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INTRODUCTION

General Introduction
The Department of Education provides districts and schools with tools to assist in delivering focused instructional programs aligned to the state assessment system. These tools include assessment anchor documents, assessment handbooks, and content-based item and scoring samplers. This 2010–2011 Modified Science Item and Scoring Sampler is a useful tool for Pennsylvania educators in the preparation of local instructional programs and the statewide Pennsylvania System of School Assessment Modified test (PSSA-M).

Description of the PSSA Modified Assessment
The PSSA-M is a statewide assessment based on modified achievement standards for students with disabilities. The assessment is intended for students with disabilities functioning above the lowest 1% of the population, but not at a level that allows them to access the general PSSA assessment.

The content curriculum standards are the same for the PSSA-M as they are for the general PSSA assessment. However, modified items may be used to measure the content standards in the PSSA-M. Modifications, such as reduced text, easier vocabulary, simplified tasks, and the addition of hint boxes, create items that are more accessible but still in line with the content standards. The PSSA-M reflects the same emphasis and patterns as the general PSSA assessment, while utilizing a simpler style and format. The PSSA-M also contains fewer items than the general PSSA assessment. These modifications are designed to allow students with disabilities to demonstrate proficiency on the assessment.

What Is Included
The 2010–2011 Modified Science Item and Scoring Samplers contain modified science multiple-choice items and open-ended items that have been written to align to the Assessment Anchor Content Standards (Assessment Anchors). They provide an idea of the types of items that will appear on the operational Spring 2011 PSSA-M. Each item has been through a rigorous review process to ensure alignment with the Assessment Anchors.

Purpose and Uses
The items in this sampler may be used as examples for creating assessment items at the classroom level, and they may also be copied and used as part of a local instructional program.* Classroom teachers may find it beneficial to have students respond to the open-ended items in this sampler. Educators can then use the sampler as a guide to score the responses either independently or together with colleagues within a school or district.

Item Format and Scoring Guidelines
The multiple-choice items have four answer choices. Each correct response to a multiple-choice item is worth one point.

Each short open-ended (SOE) item is designed to take about ten minutes to complete. During an official testing administration, students are given additional time as necessary to complete the test items. Each open-ended item in science is scored using an item-specific scoring guideline based on a 0–2 point scale. In this sampler, every item-specific scoring guideline is combined with examples of student responses representing each score point to form a practical item-specific scoring guide.

The sampler also includes the General Scoring Guidelines for Science used to develop the item-specific guidelines and guides. These General Scoring Guidelines should be used if any additional item-specific scoring guidelines are created for use within local instructional programs.*

* The permission to copy and/or use these materials does not extend to commercial purposes.
**Item Alignment**

All PSSA-M items are aligned to statements and specifications included in the Assessment Anchor Content Standards documents. The science content included in the PSSA-M science multiple-choice items will align with the Assessment Anchors as defined by the Eligible Content statements. The process skills, directives, and action statements will also specifically align with the Assessment Anchors as defined by Eligible Content statements.

The science content included in the PSSA-M science open-ended items will align with content included in Eligible Content statements. The process skills, directives, and action statements included in the performance demands of the PSSA-M science open-ended items will align with specifications included in the Assessment Anchor statements, the Descriptor statements, and/or the Eligible Content statements. In other words, the verbs or action statements used in the open-ended questions or stems can come from the Eligible Content, Descriptor, or Assessment Anchor.

**GENERAL SCORING GUIDELINES FOR SCIENCE**

2 – 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.

1 – 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.

0 – 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
SCIENCE

SCIENCE REPORTING CATEGORIES

Science scores are reported in four categories:

A – The Nature of Science
B – Biological Sciences
C – Physical Sciences
D – Earth and Space Sciences

Examples of multiple-choice and short open-ended items assessing these categories are included in this sampler.

DESCRIPTION OF SAMPLE ITEMS

The modified science multiple-choice items begin on page 4. Each item is preceded by the Assessment Anchor and Eligible Content coding. The majority of answer options are followed by a brief analysis or rationale. The correct answer is indicated by an asterisk (*) in the item and labeled as “Key” in the analysis.

Two short open-ended items follow the multiple-choice items. Each of these is displayed with an item-specific scoring guideline and examples of responses with scores and annotations.

Each item in this sampler has been modified from an existing item in either the 2008–2009 or the 2009–2010 PSSA Science Item and Scoring Sampler. The text box below each modified item provides the sequence number for the source item and a description that explains how the item was modified. Some examples of modifications include simplified or reduced text, extra spacing, reduced steps or tasks, simplified graphics, the addition of hint boxes, enlarged font sizes, and the use of bold-faced text.

The 2008–2009 PSSA Science Item and Scoring Sampler and the 2009–2010 PSSA Science Item and Scoring Sampler Supplement can be found on the PDE website at www.education.state.pa.us. In the left-hand column, select “Programs,” “Programs O–R,” “Pennsylvania System of School Assessment (PSSA),” and then “Resource Materials.” Scroll down to find the appropriate sampler.
MULTIPLE-CHOICE ITEMS

A.1.1.2

1 Which question about the Allegheny River is **best** answered through scientific inquiry?

- How many species of fishes live in the river? *
- Will the river be a fun place to visit?
- Is fishing a popular sport on the river?
- How much money should be spent to manage the river?

**A Key:** Using sampling-type investigations, it is possible to determine the number of species of fishes that live in the river. This technique is used to help determine the health of the river.

**B** The term “fun” is a personal opinion and cannot be investigated scientifically.

**C** This question involves personal opinion (“popular”).

**D** The answer to this question depends on economics, personal preference, and perhaps some data from scientific investigations. The question is not answerable using scientific inquiry alone.

---

Modified from Item 1, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The text in the question and all answer options has been simplified, and some text has been removed to reduce processing.
A.1.3.2

2 The graph below shows how the population of organism X changed during one month.

Which of these most likely happened in the first half of the month?

- The number of predators increased.
- The amount of available food decreased.
- The rate of fatal infections increased.
- The competition for natural resources decreased.  *

A. This would have decreased the population.
B. This would have decreased the population.
C. This would have decreased the population.
D. Key: This allows more individuals to take the natural resources shared with competitive species, thus increasing X’s number.

Modified from Item 4, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: The lead-in direction has been revised to provide descriptive context about the graph for species X. The title of the graph has been made more specific, and the numbers on the x-axis have been removed to reduce processing. The question in the stem and the answer options have been simplified and restated more directly.
A.2.1.2

3  Which question about birds is **most** testable in a local park?

- Do birds like resting in trees?
- How do birds know when to lay eggs?
- Why do birds have feathers instead of fur?
- Which type of seeds attracts the greatest number of birds? *

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>This is not a testable question in a local park setting.</td>
</tr>
<tr>
<td>B</td>
<td>This is not a testable question in a local park setting.</td>
</tr>
<tr>
<td>C</td>
<td>This is not a testable question in a local park setting.</td>
</tr>
<tr>
<td>D</td>
<td>Key: This is a testable question in a local park setting. Students could set up bird feeders with different types of seeds and record the numbers of birds that are attracted to it.</td>
</tr>
</tbody>
</table>

Modified from Item 3, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: The question and the answer options have been simplified and restated more directly.
A student has two samples of copper. The table below shows the masses, volumes, and densities of two copper samples.

<table>
<thead>
<tr>
<th>Copper Sample</th>
<th>Mass (g)</th>
<th>Volume (cm³)</th>
<th>Density (g/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.0</td>
<td>0.56</td>
<td>8.93</td>
</tr>
<tr>
<td>2</td>
<td>10.0</td>
<td>1.12</td>
<td>8.93</td>
</tr>
</tbody>
</table>

Which conclusion is best supported by the data in the table?

- Increasing the mass of copper increases its density.
- Increasing the mass of copper increases its volume.
- Increasing the volume of copper decreases its mass.
- Increasing the volume of copper decreases its density.

A. The mass of the copper increased with no change in density.
B. Key: With an increase in mass, there was a corresponding increase in volume of the copper.
C. With an increase in volume, there was a corresponding increase, rather than decrease, in mass of the copper.
D. The volume of the copper increased with no change in density.

Modified from Item 3, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The lead-in direction has been revised to provide descriptive context about the table, which has been simplified by removing four rows of data. The word “best” has been added to the question in the stem and set in bold-faced type for emphasis, and all of the answer options now refer specifically to “copper” rather than “a substance.”
A balance is shown in the diagram below.

Using a Balance

The steps completed to measure the mass of an object using the balance are below. The steps are not shown in the correct order.

Steps – Out of Order
1. Read the measurement.
2. Place the object on the pan.
3. Slide the riders until the pointer lines up with the (0) line.

Which list shows the steps in the correct order to find the mass of the object?

- 2, 1, 3
- 1, 3, 2
- 1, 2, 3
- 2, 3, 1 *
A Moving the riders comes before placing an object on the pan and making the measurement.
B These steps are the reverse of the correct order.
C The measurement can not be made without placing an object on the pan first.
D Key: Adding an object, moving the riders, and finally, making the measurement is the correct order.

Modified from Item 4, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The lead-in direction line has been revised to provide descriptive context about the diagram for the balance. The graphic has been revised by removing the label for the zero adjustment and the label and image for the box. An explanatory statement has been added before the text box and the number of steps in the text box has been reduced from four to three. All of the answer options have been revised to reflect these changes.
6. Which statement describes one way scientists use seismographs?

Helpful Hint:
• Seismographs can be used to find out the strength of earthquakes.

- to view distant stars
- to measure the masses of objects
- to help record atmospheric temperature changes
- to help determine the composition of Earth’s interior

A. Spectrographs are used to analyze star spectra, but they are not related to seismographs.
B. The masses of objects are measured with a balance.
C. Records of temperature changes would be kept on a computer equipped with a temperature probe.
D. Key: Seismographs are used for a variety of things, including determining the composition of Earth’s interior.

Modified from Item 5, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The text of the question has been simplified and restated more directly, and a hint box that provides a general definition of seismographs has been added below the question. An answer option has also been simplified.
A.3.1.2

7 The table below lists three organisms and their energy sources.

<table>
<thead>
<tr>
<th>Organism</th>
<th>Energy Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>mouse</td>
<td>plants</td>
</tr>
<tr>
<td>grass</td>
<td>the Sun</td>
</tr>
<tr>
<td>lynx</td>
<td>other animals</td>
</tr>
</tbody>
</table>

In which trophic pyramid are the organisms correctly displayed?

- A The grass is the producer and should be displayed at the base of the trophic pyramid.
- B Key: The organisms in this pyramid are correctly displayed by trophic level.
- C The energy source for the grass is the Sun and not the other organisms.
- D The mouse is a consumer, not a producer.

Modified from Item 6, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: The lead-in direction has been revised to provide descriptive context about the table that lists the organisms and the energy sources. One row in the table has been removed, and the text for the remaining three energy sources has been simplified to reduce processing. The graphics for the options have been simplified to reflect the changes in the table.
A.3.1.3

8 Systems have inputs, outputs, processes, and feedbacks. When a lizard is on hot sand, nerves in its foot send a message to the brain. The brain tells the foot to move off the hot sand, as shown in the drawing below.

In this example, what is the message sent from the nerves to the brain?

- an input *
- an output
- a process
- a feedback

A Key: Input is the message that tells the lizard the sand is hot.
B Output is the message that tells the foot to move.
C The process is the various steps required to complete the activity.
D Feedback will occur when the foot cools off.

Modified from Item 6, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The lead-in direction line has been revised to provide descriptive context about systems, inputs, processes, etc. The context setup has been reduced in both volume and complexity and has been repositioned above the graphic of the lizard. The question in the stem has been simplified and restated more directly. The answer options have been revised to align with the revised stem.
How is this fish adapted to live in the weedy areas in freshwater lakes?

- The upper fin looks like another fish.
- The lower fins look like the legs of a turtle.
- The stripes of the fish look like plants in the water. *
- The mouth of the fish looks like the bottom of a lake.

**A** The upper fin of this fish is short and does not resemble another fish.
**B** The lower fins may look like turtle legs to some students, but this does not explain how this would help the fish in weedy areas.
**C** Key: The stripes on this fish would camouflage this fish in weedy areas.
**D** The mouth appearing to be like the bottom of a lake would not be helpful in a weedy area.

Modified from Item 8, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The lead-in direction line has been revised to provide descriptive context about the graphic of the fish. The eye of the fish has been enlarged for clarity. The question has been restated more directly, and the text in three of the answer options has been reduced.
A change causes a thick layer of algae to grow on the surface of a large pond, as shown in the drawing below.

Which change most likely causes the algae to grow on the surface of the pond?

- an increase in the amount of fertilizer getting into the pond *
- a decrease in the amount of water evaporating from the pond
- an increase in the number of fish living in the pond
- a decrease in the amount of pollen blowing across the pond
B.3.3.3

11 Which statement describes how recycling aluminum cans helps the environment?

- Recycling uses energy.
- Recycling makes waste.
- Recycling conserves resources. *
- Recycling produces air pollution.

A Recycling does use energy and using energy generally has negative effects. Recycling may use more or less energy than that required to obtain the original material.

B Recycling materials often leaves some waste that must be disposed of, which is a negative effect.

C Key: Recycling materials prevents mining new resources; thus, it conserves resources.

D Recycling requires energy. The sources of that energy release air pollutants, which would be a negative effect.

Modified from Item 10, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The text in the question and answer options has been reduced for clarity.
C.1.1.2

12 A student wants to identify two unknown mineral samples using their physical properties. The table below shows four physical properties of each mineral sample.

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>Sample 1</th>
<th>Sample 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>color</td>
<td>gray</td>
<td>gray</td>
</tr>
<tr>
<td>luster</td>
<td>metallic</td>
<td>metallic</td>
</tr>
<tr>
<td>density</td>
<td>5.3 g/cm³</td>
<td>7.4 g/cm³</td>
</tr>
<tr>
<td>volume</td>
<td>4.6 cm³</td>
<td>4.6 cm³</td>
</tr>
</tbody>
</table>

Which physical property will most help the student identify each mineral sample?

- color
- luster
- density *
- volume

A Both samples have the same color.
B Both samples have the same luster.
C Key: density of each sample is different.
D Both samples have the same volume and volume cannot be used to identify a sample.

Modified from Item 9, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: The lead-in direction has been revised to provide descriptive context about the table showing the properties of the two mineral samples. The names of the minerals have been changed to numeric labels, and the table has been enhanced for clarity by adding a column that specifically labels each property of the two samples. Context has been removed from the item, the wording of the question in the stem has been simplified and restated more directly, and a bold-faced word has been added for emphasis. Each answer option has been shortened from a complete sentence to one word to reduce processing.
The table below shows the density of each type of plastic and the density of water.

### Densities of Substances

<table>
<thead>
<tr>
<th>Substance</th>
<th>Density (grams/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>plastic X</td>
<td>1.38</td>
</tr>
<tr>
<td>plastic Y</td>
<td>0.90</td>
</tr>
<tr>
<td>water</td>
<td>1.00</td>
</tr>
</tbody>
</table>

A student is given a mixture of 6 plastic beads that all look alike. Some of the beads are made from plastic X and some are made from plastic Y. Which picture best shows what will happen if the beads are dropped in water?

- [ ]
- [ ]
- [ ]
- [ ]

*
A In order for both beads to float, both would have to be less dense than water.
B In order for both beads to sink, both would have to be more dense than water.
C Plastic X beads would have to have a density less than water in order to float. Plastic Y beads would have to have a density greater than water in order to sink.
D Key: Plastic X beads have a density greater than water, so they sink. Plastic Y beads have a density less than water, so they float.

C.2.2.1

14 Which energy source has the greatest impact on Earth’s living environments?

○ moving air
○ moving water
○ the Sun *
○ geothermal

A Moving air is “wind,” which is an energy source, but it has less impact than the Sun.
B Water power is an energy source, but it has less impact than the Sun.
C Key: The Sun is the direct source of energy for all photosynthetic organisms. It is indirectly the source of energy for all organisms in food chains with photosynthetic organisms as the producers.
D Some organisms can use energy from compounds released by geothermal activity, but this energy source appears to have little impact on the vast majority of living organisms.
C.2.2.3

15 Which energy source is renewable?

○ oil
○ solar power *
○ nuclear energy
○ natural gas

A Oil is derived from a nonrenewable resource.
B Key: Solar power is renewable.
C Nuclear energy is derived from a nonrenewable resource.
D Natural gas is derived from a nonrenewable resource.

Modified from Item 7, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: Text has been removed so that the question is simplified and restated more directly. Each answer option has been shortened from a complete sentence to one or two words to reduce processing.
16 Use the diagram below to answer the question.

A ball is dropped to the floor. Which statement best describes the ball’s energy as it falls through the air from the highest point?

- Potential energy is converted to kinetic energy. *
- Kinetic energy is converted to potential energy.
- Kinetic energy stays constant, and potential energy decreases.
- Potential energy stays constant, and kinetic energy decreases.

A Key: Potential energy is converted to kinetic energy as the ball falls.
B The ball has its greatest potential energy at the top. The potential energy is converted to kinetic energy as the ball falls.
C The ball does not have kinetic energy until it is dropped.
D The potential energy is converted to kinetic energy as the ball falls.

Modified from Item 13, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: A graphic of a ball has been added for clarity. The contextual vocabulary has been simplified and restated more directly to link with the graphic. All of the answer options have been restated more directly to focus on the task.
D.1.3.1

17 Which statement best describes the process of evaporation?

- Energy from the Sun changes liquid water into water vapor. *
- Liquid water droplets cool and fall to Earth.
- Liquid water droplets change into solid water in thin air.
- Water vapor in the air cools and forms liquid water droplets.

A Key: This statement is a correct description of the process of evaporation.
B This statement describes precipitation.
C This statement describes how snow/hail forms.
D This statement describes condensation.

Modified from Item 8, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: The question has been simplified and restated more directly, and a bold-faced word has been added for emphasis. The four answer options have been reworded using simpler phrases rather than technical terms.
D.1.3.4

18 Which type of water way is the best environment for decomposers?

Helpful Hint:
• Decomposers are organisms that break down organic matter.

○ a steep mountain stream
○ a shallow and cold river
○ a wide and slow-moving river *
○ a narrow and rapid stream

A Few decomposers are found in steep mountain streams due to the swift water.
B Few decomposers are found in cold water.
C Key: Compared to the other bodies of water, this river has the best conditions for decomposition, as organic material would become trapped in the slower moving areas of the river.
D A narrow and rapid stream is likely to be confined in a rocky area with little available organic matter for decomposition.

Modified from Item 14, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: A hint box with the definition for “decomposers” has been positioned after the question, and the wording for the question has been simplified and restated more directly. Text has been removed from all of the answer options to reduce processing.
D.3.1.1

19 Which two factors have the **greatest** influence on tides?

- rotation of Earth and gravity of the Moon *
- revolution of Earth and gravity of the Moon
- rotation of Earth and gravity of Earth
- revolution of Earth and gravity of Earth

A Key: The gravitational force between Earth and the Moon and the rotation of Earth are the main factors that cause ocean tides.

B Earth completes one revolution around the Sun each year, but this does not account for the twice-daily tides.

C The slight differences in gravity across the Earth do not account for variations such as tides.

D Earth does revolve around the Sun, but the revolution takes one year. This revolution does affect the tides, but not as much as the Moon.

Modified from Item 15, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The wording in the question has been simplified for clarity, and all of the answer options have been restated more directly to focus on the task.
D.3.1.2

20 Which of the following has the greatest effect on the path of a comet?

- the atmosphere of Earth
- the asteroid belt near Mars
- the gravity of Jupiter *
- the rings of Saturn

A The thickness or composition of Earth’s atmosphere does not greatly affect the path of a comet.
B Asteroids are small and would have little effect on a comet.
C Key: Jupiter is very massive and easily affects the path of objects that pass by.
D Saturn’s rings would have little effect on a comet. Saturn would have an effect because it is so massive, but not as great an effect as Jupiter.

Modified from Item 16, Grade 8 PSSA Science Sampler 2009 – 2010

Modifications: The wording in the question has been simplified for clarity, and all of the answer options have been shortened and restated more directly in order to focus on the task.
**SCIENCE**

**FIRST OPEN-ENDED ITEM**

A.2.2.3

This is a short open-ended (SOE) question. It is worth two points.

21 A microscope is a tool doctors use to help determine if people are healthy. A microscope is shown in the drawing below.

![Microscope drawing]

Part A: Describe one way doctors use microscopes to determine if people are healthy.

One way doctors use microscopes: ____________________________________________

__________________________________________________________________________

__________________________________________________________________________

Helpful Hints:

- microscopes are used to see things that are too small to be seen with the naked eye
- many diseases are caused by things too small to see with the naked eye

Answer Part B on the next page.
Part B: Describe one way a doctor’s job would be different if the doctor did not have a microscope as a tool for diagnosis.

One way a doctor’s job would be different: ____________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Modified from Item 12, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: The lead-in direction line has been revised to provide a definition for and context about the newly added graphic of the microscope. The questions in both parts A and B have been simplified and restated more directly, and bold-faced prompt phrases have been added to both A and B to provide additional guidance. A hint box with two bullets of descriptive text has been added below the response box to provide more direction.
ITEM-SPECIFIC SCORING GUIDELINE

Item #21

This item would be reported under Category A, The Nature of Science.

Assessment Anchor:

A.2.2– Apply appropriate instruments for a specific purpose and describe the information the instrument can provide.

Specific Eligible Content addressed by this item:

A.2.2.3– Describe ways technology extends and enhances human abilities for specific purposes (e.g., microscope, telescope, micrometer, hydraulics, barometer).

Scoring Guide:

Part A:  Describe one way doctors use microscopes to determine if people are healthy.

Part B:  Describe one way a doctor’s job would be different if the doctor did not have the microscope as a tool for diagnosis.

<table>
<thead>
<tr>
<th>Score</th>
<th>In response to this item, the student—</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>demonstrates a <em>thorough</em> understanding of how technology extends human abilities by describing one way microscopes are used and describing how a doctor’s job would be different without microscopes. The response is clear, complete, and correct.</td>
</tr>
<tr>
<td>1</td>
<td>demonstrates a <em>partial</em> understanding of how technology extends human abilities by providing a complete answer to one part of the question or a very general answer to both of the parts. The response may contain some work that is incomplete or unclear.</td>
</tr>
<tr>
<td>0</td>
<td>provides <em>insufficient</em> evidence to demonstrate any understanding of the content being tested.</td>
</tr>
<tr>
<td>Non-scorable</td>
<td>BLK (blank) – No response or written refusal to respond or response too brief to determine response</td>
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<td>IL  – Illegible</td>
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</tbody>
</table>

Note: No deductions should be taken for misspelled words or grammatical errors.
This is a short open-ended (SOE) question. It is worth two points.

**21** A microscope is a tool doctors use to help determine if people are healthy. A microscope is shown in the drawing below.

**Helpful Hints:**
- microscopes are used to see things that are too small to be seen with the naked eye
- many diseases are caused by things too small to see with the naked eye

**Part A:** Describe one way doctors use microscopes to determine if people are healthy.

One way doctors use microscopes: ____________________________

The student correctly describes one way doctors use microscopes.

**Answer Part B on the next page.**
Part B: Describe one way a doctor’s job would be different if the doctor did not have a microscope as a tool for diagnosis.

One way a doctor’s job would be different: A doctor would have to see how you are sick to guess what is wrong with you.

The student correctly describes one way a doctor’s job would be different not having a microscope as a tool.
This is a short open-ended (SOE) question. It is worth two points.

21 A microscope is a tool doctors use to help determine if people are healthy. A microscope is shown in the drawing below.

Part A: Describe one way doctors use microscopes to determine if people are healthy.

One way doctors use microscopes: SEE YOUR BLOOD TO MAKE SURE EVERYTHING IS HEALTHY

The student correctly describes one way doctors use microscopes.

Helpful Hints:
- microscopes are used to see things that are too small to be seen with the naked eye
- many diseases are caused by things too small to see with the naked eye

Answer Part B on the next page.
Part B: Describe one way a doctor’s job would be different if the doctor did **not** have a microscope as a tool for diagnosis.

One way a doctor’s job would be different: ____________________________

HE WOULD CHARGE MORE MONEY TO TELL PERSON WHAT’S WRONG.

The student incorrectly describes one way a doctor’s job would be different not having a microscope as a tool.
A.2.2.3 Response Score: 0

This is a short open-ended (SOE) question. It is worth two points.

21 A microscope is a tool doctors use to help determine if people are healthy. A microscope is shown in the drawing below.

Part A: Describe one way doctors use microscopes to determine if people are healthy.

One way doctors use microscopes: Microscopes are used to take your blood when you are sick.

Helpful Hints:
- microscopes are used to see things that are too small to be seen with the naked eye
- many diseases are caused by things too small to see with the naked eye

The student incorrectly describes one way doctors use microscopes.

Answer Part B on the next page.
21 Continued. Please refer to the previous page for task explanation.

**Part B:** Describe one way a doctor’s job would be different if the doctor did **not** have a microscope as a tool for diagnosis.

One way a doctor’s job would be different: ____________ 

The student incorrectly describes one way a doctor’s job would be different not having a microscope as a tool.
SECOND OPEN-ENDED ITEM

D.3.1.2

This is a short open-ended (SOE) question. It is worth two points.

22 A planet and a star each have a gravitational pull on one another. The diagram below shows some information about a planet and a star in a system.

Part A: Identify the object that has the greater gravitational pull in this system.

Object that has greater gravitational pull: ____________________________

Part B: Explain why the object you identified in part A has the greater gravitational pull.

Why object has greater gravitational pull: ____________________________

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Modified from Item 10, Grade 8 PSSA Science Sampler 2008 – 2009

Modifications: The lead-in direction line has been revised to provide descriptive context about the graphic of the star-and-planet system which has been reduced and simplified. The general direction line above the response boxes for parts A and B has been removed, and prompt phrases have been inserted in both A and B to provide more direction. The specific direction lines in parts A and B have been simplified to reduce processing.
ITEM-SPECIFIC SCORING GUIDELINE

Item #22

This item would be reported under Category D, Earth and Space Sciences.

Assessment Anchor:

D.3.1– Explain the relationships between and among the objects of our solar system.

Specific Eligible Content addressed by this item:

D.3.1.2– Describe the role of gravity as the force that governs the movement of the solar system and universe.

Scoring Guide:

Part A: Identify the object that has the greater gravitational pull in this system.

Part B: Explain why the object you identified in part A has the greater gravitational pull.

<table>
<thead>
<tr>
<th>Score</th>
<th>In response to this item, the student—</th>
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<tbody>
<tr>
<td>2</td>
<td>demonstrates a thorough understanding of gravity and the relationships of planetary motion by clearly stating that the star has the greater gravitational pull in this system and explaining that the star has the greater gravitational pull within this system because its mass is greater. The response is clear, complete, and correct.</td>
</tr>
<tr>
<td>1</td>
<td>demonstrates a partial understanding of gravity and the relationships of planetary motion by clearly stating that the star has the greater gravitational pull in this system or explaining that the star has the greater gravitational pull within this system because its mass is greater. The response may contain some work that is incomplete or unclear.</td>
</tr>
<tr>
<td>0</td>
<td>provides insufficient evidence to demonstrate any understanding of the content being tested.</td>
</tr>
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Note: No deductions should be taken for misspelled words or grammatical errors.
OPEN-ENDED ITEM RESPONSES

D.3.1.2 Response Score: 2 points

This is a short open-ended (SOE) question. It is worth two points.

22 A planet and a star each have a gravitational pull on one another. The diagram below shows some information about a planet and a star in a system.

Part A: Identify the object that has the greater gravitational pull in this system.

Object that has greater gravitational pull: The star has the greater pull.

The student correctly identifies the star as having the greater gravitational pull.

Part B: Explain why the object you identified in part A has the greater gravitational pull.

Why object has greater gravitational pull: The star has the greater pull. It has the greater mass.

The student correctly explains that the star has the greater gravitational pull because it has the greater mass.
D.3.1.2 Response Score: 1 point

This is a short open-ended (SOE) question. It is worth two points.

22 A planet and a star each have a gravitational pull on one another. The diagram below shows some information about a planet and a star in a system.

**Part A:** Identify the object that has the greater gravitational pull in this system.

Object that has greater gravitational pull: **THE STAR HAS THE GREATER PULL.**

The student correctly identifies the star as having the greater gravitational pull.

**Part B:** Explain why the object you identified in part A has the greater gravitational pull.

Why object has greater gravitational pull: **BECAUSE IT HAS THE LARGEST CIRCLE.**

The student incorrectly explains that the star has the greater gravitational pull because it has the largest circle.
SCIENCE

D.3.1.2 Response Score: 0

This is a short open-ended (SOE) question. It is worth two points.

22 A planet and a star each have a gravitational pull on one another. The diagram below shows some information about a planet and a star in a system.

Part A: Identify the object that has the greater gravitational pull in this system.

Object that has greater gravitational pull: planet

The student incorrectly identifies the planet as having the greater gravitational pull.

Part B: Explain why the object you identified in part A has the greater gravitational pull.

Why object has greater gravitational pull: cause it goes around the star.

The student incorrectly explains that the planet has the greater gravitational pull because it circles the star.