PSSA

8th grade

Science Practice

Name: _____

SCIENCE

MULTIPLE-CHOICE ITEMS

Note: All percentages listed in the tables below each item have been rounded.

A.1.1.2

1. Which question about the Allegheny River can best be answered through scientific inquiry?

   A How many species of fishes are present in this river?

   B Will this river be a fun place to visit?

   C Will fishing be a popular sport on this river in five years?

   D How much money should be spent to manage this river?

A.1.2.2

2. Which statement explains a long-term health effect of vaccinating people for a disease like influenza or malaria?

   A The disease would be completely eliminated.

   B The risk of contracting the disease would be reduced.

   C Body cells would mutate to produce a new disease strain.

   D Vaccinated individuals would become carriers of the disease.

A.2.1.5

Use the table below to answer question 3.

Mass, Volume, and Density Measurements of Substances

Substance	Mass (g)	Volume (cm^3)	Density (g/cm^3)
copper	5.0	0.56	8.93
copper	10.0	1.12	8.93
zinc	15.0	2.10	7.14
zinc	20.0	2.80	7.14
lead	25.0	2.20	11.36
lead	30.0	2.64	11.36

3. Which conclusion is supported by the data in the table?

   A By increasing the mass of a substance, its density will increase.

   B By increasing the mass of a substance, its volume will increase.

   C By increasing the volume of a substance, its mass will decrease.

   D By increasing the volume of a substance, its density will decrease.

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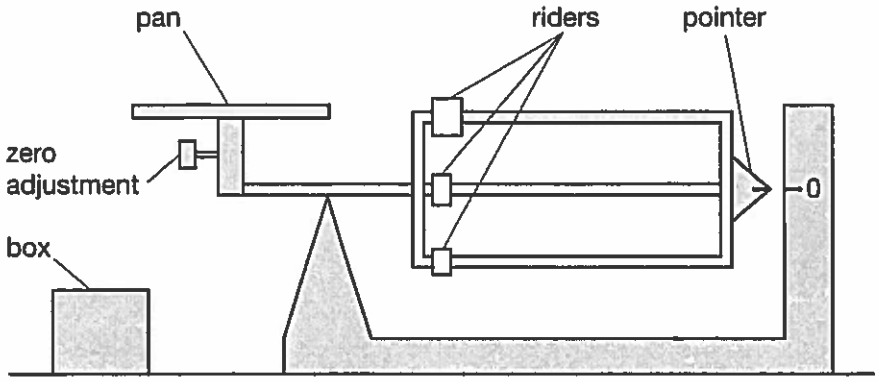
A.2.2.1

Use the diagram and steps below to answer question 4.



Using a Balance

Steps—Out of Order

1. Read the measurement.
2. Place the box on the pan.
3. Slide the riders until the pointer lines up with the zero (0) line.
4. "Zero" the balance.

4. Which sequence shows the correct order to measure the mass of the box?

A 2, 1, 4, 3

B 2, 3, 4, 1

C 4, 1, 2, 3

D 4, 2, 3, 1

A.2.2.3

5. Which of the following describes one way scientists use seismographs?

   A to view distant stars and planets

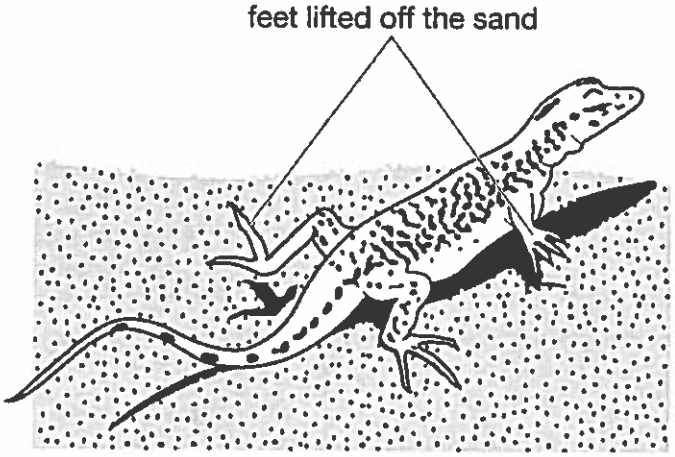
   B to measure the masses of objects

   C to help record atmospheric temperature changes

   D to help determine the composition of Earth's interior

A.3.1.3

Use the figure below to answer question 6.



6. When a desert lizard is on hot sand, nerves in its foot send a message to the brain. The brain analyzes this information and sends a message back through the nerves in the foot. This message tells the foot to move off the hot sand. Once the foot has moved off the hot sand, a message is relayed back to the brain. In this example, what is the first message sent to the brain?

   A input

   B output

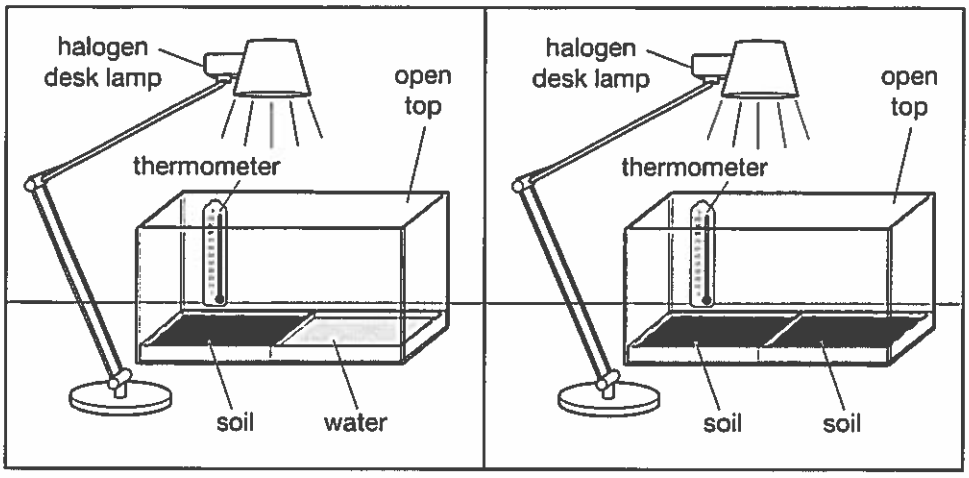
   C process

   D feedback

A.3.2.1

Use the model diagrams below to answer question 7.

Models of Two Different Regions on Earth



7. The diagrams show models of two different systems that represent different regions on Earth. Which question would these models **most likely** help students answer?

   A How do bodies of water affect the average daily high temperature of a region?

   B When does the hottest time of the day occur for regions at different latitudes?

   C What effect does the ocean have on the amount of rainfall for a region?

   D Where are desert regions located on a continent in relation to bodies of water?

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B.1.1.1

Use the picture below to answer question 8.

8. How is this fish adapted for weedy areas in freshwater lakes?

   A The upper fin of the fish looks like waves of water.

   B The lower fins of the fish look like the legs of a turtle.

   C The stripes of the fish look like plants in the water.

   D The front of the fish looks like the surface of a rock.

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B.2.2.2

9. Which statement **best** describes a dominant gene?

   A It is the gene that produces mutations.

   B It is the gene that produces desirable traits.

   C It is the gene that masks a recessive gene.

   D It is the gene that is masked by a recessive gene.

B.3.3.3

10. Which statement describes how recycling aluminum cans positively affects the environment?

   A Recycling uses energy.

   B Recycling makes solid waste.

   C Recycling conserves mineral resources.

   D Recycling produces air pollution.

C.1.1.2

Use the table below to answer question 11.

Densities of Substances

Substance	Density (grams/cm^3)
plastic X	1.38
plastic Y	0.90
water	1.00

11. A student is given a mixture of 200 plastic beads that all look alike. Each bead is made from one of two types of plastic: plastic X or plastic Y. Which statement describes what will happen when the mixture of beads is placed in water?

    A Both kinds of plastic beads will float in the water.

    B Both kinds of plastic beads will sink in the water.

    C Plastic X beads will float in the water and plastic Y beads will sink.

    D Plastic X beads will sink in the water and plastic Y beads will float.

C.2.2.1

12. Which energy source can be described as having the **greatest** impact on Earth's living environments?

    A moving air

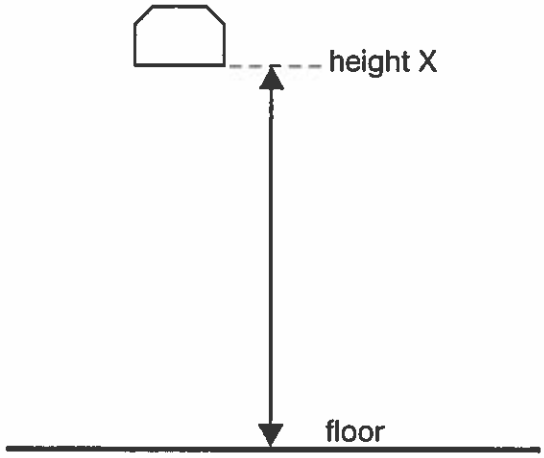
    B moving water

    C the Sun

    D geothermal

C.3.1.2

Use the diagram below to answer question 13.



13. An object is lifted into the air and dropped. Which statement **best** describes the object's energy as it falls through the air from the stationary position at height X?

    A At height X, the energy is potential, which changes to kinetic as the object falls.

    B At height X, the energy is kinetic, which changes to potential as the object falls.

    C At height X, the energy is potential and kinetic, and the object loses potential energy as it falls.

    D At height X, the energy is potential and kinetic, and the object loses kinetic energy as it falls.

D.1.3.4

14. Which type of moving water provides the **best** environment for organisms that decompose dead organic matter?

    A a steep mountain stream that flows when snow melts in the spring

    B a shallow river with cold, clear water and a sandy bottom

    C a slow-moving river with a wide, open channel

    D a rapidly moving stream with a narrow, steep channel

D.3.1.1

15. Which statement describes two factors that have the **greatest** influence on tides?

    A Earth rotates on its axis once each day, and the gravity of the Moon causes the oceans to bulge.

    B Earth rotates on its axis once each year, and the gravity of the Moon causes the oceans to bulge.

    C Earth revolves around the Sun once each year, and the gravity of Earth causes the oceans to bulge.

    D Earth revolves around the Sun once each day, and the gravity of the Sun causes the oceans to bulge.

D.3.1.2

16. Which planet has the **greatest** role in changing the direction of a comet's path?

    A Earth, because of its atmosphere of nitrogen and carbon dioxide

    B Mars, because of its position near the asteroid belt

    C Jupiter, because of its strong gravitational force

    D Saturn, because of its significant ring structure

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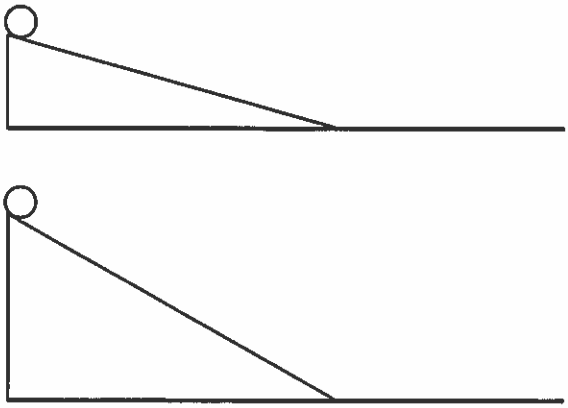
FIRST OPEN-ENDED ITEM

A.2.1.2

Use the figures below to answer question 17.



17. An experiment is set up to investigate how different ramps affect a ball's speed.

Part A: Create a question that could be tested using these two ramps.

Part B: State a hypothesis that could scientifically test the question.

Sampler Sequence	Scorepoint 2	Scorepoint 1	Scorepoint 0
17	50%	34%	16%

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ITEM-SPECIFIC SCORING GUIDELINE

Item #17

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

Assessment Anchor:

A.2.1– Apply knowledge of scientific investigation or technological design in different contexts to make inferences to solve problems.

Specific Eligible Content addressed by this item:

A.2.1.2– Use space/time relationships, define concepts operationally, raise testable questions, or formulate hypotheses.

Scoring Guide:

Part A: Create a question that could be tested using these two ramps.

Part B: State a hypothesis that could scientifically test the question.

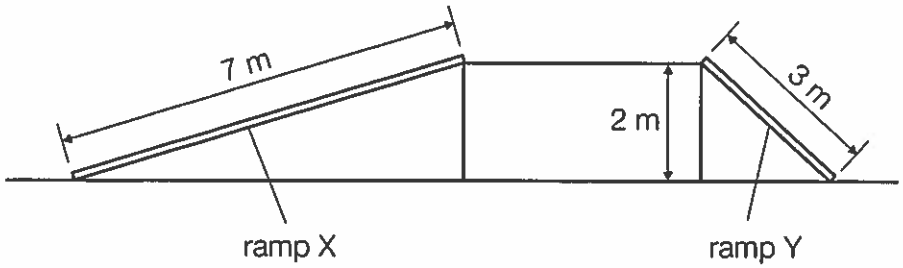
Score	In response to this item, the student—
2	demonstrates a *thorough* understanding of using space/time relationships to raise testable questions or formulate a hypothesis by creating a question that could be tested using the two ramps **and** by formulating a hypothesis that could scientifically test the question. The response is clear, complete, and correct.
1	demonstrates a *partial* understanding of using space/time relationships to raise testable questions by creating a question that could be tested using the two ramps **or** by formulating a hypothesis that could scientifically test the question. The response may contain some work that is incomplete or unclear.
0	provides *insufficient* evidence to demonstrate any understanding of the content being tested.
Non-scorable	BLK (blank) – No response or written refusal to respond or response too brief to determine response OT – Off task/topic LOE – Response in a language other than English IL – Illegible

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

SECOND OPEN-ENDED ITEM

C.3.1.3

Use the diagram below to answer question 18.



18. A worker needs to move a box of heavy equipment from the ground to a platform 2 meters high. Rather than lift the box, the worker can use one of two ramps. Ramp X is 7 meters long and ramp Y is 3 meters long.

Part A: Why would a worker use a ramp rather than lift the box?

Part B: Choose either ramp X (7 meters long) or ramp Y (3 meters long) and explain the benefits of using that ramp instead of the other ramp.

Sampler Sequence	Scorepoint 2	Scorepoint 1	Scorepoint 0
18	25%	39%	36%

SCIENCE

ITEM-SPECIFIC SCORING GUIDELINE

Item #18

This item is reported under Category C, Physical Sciences.

Assessment Anchor:

C.3.1– Describe the effect of multiple forces on the movement, speed, or direction of an object.

Specific Eligible Content addressed by this item:

C.3.1.3– Explain that mechanical advantage helps to do work (physics) by either changing a force or changing the direction of the applied force (e.g., simple machines, hydraulic systems).

Scoring Guide:

Part A: Why would a worker use a ramp rather than lift the box?

Part B: Choose either ramp X (7 meters long) or ramp Y (3 meters long) and explain the benefits of using that ramp instead of the other ramp.

Score	In response to this item, the student—
2	demonstrates a *thorough* understanding of mechanical advantages produced by simple machines by explaining why a worker would use a ramp rather than lift a box **and** by explaining the benefits of choosing one ramp over the other. The response is clear, complete, and correct.
1	demonstrates a *partial* understanding of mechanical advantages produced by simple machines by explaining why a worker would use a ramp rather than lift a box **or** by explaining the benefits of choosing one ramp over the other. The response may contain some work that is incomplete or unclear.
0	provides *insufficient* evidence to demonstrate any understanding of the content being tested.
Non-scorable	BLK (blank) – No response or written refusal to respond or response too brief to determine response OT – Off task/topic LOE – Response in a language other than English IL – Illegible

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

SCIENCE SCENARIO

Directions: Use the information presented on pages 24 and 25 to answer questions 19 through 22.

Cloud Study

As part of a school project, a student records the types of clouds observed in the sky near the student's home for five days. These data are shown in the table below.

Types of Clouds

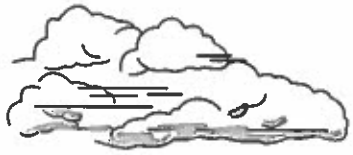
Day	Observations
Monday	wispy clouds that curl in thin streams
Tuesday	puffy clouds that are mostly small and move slowly through the sky
Wednesday	a layer of light grayish cloud that covers the entire sky
Thursday	thin, wispy clouds that curl in thin streams
Friday	very tall, puffy gray clouds that move quickly across the sky

SCIENCE SCENARIO

Directions: Use the information presented on pages 24 and 25 to answer questions 19 through 22.

The student also decides to sketch the clouds observed. The sketches are shown in the table below.

Daily Cloud Sketches

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

SCIENCE SCENARIO

MULTIPLE-CHOICE ITEMS

Directions: Use the information presented on pages 24 and 25 to answer questions 19 through 22.

A.2.2.3

19. When the student's parent heard about the cloud project, the parent gave the student a barometer and explained that it can help the student make weather predictions. How can this instrument help the student make weather predictions?

    A It measures pressure changes.

    B It measures temperature changes.

    C It measures cloud precipitation.

    D It measures wind speed.

D.2.1.3

20. According to the student's observations, on which days would precipitation **most likely** have occurred?

    A Monday and Tuesday

    B Monday and Thursday

    C Wednesday and Thursday

    D Wednesday and Friday

D.1.3.1

21. Which physical process caused the clouds observed by the student to form from water vapor in the air?

    A condensation

    B distillation

    C evaporation

    D sublimation

A.2.2.2

22. On a particular day, the student notices that the sky is filled with clouds of many different sizes. The student counts the number of big clouds, medium clouds, and little clouds, and records the number of each type. According to which quantity did the student organize the clouds?

    A elevation

    B water content

    C temperature

    D relative volume