



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

**Released Items  
Support Materials  
2011**

**Grade 8  
Science**

**NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE**

**Grade 8 Science Released Item Information**

Item Number	Big Idea <sup>1</sup>	Assessment Target	Depth of Knowledge Code	Item Type <sup>2</sup>	Answer Key	Total Possible Points
1	INQ	PS 1-1	2	MC	B	1
2	SAE	PS 2-6	2	MC	B	1
3	POC	PS 3-8	2	MC	D	1
4	SAE	ESS 1-2	2	MC	A	1
5	POC	ESS 1-4	2	MC	C	1
6	POC	ESS 2-8	2	MC	C	1
7	FAF	LS 1-2	2	MC	C	1
8	INQ	LS 4-10	1	MC	A	1
9	POC	LS 4-11	2	MC	C	1
10	SAE	LS 1-1	3	CR		4

**Grade 8 Science Released Inquiry Task Information**

Item Number	Big Idea <sup>1</sup>	Inquiry Construct	Depth of Knowledge Code	Item Type <sup>2</sup>	Total Possible Points
1	INQ	8	3	CR	3
2	INQ	4	3	CR	3
3	INQ	5	2	SA	2
4	INQ	6	2	SA	2
5	INQ	13	3	CR	3
6	INQ	10	2	SA	2
7	INQ	1	3	CR	3

<sup>1</sup>Big Idea: NOS = Nature of Science, SAE = Systems and Energy, MAS = Models and Scale, POC = Patterns of Change, FAF = Form and Function, INQ = Scientific Inquiry

<sup>2</sup>Item Type: MC = Multiple Choice, CR = Constructed Response, SA = Short Answer

NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE

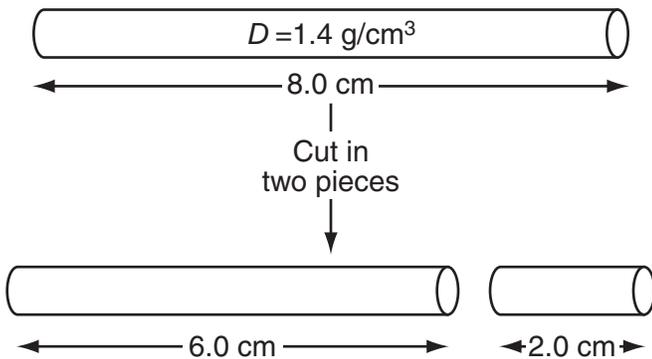
PS1 (5–8) INQ-1 Students will investigate the relationships among mass, volume, and density.

- 1 The table below shows characteristics of a solid, cylindrical rod.

**Characteristics of Cylindrical Rod**

Mass (g)	Volume (cm <sup>3</sup> )	Density (g/cm <sup>3</sup> )
14.0	10.0	1.4

The rod is cut into two pieces, as shown in the diagram below.



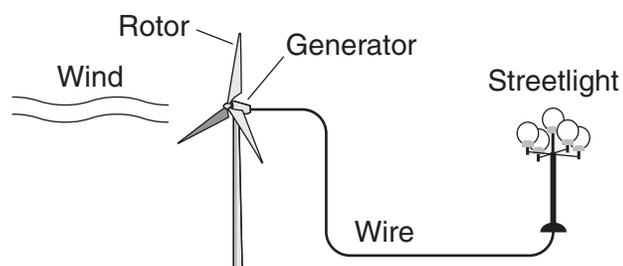
What is the density of the piece of the rod that is 2.0 cm long?

- A.  $0.7 \text{ g/cm}^3$
- B.  $1.4 \text{ g/cm}^3$
- C.  $2.0 \text{ g/cm}^3$
- D.  $2.8 \text{ g/cm}^3$

NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE

**PS2 (5–8) SAE-6** Students will, given a real-world example, show that within a system, energy transfers from one form to another (i.e., chemical, heat, electrical, gravitational, light, sound, mechanical).

- 2 The diagram below shows a windmill system.



Which part of the system directly changes mechanical energy to electrical energy?

- A. rotor
- B. generator
- C. wire
- D. streetlight

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GRADE 8 SCIENCE**

**PS3 (5–8) POC-8** Students will use data to determine or predict the overall net effect of multiple forces (e.g., friction, gravitational, magnetic) on the position, speed, and direction of motion of objects.

- 3 The table below shows the distances and times traveled by four cars moving at constant speeds.

**Distances and Times  
Traveled by Four Cars**

<b>Car</b>	<b>Distance (km)</b>	<b>Time (hr)</b>
W	100	5
X	90	3
Y	80	2
Z	50	1

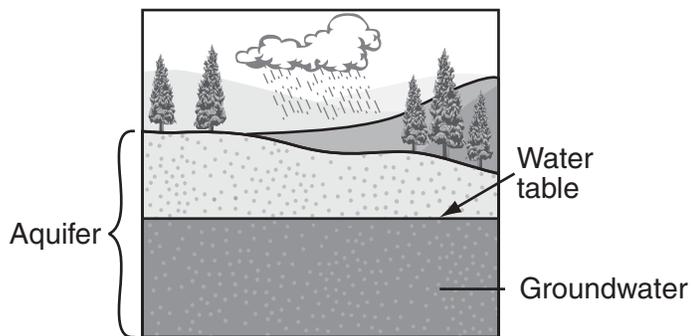
Which car has the greatest average speed?

- A. Car W
- B. Car X
- C. Car Y
- D. Car Z

NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE

ESS1 (5–8) SAE-2 Students will explain the processes that cause the cycling of water into and out of the atmosphere and their connections to our planet’s weather patterns.

- 4 The diagram below shows an aquifer.



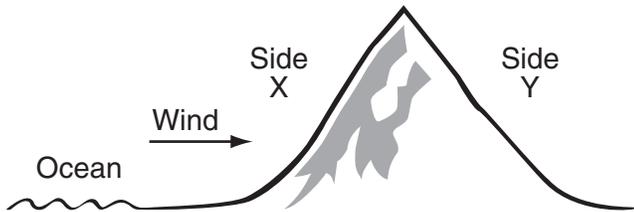
Which statement is **best** supported by the information shown in the diagram?

- A. The water table will rise if there is an increase in rain.
- B. The water table will fall if the slope of the land changes.
- C. The amount of groundwater in the aquifer will decrease if more trees grow.
- D. The amount of groundwater in the aquifer will remain constant if there is a decrease in rain.

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GRADE 8 SCIENCE

**ESS1 (5–8) POC-4** Students will explain the role of differential heating or convection in ocean currents, winds, weather and weather patterns, atmosphere, or climate.

- 5 The diagram below shows wind approaching a mountain from an ocean.



Which phrase describes the environment on Side Y of the mountain?

- A. very cold because the mountain has a high altitude
- B. very warm because the mountain absorbs the Sun's heat
- C. very dry because moisture is lost when rain falls on Side X
- D. very wet because clouds form on Side X and move to Side Y

**NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE**

**ESS2 (5–8) POC-8** Students will explain temporal or positional relationships between or among the Earth, Sun, and Moon (e.g., night/day, seasons, year, tides) OR how gravitational force affects objects in the solar system (e.g., moons, tides, orbits, satellites).

- 6 Why are different phases of the Moon visible from Earth?
- A. The Moon revolves around the Sun and absorbs the Sun's light.
  - B. Earth revolves around the Sun and absorbs the Sun's light.
  - C. The Moon revolves around Earth and reflects the Sun's light.
  - D. Earth revolves around the Sun and reflects the Sun's light.

**NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE**

**LS1 (5–8) FAF-2** Students will describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs, and systems).

- 7** Which parts of the human body work together to defend it from harmful bacteria?
- A. skin cells, capillaries, ribs
  - B. red blood cells, skin cells, lungs
  - C. white blood cells, skin cells, nose
  - D. muscle cells, bone marrow, spleen

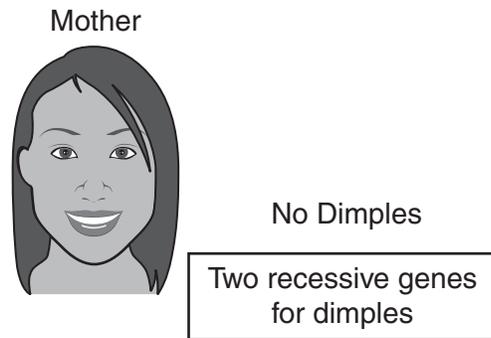
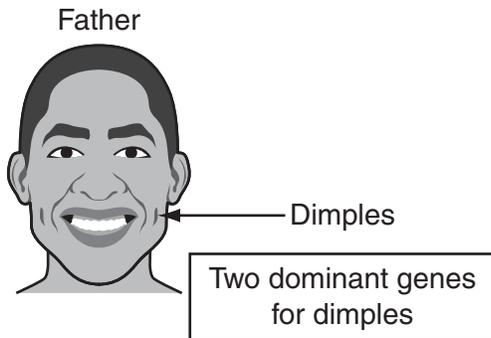
**LS4 (5–8) INQ-10** Students will use data and observations to support the concept that environmental or biological factors affect human body systems (biotic and abiotic).

- 8** Caffeine is a stimulant. Which side effect is a person **most likely** to experience after consuming caffeine?
- A. increased heart rate
  - B. decreased breathing rate
  - C. decreased blood pressure
  - D. increased fine-motor coordination

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GRADE 8 SCIENCE

**LS4 (5–8) POC-11** Students will, using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring.

- 9 The pictures below show a father with dimples and a mother without dimples.



The parents have two sons and two daughters. Based on the parents' genes, which children have dimples?

- A. only the sons
- B. only the daughters
- C. all of the children
- D. none of the children

**NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE**

**LS1 (5–8) SAE-1** Students will, using data and observations about the biodiversity of an ecosystem, make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem.

- 10 An ecosystem in Yellowstone National Park includes populations of coyotes, elk, deer, foxes, gray wolves, hawks, rabbits, mice, and grasses. The table below lists these populations and their diets.

**Yellowstone National  
Park Ecosystem**

Population	Diet
Coyotes	Deer, elk, foxes, mice, rabbits
Elk	Grasses
Deer	Grasses
Foxes	Mice, rabbits
Gray wolves	Deer, elk, foxes, mice, rabbits
Hawks	Mice, rabbits
Rabbits and mice	Grasses
Grasses	_____

- a. Draw a food web that includes all of the populations listed in the table.
- b. Suppose that gray wolves are eliminated from Yellowstone National Park. Predict how the change in the wolf population would initially affect **one** of the consumers in your food web. Use evidence to justify your prediction.

**NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE**

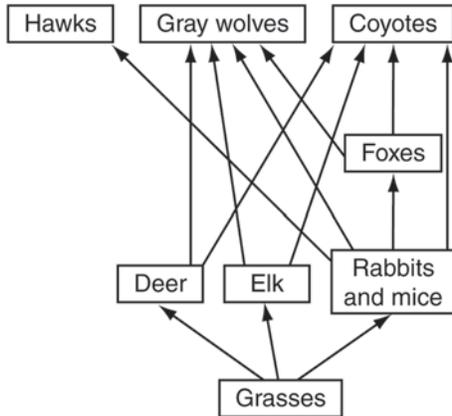
**Scoring Guide**

<b>Score</b>	<b>Description</b>
4	The response demonstrates a thorough understanding of using data and observations about the biodiversity of an ecosystem to make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem. The response includes a food web that includes all of the organisms listed in the table. The response also includes a prediction how the elimination of gray wolves from Yellowstone National Park would initially affect <b>one</b> of the consumers in the food web. The response uses evidence to justify the prediction.
3	The response demonstrates a general understanding of using data and observations about the biodiversity of an ecosystem to make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem. The overall response is general.
2	The response demonstrates a limited understanding of using data and observations about the biodiversity of an ecosystem to make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem. The overall response is limited.
1	The response demonstrates a minimal understanding of using data and observations about the biodiversity of an ecosystem to make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem. The overall response is minimal.
0	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE

Training Notes

a. A thorough understanding can be exemplified by the following food web:



The food web should contain the **8** populations listed in the table (**9** populations if students count the rabbits and mice separately) and arrows correctly connecting **each** diet population to its consumer population. (At each level, multiple arrows should be shown.) For full credit, students must include arrow heads on arrows and the arrows must be correctly pointing toward the consumer.

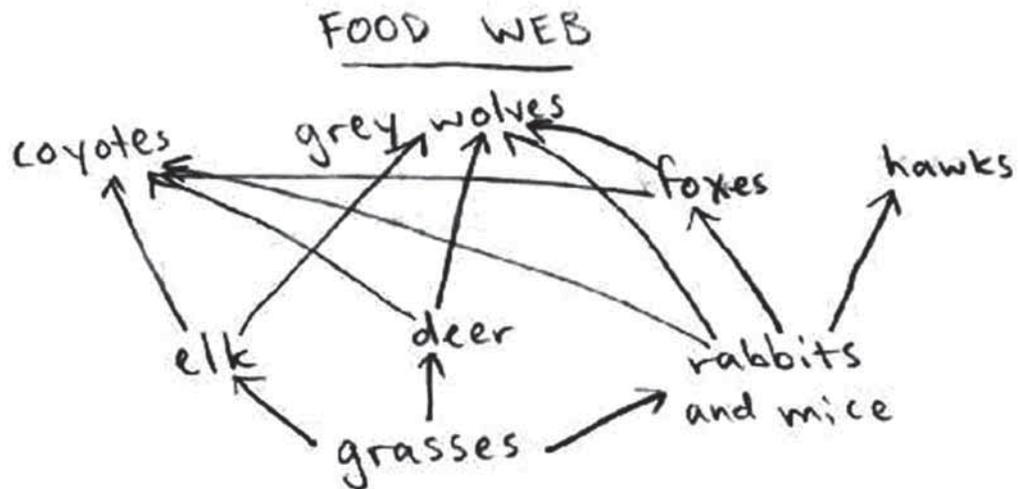
b. A thorough understanding can be exemplified by **one** of the following sample responses:

- Deer (or Elk): These populations would increase because there would be no wolves preying on them.
- Coyotes: This population would increase because there would be more elk, deer, rabbits and mice, and foxes to eat since there would be no competition from wolves.
- Hawks: This population would decrease because the populations of rabbits and mice would decrease due to an increase in foxes. There would be an increase in foxes because there would be no wolves preying on them.
- Foxes: This population would increase because gray wolves eat foxes.
- Rabbits and mice: These populations would increase because no wolves would be preying on them. These populations may also decrease due to an increase in the coyote or fox population.
- Acceptable responses may describe a reasonable prediction of the effect on the consumer population after a time lag.

NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE

SCORE POINT 4

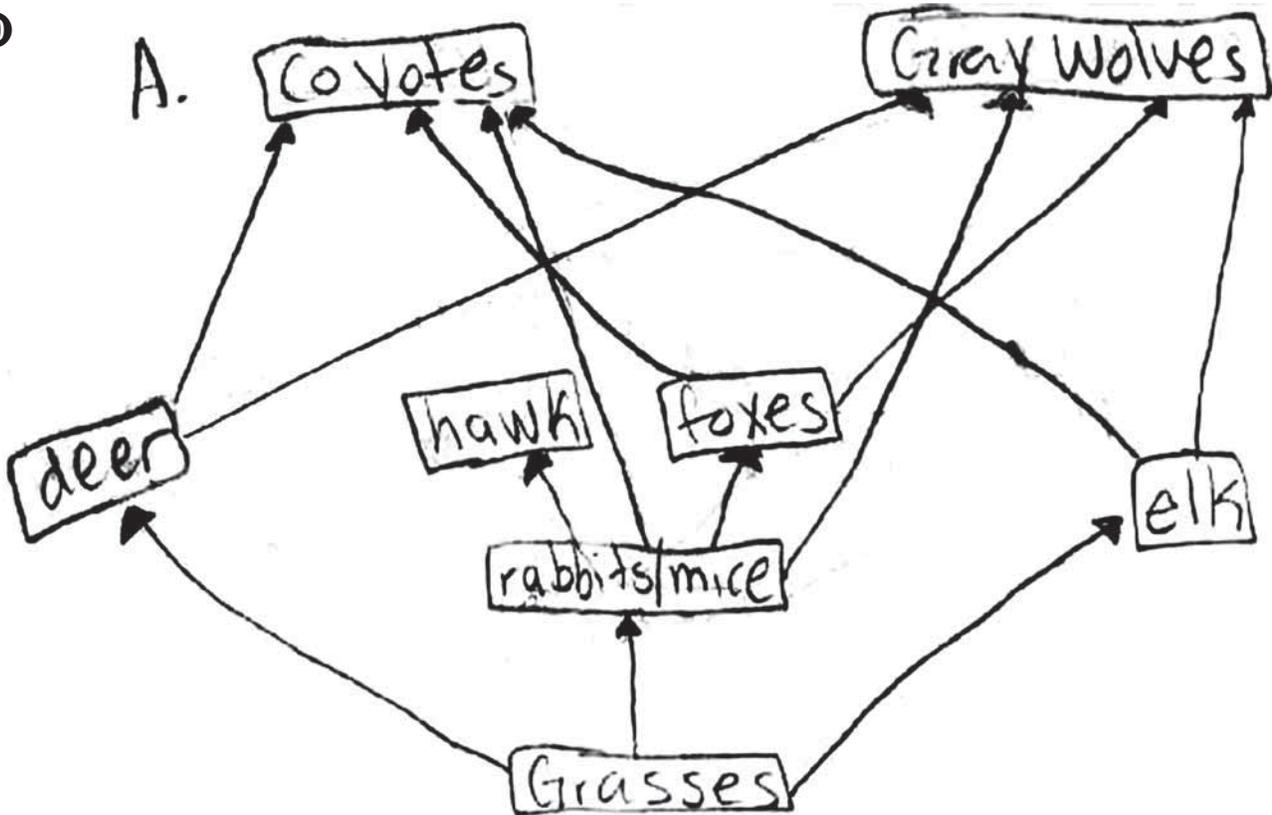
10  
a.



b. If gray wolves were eliminated from Yellowstone National Park, then it would affect parts of the food chain like foxes. There would be more foxes because the wolves would not eat them, and the foxes would also eat other animals more.

Response demonstrates a thorough understanding of using data and observations about the biodiversity of an ecosystem to make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem. Response includes a complete food web and a prediction how the elimination of gray wolves from Yellowstone National Park would initially affect one of the consumers in the food web ("foxes").

10



B. If the gray wolves were eliminated from Yellowstone National Park, the fox population would increase.

Response demonstrates a general understanding of using data and observations about the biodiversity of an ecosystem to make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem. Response includes a complete food web and a prediction how the elimination of gray wolves from Yellowstone National Park would initially affect one of the consumers in the food web ("foxes") with no explanation.

10

A.



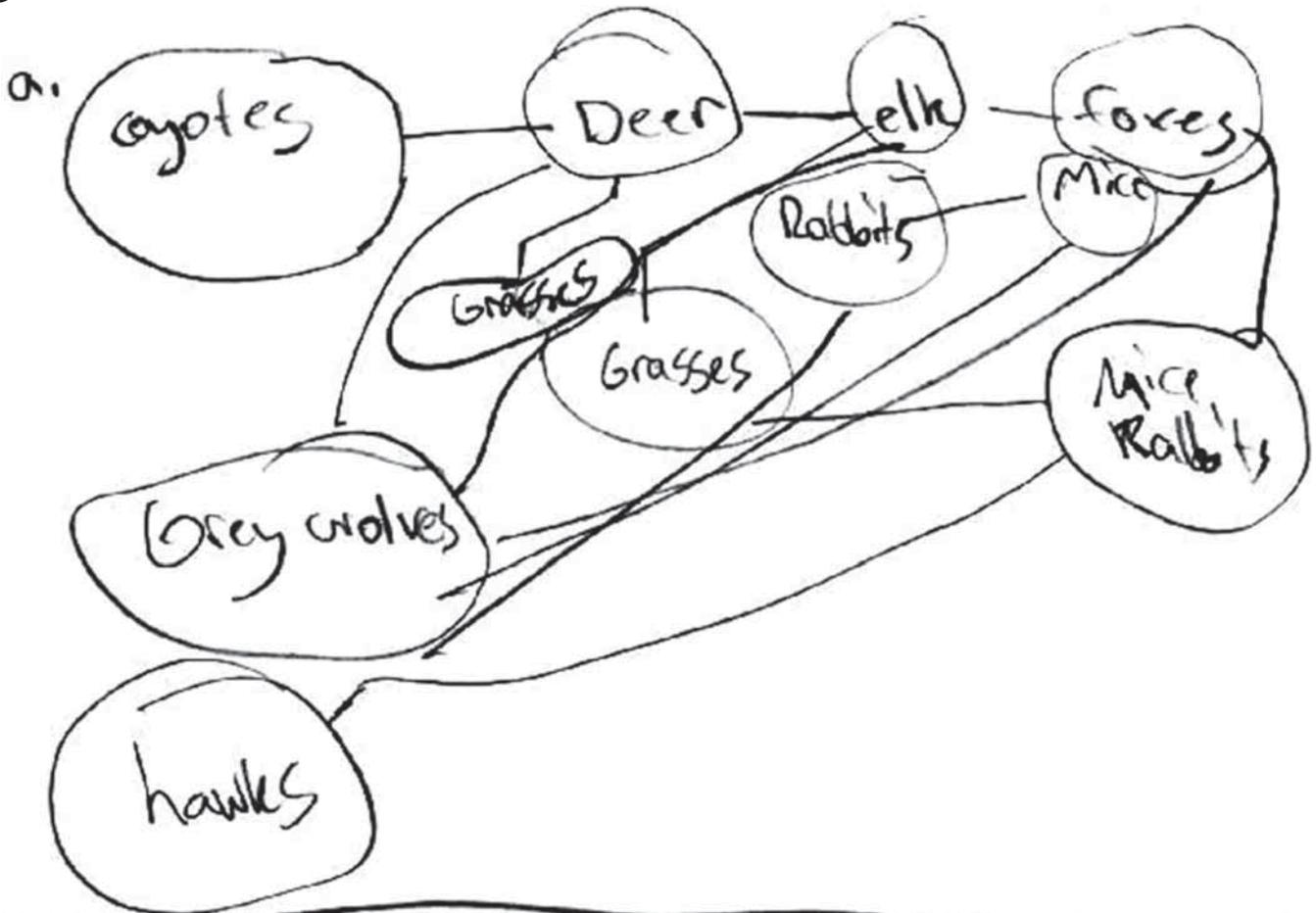
B. If the gray wolves were eliminated from Yellowstone National Park the deer would be effected. This is because only coyotes and the grey wolves eat deer and the deer eat grass. With the wolves gone the deer would over populate.

Response demonstrates a limited understanding of using data and observations about the biodiversity of an ecosystem to make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem. Response includes an unclear food web with marginal trophic organization and a prediction how the elimination of gray wolves from Yellowstone National Park would initially affect one of the consumers in the food web ("deer") with an explanation.

NECAP 2011 RELEASED ITEMS  
GRADE 8 SCIENCE

SCORE POINT 1

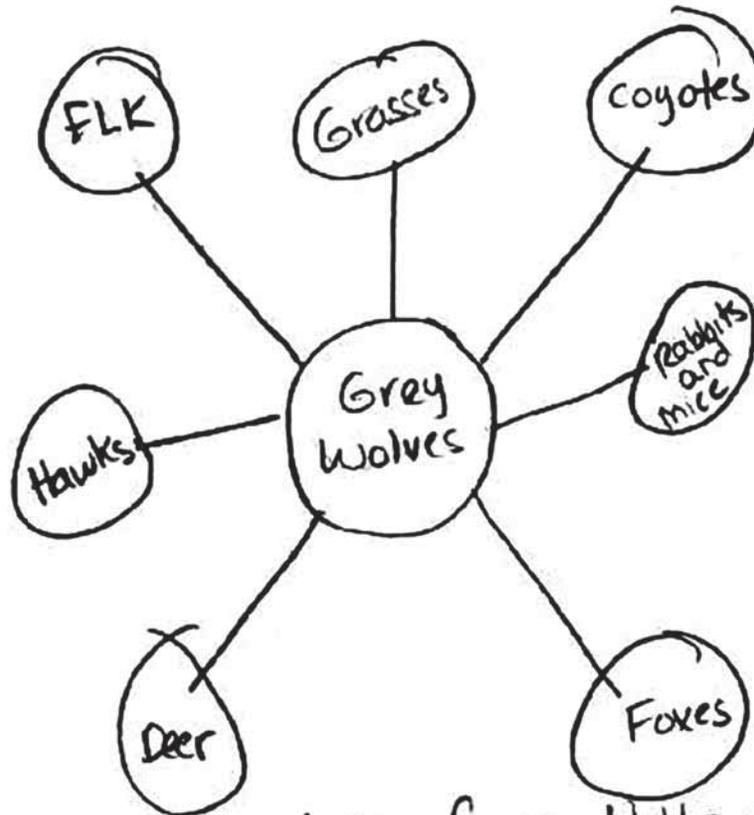
10



3. coyotes would have more Deer, Elk, foxes  
mice and Rabbits to feed on.

Response demonstrates a minimal understanding in part (b) for correct prediction without explanation.  
Part (a) receives no credit.

10



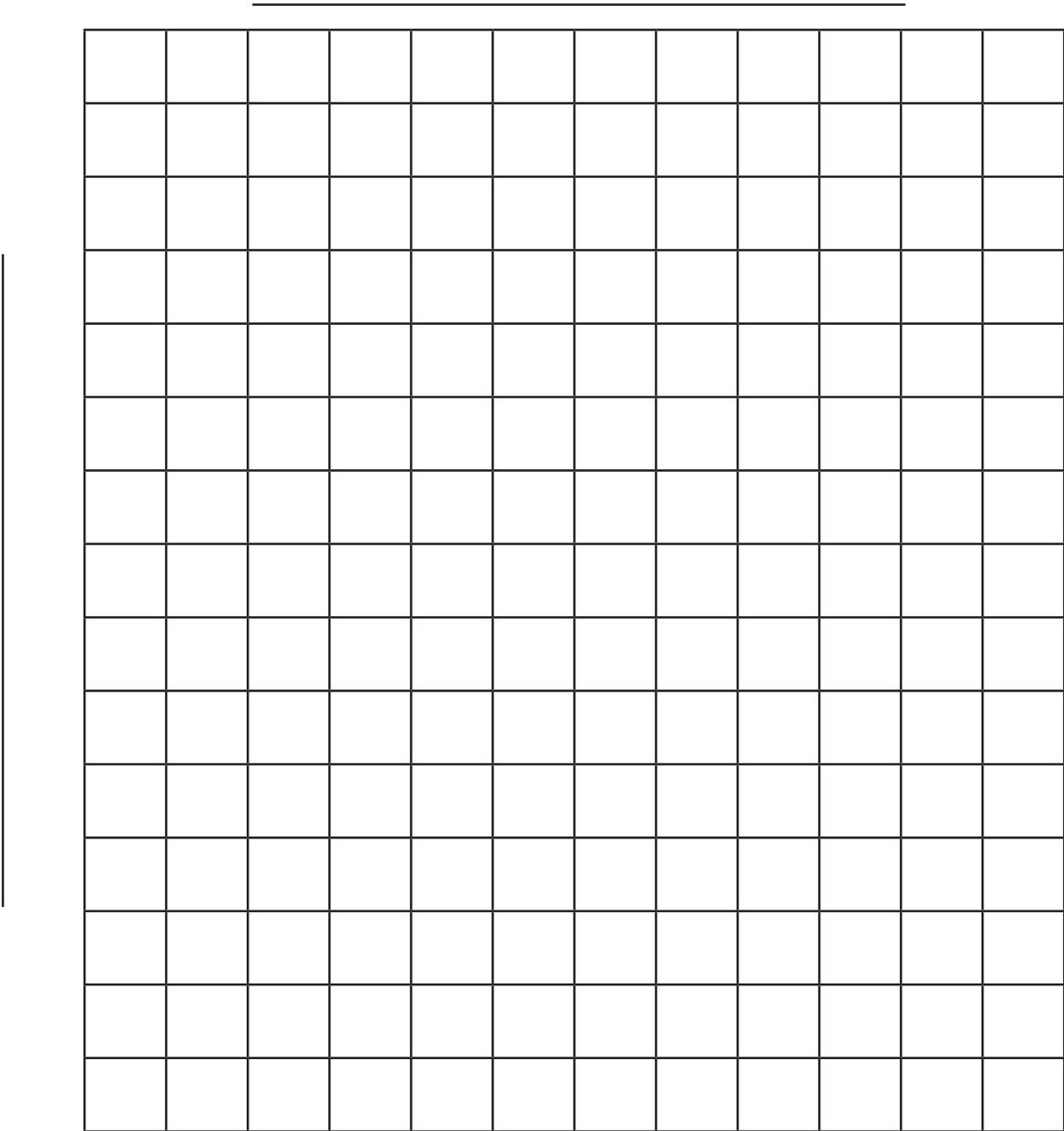
Ⓑ if the grey wolves from Yellowstone Park are eliminated, then they are going to make a policy of no wolves around which then takes out the coyotes and the foxes. which will decrease the wolf population.

Response does not demonstrate understanding of concept.

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

<b>Broad Area of Inquiry:</b>	<b>Conducting Investigations</b>
<b>Inquiry Construct 8:</b>	Use accepted methods for organizing, representing, and manipulating data.

- 1 Use your calculated **averages** from the data table on page 2 to graph the relationship between shrub size (including no shrubs) and number of rabbits caught by the fox. Include a title and all other required elements of a graph.



**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>3</b>	The response demonstrates a thorough understanding of how to use accepted methods for organizing and representing data. The response uses data to construct a graph appropriate for the data. The graph includes a title, labeled axes, and a scale for the range of data plotted.
<b>2</b>	The response demonstrates a general understanding of how to use accepted methods for organizing and representing data.
<b>1</b>	The response demonstrates a limited understanding of how to use accepted methods for organizing and representing data.
<b>0</b>	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes**

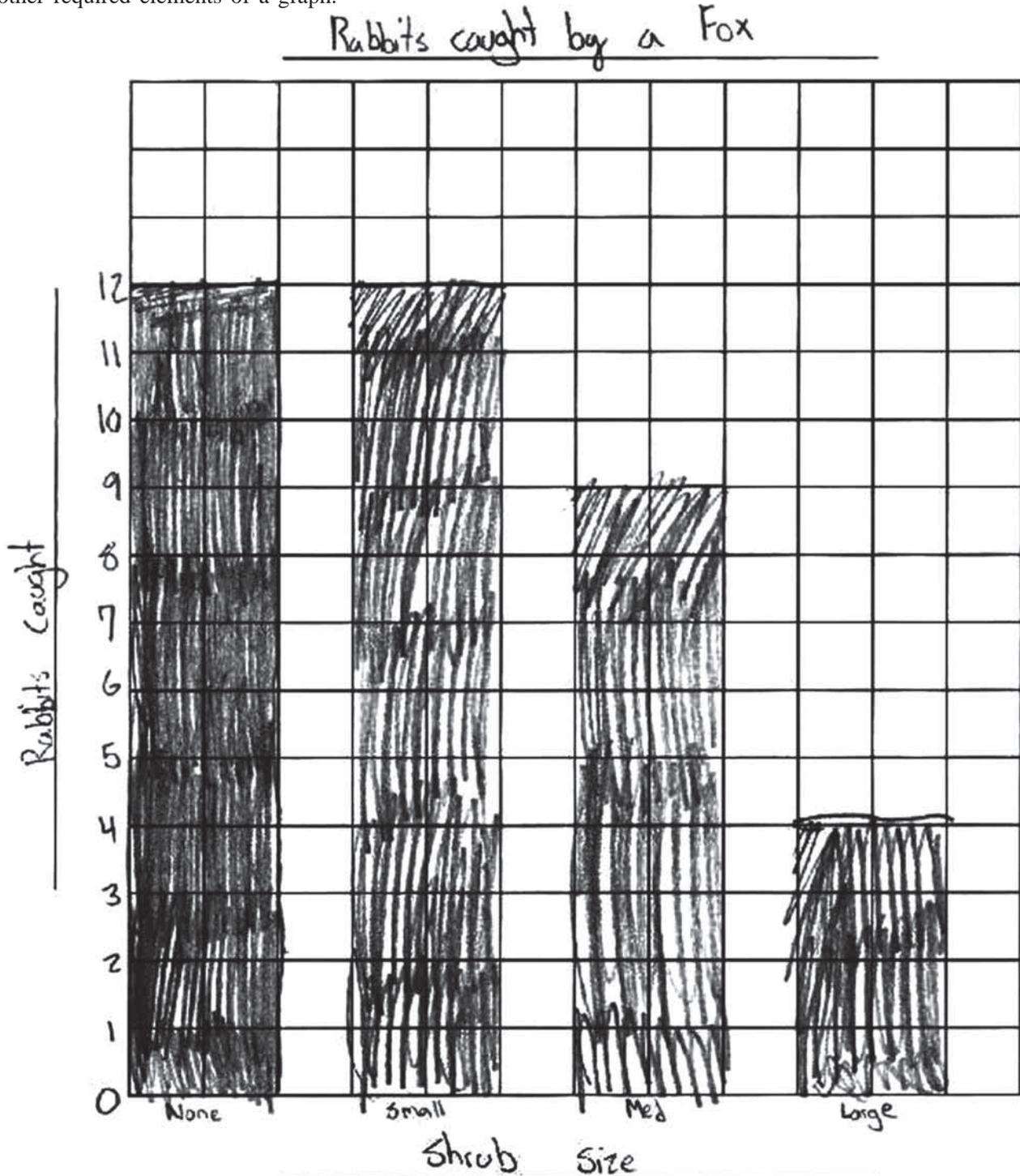
Components of correctly drawn graph should include:

- Format should be a bar graph. (Note: A line graph is not the most appropriate type of graph as it should be used for representing change over time.)
- Axes' titles should be relevant to the data table and include text similar to "Average Number of Caught Rabbits" (*y*-axis) and "Size of Shrubs" (*x*-axis). Students may also use a key or comparable labeling system; however, a key is not a substitute for axes' labels.
- Data range for *y*-axis should include student's averages from his/her data table.
- Data range for *x*-axis should include "no shrubs," "small," "medium," and "large" shrubs.
- Graph title should be relevant to the data represented in the graph and may include text similar to "Relationship between Size of Shrubs and Average Number of Rabbits Caught."

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 3

- 1 Use your calculated **averages** from the data table on page 2 to graph the relationship between shrub size (including no shrubs) and number of rabbits caught by the fox. Include a title and all other required elements of a graph.



Response demonstrates a thorough understanding of organizing and representing data by constructing an appropriate graph. The graph includes a title, labeled axes, and an appropriate scale for the range of data plotted.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 3 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

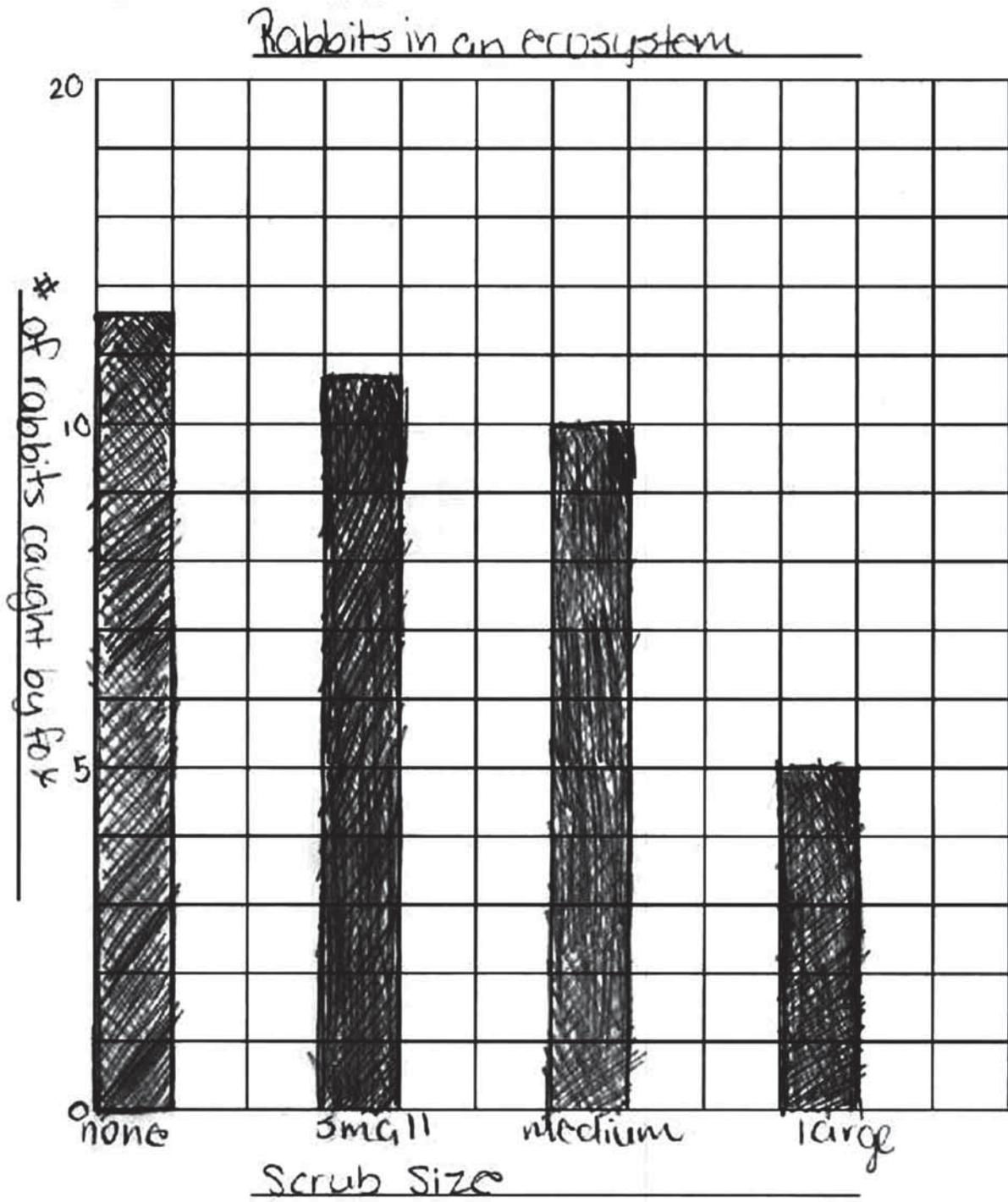
**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
<b>Trial 1</b>	10	9	7	3
<b>Trial 2</b>	12	12	8	5
<b>Trial 3</b>	14	16	11	4
<b>Average (round to nearest whole number)</b>	12	12	9	4

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2

- 1 Use your calculated **averages** from the data table on page 2 to graph the relationship between shrub size (including no shrubs) and number of rabbits caught by the fox. Include a title and all other required elements of a graph.



Response demonstrates a general understanding of organizing and representing data by constructing an appropriate graph. The y-axis scale is incorrect, which causes an incorrect representation of data.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

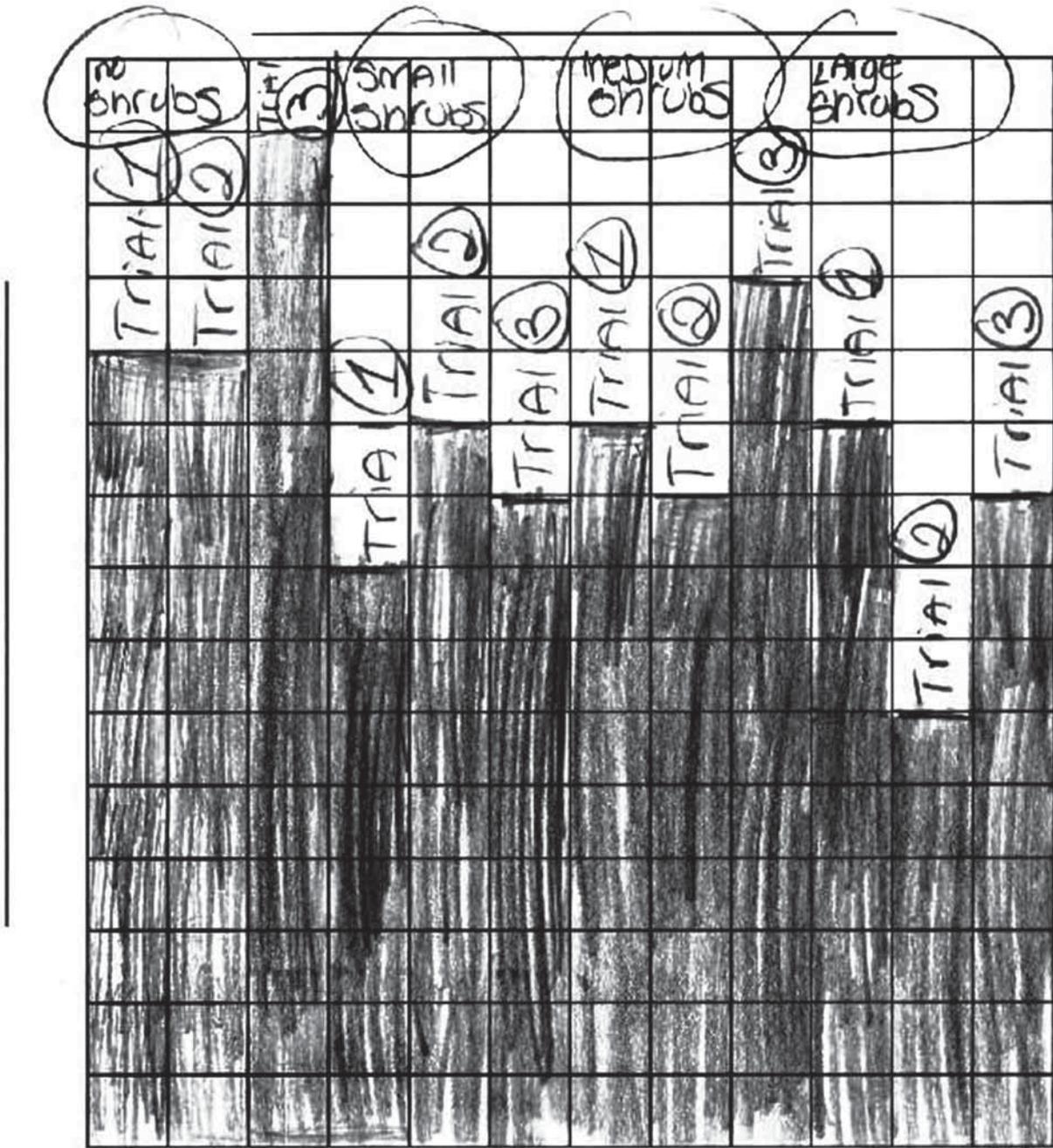
**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
Trial 1	14	15	12	4
Trial 2	14	11	9	6
Trial 3	13	11	9	4
<b>Average (round to nearest whole number)</b>	14	12	10	5

NECAP 2011 RELEASED INQUIRY TASK  
 GRADE 8 SCIENCE

SCORE POINT 1

- 1 Use your calculated **averages** from the data table on page 2 to graph the relationship between shrub size (including no shrubs) and number of rabbits caught by the fox. Include a title and all other required elements of a graph.



Response demonstrates a limited understanding of organizing and representing data by constructing an appropriate graph. Response has correctly graphed each trial if 1 box = 1.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

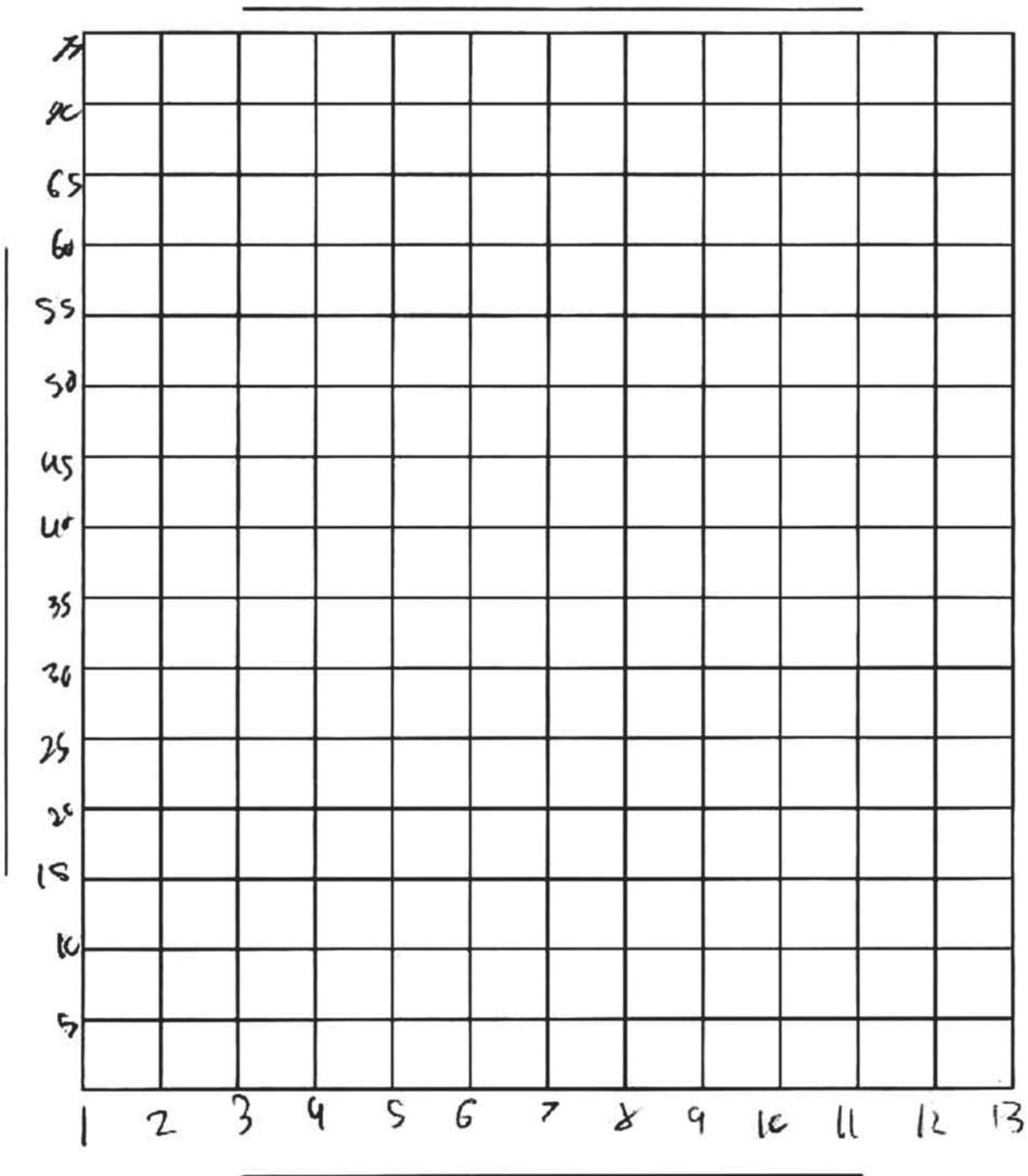
**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
Trial 1	11	8	10	10
Trial 2	11	10	9	6
Trial 3	14	4	12	4
<b>Average (round to nearest whole number)</b>	12	9	10.3	8.3

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 0

- 1 Use your calculated **averages** from the data table on page 2 to graph the relationship between shrub size (including no shrubs) and number of rabbits caught by the fox. Include a title and all other required elements of a graph.



Response is incorrect; no understanding of accepted graphing methods is shown.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 0 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
Trial 1	13	15	9	7
Trial 2	9	12	9	7
Trial 3	15	10	9	7
<b>Average (round to nearest whole number)</b>	37	37	27	21

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

<b>Broad Area of Inquiry:</b>	<b>Planning and Critiquing of Investigations</b>
<b>Inquiry Construct 4:</b>	Identify information/evidence that needs to be collected in order to answer the question, hypothesis, prediction.

- 2 Copy your prediction from page 3 of your Inquiry Booklet. Do your data and observations support your prediction? Use specific data from the investigation to explain your answer.

**Scoring Guide**

Score	Description
3	The response demonstrates a thorough understanding of how to identify information and/or evidence that need to be collected in order to support a prediction. The response explains how the data and observations support the prediction of what happens to the number of rabbits as the size of the shrubs increases. The response includes data to support the prediction.
2	The response demonstrates a general understanding of how to identify information and/or evidence that need to be collected in order to support a prediction.
1	The response demonstrates a limited understanding of how to identify information and/or evidence that need to be collected in order to support a prediction.
0	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes**

Sample response:

The data support my prediction because the data show a decrease in the number of rabbits caught as the shrub size changed from small, to medium, to large. When there were no shrubs, there were an average number of (*insert #*) rabbits caught. When the shrubs were small, there was an average of (*insert #*) rabbits caught. When the shrub size changed to medium, there was an average of (*insert #*) rabbits caught. Finally, when the shrub size was large, there was an average of (*insert #*) rabbits caught.

Note: This is the expected response; however, the students' responses should reflect their data.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 3

- 2 Copy your prediction from page 3 of your Inquiry Booklet. Do your data and observations support your prediction? Use specific data from the investigation to explain your answer.

I believe the larger the shrub, the more space to hide from the foxes without being caught and eaten. My data and observations do in fact support my data. When the ecosystem had no shrubs, an average of 16 rabbits were eaten. With large shrubs, an average of 6 were caught and eaten.

Response demonstrates a thorough understanding. The response describes how the data and observations support the prediction of what happens to the number of rabbits as the size of the shrubs increases. The response includes data to support the prediction ("no shrubs, an average of 16 rabbits were eaten. With large shrubs, an average of 6 were caught and eaten").

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 3 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
<b>Trial 1</b>	14	14	7	6
<b>Trial 2</b>	16	9	10	6
<b>Trial 3</b>	18	12	9	7
<b>Average (round to nearest whole number)</b>	16	~12	~9	6

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2

- 2 Copy your prediction from page 3 of your Inquiry Booklet. Do your data and observations support your prediction? Use specific data from the investigation to explain your answer.

I think that the shrubs are what will help the rabbits hide and will be harder for the fox to try and find them. The bigger the shrubs the more rabbits are safe, the smaller or if there is no shrubs the easier it is for the foxes to catch the rabbits.

I do think that the data and observation support my prediction because as shown in the data table the average of the fox catching goes down more every time the shrubs get bigger.

Response demonstrates a general understanding. Prediction is supported by observation and some information, but no data.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
<b>Trial 1</b>	11	10	8	2
<b>Trial 2</b>	13	6	10	4
<b>Trial 3</b>	12	8	4	4
<b>Average (round to nearest whole number)</b>	12	8	7	3

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1

- 2 Copy your prediction from page 3 of your Inquiry Booklet. Do your data and observations support your prediction? Use specific data from the investigation to explain your answer.

I think that more shrubs, there are the less rabbits will die.

yes, my data and observations support my prediction.

Response demonstrates a limited understanding. Prediction is supported by an observation, but no explanation or data is provided.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
Trial 1	9	10	8	3
Trial 2	10	9	6	4
Trial 3	11	10	7	4
<b>Average (round to nearest whole number)</b>	10	10	7	4

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 0

- 2 Copy your prediction from page 3 of your Inquiry Booklet. Do your data and observations support your prediction? Use specific data from the investigation to explain your answer.

I predict that if the shrub is smaller then the easier it is for the fox to get the rabbits.

Response is incorrect or irrelevant to the skill or concept being measured. Response contains prediction only.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 0 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
<b>Trial 1</b>	15	8	12	7
<b>Trial 2</b>	14	15	9	4
<b>Trial 3</b>	16	14	8	5
<b>Average (round to nearest whole number)</b>	15	12	10	5

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

<b>Broad Area of Inquiry:</b>	<b>Planning and Critiquing of Investigations</b>
<b>Inquiry Construct 5:</b>	Develop an organized and logical approach to investigating the question, including controlling variables.

3 Explain why it was important to conduct multiple trials during the investigation.

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>2</b>	The response demonstrates a general understanding of how to develop an organized and logical approach to investigating a question. The response explains one reason it was important to conduct multiple trials.
<b>1</b>	The response demonstrates a limited understanding of how to develop an organized and logical approach to investigating a question.
<b>0</b>	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes**

Sample response:

Conducting multiple trials allows data to be averaged. This provides a more accurate result because sometimes there are [anomalous] data points that are very different than the majority of the data points (sometimes as a result of error). Multiple trials allow you to reduce the effect of those different points. Conducting multiple trials also reduces error and improves accuracy.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2

- 3 Explain why it was important to conduct multiple trials during the investigation.

The more trials that any scientist does the more accurate the data will be. If you want to be exact with your data gathered you will conduct many trials to get as much detail on what's being tested. The more detail and data you have the more accurate your average's will be.

Response demonstrates a general understanding of how to develop an organized and logical approach to investigating a question. The response describes one reason it was important to conduct multiple trials ("The more detail . . . the more accurate your average's will be").

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1

- 3 Explain why it was important to conduct multiple trials during the investigation.

Its important so you can double check if your doing the experiment right. Also so it can be more accurate.

Response demonstrates a limited understanding of how to develop an organized and logical approach to investigating a question. The response is limited—"double check" if experiment is being done correctly and for accuracy. No explanation is included.

SCORE POINT 0

- 3 Explain why it was important to conduct multiple trials during the investigation.

Because the answers can sometimes change

Response is incorrect or irrelevant to the skill or concept being measured. "Answers can sometimes change" is too vague with no explanation.

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

<b>Broad Area of Inquiry:</b>	<b>Planning and Critiquing of Investigations</b>
<b>Inquiry Construct 6:</b>	Provide reasoning for appropriateness of materials, tools, procedures, and scale used in the investigation.

- 4 In this investigation, you used a model of an ecosystem. Describe **two** ways the real ecosystem was correctly represented by this model.

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>2</b>	The response demonstrates a general understanding of the appropriateness of materials, tools, procedures, and scale used in the investigation. The response describes two ways the real ecosystem was correctly represented by the model.
<b>1</b>	The response demonstrates a limited understanding of the appropriateness of materials, tools, procedures, and scale used in the investigation.
<b>0</b>	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes**

Sample responses:

Two ways the real ecosystem was correctly represented by this model may include

- Shrubs can be different sizes.
- More rabbits can fit in a larger shrub than in a smaller shrub.
- Throwing the disks at random shows that it is somewhat a matter of luck as to which rabbits get eaten.
- Many rabbits would be hunted by one fox.
- Foxes have specific hunting areas.
- Rabbits use shrubs to hide from foxes.
- Foxes catch/eat the rabbits.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2

- 4 In this investigation, you used a model of an ecosystem. Describe **two** ways the real ecosystem was correctly represented by this model.

1. The real ecosystem was correctly represented by this model because the rabbits were scattered randomly instead of all lined up. In the real ecosystem the rabbits would be in random places, like the model represented in this lab.

2. The real ecosystem was correctly represented by this model, once again because the shrubs were randomly placed and all different shapes and sizes, which is similar to the real ecosystem.

Response demonstrates a general understanding of the appropriateness of materials, tools, procedures, and scale used in the investigation. The response demonstrates a general understanding by describing two ways the real ecosystem was correctly represented by the model ("rabbits were scattered randomly" and "shrubs were randomly placed and all different . . . sizes").

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1

- 4 In this investigation, you used a model of an ecosystem. Describe **two** ways the real ecosystem was correctly represented by this model.

Because not every bunny  
got away so it acts  
like the real woods.

Response demonstrates a limited understanding by describing only one way the real ecosystem was correctly demonstrated by the model ("not every bunny got away").

SCORE POINT 0

- 4 In this investigation, you used a model of an ecosystem. Describe **two** ways the real ecosystem was correctly represented by this model.

It was equally represented  
because it had all the  
information. But they could  
have put more detail.

Response is incorrect or irrelevant to the skill or concept being measured. "It was equally represented" is too vague; it is not clear if it is referring to the model, the ecosystem, or something else.

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

<b>Broad Area of Inquiry:</b>	<b>Developing and Evaluating Explanations</b>
<b>Inquiry Construct 13:</b>	Communicate how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations.

- 5 Identify **one** factor (type of organism or physical characteristic) that may be found or introduced in a **real** ecosystem that is not found in the model ecosystem. Explain why changing your model to include this factor would make your model work more like a real ecosystem.

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>3</b>	The response demonstrates a thorough understanding of how communicating scientific knowledge applies to explain results, propose further investigations, or construct alternative explanations. The response identifies one factor that may be found or introduced in the real ecosystem that was not in the model ecosystem. The response explains why changing the model to include the factor would make the model work more like a real ecosystem.
<b>2</b>	The response demonstrates a general understanding of how communicating scientific knowledge applies to explain results, propose further investigations, or construct alternative explanations.
<b>1</b>	The response demonstrates a minimal understanding of how communicating scientific knowledge applies to explain results, propose further investigations, or construct alternative explanations.
<b>0</b>	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

**Training Notes**

Sample responses:

Factors include

- The growth of new (perhaps invasive) plants—this would make the model work more like a real ecosystem because most ecosystems are not isolated from one another and other organisms can enter the ecosystem
- The introduction of a new predator species—this would make the model work more like a real ecosystem because most ecosystems are not isolated from one another and other species can enter the ecosystem
- The introduction of a new prey species—this would make the model work more like a real ecosystem because most ecosystems are not isolated from one another and other species can enter the ecosystem
- Diseases that affect the animal or plant populations—this would make the model work more like a real ecosystem because most ecosystems are not isolated from one another and other species can enter the ecosystem and bring diseases
- Weather (e.g., rainfall, snow)—this would make the model work more like a real ecosystem because weather is a real factor that affects the hunting/hiding/foraging behaviors of animals
- Topography (e.g., hills, valleys)—this would make the model work more like a real ecosystem because many ecosystems are not perfectly flat and the animals' hunting/hiding/foraging behaviors may be affected by hills and valleys
- Time of day—this would make the model work more like a real ecosystem because rabbits are more active during dawn and dusk, which affects whether foxes can find them

Note: See rubric. Responses that include only a factor or an explanation have a maximum score point of 1.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 3

- 5 Identify **one** factor (type of organism or physical characteristic) that may be found or introduced in a **real** ecosystem that is not found in the model ecosystem. Explain why changing your model to include this factor would make your model work more like a real ecosystem.

A physical characteristic that is not found in the model is a tree - usually, rabbits and foxes live in the woods, so it would make sense to include trees in the model. Including this factor would make my model work more like a real ecosystem because a tree would be an obstacle for the rabbits, and there wouldn't be as many shrubs to hide in. This is a very real situation, so it would make the model more accurate.

Response demonstrates a thorough understanding by identifying one factor that may be found or introduced in the real ecosystem that was not in the model ecosystem. The response explains why changing the model to include the factor would make the model work more like a real ecosystem ("tree: an obstacle for the rabbits," and "wouldn't be as many shrubs to hide in").

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2

- 5 Identify **one** factor (type of organism or physical characteristic) that may be found or introduced in a **real** ecosystem that is not found in the model ecosystem. Explain why changing your model to include this factor would make your model work more like a real ecosystem.

In an environment where rabbits live, there would be a lot of holes around where they live and instead of hiding in the bushes, they could also crawl into their holes where the predators can't go.

Response demonstrates a general understanding by identifying one factor that may be found or introduced in the real ecosystem that was not in the model ecosystem. The response includes a general explanation (holes: "instead of hiding in the bushes," the rabbits could hide in holes).

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1

- 5 Identify **one** factor (type of organism or physical characteristic) that may be found or introduced in a **real** ecosystem that is not found in the model ecosystem. Explain why changing your model to include this factor would make your model work more like a real ecosystem.

There wouldn't just be shrubs to hide behind. there might be trees or big rocks.

Response demonstrates a minimal understanding by identifying one factor that may be found or introduced in the real ecosystem ("trees or big rocks") with a minimal explanation.

SCORE POINT 0

- 5 Identify **one** factor (type of organism or physical characteristic) that may be found or introduced in a **real** ecosystem that is not found in the model ecosystem. Explain why changing your model to include this factor would make your model work more like a real ecosystem.

if you took out the shrubs you would be able to catch more rabbits.

Response is irrelevant to the skill or concept being measured.

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

<b>Broad Area of Inquiry:</b> <b>Conducting Investigations</b> <b>Inquiry Construct 10:</b> Summarize results based on data.
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- 6 Describe the relationship between the predator and prey populations from Year 0 through Year 15. Use specific data from the graph in your description.

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>2</b>	The response demonstrates a general understanding of how to summarize results based on data. The response describes the changes between the predator and prey populations from Year 0 through Year 15 and uses specific information from the graph.
<b>1</b>	The response demonstrates a limited understanding of how to summarize results based on data.
<b>0</b>	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes**

Sample responses:

- After the number of prey increased, the number of predators increased; then, after the number of prey decreased, the number of predators decreased.
- The number of prey increases to around 440 at Year 2, then decreases to about 20 at Year 7 because the number of predators has been increasing. Then the number of prey increases again to around 440 at Year 15, followed by an increase in the number of predators.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2 (EXAMPLE A)

- 6 Describe the relationship between the predator and prey populations from Year 0 through Year 15. Use specific data from the graph in your description.

There population fluctuates, when the lines are high then it means there enough prey to feed the predators and they both are doing good. When the dotted line is low then the prey is dying from the predators, The predator then starts dying from starvation and attacks from other predators, when the predators are so low the prey starts to grow but so does the predators. Then this whole thing happens again.

Response demonstrates a general understanding of how to summarize results based on data. The response describes the changes between the predator and prey populations from Year 0 through Year 15 (data is in the form of factual information, rather than numbers) and uses specific information from the graph (refers to the lines in the graph).

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2 (EXAMPLE B)

- 6 Describe the relationship between the predator and prey populations from Year 0 through Year 15. Use specific data from the graph in your description.

This information shows that starting at year zero, when the predator population is low, the prey population is high. What happens, though, is the prey population steadily decreases once the predator population increases. This happens at years three, fifteen, etc. Once the prey population starts to drop to about 200, the predator population also decreases because they are running out of food. Then as the predator population suffers at its lowest point of about 20 or 30, the prey population skyrockets. This cycle continues over and over again.

Response demonstrates a general understanding of how to summarize results based on data. The response describes the changes between the predator and prey populations from Year 0 through Year 15 and uses specific information from the graph (data is in the form of numbers).

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1

- 6 Describe the relationship between the predator and prey populations from Year 0 through Year 15. Use specific data from the graph in your description.

The relationship I see is over the 15 years they always have a flow, as the population increase for prey so does predator and when it decrease it goes right along side of each other.

Response demonstrates a limited understanding of how to summarize results based on data. The response includes the relationship but uses no specific data from the graph.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 0

- 6 Describe the relationship between the predator and prey populations from Year 0 through Year 15. Use specific data from the graph in your description.

There has been a constant number in Prey due to the fact that the predator is also a constant number. For example the predator has a constant number every 6-7 years.

Response is incorrect. The response does not demonstrate an understanding of the information in the graph.

**NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE**

**Broad Area of Inquiry:** **Formulating Questions and Hypothesizing**  
**Inquiry Construct 1:** Analyze information from observations, research, or experimental data for the purpose of formulating a question, hypothesis, or prediction.

- 7 A fire occurred in the ecosystem represented in the graph on page 6 at Year 30, destroying the large shrubs. Only small shrubs grew back over the next 15 years. Based on what you learned in your investigation and the graph on page 6, explain how the graph for the prey population from Years 30 to 45 would compare to the years before the fire. Use data from your investigation to support your reasoning.

**Scoring Guide**

Score	Description
3	The response demonstrates a thorough understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a hypothesis or prediction. The response uses information and data from the investigation to describe and explain how the graph of the prey population would look from years 30 to 45 compared to before the fire.
2	The response demonstrates a general understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a hypothesis or prediction.
1	The response demonstrates a limited understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a hypothesis or prediction.
0	The response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes**

Sample response:

The graph of the prey population would decrease for several years after the fire because only small shrubs would be available for the rabbits to hide in. In the investigation, more rabbits were caught by the fox when the shrubs in the ecosystem were small, (*insert data*) versus when the shrubs were large, (*insert data*). The rabbit population may then increase because shrubs that are larger sizes may grow over time and the rabbits would have more places to hide. [Students may also write that, based on the graph, the rabbit population will decrease for several years, the predator population will decrease. This will then cause the rabbit population to increase again, followed by an increase in the predator population.]

Note: See rubric. Responses that include only an explanation or data relating to the investigation have a maximum score point of 1.

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 3

- 7 A fire occurred in the ecosystem represented in the graph on page 6 at Year 30, destroying the large shrubs. Only small shrubs grew back over the next 15 years. Based on what you learned in your investigation and the graph on page 6, explain how the graph for the prey population from Years 30 to 45 would compare to the years before the fire. Use data from your investigation to support your reasoning.

With only small shrubs to hide in, the prey population will go down because it will be more difficult for them to hide from predators. This is proven by my investigation. With small shrubs many of the rabbits died, but with large shrubs only one-sixth of that amount were caught. Eventually, with such little prey, the predator population would go down. Then, with such few predators, the prey population will go up very high and the cycle will continue.

Response demonstrates a thorough understanding by using information and data from the investigation to describe and explain how the graph of the prey population would look from Years 30 to 45 compared to before the fire ("With small shrubs many of the rabbits died, but with large shrubs only one-sixth of that amount were caught").

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 3 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
Trial 1	18	14	10	4
Trial 2	16	12	7	0
Trial 3	20	17	12	5
<b>Average (round to nearest whole number)</b>	18	14	10	3

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2

- 7 A fire occurred in the ecosystem represented in the graph on page 6 at Year 30, destroying the large shrubs. Only small shrubs grew back over the next 15 years. Based on what you learned in your investigation and the graph on page 6, explain how the graph for the prey population from Years 30 to 45 would compare to the years before the fire. Use data from your investigation to support your reasoning.

Seeing as small shrubs barely protected the bunnies from the fox in the investigation, I don't think they would be much help to this ecosystem. I believe that this would cause the prey population to drop exceedingly, leaving the predators to eventually drop in population as well. Once they eat all of their prey, what food will they have afterward?

Response demonstrates a general understanding by using information and data from the investigation to describe and explain how the graph of the prey population would look from Years 30 to 45 compared to before the fire ("small shrubs barely protected the bunnies from the fox").

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 2 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
<b>Trial 1</b>	15	13	15	8
<b>Trial 2</b>	18	18	10	4
<b>Trial 3</b>	15	13	12	5
<b>Average (round to nearest whole number)</b>	16	15	12	6

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1

- 7 A fire occurred in the ecosystem represented in the graph on page 6 at Year 30, destroying the large shrubs. Only small shrubs grew back over the next 15 years. Based on what you learned in your investigation and the graph on page 6, explain how the graph for the prey population from Years 30 to 45 would compare to the years before the fire. Use data from your investigation to support your reasoning.

The prey population would go down because the prey would have less places to hide and the predators would get them easier.

Response demonstrates a limited understanding by using information and data from the investigation to describe and explain how the graph of the prey population would look from Years 30 to 45 compared to before the fire. ("The prey population would go down because the prey would have less places to hide" implies a reference to the investigation.)

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 1 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
<b>Trial 1</b>	17	15	13	8
<b>Trial 2</b>	15	14	12	7
<b>Trial 3</b>	16	13	11	6
<b>Average (round to nearest whole number)</b>	16	14	12	7

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 0

- 7 A fire occurred in the ecosystem represented in the graph on page 6 at Year 30, destroying the large shrubs. Only small shrubs grew back over the next 15 years. Based on what you learned in your investigation and the graph on page 6, explain how the graph for the prey population from Years 30 to 45 would compare to the years before the fire. Use data from your investigation to support your reasoning.

There was no more population after the fire. If there was no fire, there would still be the same relationship between them.

Response is incorrect. (Response makes an assumption that all will perish in the fire.)

NECAP 2011 RELEASED INQUIRY TASK  
GRADE 8 SCIENCE

SCORE POINT 0 (CONTINUED)

**Directions:**

- Copy your data from the data table on page 5 of your Inquiry Booklet to the data table below. Be sure to double-check that you copied the data correctly.

**Data Table: Rabbits Caught by Fox**

<b>Rabbits Caught by Fox</b>	<b>No Shrubs</b>	<b>Small Shrubs</b>	<b>Medium Shrubs</b>	<b>Large Shrubs</b>
Trial 1	17	11	7	4
Trial 2	15	14	12	4
Trial 3	16	14	12	4
<b>Average (round to nearest whole number)</b>	16	12	10	4