Delaware DeSSA Grade 8 Science Practice

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Delaware
DeSSA

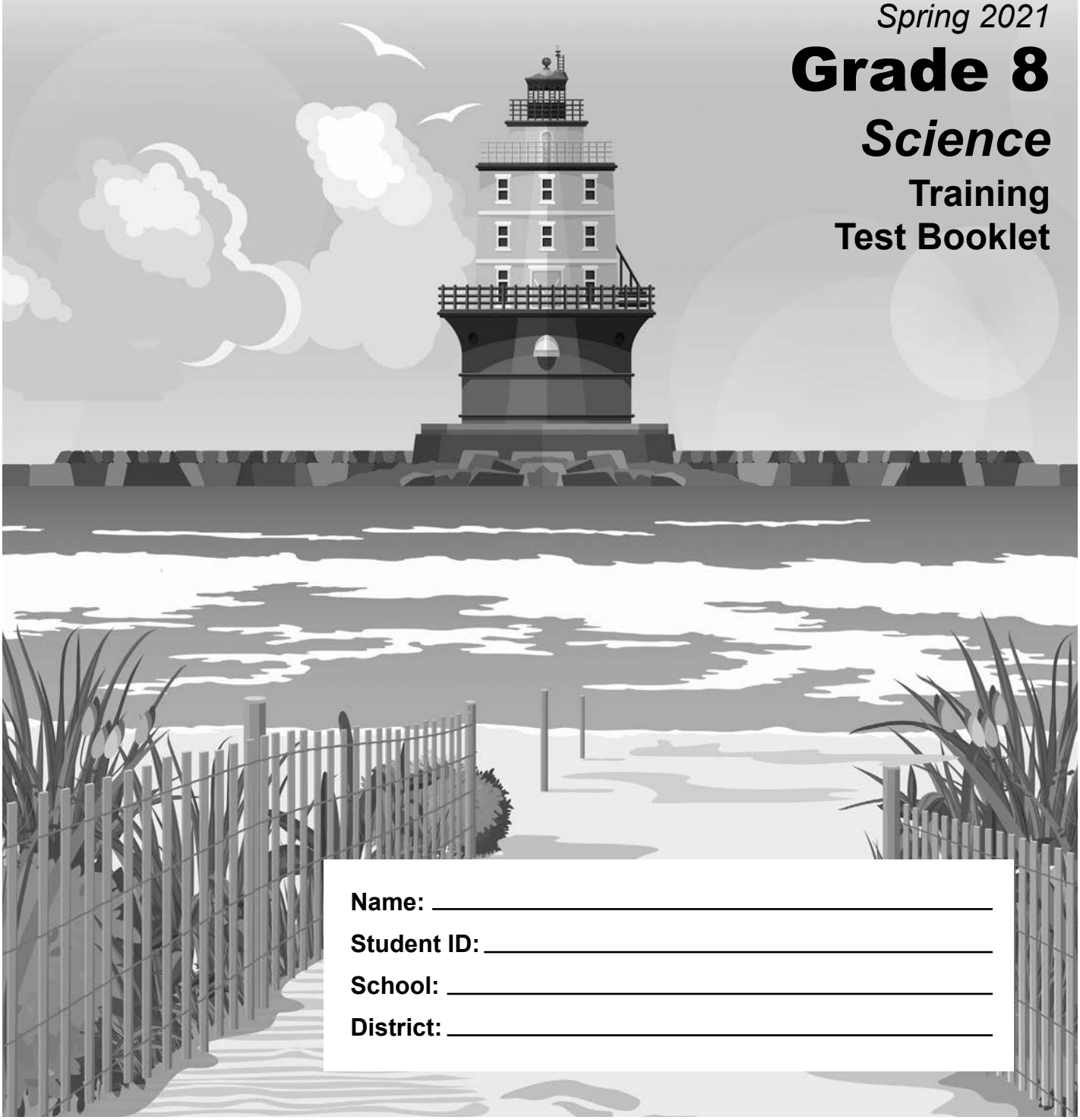
Delaware System of Student Assessments

Spring 2021

Grade 8

Science

Training Test Booklet



Name: _____

Student ID: _____

School: _____

District: _____

Science

This practice test contains samples of various question types that will appear on the Spring test. Read each question carefully and follow the directions.

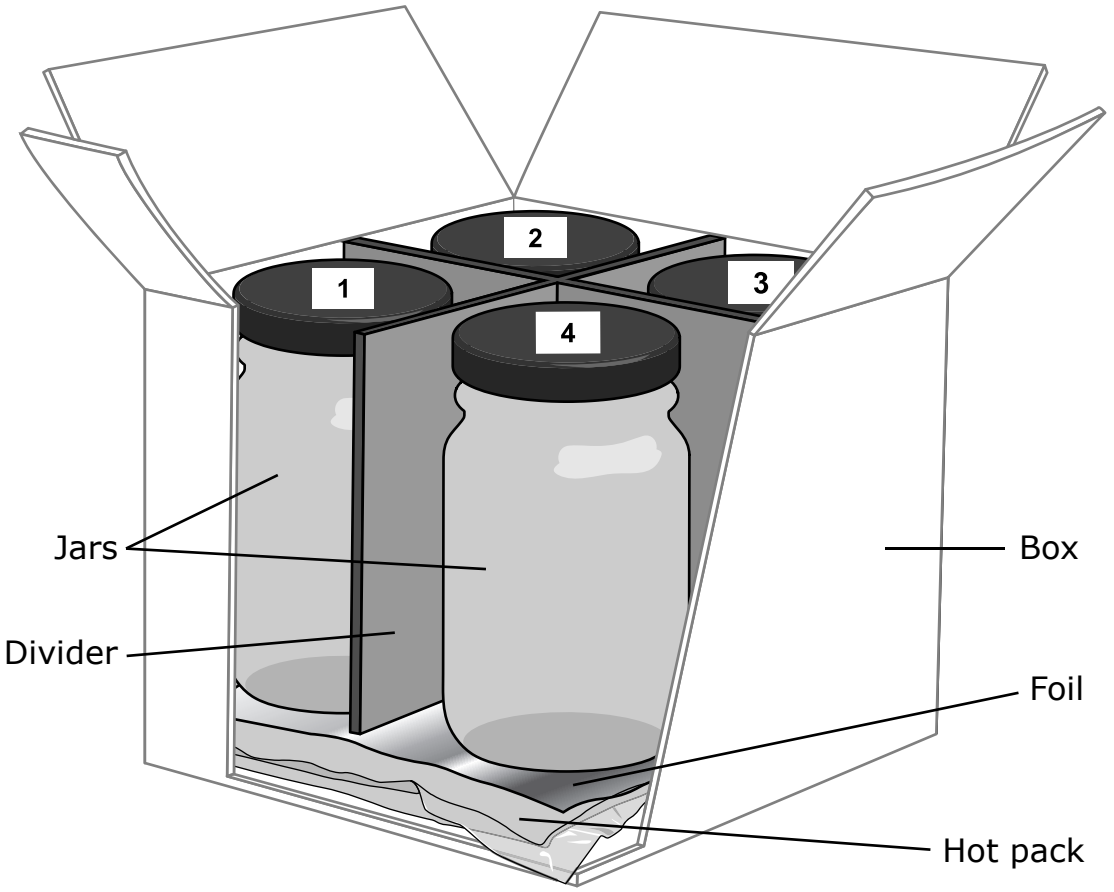
Use the information in Source 1a, Source 1b, Source 1c, and Source 1d to answer the following questions.

Source 1a. Hot Pack Investigation 1

A student investigated how volume affects how the temperature of a substance changes, by following these steps:

1. Place an instant hot pack in the bottom of a cardboard box.
2. Put a layer of aluminum foil on top of the hot pack.
3. Place a tight-fitting cardboard divider in the box on top of the foil to create four sections.
4. Add a different volume of room-temperature water to each jar.
5. Place one jar in each section, as shown in **Figure 1**.

Figure 1. Box for Hot Pack Investigation 1



The cardboard box was sealed and the water was allowed to heat for 10 minutes. After 10 minutes, the student removed the four jars and immediately recorded the temperature of the water in each jar.

1. Use the information in Source 1a to help you answer this question.

Which question can **best** be answered by performing Hot Pack Investigation 1?

A. How will the temperature of the water in each jar affect the hot pack?

B. How will the temperature of the water in each jar change during the 10 minutes the box is sealed?

C. How much thermal energy will be transferred between the instant hot pack and the water in each jar?

D. How much thermal energy will be transferred to the surrounding air during the 10 minutes the box is sealed?

Source 1b. Hot Pack Investigation 2

The student collected the data shown in **Table 1** before and after using an instant hot pack on his arm.

Table 1. Instant Hot Pack Data

	Before Using	After Using
Mass of Instant Hot Pack	300 g	300 g
Temperature of Instant Hot Pack	45°C	25°C
Temperature of Arm	30°C	35°C
Temperature of Room	20°C	20°C

2. Use the information in Source 1b to help you answer this question.

Which **two** statements support the student's claim that the matter and energy of the instant hot pack are conserved even though the temperature of the instant hot pack changed?

A. The mass of the instant hot pack did not change because the amount of matter was constant.

B. The mass of the instant hot pack did not change because the total amount of energy was conserved.

C. Matter was conserved because it flowed from the hot pack to the arm, as shown by the temperature data.

D. Energy was conserved because it flowed from the instant hot pack into the arm, causing the arm to warm, as shown by the temperature data.

E. The instant hot pack transferred energy as cold flowed from the arm into the hot pack and changed the temperature of the arm, until both were at the same temperature.

Source 1c. Hot Pack Investigation 3

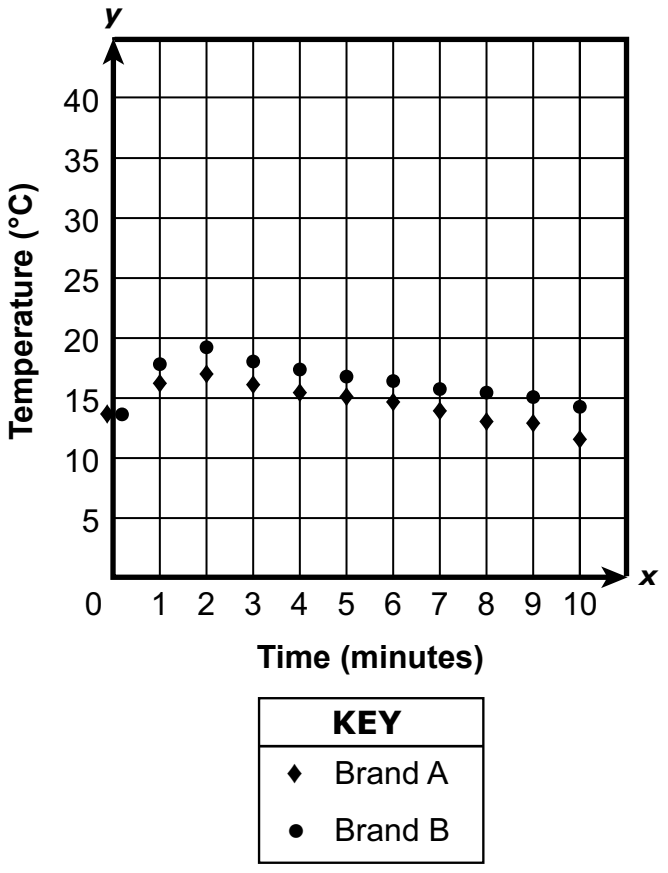
The student notices that the ratio of salt to water is different in different brands of hot packs. The student tests two different brands of hot packs to see how these ratios affect the temperatures of the hot packs over time. The student places two different hot packs on two identical metal benches outside on a cool day and records the temperature of each hot pack each minute for ten minutes.

The student's data are shown in **Table 1** and **Graph 1**.

Table 1. Hot Pack Brands Data

Hot Pack Brand	Mass of Salt (g)	Volume of Water (mL)
A	75.0	300
B	100.0	300

Graph 1. Temperature over Time



3. Use the information in Source 1c to help you answer this question.

Part A

Which claim is **best** supported by the student's data?

A. A salt solution with more mass will have a higher temperature than a salt solution with less mass.

B. A salt solution with more water than salt will have a higher temperature than a salt solution with more salt than water.

C. A salt solution with a higher ratio of salt to water will have a higher temperature than a salt solution with a lower ratio of salt to water.

D. A salt solution with a greater total volume of salt and water will have a higher temperature than a salt solution with a smaller total volume of salt and water.

Part B

Based on the data, which **two** combinations of salt and water will likely reach a higher temperature than either Brand A or Brand B?

A. 75.0 g of salt and 250 mL of water

B. 100.0 g of salt and 250 mL of water

C. 100.0 g of salt and 400 mL of water

D. 125.0 g of salt and 400 mL of water

E. 150.0 g of salt and 400 mL of water

4. Use the information in Source 1c to help you answer this question.

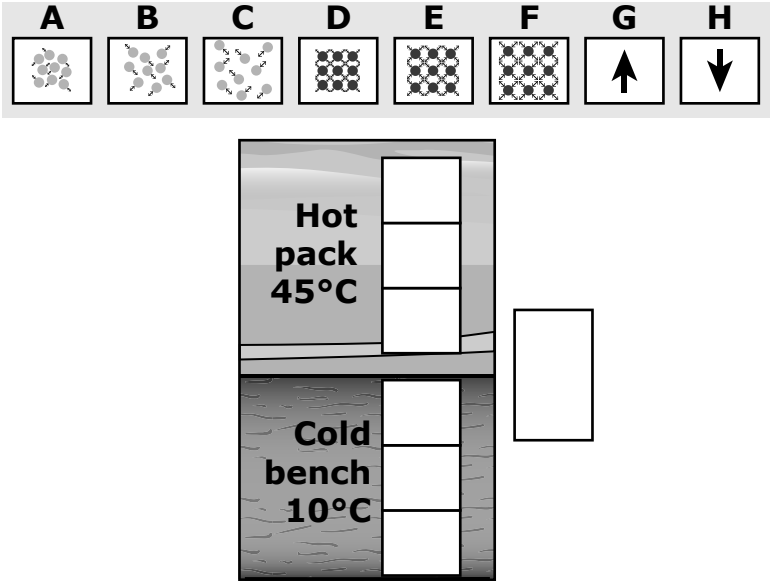
The student looks at the hot packs on the bench and determines that the hot packs and the bench can be thought of as two interacting systems. The student wants to model energy flow and average kinetic energy of the particles at different locations as these two systems interact.

Follow these steps to complete the student's model.

Step 1: Look at these six particle pictures, labeled A–F. Each picture represents the motion of the particles at one location in the model.

Step 2: Write the letter of the picture (A–F) that **best** represents the motion of the particles in each white box on the model. Each letter should only be used **one** time.

Step 3: On the right side of the model, write the letter of the arrow (G or H) that shows the direction in which energy is transferred between the hot pack and the cold bench in this system.



Source 1d. Hot Pack Investigation 4

The student wants to test how the ratio between the mass of a hot pack and the mass of a water sample relates to temperature change. The student designs this procedure.

1. Place a beaker with 50 mL of room-temperature water on top of a 300-g hot pack
2. Place a beaker with 100 mL of room-temperature water on top of a 600-g hot pack

The student realizes that he must redesign his procedure before conducting the test.

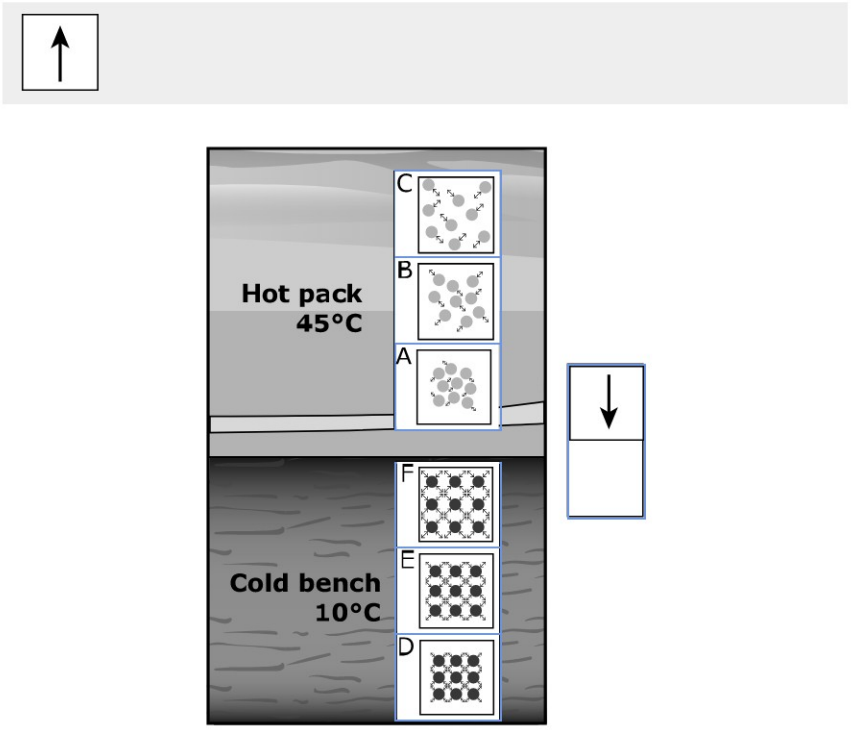
5. Use the information in Source 1d to help you answer this question.

Explain how the student should redesign the procedure to test how the ratio between the mass of a hot pack and the mass of a water sample relates to temperature change. Use information about proportion and quantity to support your explanation.

STOP

Delaware System of Student Assessments (DeSSA)

Science Grade 8 Practice Test

Question Number	Answer	PE
1	B	MS-PS3-4
2	A, D	MS-PS3, MS-PS3-4
3	Part A: C Part B: B, E	MS-PS3-4
4		MS-PS3-5

<table>
<tr><th>Question Number</th><th>Answer</th><th>PE</th></tr>
<tr><td>5</td><td>
<table>
<tr><th colspan="2">Scoring Information</th></tr>
<tr><th>Score</th><th>Description</th></tr>
<tr><td>2</td><td>This response correctly explains how the student should redesign the procedure and uses proportion and quantity to support the explanation.</td></tr>
<tr><td>1</td><td>This response correctly explains how the student should redesign the procedure but does not use proportion and quantity to support the explanation.</td></tr>
<tr><td>0</td><td>This response is incorrect or irrelevant.</td></tr>
<tr><th colspan="2">Sample Responses</th></tr>
<tr><td>2</td><td>The student could revise his procedure so that either the volume of the water or the mass of the hot pack is increased, but not both. Increasing the sizes of both the hot pack and the water proportionally causes the ratio of salt to water to remain constant. In order to test the ratio, the increase cannot be proportional.</td></tr>
<tr><td>1</td><td>The student must increase the quantity of either the mass of the water or the mass of the hot pack while keeping the other quantity the same.</td></tr>
<tr><th colspan="2">Scoring Notes</th></tr>
<tr><td colspan="2">• Explanation of how the student should redesign the procedure. (1 point)
• Use of proportion and quantity to support the explanation. (1 point)</td></tr>
</table>
</td><td>MS-PS3-4</td></tr>
</table>