NEW ENGLAND COMMON ASSESSMENT PROGRAM

Practice Test Science Inquiry Task

Scoring Guide

2008

Grade 11

Acid Lakes

GRADE 11

PRACTICE TEST SCIENCE INQUIRY TASK

SCORING GUIDE

Item Number: 1	Point Range: 0-2	Inquiry Construct : 4	DOK: 2

1. Holly and Jason identified two variables, talc and lime, to investigate. Explain why it is important for them to test the effects these two variables have on pH separately rather than at the same time.

Scoring Guide:

Score	Description
2	Response includes practical scientific knowledge about testing each variable, talc and lime, separately in order to determine their effects on the dependent variable, the pH (i.e., a fair test). Response explains that it is important to test the two variables separately because the two variables might affect each other, making it impossible to determine which one has an effect.
1	Response includes practical scientific knowledge about testing each variable, talc and lime, separately in order to determine their effects on the dependent variable, the pH. OR Response explains that it is important to test the two variables separately because the two variables might affect each other, making it impossible to determine which one has an effect.
0	Response includes incomplete, irrelevant, or incorrect scientific knowledge of a fair test. OR Response is not related to the task content.

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Item Number: 2	Point Range: 0-2	Inquiry Construct : 1	DOK: 2

2. Predict how the effects of talc on an acidic lake's pH will compare with the effects of lime. Use information from the story and your understanding of acids and bases to explain your thinking.

Scoring Guide:

Score	Description
2	Response is a logical prediction that compares talc's effect on a lake's pH with lime's effect on lake's pH. AND Response includes relevant scientific knowledge about acids and bases to justify the answer. This may include observations from either the story or personal experience (lab work done in school) that are relevant to the prediction.
1	Response is a logical prediction that compares talc's effect on a lake's pH with lime's effect on lake's pH. OR Response includes relevant scientific knowledge about acids and bases to justify the answer. This may include observations from either the story or personal experience (lab work done in school) that are relevant to the prediction.
0	Response includes incomplete, illogical, or no description of a prediction; applies incorrect or irrelevant scientific knowledge or observations; or does not address the task content (acids and bases).

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Item Number: 3	Point Range: 0-2	Inquiry Construct : 11	DOK: 2

3. Which graph best represents Holly and Jason's data? Explain why the graph you chose best represents their data.

Scoring Guide:

Score	Description
2	Response indicates that graph B is correct. AND Response explains that graph B is correct because the graph features are labeled accurately or because the graph shows the correct relationship between the variables that were tested.
1	Response indicates that graph B is correct. OR Response explains that graph B is correct because the graph features are labeled accurately or because the graph shows the correct relationship between the variables that were tested.
0	Response indicates a graph other than graph B. Response does not include an explanation of why the graph is correct or includes an incorrect or incomplete explanation.

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Item Number: 12	Point Range: 0-2	Inquiry Construct : 12	DOK: 3

4. How do the results of Holly and Jason's investigation support or refute your prediction about how the effects of talc on Acid Lake A's pH compare with the effects of lime? Use the data to explain your answer.

Scoring Guide:

Score	Description
2	Response clearly describes and uses data as evidence to support or refute the prediction about the effects of talc and lime on the pH of the lake. AND Response integrates scientific knowledge, terminology, and/or observations that address the prediction.
1	Response describes and uses data as evidence to support or refute the prediction about the effects of talc and lime on the pH of the lake. AND Response does not integrate scientific knowledge, terminology, and/or observations to address the prediction.
0	Response does not describe or use data as evidence to support or refute the prediction about the effects of talc and lime on the pH of the lake. Response uses incorrect or irrelevant scientific knowledge, terminology, or observations to explain the results; proposed explanations are irrelevant. Response is not addressing the task content or situation.

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Item Number: 5	Point Range: 0-2	Inquiry Construct : 12	DOK: 3

5. How would you expect the pH of a lake with granite bedrock (talc) to compare with the pH of a lake with limestone bedrock (lime) if both lakes receive the same amount of acid rain? Support and justify your answer with the data provided from Holly and Jason's investigation.

Scoring Guide:

Score	Description
2	Response clearly describes and uses data as evidence to support or refute the prediction about the effects of talc and lime on the pH of the lake. AND Response integrates scientific knowledge, terminology, and/or observations that address the prediction.
1	Response describes and uses data as evidence to support or refute the prediction about the effects of talc and lime on the pH of the lake. AND Response does not integrate scientific knowledge, terminology, and/or observations to address the prediction.
0	Response does not describe or use data as evidence to support or refute the prediction about the effects of talc and lime on the pH of the lake. Response uses incorrect or irrelevant scientific knowledge, terminology, or observations to explain the results; proposed explanations are irrelevant. Response is not addressing the task content or situation.

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Item Number: 6	Point Range: 0-3	Inquiry Construct : 8	DOK: 2

6. Organize the data from the Watershed W6 table into a graph that shows how the concentrations of calcium, nitrates, and sulfates change over time.

Scoring Guide:

Score	Description
3	Response is an appropriate graph (line or bar) that includes correct variable labels and units (mg/L), a correct scale, correct labels for both axes (Time and Concentrations) and a graph title. AND Response shows the correct relationship among the variables of calcium, nitrates, and sulfates.
2	Response is an appropriate graph (line or bar) that includes correct variable labels and units (mg/L), a correct scale, correct labels for both axes (Time and Concentrations), and a graph title. OR Response shows the correct relationship among the variables of calcium, nitrates, and sulfates.
1	Response is an incomplete or incorrect graph (e.g., one variable label is missing or incorrect; the units on the graph are missing or incorrect; the scale is incorrect; the graph title is missing; OR The relationship among the variables is incorrect)
0	Response includes incorrect or missing graph, labels and/or incorrect or missing title; shows an incorrect relationship among the variables ; uses an incorrect scale; names the variables incorrectly; or is not related to the task content.

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Item Number: 7	Point Range: 0-2	Inquiry Construct : 11	DOK: 2

7. Explain how changes in the concentrations of calcium, nitrates, sulfates, and pH in Watershed W6 relate to one another. If this trend continues into the year 2020, describe one possible effect on an abiotic or biotic factor of the ecosystem.

Scoring Guide:

Score	Description
2	Response correctly explains the relationship among the concentrations of calcium, nitrates, sulfates, and pH in Watershed W6. AND Response explains a plausible effect of the ongoing trend of an abiotic or biotic factor in the ecosystem and includes relevant scientific knowledge and/ or observations in the explanation.
1	Response correctly explains the relationship among the concentrations of calcium, nitrates, sulfates, and pH in Watershed W6. OR Response explains a plausible effect of the ongoing trend of an abiotic or biotic factor in the ecosystem and includes relevant scientific knowledge and/ or observations in the explanation.
0	Response applies incorrect information from observations or an incorrect description; makes no attempt to describe abiotic or biotic factors; or is not related to the given situation or the task content.

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Item Number: 8	Point Range: 0-3	Inquiry Construct : 5	DOK: 3

8. Suppose you are a fishing guide in an area adjacent to Watershed W6. You are worried about the effects of acid rain on the fish populations. Design a study to monitor how acid precipitation affects the population of trout in the streams and lakes you frequent. Make sure you include the scientific procedures, materials, and data you plan to collect in this investigation.

Scoring Guide:

Score	Description
3	Response describes a logical experimental procedure, including efforts to control the variables. AND Response shows a connection to the goal of the study (monitoring fish populations in relation to acid rain). AND Response includes descriptions of relevant data sets and explains what the data may indicate.
2	Response describes a logical experimental procedure, including efforts to control the variables. AND Response shows a connection to the goal of the study (monitoring fish populations in relation to acid rain). OR Response includes descriptions of relevant data sets and explains what the data may indicate.
1	Response describes a logical experimental procedure, including efforts to control the variables. OR Response shows a connection to the goal of the study (monitoring fish populations in relation to acid rain). OR Response includes descriptions of relevant data sets and explains what the data may indicate
0	Response applies incorrect information from observations; includes an incorrect description; makes no attempt to describe a procedure or data sets; OR is not related to the task content.

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Summary of Inquiry Constructs and Broad Areas of Inquiry

Broad Areas of Inquiry Constructs	Inquiry Constructs (Item Number)	DOK	Maximum Points
Formulating Questions and Hypothesizing 1, 2, 3	1 (Item 2)	2	2
Planning and Critiquing of Investigations 4, 5, 6	4 (Item 1)	2	2
	5 (Item 8)	3	2
Conducting Investigations 7, 8, 9, 10	8 (Item 6)	2	3
Developing and Evaluating Explanations 11, 12, 13	11 (Item 3)	2	2
	11(Item 7)	2	2
	12 (Item 4)	3	2
	12 (Item 5)	3	2
	Total Points for Task		18