

THE UNIVERSITY OF THE STATE OF NEW YORK

GRADE 4

ELEMENTARY-LEVEL SCIENCE TEST

WRITTEN TEST

JUNE 1, 2015

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 14 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.

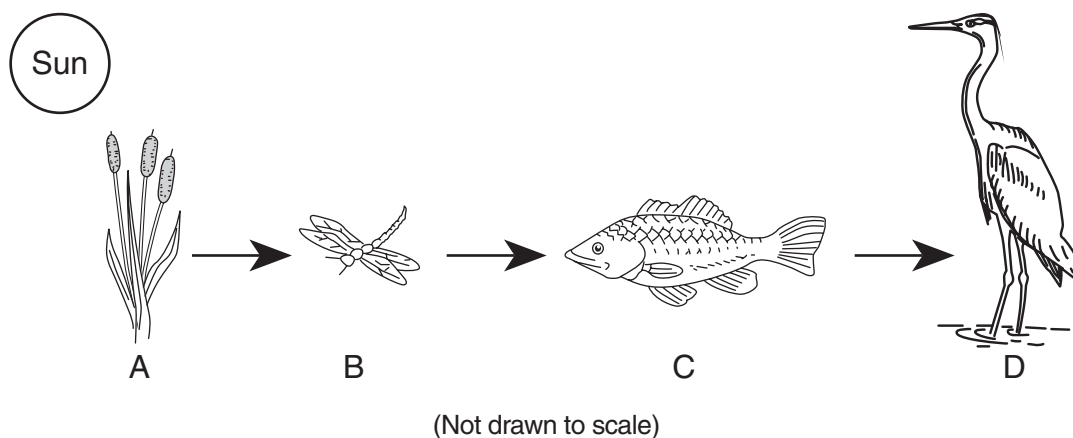
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THE UNIVERSITY OF THE STATE OF NEW YORK
THE STATE EDUCATION DEPARTMENT
ALBANY, NEW YORK 12234

Part I

Base your answers to questions 1 and 2 on the food chain below and on your knowledge of science. Four organisms in the food chain are labeled *A*, *B*, *C*, and *D*.



1 Which organism in this food chain is both predator and prey?

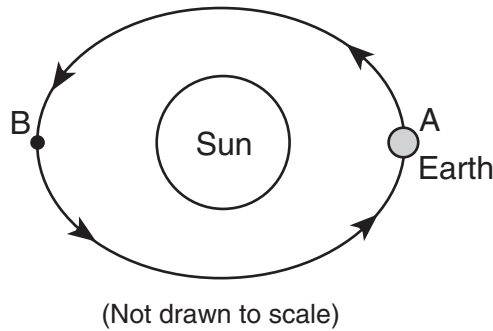
- A *A*
- B *B*
- C *C*
- D *D*

Note that question 2 has only three choices.

2 If the population of organism *A* ***decreases***, the population of organism *B* would most likely

- A decrease
- B increase
- C remain the same

- 3** The diagram below shows Earth revolving around the Sun. Letters *A* and *B* show two locations in Earth's orbit around the Sun.



It takes Earth one year to revolve around the Sun. How long will it take for Earth to travel from point *A* to point *B*?

- A 1 month
 - B 3 months
 - C 6 months
 - D 9 months
- 4** Which two terms are used to describe weather?
- A wind direction and amount of erosion
 - B gravity and amount of rain
 - C groundwater and cloud cover
 - D air temperature and wind speed
- 5** Which process occurs when ocean waves drop seashells on a beach?
- A condensation
 - B deposition
 - C classification
 - D rotation

6 Which unit of measurement should be used to describe the mass of an apple?

- A gram
- B liter
- C minute
- D meter

Note that question 7 has only three choices.

7 An object is attracted to a magnet. When the magnet is moved away from the object, the magnetic force on the object will

- A decrease
- B increase
- C remain the same

8 Which characteristic describes the texture of a kitten's fur?

- A gray
- B warm
- C long
- D soft

9 The diagram below shows a pencil being measured with paper clips.



What is the length of the pencil in paper clips?

- A 4.0
- B 4.5
- C 5.0
- D 5.5

- 10** A student pours water into a cup and places the cup in a freezer. After many hours, the water will change from
- A solid to gas
 - B solid to liquid
 - C liquid to solid
 - D liquid to gas
- 11** Which energy transfer occurs when a student blows a whistle?
- A electrical to sound
 - B light to electrical
 - C heat to mechanical
 - D mechanical to sound
- 12** Which object is the best conductor of electricity?
- A glass rod
 - B wooden stick
 - C plastic straw
 - D metal nail
- 13** Which color baseball cap would absorb the most light on a sunny day?
- A pink
 - B black
 - C white
 - D yellow

- 14** Which force causes a soccer ball to fall to the ground after it has been kicked up in the air?
- A erosion
 - B friction
 - C gravity
 - D magnetism
- 15** Volume and mass are properties of
- A friction
 - B light
 - C matter
 - D sound
- 16** Which tool should a student use to examine spots on a frog?
- A thermometer
 - B hand lens
 - C graduated cylinder
 - D magnet

17 Which process is common to most living things?

- A flying
- B talking
- C seeing
- D reproducing

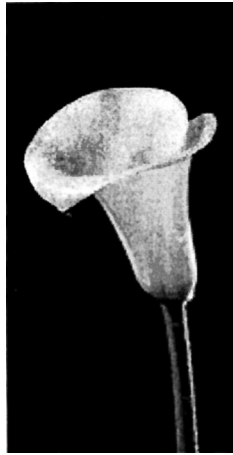
18 Which trait can children inherit from their parents?

- A long hair
- B favorite color
- C brown eyes
- D broken arm

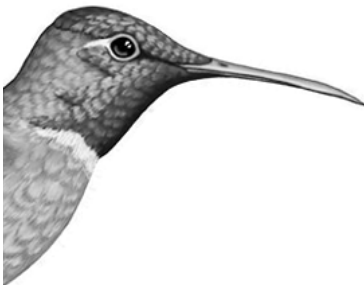
19 During which process do animals increase in size?

- A breathing
- B growing
- C shedding
- D repairing

- 20** The diagram below shows a flower that contains a sweet liquid called nectar.



Four birds, labeled *A*, *B*, *C*, and *D*, are shown below. The birds eat different foods.



A



B



C



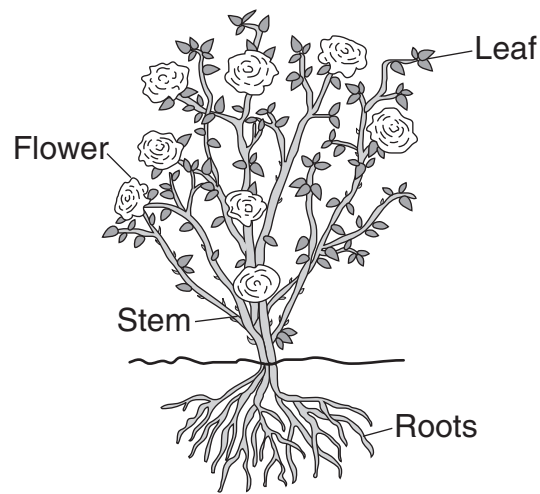
D

(Not drawn to scale)

Which bird's beak will make it easiest to get nectar out of the flower?

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

Base your answers to questions 21 and 22 on the diagram of a flowering plant below and on your knowledge of science. Four structures that help the plant to survive, grow, and reproduce are labeled.



(Not drawn to scale)

21 Which structure takes in water and nutrients from the soil?

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

22 Which structure produces seeds for reproduction?

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

- 23** An octopus squirts black ink around itself to hide from predators. This adaptation is an example of
- A creating shelter
 - B recycling nutrients
 - C a transfer of energy
 - D a defense mechanism
- 24** Which activity is an example of a good health habit?
- A riding a bicycle without a helmet
 - B smoking cigarettes
 - C wearing a hat while in the Sun
 - D eating with dirty hands
- 25** The correct order of a plant's stages of growth and development is
- A young plant → seed → mature plant
 - B seed → mature plant → young plant
 - C seed → young plant → mature plant
 - D mature plant → young plant → seed

- 26** In the spring and early summer, bears often scratch their backs against trees to remove winter fur. This is an example of an animal
- A completing its life cycle
 - B beginning hibernation
 - C responding to its environment
 - D preparing for migration
- 27** A bird builds a nest to
- A hibernate in winter
 - B shelter its offspring
 - C produce more feathers
 - D eliminate waste
- 28** Which type of organism helps return nutrients from dead plants and animals to the soil?
- A producer
 - B prey
 - C predator
 - D decomposer

29 What is the main source of energy for all of the organisms in most food chains?

- A sunlight
- B water
- C green plants
- D decomposers

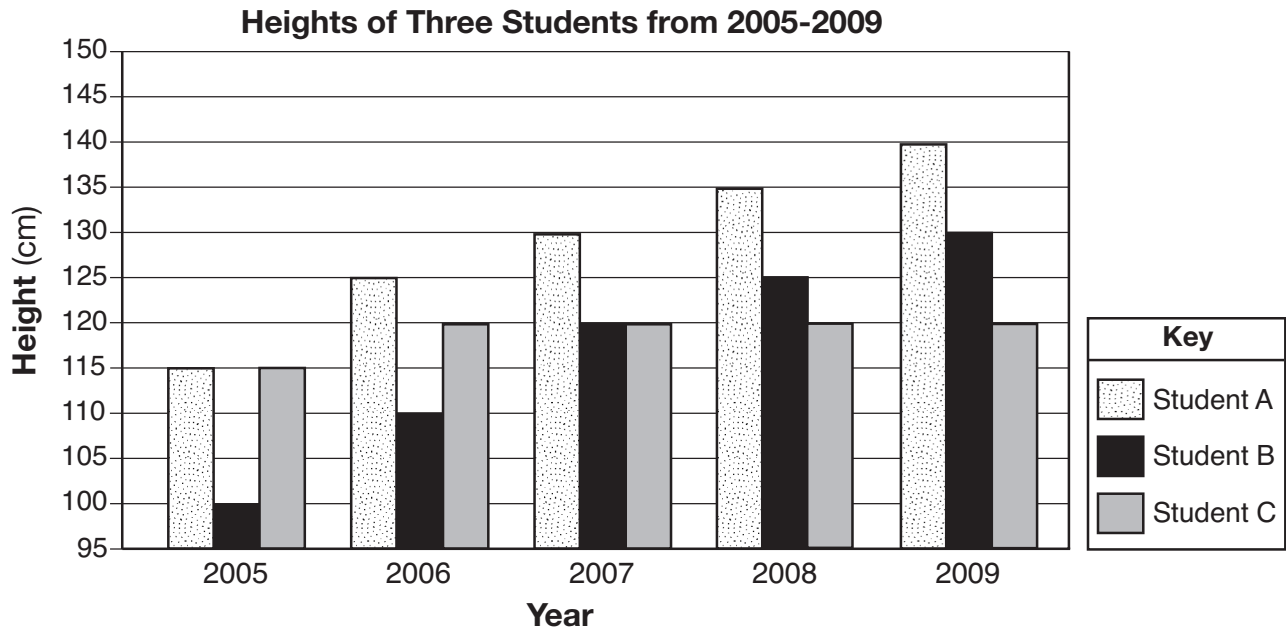
30 Which human activity will help conserve Earth's natural resources?

- A leaving the television on all day
- B recycling plastic bottles
- C cutting down trees
- D burning trash in the yard

Part II

Directions (31–44): Record your answers in the space provided below each question.

Base your answers to questions 31 and 32 on the bar graph below and on your knowledge of science. The bar graph shows the heights, in centimeters (cm), of three different students from 2005 to 2009.



31 In which year were student *B* and student *C* the same height? [1]

32 In 2006, how much taller was student *A* than student *C*? [1]

_____ **cm**

Base your answers to questions 33 and 34 on the data table below and on your knowledge of science. A student observes the color, temperature, and volume of five different liquids, *A*, *B*, *C*, *D*, and *E*. The observations are shown in the data table.

Observations of Five Liquids

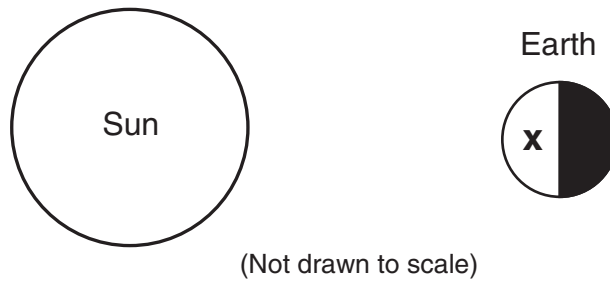
Liquid	Color	Temperature	Volume
A	brown	80°C	6 mL
B	white	40°C	10 mL
C	clear	60°C	15 mL
D	pink	80°C	18 mL
E	brown	40°C	20 mL

- 33** Based on the data table, which liquid is brown and has the lowest temperature? [1]

Liquid _____

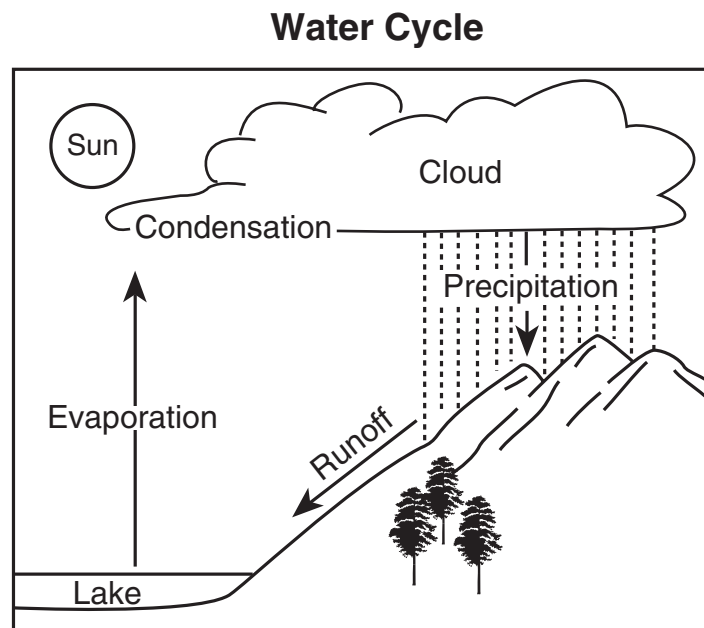
- 34** Write a statement that describes the difference between the volume of liquid *A* and the volume of liquid *D*. [1]

- 35** The diagram below shows the Sun and Earth. Letter *X* shows a location on Earth's surface.



Location *X* is shown during the day. Explain why it will be night at location *X* in 12 hours. [1]

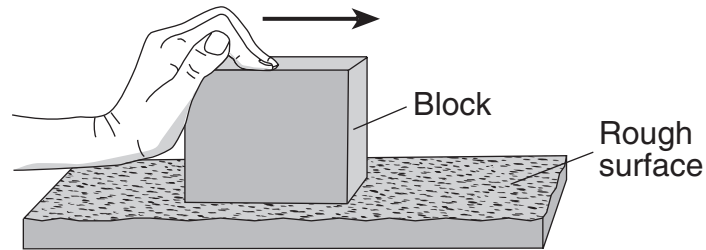
36 Four processes in the water cycle are labeled in the diagram below.



The first column of the chart below describes what happens during each process in the water cycle. Complete the chart by filling in the word for **each** process. The process in the first row is shown. [1]

What Happens During the Process	Water Cycle Process
Water falls from the cloud to the ground.	precipitation
Liquid water flows over Earth's surface.	
Liquid water changes into water vapor.	
Water vapor changes into liquid water.	

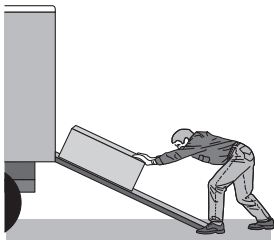
Base your answers to questions 37 and 38 on the diagram below, which shows a wooden block being pushed across a rough surface.



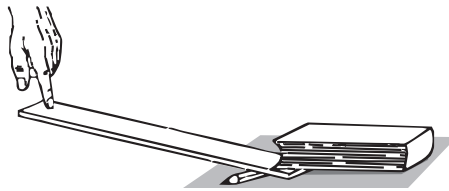
37 Explain why pushing the wooden block across the rough surface will make the bottom of the block feel warm. [1]

38 Describe **one** change to the block or to the surface that could be made so that the bottom of the block will **not** feel as warm after it is pushed. [1]

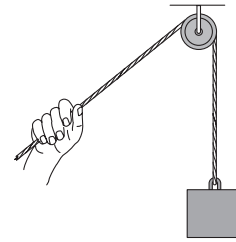
- 39** The diagrams below, labeled *A*, *B*, and *C*, show three different simple machines being used.



A



B



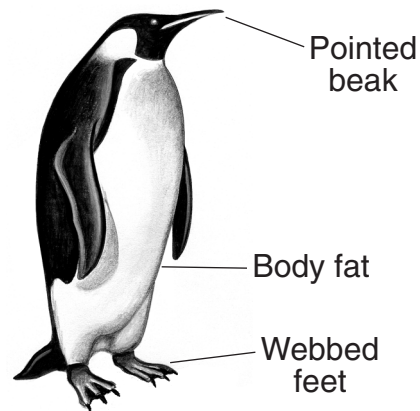
C

(Not drawn to scale)

In the chart below, write the letter of the diagram that shows an example of **each** simple machine. [1]

Simple Machine	Letter
lever	
pulley	
inclined plane	

- 40** The diagram below shows a penguin. This penguin lives near water in a very cold environment. Three body structures are labeled.

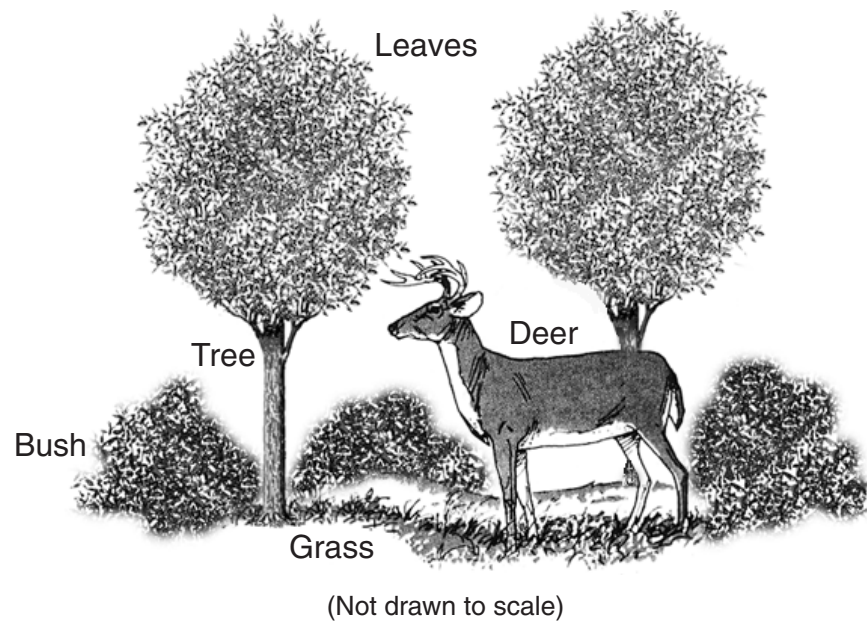


Select **one** body structure labeled in the diagram. Explain how it helps the penguin survive in its environment. [1]

Body structure: _____

How this body structure helps the penguin survive in its environment:

41 The diagram below shows a deer in a woodland environment.



Identify **two** ways that the deer depends on plants to survive. [2]

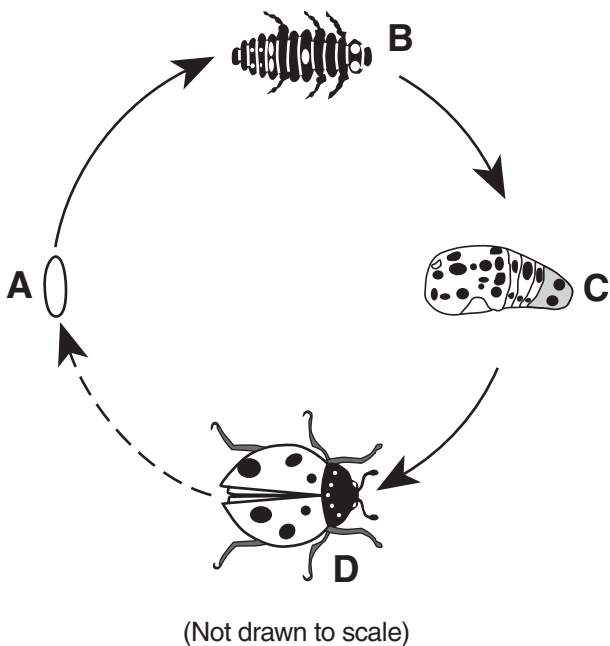
(1) _____

(2) _____

42 Give **one** reason why butterflies migrate in the fall. [1]

Base your answers to questions 43 and 44 on the diagram below and on your knowledge of science. The diagram shows the life cycle of a lady bird beetle (ladybug). The four stages of development are labeled A, B, C, and D.

The Life Cycle of the Lady Bird Beetle



43 In the chart below, write the letter from the diagram that represents **each** stage of development listed. The letter for the adult stage is shown. [1]

Stage of Development	Letter
adult	D
egg	
pupa	
larva	

44 List **two** things that the lady bird beetle and other animals need to live. [1]

_____ and _____

GRADE 4**ELEMENTARY-LEVEL
SCIENCE TEST****JUNE 2015 WRITTEN TEST****FOR TEACHERS ONLY****ANSWER KEY FOR PART I**

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

31 [1] Allow 1 credit for 2007.

32 [1] Allow 1 credit for 5 cm.

33 [1] Allow 1 credit for liquid *E*.

34 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The volume of liquid *A* is 12 mL less than the volume of liquid *D*.
- *D* has 12 mL more than *A*.
- Liquid *D* has a greater volume.
- *A* has less volume than *D*.
- *D* is three times *A*.
- *A* has 6 mL and *D* has 18 mL.

Unacceptable responses include:

D has 18 mL. (Acceptable responses must compare the volumes of *A* and *D*.)

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

- Earth rotates every 24 hours, so in 12 hours, the *X* will be facing away from the Sun.
- In 12 hours, side *X* will no longer be facing the Sun.
- Earth turns on its axis.
- Earth spins.
- Earth rotates.

36 [1] Allow 1 credit for an acceptable response in *all three* unshaded rows of the chart, as shown below.

What Happens During the Process	Water Cycle Process
Water falls from the cloud to the ground.	precipitation
Liquid water flows over Earth’s surface.	runoff
Liquid water changes into water vapor.	evaporation
Water vapor changes into liquid water.	condensation

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

- Friction between the block and the rough surface produces heat.
- Friction produces heat.
- Heat is produced by rubbing.
- Rubbing the block on the rough surface causes friction, which produces heat.
- friction

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

- Change to a smoother surface.
- Change the block to plastic because there would be less friction when it rubs on the rough surface.
- Push the block a shorter distance.
- Push down on the block with less force so there will be less friction.
- Add oil to the surface.
- Put wax on the block.

Unacceptable responses include: Change the surface. (This is not specific enough. Acceptable responses must specify *how* to change the surface.)

39 [1] Allow 1 credit for *three* acceptable responses as shown below.

Simple Machine	Letter
lever	B
pulley	C
inclined plane	A

40 [1] Allow 1 credit for an acceptable response for the selected body structure. Acceptable responses include, but are not limited to:

Body Structure	How the Structure Helps the Penguin Survive in its Environment
pointed beak/beak	<ul style="list-style-type: none">— catch food— eat food— defend itself
body fat/fat	<ul style="list-style-type: none">— stay warm— provide energy— protect the body— slide on its belly— store energy/food
webbed feet/feet	<ul style="list-style-type: none">— move in water— walk on ice— swim— carry the egg/baby to protect it

- 41 [2] Allow a maximum of 2 credits, 1 credit for each acceptable response. Acceptable responses include, but are not limited to:

Way the Deer Depends on Plants	Similar Responses
shelter	<ul style="list-style-type: none">— It needs the plants for shelter.— It lies in the grass.— shelter
protection	<ul style="list-style-type: none">— It can use the bushes to hide from predators.— It hides behind the bushes.— protection
food/nutrients	<ul style="list-style-type: none">— It gets food from the leaves.— It eats the grass for food.— food— nutrients
oxygen	<ul style="list-style-type: none">— It gets oxygen from the plants.— The plants make oxygen for the deer.— oxygen
comfort	<ul style="list-style-type: none">— The deer needs the tree for shade.

Note: The two acceptable responses must address different ways. Similar responses are grouped together in the second column above.

Unacceptable responses include:

It gets carbon dioxide from the plants.

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

- They move to warmer temperatures.
- decreased food supply in the north
- They move to where there is more food.
- to reproduce
- to find mates
- The butterflies are adapting to a change in the environment.

Unacceptable responses include: Winter is coming. Change of season. These are not specific enough. It is still winter where they are migrating to, it's just warmer.

43 [1] Allow 1 credit for the correct letters in *all three* unshaded rows.

Example of a 1-credit response:

Stage of Development	Letter
adult	D
egg	A
pupa	C
larva	B

Note: Do *not* allow credit for numbers instead of letters. (It is not possible to know which number is being used for which letter.)

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

- air/oxygen
- water
- food
- space