

2023 MCAS Sample Student Work and Scoring Guide

Grade 5 Science and Technology/Engineering Question 15: Constructed-Response

Reporting Category: Physical Science

Practice Category: Evidence, Reasoning, and Modeling

Standard: [5.PS.1.2](#) - Measure and graph the weights (masses) of substances before and after a reaction or phase change to provide evidence that regardless of the type of change that occurs when heating, cooling, or combining substances, the total weight (mass) of matter is conserved.

Item Description: Explain why the mass of a liquid decreases in an open beaker; determine and explain how closing the beaker will most likely affect the mass of the liquid.

[View item in MCAS Digital Item Library](#)

Scoring Guide

Select a score point in the table below to view the sample student response.

Score*	Description
3A	The response demonstrates a thorough understanding of how mass is conserved when a substance changes phases in a closed system. The response clearly explains why the mass of the contents in the beaker decreased during an investigation. The response also correctly determines the most likely total mass of the beaker, the lid, and the beaker's contents in another investigation and clearly explains the reasoning.
3B	
2	The response demonstrates a partial understanding of how mass is conserved when a substance changes phases in a closed system.
1	The response demonstrates a minimal understanding of how mass is conserved when a substance changes phases in a closed system.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

*Letters are used to distinguish between sample student responses that earned the same score (e.g., 3A and 3B).

Score Point 3A

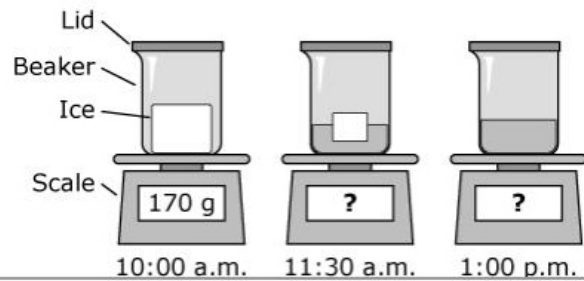
A group of students conducted two investigations using water.

Investigation 1

The students completed the following steps.

1. Put a cube of ice into a beaker and cover the beaker with a lid.
2. Measure the mass of the ice, beaker, and lid.
3. Let the beaker remain at room temperature for three hours so that the ice becomes liquid water.
4. Measure the mass of the liquid water, beaker, and lid.

The diagram shows investigation 1.

**This question has two parts.**

The data from investigation 2 show the mass of the beaker and its contents.

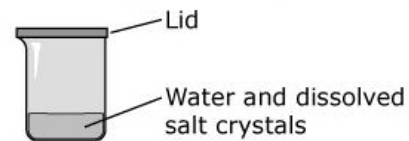
Part A

Explain why the mass of the contents in the beaker decreased during the investigation.

The mass of the contents in the beaker decreased because the water evaporated and is no longer in the beaker.

Part B

The students repeated investigation 2 with the same amounts of salt and water, but this time they put a lid on top of the beaker, as shown.



The mass of the beaker, the lid, and the beaker's contents was 90 g on day 1. The students continued to measure the mass of the setup for three days.

What was the most likely total mass of the beaker, the lid, and the beaker's contents on day 3 of the investigation? Explain your reasoning.

The mass on day 3 is likely 90 grams as well because the lid prevents the water from leaving the beaker through evaporation.

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Score Point 3B

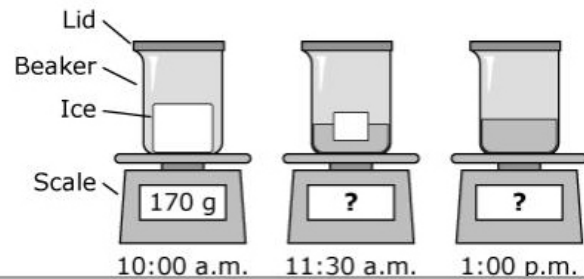
A group of students conducted two investigations using water.

Investigation 1

The students completed the following steps.

1. Put a cube of ice into a beaker and cover the beaker with a lid.
2. Measure the mass of the ice, beaker, and lid.
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4. Measure the mass of the liquid water, beaker, and lid.

The diagram shows investigation 1.

**This question has two parts.**

The data from investigation 2 show the mass of the beaker and its contents.

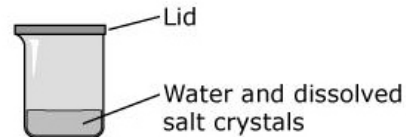
Part A

Explain why the mass of the contents in the beaker decreased during the investigation.

The water in the beaker evaporated a little at a time.

Part B

The students repeated investigation 2 with the same amounts of salt and water, but this time they put a lid on top of the beaker, as shown.



The mass of the beaker, the lid, and the beaker's contents was 90 g on day 1. The students continued to measure the mass of the setup for three days.

What was the most likely total mass of the beaker, the lid, and the beaker's contents on day 3 of the investigation? Explain your reasoning.

The weight would still be 90 grams because they kept a lid on and nothing could get out of the beaker.

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Score Point 2

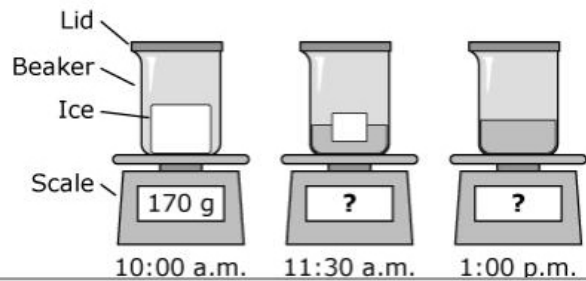
A group of students conducted two investigations using water.

Investigation 1

The students completed the following steps.

1. Put a cube of ice into a beaker and cover the beaker with a lid.
2. Measure the mass of the ice, beaker, and lid.
3. Let the beaker remain at room temperature for three hours so that the ice becomes liquid water.
4. Measure the mass of the liquid water, beaker, and lid.

The diagram shows investigation 1.



This question has two parts.

The data from investigation 2 show the mass of the beaker and its contents.

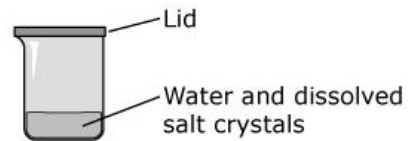
Part A

Explain why the mass of the contents in the beaker decreased during the investigation.

The mass of the contents in the beaker decreased because the water had more mass than the crystals, but than the water turned into crystals, so the mass had to decrease.

Part B

The students repeated investigation 2 with the same amounts of salt and water, but this time they put a lid on top of the beaker, as shown.



The mass of the beaker, the lid, and the beaker's contents was 90 g on day 1. The students continued to measure the mass of the setup for three days.

What was the most likely total mass of the beaker, the lid, and the beaker's contents on day 3 of the investigation? Explain your reasoning.

The most likely total mass on day three is 90 g because with the lid on the water can't get out so it would have the same mass as it did on day one, which is 90 grams.

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Score Point 1

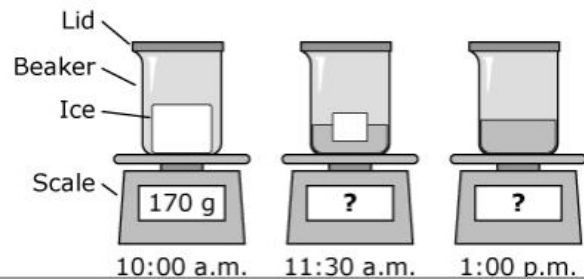
A group of students conducted two investigations using water.

Investigation 1

The students completed the following steps.

1. Put a cube of ice into a beaker and cover the beaker with a lid.
2. Measure the mass of the ice, beaker, and lid.
3. Let the beaker remain at room temperature for three hours so that the ice becomes liquid water.
4. Measure the mass of the liquid water, beaker, and lid.

The diagram shows investigation 1.

**This question has two parts.**

The data from investigation 2 show the mass of the beaker and its contents.

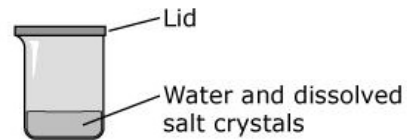
Part A

Explain why the mass of the contents in the beaker decreased during the investigation.

The mass decreased because the water from the beaker evaporated a little each day, leaving only the crystals in the beaker.

Part B

The students repeated investigation 2 with the same amounts of salt and water, but this time they put a lid on top of the beaker, as shown.



The mass of the beaker, the lid, and the beaker's contents was 90 g on day 1. The students continued to measure the mass of the setup for three days.

What was the most likely total mass of the beaker, the lid, and the beaker's contents on day 3 of the investigation? Explain your reasoning.

The mass of the beaker, the lid, and the mixture in three days was probably around thirty grams. I know that the water decreased a little each day and ninety divided by three was thirty.

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Score Point 0

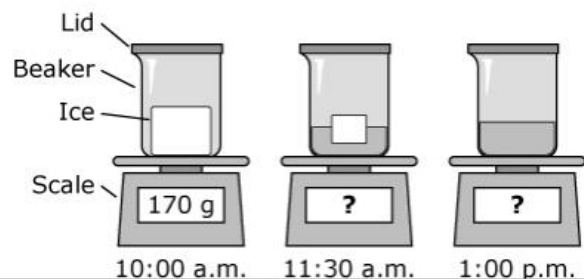
A group of students conducted two investigations using water.

Investigation 1

The students completed the following steps.

1. Put a cube of ice into a beaker and cover the beaker with a lid.
2. Measure the mass of the ice, beaker, and lid.
3. Let the beaker remain at room temperature for three hours so that the ice becomes liquid water.
4. Measure the mass of the liquid water, beaker, and lid.

The diagram shows investigation 1.

**This question has two parts.**

The data from investigation 2 show the mass of the beaker and its contents.

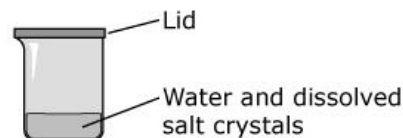
Part A

Explain why the mass of the contents in the beaker decreased during the investigation.

The mass of the contents in the beaker decreased in investigation 2 because the salt crystals dissolved in the water that is in the beaker.

Part B

The students repeated investigation 2 with the same amounts of salt and water, but this time they put a lid on top of the beaker, as shown.



The mass of the beaker, the lid, and the beaker's contents was 90 g on day 1. The students continued to measure the mass of the setup for three days.

What was the most likely total mass of the beaker, the lid, and the beaker's contents on day 3 of the investigation? Explain your reasoning.

The most likely total mass of the beaker, the lid, and the beaker's contents on day 3 is 84 g.

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