PSSA

Pennsylvania System of School Assessment

Science
Grade 8

Item Sampler Scoring Guide

2025–2026

Pennsylvania
Department of Education

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INFORMATION ABOUT SCIENCE

Introduction

General Introduction

The Pennsylvania Department of Education (PDE) provides districts and schools with tools to assist in delivering focused instructional programs aligned with the Pennsylvania Academic Standards (PAS). These tools include STEELS Standards, STEELS Foundation Boxes, assessment handbooks, content-based online Item Samplers, and a Sampler Guide. The online Item Sampler is intended to be used in conjunction with this Sampler Guide as a useful tool for Pennsylvania educators in preparing local instructional programs by providing samples of test item types and scored student responses. The online Item Sampler and this Sampler Guide are not designed to be used as a pretest, a curriculum, or any other benchmark for operational testing.

The online Item Sampler is available in Braille format. For more information regarding Braille, call (717) 901-2238.

Pennsylvania Science, Technology, Engineering, Environmental Literacy & Sustainability (STEELS) Standards

The online Item Sampler and this Sampler Guide contain examples of test questions designed to assess the STEELS standards.

What Is Included

The online Item Sampler contains test questions, or test “items,” that have been written to align to the STEELS standards. The sample test questions model the types of items that may appear on an operational PSSA. Each sample test question has been through a rigorous review process to ensure alignment with the STEELS standards prior to being piloted in an embedded field test within a PSSA assessment and then used operationally on a PSSA assessment. Answer keys, scoring guidelines, and any related stimulus materials are also included. To access the Online Item Sampler, go to https://portal.te.drcedirect.com/PA. Select Item Samplers. Then, select the subject and grade levels as needed. Additionally, this Sampler Guide PDF provides sample student responses for each open-ended (OE) item to demonstrate the range of responses that students provided in response to these items.

Purpose and Uses

The items in the online Item Sampler may be used[1] as examples for creating assessment items at the classroom level. Classroom teachers may find it beneficial to have students respond to the open-ended items in the online Item Sampler. Educators may then use this Sampler Guide as a model to score the responses either independently or together with colleagues within a school or district. This Sampler Guide also includes the *General Description of Scoring Guidelines for Science Open-Ended Items* that students will have access to during a PSSA science administration. The general description of scoring guidelines may be distributed to students for use during local assessments and may also be used by educators when scoring local assessments.

Item Format and Scoring Guidelines

The multiple-choice (MC) items have four answer choices. Each correct response to an MC item is worth one point.

Each OE item in science is scored using an item-specific scoring guideline based on a 0–3-point scale.

Testing Time and Mode of Test Delivery for the PSSA

The PSSA is delivered in an online format. The estimated response time for each item type is listed below.

- **Multiple-Choice:** 1 minute
- **Open-Ended:** 5 minutes

During an official test administration, students are given as much additional time as is necessary to complete the test questions.

[1] The permission to copy and/or use these materials does not extend to commercial purposes.

Item and Scoring Sampler Format

The online Item Sampler and this Sampler Guide include the test directions and scoring guidelines that appear in the PSSA science assessments. Each MC item contains a table that includes the item alignment, the answer key, the depth of knowledge (DOK) level, points possible, and a brief answer-option rationale[2].

Each OE item contains a table that includes the item alignment, DOK level, points possible, and mean score. Additionally, each of the included item-specific scoring guidelines is combined with sample student responses representing each score point to form a practical item-specific scoring guide. The *General Description of Scoring Guidelines for Science Open-Ended Items* used to develop the item-specific scoring guidelines should be used if any additional item-specific scoring guidelines are created for use within local instructional programs. The student responses in this Sampler Guide are actual student responses.

Example Multiple-Choice Item Information Table

Item-Specific Information
Alignment:
Answer Key:
Depth of Knowledge:
Points Possible:

Option Annotations
Brief answer-option analysis or rationale.

Example Open-Ended Item Information Table

Category	Item-Specific Information
Alignment	Assigned STEELS Standard
Depth of Knowledge	Assigned DOK
Points Possible	Number of Points
Mean Score[3]	Average Score

[2] The *p*-values are not included for the MC items in the 2025 Item Sampler.
[3] The mean student scores are not included for the OE items in the 2025 Item Sampler.

General Description of Scoring Guidelines for Science Open-Ended Questions

3 Points

- The response demonstrates a *thorough* understanding of the scientific content, concepts, and procedures required by the task(s).
- The response provides a clear, complete, and correct response as required by the task(s). The response may contain a minor blemish or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

2 Points

- The response demonstrates a *partial* understanding of the scientific content, concepts, and procedures required by the task(s).
- The response is somewhat correct with *partial* understanding of the required scientific content, concepts, and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

1 Point

- The response demonstrates a *minimal* understanding of the scientific content, concepts, and procedures required by the task(s).
- The response is somewhat correct with *minimal* understanding of the required scientific content, concepts, and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

0 Points

- The response provides *insufficient* evidence to demonstrate any understanding of the scientific content, concepts, and procedures as required by the task(s) for that grade level.
- The response may show only information copied or rephrased from the question or *insufficient* correct information to receive a score of 1.

Special categories within zero reported separately:

BLK (blank)	No response or written refusal to respond or too brief to determine response
OT	Off task/topic
LOE	Response in a language other than English
IL	Illegible

PSSA SCIENCE GRADE 8

Science—Summary Data

Multiple-Choice

Sample Number	Alignment	Answer Key	Depth of Knowledge	Points
1	3.1.6-8.C	B	2	1
2	3.1.6-8.F	A	2	1
3	3.1.6-8.S	C	3	1
4	3.2.6-8.C	B	2	1
5	3.2.6-8.D	B	2	1
6	3.2.6-8.J	C	2	1
7	3.3.6-8.A	C	2	1
8	3.3.6-8.G	D	2	1
9	3.3.6-8.E	A	2	1
10	3.5.6-8.B	A	2	1
11	3.5.6-8.P (ETS)	C	2	1
12	3.5.6-8.V	C	3	1
13	3.1.6-8.D	D	2	1
14	3.2.6-8.C	D	2	1
15	3.3.6-8.H	C	2	1
16	3.5.6-8.EE	A	2	1

Open-Ended

Sample Number	Alignment	Depth of Knowledge	Points
17	3.1.6-8.I	2	3
18	3.5.6-8.P (ETS)	2	3

Science Test Directions

Read these directions carefully before beginning the assessment. To look at these directions again, select the **? [Help]** button and choose the **Test Directions** tab.

This section of the test has multiple-choice questions and open-ended questions. Each multiple-choice question has four answer choices. Each open-ended question has one or more areas in which to enter your response(s). The open-ended questions may have multiple pages. These page numbers will be shown below the question number, for example, “1 of 3.”

Answering Questions

Read each question carefully and choose your answer or enter your response.

1. For multiple-choice questions, first, find the answer to the question. Then, select the correct answer using the **Pointer** tool.
    - Only one of the answer choices provided is correct.
    - To change an answer, use the **Pointer** tool to choose a different answer.
    - Select the **Flag** button if you are not sure of the answer to a question. It will mark the question so you know to go back and answer the question later.
2. For open-ended questions, use the keyboard or the equation builder to type your response in the areas provided.
    - For questions that require using the equation builder, select the question mark button **[?]** in the upper-right corner of that feature. This will open **Help**, which offers descriptions about how to use that feature.
    - An example of the scoring guidelines that professional scorers will use to evaluate your responses to open-ended questions can be found by selecting the **? [Help]** button and choosing the **Scoring Guidelines** tab. You may refer to the **Scoring Guidelines** at any time while responding to open-ended questions.
3. Use tools such as the **Cross-Off**, **Highlighter**, **Notepad**, **Magnifier**, **Line Guide**, and **Calculator** to assist you during the test.

Navigation

1. Only one question at a time will appear on the screen. Use the **Next** and **Back** buttons to move from question to question or page to page.
2. When you have answered all the questions, select the **Review/End Test** button at the top-right of the screen.
    - Select questions from the list that appears on the screen to check your work.
    - When you have finished and have checked your answers, follow the directions on the screen to exit.

Helpful Hints

- There is no time limit to finish the test.
- If you need to take a break from the assessment, select the **Pause Test** button. Select the **Resume** button to continue. If you are away from the assessment for more than 20 minutes, you will need to log back in.
- To see your progress on the test, select the **Review/End Test** button. You may go to any question by selecting it from the list that appears on the screen.
- Select the **? [Help]** button to find more information.

Open-Ended Item-Specific Scoring Guideline

#17 Item Information

Category	Item-Specific Information
Alignment	3.1.6-8.I
Depth of Knowledge	2
Points Possible	3

Item-Specific Scoring Guideline

Score	Description
3	The response demonstrates a *thorough* understanding of analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem by • identifying whether the beetle population increased or decreased over time **AND** • describing a change that likely occurred in the beetle's ecosystem that could have caused the change in the beetle population **AND** • describing a second change that likely occurred in the beetle's ecosystem that could have caused the change in the beetle population. The response is clear, complete, and correct.
2	The response demonstrates a *partial* understanding of analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem by fulfilling **two** of the bullets listed under the 3-point response. The response may contain some work that is incomplete or unclear.
1	The response demonstrates a *minimal* understanding of analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem by fulfilling **one** of the bullets listed under the 3-point response. The response may contain some work that is incomplete or unclear.
0	The response provides *insufficient* evidence to demonstrate any understanding of the concept being tested.

Note: No deductions should be taken for misspelled words or grammatical errors.

Responses that will receive credit:

Part A (1 point):

- The beetle population increased over time.
- The beetle population was constant for an amount of time, then increased, then remained constant.

Part B (2 points, 1 point for each change):

- The beetles had more available food sources (prey).
- The beetles had fewer predators.
- Environmental conditions changed, which supported the survival (and reproduction) of more beetles. (Possible conditions students may use: more water, favorable temperatures, more shelter.)

Sample Student Responses

Item 17 – 3 points

Part A – Student Response
It increased over time.

Part B (Change 1) – Student Response
There are less predators trying to eat them.

Part B (Change 2) – Student Response
There are more of their prey, so they can eat more.

Annotations
The response demonstrates a thorough understanding of analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. In Part A, the response correctly identifies whether the beetle population increased or decreased over time (*It increased over time*). In Part B, the response correctly describes two likely changes in the beetles' ecosystem that could have caused the change in the beetle population (Change 1: *There are less predators trying to eat them,* Change 2: *There are more of their prey, so they can eat more*). The response is clear, complete, and correct.

Item 17 – 2 points

Part A – Student Response
Over time the beetle population increased.

Part B (Change 1) – Student Response
One change is that their was a decrease of the organism that fed off them.

Part B (Change 2) – Student Response
Another change is that there might have been a mutation that helped them adapt to their environment.

Annotations
The response demonstrates a partial understanding of analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. In Part A, the response correctly identifies whether the beetle population increased or decreased over time (*Over time the beetle population increased*). In Part B, the response correctly describes only one likely change in the beetles' ecosystem that could have caused the change in the beetle population (Change 1: *their was a decrease of the organism that fed off them*). The Change 2 response (*there might have been a mutation that helped them adapt to their environment*) does not correctly describe a likely change in the beetles' ecosystem that could have caused the change in the beetle population and receives no credit.

Item 17 – 1 point

Part A – Student Response
it increesed because the line goes up

Part B (Change 1) – Student Response
they evolved and got stronger

Part B (Change 2) – Student Response
they traveled to a different enviroment

Annotations
The response demonstrates a minimal understanding of analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. In Part A, the response correctly identifies whether the beetle population increased or decreased over time (*it increesed because the line goes up*). In Part B, the responses (Change 1: *they evolved and got stronger,* Change 2: *they traveled to a different enviroment*) do not correctly describe two likely changes in the beetles' ecosystem that could have caused the change in the beetle population and receive no credit.

Item 17 – 0 points

Part A – Student Response
Decrease

Part B (Change 1) – Student Response
Air

Part B (Change 2) – Student Response
water

Annotations
The response demonstrates insufficient evidence to demonstrate any understanding of analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. In Part A, the response (*Decrease*) does not correctly identify whether the beetle population increased or decreased over time and receives no credit. In Part B, the responses (Change 1: *Air,* Change 2: *water*) do not correctly describe two likely changes in the beetles' ecosystem that could have caused the change in the beetle population and receive no credit.

Open-Ended Item-Specific Scoring Guideline

#18 Item Information

Category	Item-Specific Information
Alignment	3.5.6-8.P (ETS)
Depth of Knowledge	2
Points Possible	3

Item-Specific Scoring Guideline

Score	Description
3	The response demonstrates a *thorough* understanding of evaluating competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem by • predicting one way that an ice dam can cause damage to a house **AND** • identifying the method that meets the criteria to prevent future ice dams and explaining how the method meets the criteria **AND** • explaining one way that method 1 is a better solution for ice dam formation than method 2 is. The response is clear, complete, and correct.
2	The response demonstrates a *partial* understanding of evaluating competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem by fulfilling **two** of the bullets listed under the 3-point response. The response may contain some work that is incomplete or unclear.
1	The response demonstrates a *minimal* understanding of evaluating competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem by fulfilling **one** of the bullets listed under the 3-point response. The response may contain some work that is incomplete or unclear.
0	The response provides *insufficient* evidence to demonstrate any understanding of the concept being tested.

Note: No deductions should be taken for misspelled words or grammatical errors.

Responses that will receive credit:

Part A (1 point):

- Ice dams can break parts of the roof (shingles) or gutters.
- Ice dams can cause water to leak into a house and damage the inside (e.g., ceilings, walls, light fixtures, etc.).

Part B (1 point):

- Method 2 meets the criteria because it prevents ice dams and costs less than $1,800.00.

Part C (1 point):

- Method 1 is a better solution because it addresses the cause of the ice dams, rather than just melting them once they form.
- Method 1 is a better solution because it lasts longer (up to 100 years) compared to method 2 which has to be replaced after 5 years.

Sample Student Responses

Item 18 – 3 points

Part A – Student Response
An ice dam can form on the roof of a house and melt into water from sunlight and leak into the house trough the roof and cause leakage throughout the ceiling and possible allow mold to grow.

Part B – Student Response
The person should get an electric heating cable installed because it melts the ice dam into water, making it slide right off, its easy to install and it costs less than Method 1.

Part C – Student Response
Method 1 is better than method 2 because its high-quality, keeps heat from escaping the interior, and prevents ice dams from forming.

Annotations
The response demonstrates a thorough understanding of evaluating competing design solutions by using a systematic process to determine how well they meet the criteria and constraints of the problem. In Part A, the response provides a correct prediction of one way that an ice dam can cause damage to a house (*An ice dam can form on the roof of a house and melt into water from sunlight and leak into the house trough the roof and cause leakage throughout the ceiling and possible allow mold to grow*). In Part B, the response identifies the method the person should use and explains how that method meets the criteria (*The person should get an electric heating cable installed . . . and it costs less than Method 1*). In Part C, the response correctly explains one way that method 1 is a better solution for ice dam formation than method 2 is (*Method 1 . . . keeps heat from escaping the interior*). The response is clear, complete, and correct.

Item 18 – 2 points

Part A – Student Response
Heat from the house could cause it to melt and have water release into the house.

Part B – Student Response
Method 1. It's the best for the price and lasts for a while.

Part C – Student Response
Although it costs more than method 2, in the long run it would be much less because you don't have to replace it every 5 years.

Annotations
The response demonstrates a partial understanding of evaluating competing design solutions by using a systematic process to determine how well they meet the criteria and constraints of the problem. In Part A, the response provides a correct prediction of one way that an ice dam can cause damage to a house (*melt and have water release into the house*). In Part B, the response (*Method 1. It's the best for the price and lasts for a while*) does not correctly identify the method the person should use or explain how that method meets the criteria and receives no credit. In Part C, the response correctly explains one way that method 1 is a better solution for ice dam formation than method 2 is (*in the long run it would be much less because you don't have to replace it every 5 years*).

Item 18 – 1 point

Part A – Student Response
it freezes the roof and a layer of the roof can come off

Part B – Student Response
they shold put heaters on the top of there roofs

Part C – Student Response
i dont think it is its more expensive

Annotations
The response demonstrates a minimal understanding of evaluating competing design solutions by using a systematic process to determine how well they meet the criteria and constraints of the problem. In Part A, the response provides a correct prediction of one way that an ice dam can cause damage to a house (*it freezes the roof and a layer of the roof can come off*). In Part B, the response (*they shold put heaters on the top of there roofs*) does not correctly identify the method the person should use or explain how that method meets the criteria and receives no credit. In Part C, the response (*i dont think it is its more expensive*) does not correctly explain one way that method 1 is a better solution for ice dam formation than method 2 is and receives no credit.

Item 18 – 0 points

Part A – Student Response
A ice dam can damage a house if the ice dam gets into the houses pipes.

Part B – Student Response
He can install heating cable because then the ice dams can melt.

Part C – Student Response
It is a better solution because you can put heat thing in the roof of the house instead of the heating cables.

Annotations
The response demonstrates insufficient evidence to demonstrate any understanding of evaluating competing design solutions by using a systematic process to determine how well they meet the criteria and constraints of the problem. In Part A, the response (*A ice dam can damage a house if the ice dam gets into the houses pipes*) does not provide a correct prediction of one way that an ice dam can cause damage to a house and receives no credit. In Part B, the response (*He can install heating cable because then the ice dams can melt*) correctly identifies the method the person should use but does not correctly explain how that method meets the criteria and receives no credit. In Part C, the response (*because you can put heat thing in the roof of the house instead of the heating cables*) does not correctly explain one way that method 1 is a better solution for ice dam formation than method 2 is and receives no credit.

PSSA Grade 8 Science
Item Sampler Scoring Guide