the day, the puddle was gone. Which process most likely caused the puddle to disappear?
- A condensation
 - B deposition
 - C evaporation
 - D erosion

17 A *negative* effect of most hurricanes is

- A more places for animals to live
- B an increase in prey
- C land habitats become flooded
- D there is more water for plants to grow

18 In order for an object to be classified as matter, it must have

- A mass and volume
- B mass and shape
- C size and shape
- D size and volume

19 The diagram below shows a person standing in front of a mirror to tie a necktie.



Which property of the mirror allows the person to see themselves?

- A magnetism
- B volume
- C hardness
- D reflectiveness

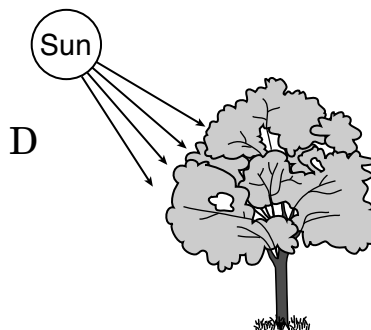
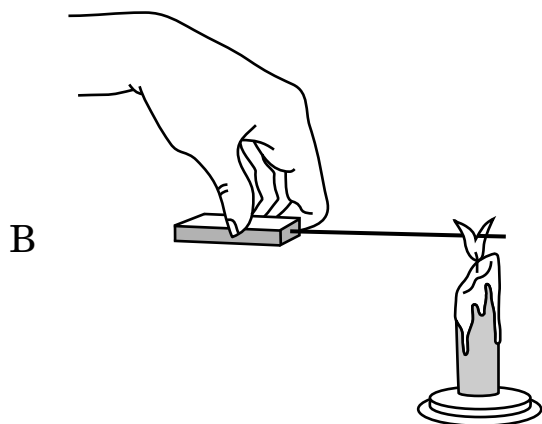
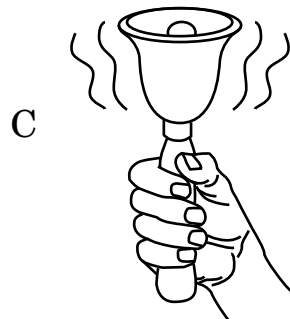
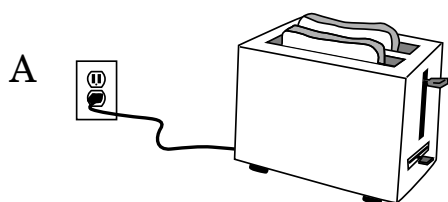
20 Which properties of an object will determine if the object will sink or float in water?

- A length and shape
- B length and color
- C material and shape
- D material and color

21 A student observes a green leaf on a tree in fall turning red over a few days. Which physical property of the leaf is changing?

- A texture
- B shape
- C color
- D volume

22 Which diagram best shows the transfer of electrical energy from one place to another?



23 Which color shirt would absorb the greatest amount of sunlight?

- A red
- B green
- C white
- D black

24 Two students made observations in their journals while on an outdoor field trip. The observations of student *A* and student *B* are shown below.

Student A	Student B
<ul style="list-style-type: none">– sweet smell– long stems– yellow flowers	<ul style="list-style-type: none">– brown stems– yellow flowers– shiny leaves

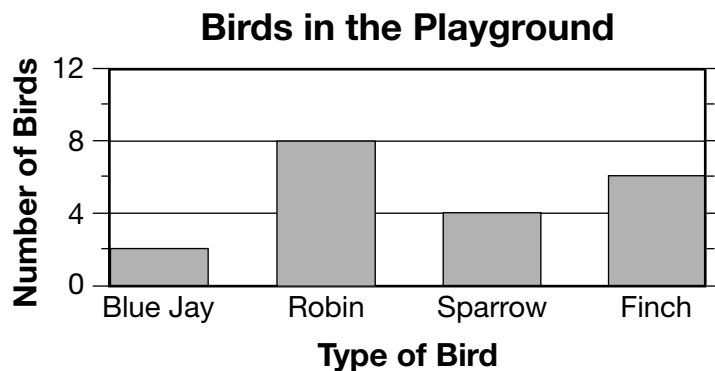
Based on the students' journals, an inference that can be made is that the students were observing

- A plants
- B water
- C birds
- D insects

25 Which scientific tool would be needed to measure the volume of water in an experiment?

- A graduated cylinder
- B magnet
- C pan balance
- D hand lens

- 26** A group of students counted the number of different types of birds they saw in the playground for one hour. A graph of their data is shown below.



Which table did the students use to make the graph?

Blue Jay	2
Robin	8
Sparrow	4
Finch	6

A

Blue Jay	2
Robin	6
Sparrow	4
Finch	6

B

Blue Jay	2
Robin	4
Sparrow	8
Finch	6

C

Blue Jay	0
Robin	8
Sparrow	6
Finch	4

D

Base your answers to questions 27 and 28 on the data table below and on your knowledge of science. The data table shows the predicted weather conditions for three days in Rochester, New York, during June.

Predicted Weather Conditions for Rochester, New York

Weather Condition	June 28	June 29	June 30
Sky Condition	scattered thunderstorms	partly cloudy	sunny
Highest Air Temperature	80°F	72°F	75°F
Lowest Air Temperature	61°F	56°F	60°F
Chance of Rain	60%	10%	0%

27 What is the predicted highest air temperature for Rochester, New York, on June 29?

- A 56°F
- B 72°F
- C 75°F
- D 80°F

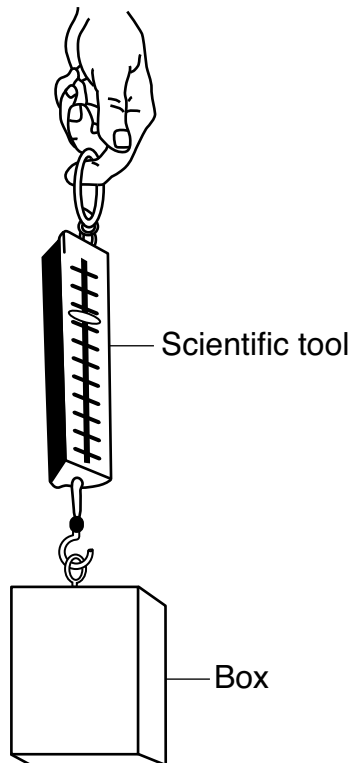
28 Which two weather conditions are being predicted in this data table?

- A wind speed and air temperature
- B sky condition and wind direction
- C wind direction and chance of precipitation
- D chance of precipitation and air temperature

29 A rubber ball would roll fastest on which surface?

- A sandy beach
- B grassy field
- C gym floor
- D thick rug

30 The diagram below shows a student using a scientific tool to find the weight of a box that is attached to the tool.



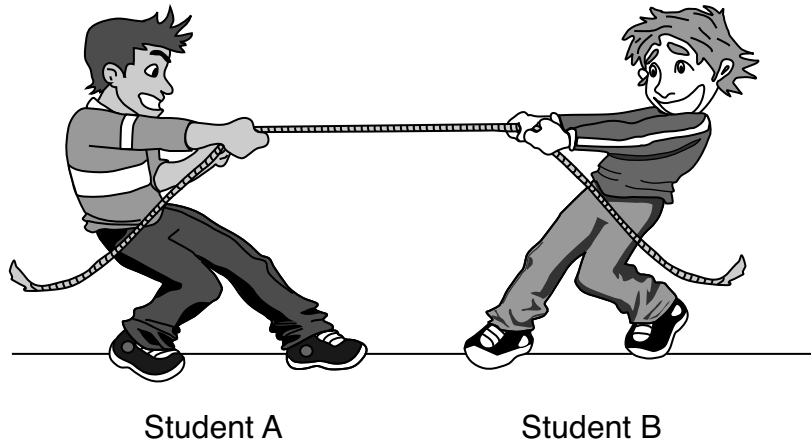
The box is classified as a solid because it has

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

Part II

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

- 31** The diagram below shows two students, labeled *A* and *B*, pulling equally on a rope.



Explain how the position of student *A* would change if student *B* were to let go of the rope. [1]

Base your answers to questions 32 and 33 on the information, photograph, and data table below and on your knowledge of science. The photograph shows rings of one tree. The data table shows the number of rings counted in four tree samples, listed as *A*, *B*, *C*, and *D*.

Tree Rings

Trees contain some of nature's most accurate evidence of the past. Their growth layers appear as rings in the cross section of the tree trunk, as shown below. Each year, the tree adds to its diameter (width), and the new growth is called a tree ring. These rings can be different thicknesses due to different growing conditions. From these rings, scientists can see evidence of floods, droughts, insect attacks, and even forest fires.

Rings of One Tree



Growth of Four Trees

Tree Sample	Number of Tree Rings
A	31
B	28
C	39
D	29

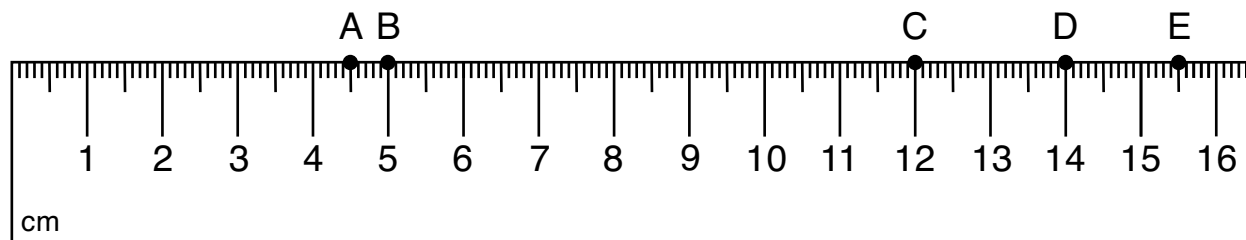
32 Based on the data, which tree sample is the oldest? Explain why this tree sample is the oldest. [1]

Tree sample: _____

Explanation: _____

33 Explain why the rings of the tree in the photograph are different thicknesses. [1]

Base your answers to questions 34 and 35 on the diagram below and on your knowledge of science. Five objects were measured with a metric ruler. The lengths of the objects are represented by the letters A through E.



- 34** Complete the data table below by placing the letter from the metric ruler with the correct object based on its length. [1]

Data Table

Object	Length of Object (cm)	Letter on Ruler
pen	14	
eraser	4.5	
marker	12	
pencil	15.5	
paper clip	5	

- 35** A student stated, “The length of three paper clips is equal to the length of the pen.” Explain why this statement is *incorrect* using the data from the table. [1]

- 36** Complete the blank spaces in the chart below by correctly classifying the examples from the first column as living or nonliving and human-created or naturally occurring. Some spaces have been completed for you. [1]

Examples	Living <i>or</i> Nonliving	Human-created <i>or</i> Naturally Occurring
dog		naturally occurring
soccer ball	nonliving	
rock		naturally occurring
oak tree	living	

Base your answers to questions 37 and 38 on the diagram below and on your knowledge of science. The diagram shows two deer, labeled *A* and *B*.



A



B

- 37** Deer *A* and deer *B* were competing for the same mate. Describe **one** advantage deer *A* would have over deer *B*. [1]

- 38** Identify **two** resources, other than a mate, that these two deer could compete for in their environment. [1]

_____ and _____

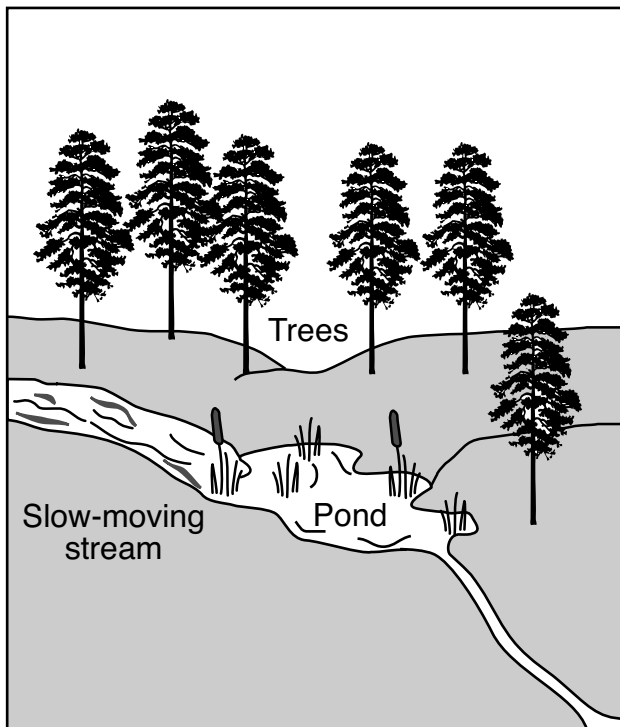
Base your answers to questions 39 and 40 on the photograph below and on your knowledge of science. The photograph shows a plant growing in loose soil.



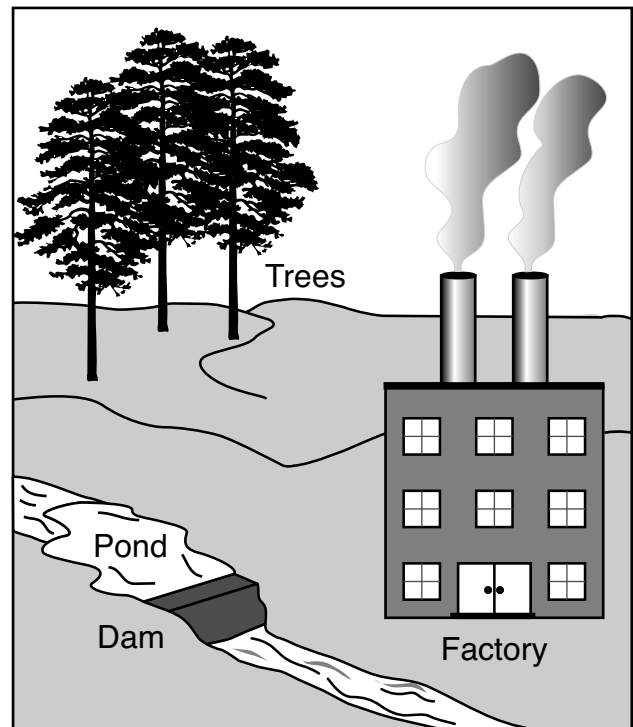
39 Describe **one** way the roots help the plant. [1]

40 Explain why plants need sunlight to grow. [1]

- 41 The diagrams below show an area of land before and after a factory was built there.



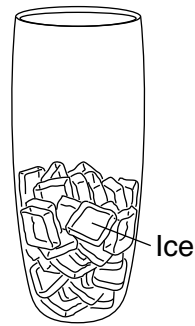
Before



After

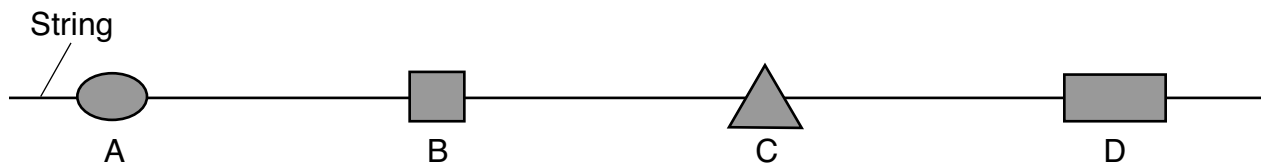
Describe **one** way the factory makes it harder for the animals living in the area to survive. [1]

42 The diagram below shows a glass that contains ice cubes.

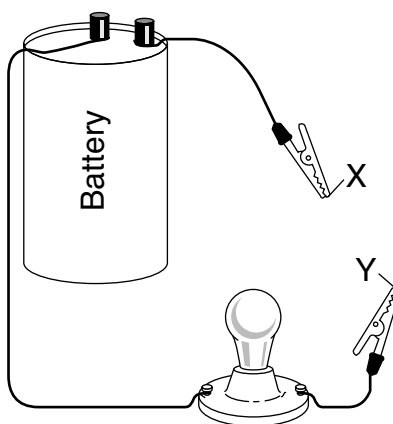


Describe how the ice in the glass can be changed to liquid water. [1]

43 The diagram below shows a string with four beads, labeled *A*, *B*, *C*, and *D*. Draw one round bead on the string between beads *C* and *D*. [1]



Base your answers to questions 44 and 45 on the diagram below and on your knowledge of science. The diagram shows a battery connected to wires and a lightbulb. Letters *X* and *Y* show the ends of two metal clips attached to the wires.



- 44** Explain why the lightbulb will light when the metal clips at *X* and *Y* touch. [1]

- 45** Describe the purpose of the battery in this setup. [1]

Grade 4 Elementary-Level Science Test**June 2022 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 2021-2022 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 '22	1	D	MC	1	1
Grade 4 ELS	June '22	2	C	MC	1	1
Grade 4 ELS	June '22	3	B	MC	1	1
Grade 4 ELS	June '22	4	A	MC	1	1
Grade 4 ELS	June '22	5	B	MC	1	1
Grade 4 ELS	June '22	6	B	MC	1	1
Grade 4 ELS	June '22	7	B	MC	1	1
Grade 4 ELS	June '22	8	D	MC	1	1
Grade 4 ELS	June '22	9	D	MC	1	1
Grade 4 ELS	June '22	10	A	MC	1	1
Grade 4 ELS	June '22	11	B	MC	1	1
Grade 4 ELS	June '22	12	C	MC	1	1
Grade 4 ELS	June '22	13	D	MC	1	1
Grade 4 ELS	June '22	14	B	MC	1	1
Grade 4 ELS	June '22	15	C	MC	1	1
Grade 4 ELS	June '22	16	C	MC	1	1
Grade 4 ELS	June '22	17	C	MC	1	1
Grade 4 ELS	June '22	18	A	MC	1	1
Grade 4 ELS	June '22	19	D	MC	1	1
Grade 4 ELS	June '22	20	C	MC	1	1
Grade 4 ELS	June '22	21	C	MC	1	1
Grade 4 ELS	June '22	22	A	MC	1	1
Grade 4 ELS	June '22	23	D	MC	1	1
Grade 4 ELS	June '22	24	A	MC	1	1
Grade 4 ELS	June '22	25	A	MC	1	1
Grade 4 ELS	June '22	26	A	MC	1	1
Grade 4 ELS	June '22	27	B	MC	1	1
Grade 4 ELS	June '22	28	D	MC	1	1
Grade 4 ELS	June '22	29	C	MC	1	1
Grade 4 ELS	June '22	30	A	MC	1	1

Key

MC = Multiple-choice question

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

- Student A will fall on the ground/floor.
- Student A will stumble/move backwards.
- Student A may be able to stand up straight.

32 [1] Allow 1 credit for sample C *and* an acceptable explanation. Acceptable responses include, but are not limited to:

- The more tree rings, the older the tree.
- It has the most tree rings.
- Thirty-nine/39 is the highest number of tree rings.

Note: Do *not* allow credit for “each year the tree adds to its diameter and the new growth is called a tree ring” because it does not explain why tree C has the most rings.

Do *not* allow credit for “39 rings” as an explanation because it does not compare 39 to the remainder of the data in the table.

33 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- There are different growing conditions (flood, drought, insect attacks, forest fires) each year.
- Growing conditions cause different tree ring widths.
- Trees receive different amounts of water, causing different tree ring widths.
- Widths are a result of the amount of water available.

34 [1] Allow 1 credit if *all five* letters are correctly listed, as shown below.

Data Table

Object	Length of Object (cm)	Letter on Ruler
pen	14	D
eraser	4.5	A
marker	12	C
pencil	15.5	E
paper clip	5	B

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

- The length of one paper clip is 5 cm. The length of three paper clips is 15 cm (5×3). The length of one pen is 14 cm. Therefore, three paper clips are not the same length as one pen.
- Three paper clips would be 15 cm long and one pen is 14 cm long.
- Three paper clips are one centimeter longer than one pen.
- 15 cm is greater than 14 cm.
- $15 \text{ cm} > 14 \text{ cm}$
- The pen would have to be 15 cm to equal three paper clips.

36 [1] Allow 1 credit for a correct response in *all four* unshaded boxes of the chart, as shown below.

Examples	Living or Nonliving	Human-created or Naturally Occurring
dog	living	naturally occurring
soccer ball	nonliving	human-created
rock	nonliving	naturally occurring
oak tree	living	naturally occurring

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

- Deer A has larger antlers to fight deer B.
- Deer A is bigger/taller than deer B.
- Deer A is stronger/more muscular than deer B.
- Deer B is smaller than deer A.

Note: Do *not* allow credit for “size/height” or “antlers” alone because it does not describe the difference between deer A and deer B.

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

- food/plants
- space
- water
- shelter/area/territory

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

- absorb/take in water
- take in nutrients from environment
- anchor/support the plant
- They keep the plant in the ground.

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

- Plants use the Sun’s energy to make food/sugar/glucose.
- Plants use the Sun’s energy for photosynthesis.
- because plants are producers that can make their own food

Note: Do *not* allow credit for responses that indicate the Sun gives/provides nutrients/nutrition because nutrients are available through the soil.

Do *not* allow credit for “producers” alone because it does not show the understanding of how this helps a plant to grow.

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

- fewer trees/less space to live in
- decreased food/water supply
- pollutes the air they breathe
- contaminates the water they drink
- Their habitat is polluted.
- Increased noise puts stress on the animals.
- More animals would be hit by cars.
- The dam flooded the animals’ habitat.

Note: Acceptable responses *must* include an effect on the organism.

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

- increase the temperature/add heat
- warm it up
- put the glass in the sunlight
- by melting the ice

Note: Do *not* allow credit for “change the temperature” because it does not describe an increase needed to melt ice.

43 [1] Allow 1 credit for any rounded shape drawn anywhere on the line between bead *C* and bead *D*.

Note: Do *not* allow credit for incorrect shapes between beads *C* and *D*.

Do *not* allow credit if the bead does not touch the line.

Do *not* allow credit if the student drew more than one bead anywhere on the line.

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

- It’s a closed circuit.
- It completes the circuit.
- The metal clips are conductors, and electricity can travel through if they touch.

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

- It is the power source.
- It provides the energy to produce electricity.
- It powers the circuit.
- changes chemical energy to electrical energy
- source of potential energy