



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

**Released Items
Support Materials
2010**

**Grade 11
Science**

**NECAP 2010 RELEASED ITEMS
GRADE 11 SCIENCE**

Grade 11 Science Released Item Information

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

Grade 11 Science Released Inquiry Task Information

| Item Number | Big Idea ¹ | Inquiry Construct | Depth of Knowledge Code | Item Type ² | Total Possible Points |
|-------------|-----------------------|-------------------|-------------------------|------------------------|-----------------------|
| 1 | INQ | 1 | 3 | SA | 2 |
| 2 | INQ | 3 | 2 | SA | 2 |
| 3 | INQ | 12 | 3 | SA | 2 |
| 4 | INQ | 12 | 3 | SA | 2 |
| 5 | INQ | 12 | 3 | CR | 3 |
| 6 | INQ | 4 | 2 | SA | 2 |
| 7 | INQ | 4 | 2 | SA | 2 |
| 8 | INQ | 13 | 3 | CR | 3 |

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

²Item Type: MC = Multiple Choice, CR = Constructed Response, SA = Short Answer

NECAP 2010 RELEASED ITEMS
GRADE 11 SCIENCE

PS1 (9–11) INQ-1 Students will use physical and chemical properties as determined through an investigation to identify a substance.

- 1 Element X is added to an airtight container at room temperature and compressed to half its original volume.

Which element is **most likely** element X?

- A. carbon
- B. copper
- C. mercury
- D. nitrogen

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PS1 (9–11) POC-3 Students will explain how properties of elements and the location of elements on the periodic table are related.

Please use the periodic table on the reference sheet to answer the question.

- 2 Sodium (Na) metal reacts violently with water to form hydrogen gas. Which element has a similar reaction when combined with water?
- A. gold (Au)
 - B. lithium (Li)
 - C. silicon (Si)
 - D. zinc (Zn)

**NECAP 2010 RELEASED ITEMS
GRADE 11 SCIENCE**

PS3 (9–11) POC-9 Students will apply the concepts of inertia, motion, and momentum to predict and explain situations involving forces and motion, including stationary objects and collisions.

Please use the Formulas on the reference sheet to answer the question.

- 3 Four colored balls are thrown against a wall. The table below shows the masses and velocities of the balls.

Data for Four Balls

| Color | Mass (g) | Velocity (m/s) |
|--------------|-----------------|-----------------------|
| Red | 4 | 7 |
| Orange | 12 | 2 |
| Yellow | 2 | 11 |
| Green | 9 | 3 |

Which ball had the **greatest** momentum when it hit the wall?

- A. the red ball
- B. the orange ball
- C. the yellow ball
- D. the green ball

**NECAP 2010 RELEASED ITEMS
GRADE 11 SCIENCE**

| |
|---|
| PS3 (9–11) POC-9 Students will apply the concepts of inertia, motion, and momentum to predict and explain situations involving forces and motion, including stationary objects and collisions. |
|---|

Please use the Formulas on the reference sheet to answer the question.

- 4 The rotational velocity of Earth is 463 m/s at the equator.
- a. Calculate the momentum of a 60 kg student standing at the equator. Show your calculations and include units in your answer.

 - b. Explain why the student lands in the same spot if he jumps straight up, even though Earth is rotating.

**NECAP 2010 RELEASED ITEMS
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Scoring Guide

| Score | Description |
|--------------|--|
| 4 | The response demonstrates a thorough understanding of how to apply the concepts of inertia, motion, and momentum. The response correctly calculates the momentum of a 60 kg student standing at the equator, shows the calculations, and includes units in the answer. The response also explains in detail why the student lands in the same spot if he jumps straight up, even though Earth is rotating. |
| 3 | The response demonstrates a general understanding of how to apply the concepts of inertia, motion, and momentum. The overall response is general. |
| 2 | The response demonstrates a limited understanding of how to apply the concepts of inertia, motion, and momentum. The overall response is limited. |
| 1 | The response demonstrates a minimal understanding of how to apply the concepts of inertia, motion, and momentum. The overall response is minimal. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

a. A thorough response can be exemplified by the following sample response:

$$p = mv, p = 60 \text{ kg} \times 463 \text{ m/s} = 27,780 \text{ kg} \cdot \text{m/s}$$

b. A thorough response can be exemplified by the following sample response:

- The student and Earth have the same velocity.
- The student has inertia because there are no external forces.
- Objects tend to stay in motion unless they are acted upon by an outside force. Therefore, the student will continue moving at the same speed as Earth. There are no outside forces preventing the student from moving with the same velocity.

NECAP 2010 RELEASED ITEMS
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SCORE POINT 4

4

a. momentum = mass \times velocity

$$\begin{array}{r} 3463 \text{ m/s} \\ \times 60 \text{ kg} \\ \hline 207780 \text{ kgm/s} \end{array}$$

b. although earth is rotating the student is also rotating. when the student jumps he is affected by the momentum already, so as he's jumping up he is still moving the way the earth is moving. Like jumping in a car.

The response demonstrates a thorough understanding. The response correctly calculates the momentum of a 60 kg student standing at the equator, shows the calculations, and includes units in the answer. The response includes a thorough explanation for part (b).

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SCORE POINT 3

4

momentum = mass (velocity)

momentum = p
mass = m
velocity = v

$$p = 60\text{kg} (463\text{m/s})$$
$$p = 27780\text{kg}\cdot\text{m/s}$$

$$v = 463\text{m/s}$$

$$m = 60\text{kg}$$

$$p = ?$$

AS the Earth rotates, we rotate along with the Earth. If the student jumps up, he is going to land in the same spot because the Earth is not moving without the people on it. If so, when the person jumped he would have been in a different spot altogether.

K

H

D

basic

D

C

M

The response demonstrates a general understanding. The response correctly calculates momentum, shows calculations, and includes correct units in the answer. The response to part (b) is somewhat confusing but shows a general understanding.

NECAP 2010 RELEASED ITEMS
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SCORE POINT 2

4

a. $463 \times 60 = 27,780$

b. the kid is moving at the same speed as Earth

The response demonstrates a limited understanding. The response to part (a) correctly calculates momentum but does not include any units. The response to part (b) includes a limited explanation that Earth and the student have the same velocity.

SCORE POINT 1

4

a: $60 \times 463 = 27780 \text{ m/s}$

b: Cause of gravity

The response demonstrates a minimal understanding. The response to part (a) correctly calculates momentum but does not include the correct units. The response receives no credit for part (b).

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SCORE POINT 0

4

$$v = \frac{x_2 - x_1}{t_2 - t_1} = \frac{\Delta x}{\Delta t}$$
$$\frac{60 \text{ kg} - x_2}{463 \text{ m/s} - t_2}$$

Because the world is
rotating slow enough.

The response is incorrect.

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ESS1 (9–11) POC-1 Students will, provided with geologic data (including movement of plates) on a given locale, predict the likelihood for an Earth event (e.g., volcanoes, mountain ranges, islands, earthquakes, tides, tsunamis).

- 5 The map of Turkey below shows the locations of the North Anatolian and East Anatolian Faults.



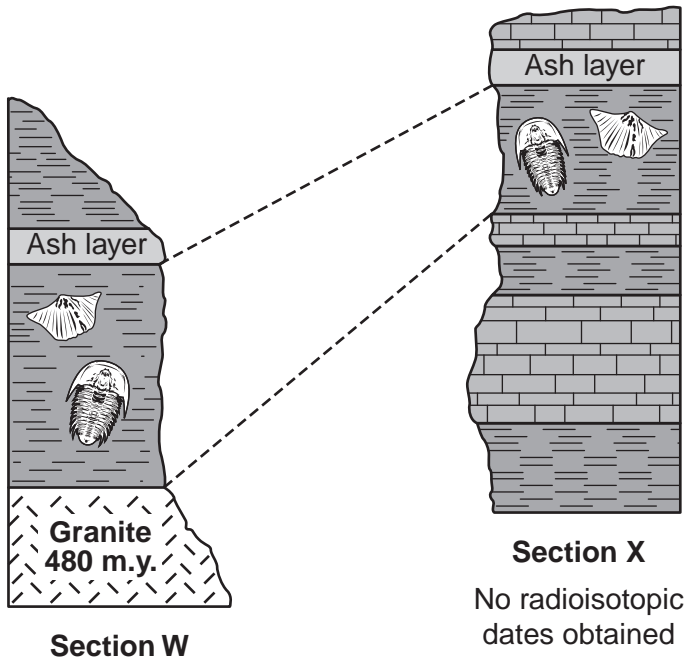
Both the North Anatolian and East Anatolian Faults are examples of strike-slip faults. Which Earth event occurs along these faults?

- A. tsunamis
- B. earthquakes
- C. formation of volcanoes
- D. formation of islands

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ESS1 (9–11) POC-4 Students will relate how geologic time is determined using various dating methods (e.g., radioactive decay, rock sequences, fossil records).

- 6 The diagram below shows two rock sections from different parts of the world.



Some radioisotopic
dates obtained

The granite layer in Section W is 480 million years old (480 m.y.). How can the **relative** age of the fossils in Section X be determined?

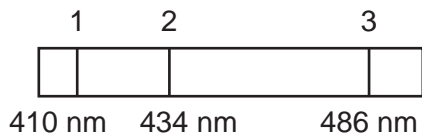
- A. by using the potassium-40 dating method on parts of the fossils
- B. by measuring the thickness of the fossil layer in each section, because fossils in a thick layer are older than fossils in a thin layer
- C. by measuring the height of the fossil layer in each section, because fossils at a high elevation are younger than fossils at a low elevation
- D. by comparing the location of the fossils in Section W to the location of the fossils in Section X

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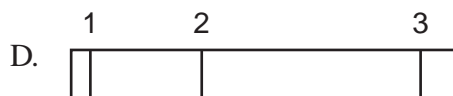
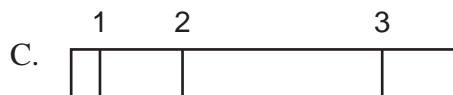
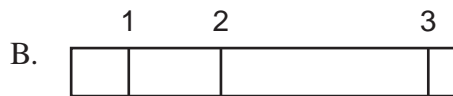
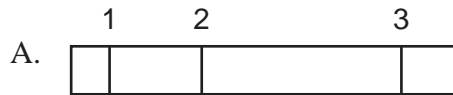
ESS3 (9–11) SAE-7 Students will, based on the nature of electromagnetic waves, explain the movement and location of objects in the universe or their composition (e.g., redshift, blueshift, line spectra).

Please use the Electromagnetic Spectrum on the reference sheet to answer the question.

- 7 For 10 years, scientists have recorded the emission spectrum of a certain star. The diagram below shows the first spectrum recorded.



Which emission spectrum shows that a redshift of the star has occurred?



**NECAP 2010 RELEASED ITEMS
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LS1 (9–11) FAF-1 Students will use data and observation to make connections between, to explain, or to justify how specific cell organelles produce/regulate what the cell needs or what a unicellular or multicellular organism needs for survival (e.g., protein synthesis, DNA replication, nerve cells).

- 8 The table below shows features of four different organisms.

Comparison of Four Organisms

| Feature | Organism W | Organism X | Organism Y | Organism Z |
|----------------------|-------------------|-------------------|-------------------|-------------------|
| Number of cells | Many | One | One | Many |
| Cells have nuclei | Yes | No | Yes | Yes |
| Cells have walls | Absent | Present | Absent | Present |
| Does photosynthesis | No | No | No | No |
| Does respiration | Yes | Yes | Yes | Yes |
| Type of reproduction | Sexual | Asexual | Asexual | Sexual |
| Can move about | Yes | Yes | Yes | No |

Which organism is **least** related to the others?

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

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| LS2 (9–11) SAE-4 Students will trace the cycling of matter (e.g., carbon cycle) and the flow of energy in a living system from its source through its transformation in cellular, biochemical processes (e.g., photosynthesis, cellular respiration). |
|--|

- 9 Undersea vents called black smokers release superheated, mineral-rich water. Light does not penetrate the water, making photosynthesis impossible. However, diverse communities of organisms exist around black smokers at depths of 2100 m below the ocean surface.

Which is the **most likely** reason these diverse communities can exist so deep in the ocean?

- A. Black smokers are warm like tropical land areas.
- B. Black smokers produce sulfur that blocks light and creates a good hideaway for many organisms.
- C. Producer organisms use minerals in the water to make food through chemosynthesis.
- D. Dead organisms that serve as bacterial food sources drift down from water close to the surface.

**NECAP 2010 RELEASED ITEMS
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LS4 (9–11) NOS-9 Students will use evidence to make and support conclusions about the ways that humans or other organisms are affected by environmental factors or heredity (e.g., pathogens, diseases, medical advances, pollution, mutations).

- 10 Queen Victoria of England lived from 1819 to 1901. Which statement supports the idea that she was a carrier of the disease hemophilia?
- A. The word “hemophilia” was first used in 1828.
 - B. Hemophilia is called the “royal disease.”
 - C. Queen Victoria’s husband died at an early age.
 - D. Queen Victoria’s grandsons had hemophilia.

**NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE**

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

- 1 Based on the background research provided in the story and in Figure 2, write a **hypothesis** about the effect fishing activities have on the cod population on Georges Bank. Explain your reasoning.

Scoring Guide

| Score | Description |
|--------------|--|
| 2 | The response includes a reasonable hypothesis and a clear explanation of thinking. |
| 1 | The response includes a reasonable hypothesis without a clear explanation or an explanation without a hypothesis. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

Response may hypothesize that fishing practices may cause the cod population to recover (increase), decline (decrease), or remain the same. Response should explain the basis for the hypothesis.

Sample responses:

- Fishing practices do not affect the population based on the fact that the NMP changed fishing practices and the cod population is still small.
- Fishing practices decrease the cod population based on the fact that the cod population decreased when fishermen started using trawlers to fish.

The hypothesis does not have to be “correct” because the students have not done any experiments at this point. However, the hypothesis should be reasonable and related to topic.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 2

1 Hypothesis:

If large-scale commercial fishing and the use of fishing trawlers continue, then the cod population on Georges Bank will continue to decrease. The population will decrease because the fishing trawlers are capable of catching more cod than ever before. Also, according to the story, fishermen have been catching older cod, which means that not as many eggs can be laid overall since the older a female cod is, the more eggs it can lay.

The response offers a reasonable hypothesis and includes a clear explanation.

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SCORE POINT 1

① The cod population has been affected by fishing practices adversely, with a large decline in the numbers of cod mostly caused by new fishing technology.

I wrote this hypothesis... because.

The response includes a reasonable hypothesis but does not offer an explanation.

SCORE POINT 0

① Hyp: I think the fishing activities effect on Georges bank because probably they keep changing the food schedule on what certain time they eat, so it's effecting the population on George's bank.

The response does not contain any correct elements. The response appears to imply that the cod are on a feeding schedule.

**NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE**

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| Broad Area of Inquiry: Formulating Questions & Hypothesizing Inquiry Construct 3: Make and describe observations in order to ask questions, hypothesize, and make predictions related to topic. |
|---|

- 2 Use the information in Graph 1 to describe how the size and age distribution of the cod population changed from 1980 to 2005.

Scoring Guide

| Score | Description |
|--------------|---|
| 2 | The response demonstrates a general understanding of how to use information in Graph 1 to describe how the size and age distribution of the cod population changed between 1980 and 2005. |
| 1 | The response demonstrates a limited understanding of how to use information in Graph 1 to describe how the size and age distribution of the cod population changed between 1980 and 2005. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

Description of change may include:

- The size of the population decreased.
- The age distribution changed from between 1 and 10 years of age to between 3 and 5 years of age.
- Older fish (>6 years of age) and younger fish (<3 years of age) are no longer part of the population.

NECAP 2010 RELEASED INQUIRY TASK
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SCORE POINT 2

2 As can be seen by the collected data provided in Graph 1, the size and age distribution of the cod population has changed drastically from 1980 to 2005. In 1980, there was approximately 8.6 million cod to be found by the fishers in Georges Bank, 5 years later this decreased slightly to 7.1 million, and in 1990 it was down to 6.9 million. However, by 1995, that number was cut in half to 3.4 million and continued to decrease as such to ~ 1.8 million in 2000 and a mere .9 million in 2005. Furthermore, where fisherman used to catch cod in all age ranges (from 1-10 years old) in 1980, by 2005, they could not catch any outside the range of 3-5 years, and even in those age groups, the magnitude of the numbers caught was pathetically small (where once, 1.5 million cod of 2-4 years could be caught, in 2005, barely half a million 3-year-old cod could be found).

The response demonstrates a general understanding of how to use Graph 1. The response uses specific data from the graph to describe how the size and age distribution of the cod changed between 1980 and 2005.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 1

2 The number of fish significantly decreased each year.

The response demonstrates a limited understanding of how to use the information from Graph 1. The response addresses only the relative number of cod caught during the period between 1980 and 2005. The response does not specifically address how the size and age distribution changed.

SCORE POINT 0

2 The younger fish got caught more than the older fish

The response does not contain relevant information. The response does not address how the size and age distribution of the cod changed over time. It is limited to the fact that younger fish got caught more than older fish, which is true throughout all of the years for which data is presented.

**NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE**

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| Broad Area of Inquiry: Developing and Evaluating Explanations Inquiry Construct 12: Use evidence to support and justify interpretations and conclusions or explain how the evidence refutes the hypothesis. |
|---|

- 3 Describe the general trend of the young cod added to the population shown in Graph 2 from 1997 to 2003. Use specific examples from the graph to support your answer.

Scoring Guide

| Score | Description |
|--------------|--|
| 2 | The response demonstrates a general understanding of how to describe the trend of the young cod population in Graph 2 and uses specific examples from the graph to support the answer. |
| 1 | The response demonstrates a limited understanding of how to describe the trend of the young cod population in Graph 2 and may or may not use specific examples. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

The number of young cod added to the population between 1997 and 2003 more than doubles (5 million to 12 million) in 1998, and then steadily decreases during the next four years. In 2003, the number significantly increases to about 22 million.

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GRADE 11 SCIENCE

SCORE POINT 2

3 In 1997, the young cod population was at 5 million, very low. It shot up to 12.5 million the year after in 98. From then on, from 98-2002 the population declined. It went from 12.5 to 7 to 4, stayed at 4 in 01 then to 3 in 02. At it's lowest point ever in the last 30 years there was a shock that came in 03. It shot up to 22 million in one year. It went up by 19 million. A huge jump for the young cod population.

The response demonstrates a general understanding of how to describe the trend of the young cod population in Graph 2 and provides specific examples from the graph to support the answer.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 1

3 The trend of the young cod added to the population from 1997 to 2003 is generally decreasing, but in 2002 and 2003 the number increases, alot in 2002 and some in 2003.

The response demonstrates a limited understanding of how to describe the trend of the young cod population in Graph 2. The response does not offer specific examples, but it describes the overall trends in terms of increasing or decreasing populations.

SCORE POINT 0

3 They populate and die over and over again.

The response does not contain any correct elements. The response suggests a lack of understanding of the meaning of the data presented in Graph 2.

**NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE**

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| Broad Area of Inquiry: Developing and Evaluating Explanations Inquiry Construct 12: Use evidence to support and justify interpretations and conclusions or explain how the evidence refutes the hypothesis. |
|---|

- 4 Describe the relationship between the number of young cod added to the population and the spawning biomass. Use specific examples from Graph 2 and Graph 3 to support your answer.

Scoring Guide

| Score | Description |
|--------------|--|
| 2 | The response demonstrates a general understanding of the relationship between the number of young cod added to the cod population and the spawning biomass. The response uses specific information from Graph 2 and Graph 3 to support the answer. |
| 1 | The response demonstrates a limited understanding of the relationship between the number of young cod added to the cod population and the spawning biomass. The response may or may not use specific information from Graph 2 and Graph 3 to support the answer. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

The number of cod old enough to reproduce generally decreases and the number of young cod added to the population generally decreases. In 1977, the biomass of spawning cod was 80,000 metric tons and the number of young cod was almost 30 million. In 2002, the biomass of spawning cod was about 30,000 metric tons and the number of young cod was less than 5 million.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 2

4 The Spawning cod biomass outlines the same trend as the Young cod added to the population each year. The number of young cod added to the population reached its peak in 1980, and a few years later, in 1982, the amount of cod old enough to reproduce was at its maximum. This makes sense, as the young cod that were born in 1980 would become old enough to reproduce a few years later. Therefore, it is clear that the spawning biomass decreases as the young cod added to the population decreases, with a shift of perhaps a couple of years.

The response demonstrates a general understanding of the relationship between the number of young cod added to the cod population and the cod spawning biomass. The response references specific trends from Graph 2 and Graph 3 to support the answer and offers further insight into reasons for the trends.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 1

4 Since it is young cod being added to the biomass they can't reproduce as many eggs as the older cod. This could be why the population is going down, because the young cod don't have enough time to grow up to reproduce more offspring.

The response demonstrates a limited understanding of the relationship between the number of young cod added to the cod population and the cod spawning biomass. The response offers a brief explanation of the meaning of the data without referencing specific trends from Graph 2 and Graph 3 to support the explanation.

SCORE POINT 0

4 ~~They~~ graph 2 shows how many were added. Graph 3 shows how many reproduce out of all that ~~the~~ they dropped in.

The response is irrelevant. Although the response attempts to describe what the data from each graph represents, it does not offer a discussion of the trends or relationships between the two graphs.

**NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE**

Broad Area of Inquiry: **Developing and Evaluating Explanations**

Inquiry Construct 12: Use evidence to support and justify interpretations and conclusions or explain how the evidence refutes the hypothesis.

- 5 Use the NMFS guideline for minimum breeding stock biomass and the data in Graph 2 and Graph 3 to explain the effect of fishing on cod recovery. Use evidence to support your explanation.

Scoring Guide

| Score | Description |
|--------------|---|
| 3 | The response includes a general explanation about the effect of fishing on cod recovery, using the NMFS guideline for minimum breeding stock biomass and the data in Graph 2 and Graph 3 to support the answer. |
| 2 | The response includes a limited explanation about the effect of fishing on cod recovery, using the NMFS guideline for minimum breeding stock biomass or the data in Graph 2 or the data in Graph 3 to support the answer. |
| 1 | Response includes a minimal explanation about the effect of fishing on cod recovery and may or may not use evidence to support the answer. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

The cod population is not recovering.

- Between 1977 and 2004, the spawning cod biomass never reached the NMFS minimum of 108,400 metric tons. According to the NMFS guideline, the Atlantic cod in Georges Bank are being overfished.
- The spawning cod biomass and the number of young cod added to the population generally decreased from about 1982 to 2002, as shown in Graphs 2 and 3. In order for recovery to occur, the spawning cod biomass needs to increase to above the minimum level.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 3

5 In graph 3, it shows that the cod have been under the minimum spawning biomass for the past 30 years. But, as fishing has increased, so has the distance between the minimum spawning biomass and the actual biomass. Graphs 2 & 3 show that new generations of cod aren't being born and that mature cods aren't as prevalent. Overfishing is taking away the breeding population, so that new cod aren't born, therefore preventing the cod population from recovering.

The response includes a general explanation about the effect of fishing on cod recovery, using the NMFS guideline for minimum breeding stock biomass and the data in Graph 2 and Graph 3 to support the answer. The response offers a clear insight into the overall meaning of the data from the graphs, the NMFP guideline, and their interconnected influence on cod recovery.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 2

5 Even though NMFS has placed limits on the fisheries, the cod are not producing enough biomass to reach NMFS Standard. The standard is around 108,400 metric tons. As of 2005 they were only producing around 50,000 metric tons of biomass. That's 78,400 metric tons less. NMFS needs to place a strict "no fishing" law until cod have come to a full recovery.

The response includes a limited explanation about the effect of fishing on cod recovery, using the NMFS guideline for minimum breeding stock biomass and the data in Graph 3 to support the answer. The response offers a subsequent conclusion recommending strict no fishing laws, but it presents no additional information to address the item.

NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE

SCORE POINT 1

5 From looking at these graphs, the only way to bring the cod breeding biomass back up above the minimum level, is to end all cod fishing. The fish are supposedly recovering now, and yet the population and breeding biomass are barely higher than they were 10 years ago. The fishing is applying too much pressure on the fish for them to recover.

The response includes a minimal explanation about the effect of fishing on cod recovery. There is only a tangential connection to the data outlined in Graph 2 and Graph 3 and to the NMFS guideline. The response primarily offers conclusions relative to the data.

SCORE POINT 0

5 It went down

The response does not offer any usable information. The unclear reference to "it" does not tell us what went down, so we cannot evaluate even the most rudimentary correctness of the statement.

**NECAP 2010 RELEASED INQUIRY TASK
GRADE 11 SCIENCE**

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

- 6 Based on the information in Graph 4, do dogfish and haddock compete with cod for food? Use **two** examples from the graph to support your answer.

Scoring Guide

| Score | Description |
|--------------|--|
| 2 | The response identifies whether cod compete with dogfish and haddock for food and uses two examples from Graph 4 to generally support the answer. |
| 1 | The response identifies whether cod compete with dogfish and haddock for food and either does not support the answer with examples from Graph 4 or provides limited support. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

Cod and dogfish compete for food. Cod primarily eat fish and arthropods. Dogfish have a diet that consists almost entirely of arthropods. So, cod and dogfish compete for arthropods.

Cod and haddock compete for food. Haddock have a varied diet that seems evenly divided among fish, arthropods, and echinoderms. So, cod and haddock compete for fish and arthropods.

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SCORE POINT 2

- 6 Yes, Dogfish & Haddock compete w/ Cod for food.
- The most obvious example is the Arthropods. All three fish make this food one of their top choices. The dogfish eats it the most, & the Cod & Haddock make it their second most eaten. They all eat it, & it's definitely one they'd compete for
 - The competition for food can also be seen b/w the mollusks. They all eat it, though cod & dogfish more often and about the same amount. This shows they compete for this food type as well

The response correctly identifies that cod do compete with dogfish and haddock for food and offers two specific examples from Graph 4 to support the answer.

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SCORE POINT 1

6 The three do seem to compete for food in general. While the cod's diet is mostly made up of other fish, this diet portion isn't as important to haddock or dogfish. On the other hand, arthropods are an important portion of the cod's diet at about 25%. Here, the cod competes greatly with the dogfish, whose diet is made up almost entirely of arthropods.

The response correctly identifies that cod do compete with dogfish and haddock for food but offers only one direct example of competition from Graph 4 to support the answer.

SCORE POINT 0

6 Everything eats, it's not a competition its survival of the fittest. This Graph show's each class of fish went after different foods. Dogfish went after Arthropods. Cod went after Fish. Haddock went after Echinoderms.

The response incorrectly indicates that cod do not compete with dogfish and haddock for food.

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

- 7 What else does Marissa’s class need to know to determine whether competition for food between cod, dogfish, and haddock might have had an impact on the cod population?

Scoring Guide

| Score | Description |
|-------|--|
| 2 | The response demonstrates a general understanding of competition for food on the cod population. |
| 1 | The response demonstrates a limited understanding of competition for food on the cod population. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

Training Notes:

Response may include:

- Is the cod population limited by the amount of food available?
- Will cod eat other food if their favorite food is not available?
- Do cod compete with other organisms for food?

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SCORE POINT 2

7 Marissa's class needs to know the availability of all the sources of the food that the 3 fish eat. If all are plentiful, then there would be no effect on the population, but if one or many were scarce then there would be more competition for food and drop in population for those who did not get the food that they needed.

The response demonstrates a general understanding of competition for food among bottom fish and offers a reasonable example of additional information that might be helpful for determining the impact of that competition on the cod population. The response further explains how this information could be used and why it would be helpful.

SCORE POINT 1

7 The population of haddock and dogfish.

The response demonstrates a limited understanding of competition for food on the cod population. The response offers a reasonable example of additional information but does not explain how the populations of haddock and dogfish would be helpful to evaluate the impact of competition for food on the cod.

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GRADE 11 SCIENCE

SCORE POINT 0

7 Marissa's class doesn't really need to know any more information to determine weather competition for food between cod, dogfish and haddock might have had an impact on cod population.

The response does not contain any correct information. The response makes no attempt to identify additional information that might be helpful to evaluate whether competition for food has an impact on the cod population.

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GRADE 11 SCIENCE**

Broad Area of Inquiry: **Developing and Evaluating Explanations**

Inquiry Construct 13: Communicate how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations.

- 8 As new evidence becomes available, scientists often develop new hypotheses. Look at your original hypothesis on page 1 of your Student Answer Booklet. Based on what you have learned during this investigation, propose a new hypothesis about the cod population on Georges Bank. Use specific information from the investigation to support your reasoning.

Scoring Guide

| Score | Description |
|--------------|--|
| 3 | The response includes a new hypothesis and a general explanation of reasoning that includes specific information from the investigation. |
| 2 | The response includes a hypothesis and a limited explanation of reasoning that may or may not include specific information from the investigation. |
| 1 | The response includes a hypothesis and does not include specific information from the investigation. |
| 0 | The response is incorrect or irrelevant to the skill or concept being measured. |
| Blank | No response |

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SCORE POINT 3

8 The destructive nature of trawler nets, lack of older cod, and possible increase in food competition have led to a decrease in the cod population. The trawler nets catch cod and destroy cod eggs and organism that the cod eat. The lack of older cod (who have been caught) makes it more difficult for the cod to increase their population, and the food competition makes the cod carrying capacity in the area much lower. All of these reasons and activities are responsible for the decrease in the cod population.

The response offers a clear and reasonable alternative hypothesis to the original hypothesis offered in item 1. The response incorporates specific information from the various investigations to support the reasoning for the new hypothesis.

SCORE POINT 3 (CONTINUED)

1 The overfishing and use of factory trawlers led to the decrease of the cod population on Georges Bank. The factory trawlers allowed fishermen to catch more fish, decreasing the population, and it allowed them to catch older fish. The older, female cod lay more eggs, so when they are killed the population suffers (like in Georges Bank).

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SCORE POINT 2

8 The Population of cod has mostly dropped due to fishing practices. For the last 30 years they have been using a method called "bottom trawling" where they don't only catch the fish but they also drag along their habitat and since they have no place to hide they don't grow as they should.

The response offers a new hypothesis but presents only a limited explanation of the reasoning. The response includes limited support from the investigations.

SCORE POINT 2 (CONTINUED)

1 The amount of cod has decreased due to past fishing practices, and even with time they haven't recovered maybe due to the competition with other species for food since the animals that cod would usually eat have now become top predators in the food web.

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SCORE POINT 1

- 8 The cod population is not only decreasing by overfishing by fisherman, but also decreasing by competition of food sources with other fish such as haddock and dog fish.

The response includes a new hypothesis but does not include specific information from the investigations to support the reasoning. The new hypothesis includes competition for food with haddock and dogfish as a factor in the decline of the cod population but does not offer any details.

SCORE POINT 1 (CONTINUED)

- 1 The effect that fishing activities have on Georges Bank is that the new machines caught way too many fish in the beginning that cod didn't have enough time to mate or enough fish to mate with, which brought the population way down.

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SCORE POINT 0

8 fishing for cod is killing the
cod population.

This response is too general to be considered a hypothesis.

SCORE POINT 0 (CONTINUED)

1 The more people who fish there the less
fish.