

**Stackable Instructionally-embedded Portable Science (SIPS) Assessments Project**

**SIPS Grade 5 Unit 1 End-of-Unit Assessment Scoring Guide**

**May 2023**

The *SIPS Grade 5 Unit 1 End-of-Unit Assessment Scoring Guide* was developed with funding from the U.S. Department of Education under the Competitive Grants for State Assessments Program, CFDA 84.368A. The contents of this paper do not represent the policy of the U.S. Department of Education, and no assumption of endorsement by the Federal government should be made.

All rights reserved. Any or all portions of this document may be reproduced and distributed without prior permission, provided the source is cited as: Stackable Instructionally-embedded Portable Science (SIPS) Assessments Project. (2023). *SIPS Grade 5 Unit 1 End-of-Unit Assessment Scoring Guide*. Lincoln, NE: Nebraska Department of Education.

Table of Contents

[SIPS Grade 5 Unit 1 EOU Assessment Task 1: What’s the Matter? 1](#_Toc112312555)

[Task 1 Scoring Rubric 6](#T1R)

[Task 1 Student Exemplars 8](#T1E)

[SIPS Grade 5 Unit 1 EOU Assessment Task 2: What Just Happened? 10](#_Task)

[Task 2 Scoring Rubric 15](#T2R)

[Task 2 Student Exemplars 18](#T2E)

[SIPS Grade 5 Unit 1 EOU Assessment Task 3: Change or Not? 21](#_Task_1)

[Task 3 Scoring Rubric 24](#T3R)

[Task 3 Student Exemplars 26](#_Student_Exemplar(s))

 **SIPS Grade 5 Unit 1 EOU Assessment Task 1: What’s the Matter?**

# Student Worksheet

This task is about the results of mixing solids with liquids.

# Task

Ms. Kim’s students are learning about matter. Matter can be a liquid, solid, or gas. Ms. Kim plans to show what can happen when a liquid and solid are mixed together. Vinegar is a clear liquid. Baking soda is a white powder.

### Prompt 1

Before mixing, Ms. Kim pours some vinegar into a bottle. Then she places some baking soda into an uninflated balloon. Next, she attaches the balloon to the top of the bottle. To mix the two materials, Ms. Kim lifts the balloon and the baking soda falls into the vinegar.

|  |  |
| --- | --- |
| Before Mixing | After Mixing |
| Diagram  Description automatically generated | Diagram  Description automatically generated |

## Part A.

After mixing the vinegar and baking soda, bubbles form. The balloon begins to expand. Ms. Kim tells the students that the gas from the bubbles fills the balloon.

In the space below, draw the arrangement of the particles **in the balloon** **after mixing**. Use the symbol of a particle in the key to draw the particles.



**KEY**

 **Particle**



 **Gas**

## Part B.

Ms. Kim tells the students that when materials are mixed, they can make a gas. Gases cannot be seen.

Use your particle arrangement drawing to explain why the students cannot see the gas particles inside the balloon.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Part C.

Ms. Kim tells the students that we can see solids and liquids. Solids and liquids are also made of particles like gases. Then, a student says the following:

**The particles of solids and liquids are arranged the same as gases. We can see solids and liquids because their particles are much bigger than gas particles**.

Do you agree with the student’s description of why we can see solids and liquids?

Circle your answer. **YES NO**

Use what you know about the arrangement **AND** size of particles of matter to explain your answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Prompt 2

Ms. Kim provides Table 1. It shows the properties of three solids. It also shows reactions, or changes, when each of the solids is mixed with water or vinegar.

Table 1. Material Properties

|  |  |  |  |
| --- | --- | --- | --- |
| **Solid** | **Description** **of Appearance** | **Mixed with Water** | **Mixed with Vinegar** |
| Baking Soda | White powder | Dissolves | Forms bubbles  |
| Corn Starch | White powder | Forms a white mixture | Forms a white mixture |
| Powdered Sugar | White powder | Dissolves | Dissolves |

Next, Ms. Kim shows the students three unknown solids. Ms. Kim tells the class each of the unknown solids is one of the solids in Table 1.

The unknown solids are labeled as:

* Solid A
* Solid B
* Solid C

Ms. Kim asks the students to think of a way to identify the unknown solids.

Complete **Diagram 1** with mixtures of unknown solids, water, and vinegar that can be used to identify the unknown solids. One mixture is filled in.

Diagram 1. Mixtures of Unknown Solids with Liquids

### Prompt 3

Which mixtures and observations would determine that **Solid B** is powdered sugar? Use **Table 1** and the completed **Diagram 1** to support your explanation.

I would mix **Solid B** with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_because

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

I will know **Solid B** is powdered sugar if\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

SIPS Grade 5 Unit 1 EOU Assessment Task 1 Rubric (5-PS1-1, 5-PS1-3, 5-PS1-4)

| **Prompt** | **Score Point 0** | **Score Point 1** | **Score Point 2** | **Score Point 3** |
| --- | --- | --- | --- | --- |
| **Prompt 1** **Part A. & Part B.** | No aspect of the response is correct  | Response includes **one (1)** of the **two (2)** aspects | Responseincludesthe following aspects:**Part A*** The drawing represents gas particles that are spaced widely apart and distributed throughout the balloon

**AND****Part B*** Evidence from the drawing supports an explanation that the particles are spread far apart and each particle is too small to be seen
 | NA |
| **Prompt 1****Part C.** | No aspect of the response is correct  | Response includes **one (1)** of the **three (3)** aspects | Response includes **two (2)** of the **three (3)** aspects | Responseincludesthe following aspects:* Circles “**NO**”
* Uses the particle arrangement of matter to support their explanation
* Uses the size of particles of matter to support their explanation
 |
| **Prompt 2** | No aspect of the response is correct  | Response includes **one (1)** of the **five (5)** correct mixtures that can be used to identify the unknown solids  | Response includes **two (2)** or **three (3)** of the **five (5)** correct mixtures that can be used to identify the unknown solids | Response includes **four (4)** or **five** **(5)** of the **five (5)** correct mixtures that can be used to identify the unknown solids |
| **Prompt 3**  | No aspect of the response is correct  | Response includes **one (1)** of the **three (3)** aspects | Response includes **two (2)** of the **three (3)** aspects | Response includes the following aspects:* Solid B needs to be mixed with both liquids
* Solid B must dissolve in both liquids
* Only powdered sugar dissolves in both liquids

**OR*** Solid B needs to be mixed with vinegar
* Solid B must dissolve in vinegar
* Only powdered sugar dissolves in vinegar
 |

## Student Exemplars

Student exemplars represent high-quality responses that align to full-point rubric scores. The exemplar responses are intended to assist educators’ understanding of the nature and expectations of each prompt. Note the exemplars serve as examples of high-quality responses, and students may respond with equally relevant, scientifically accurate responses and ideas that meet the expectations of a full-point rubric score.

### Prompt 1

### Part A.

*In the space below, draw the arrangement of the particles* ***in the balloon after mixing****. Use the symbol of a particle in the key to draw the particles.*





**KEY**

 **Particle**

###

 **Gas**

### Part B.

*Use your particle arrangement drawing to explain why the students cannot see the gas particles inside the balloon.*

Gas is produced. The gas fills and inflates the balloon. The students cannot see the gas particles because they are very tiny. Like in my drawing, gas particles fill up the space in the balloon because they are spread far apart.

## *Part C.*

*Do you agree with the student’s description of why we can see solids and liquids?*

*Circle your answer.* ***YES NO***

 *Use what you know about the arrangement* ***AND*** *size of particles of matter to explain your answer.*

I disagree because all matter is made of particles too small to be seen. That means I can’t see the particles of solids and liquids or gases. The reason why I can see a solid or liquid is because of the arrangement of the particles. Because gas particles are spread far apart is why gas cannot be seen. I can see solids and liquids because the particles are close together, but I would not be able to see a single particle. It would be too small.

### Prompt 2

*Complete* ***Diagram 1*** *with mixtures of unknown solids, water, and vinegar that can be used to identify the unknown solids. One mixture is filled in.*

***Diagram 1. Mixtures of Unknown Solids with Liquids***

### Prompt 3

*Which mixtures and observations must be collected to determine that* ***Solid B*** *is powdered sugar? Use* ***Table 1*** *and* ***Diagram 1*** *to support your explanation.*

*I would mix* ***Solid B*** *with* eachof the liquids *because* powdered sugar dissolves in both water and vinegar*.*

*I will know* ***Solid B*** *is powdered sugar if* the powder dissolves in both liquids, and there is no reaction*.*

*OR*

*I would mix* ***Solid B*** *with* vinegar *because* only powdered sugar dissolves in vinegar*.*

*I will know* ***Solid B*** *is powdered sugar if* the powder dissolves in vinegar, and there is no reaction, and no white substance is formed.

 **SIPS Grade 5 Unit 1 EOU Assessment Task 2: What Just Happened?**

# Student Worksheet

This task is about properties of matter.

# Task

Have you ever reached for a glass of ice water to have the glass slip from your hand? When you pour the water over the ice, the glass is dry on the outside. But when you pick it up later, the outside of the glass is covered with water droplets. Condensation occurs when water vapor cools and forms water droplets on a surface.

The pictures below show Glass 1with no iceand Glass 2with ice.

* Each glass is the same size.
* Each glass is filled with the same amount of room temperature water.
* Ice cubes are only added to **Glass 2.**

**Glass 1 with No Ice Glass 2 with Ice**



After a few minutes, there is no change to Glass 1.

After a few more minutes, water droplets form on the surface of Glass 2.

### Prompt 1

## Part A.

Condensation happens when particles in a gas cool down. As the gas particles cool, they begin to move closer together. Finally, the particles form a liquid.

When water is a gas, it is called water vapor. When water vapor cools, it forms liquid water.

## Use Model 1 to draw the particle arrangement of water particles in water vapor.

## Use Model 2 to draw the particle arrangement of water particles in liquid water.

* Use the symbol of a particle in the key to draw the particles.



##

**KEY**

 **Particle**

## Icon  Description automatically generated

## Part B.

Explain how the process of condensation supports the idea that all single water particles are too small to be seen. Use your particle arrangement drawings to support your response.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Prompt 2

Materials can be identified by their properties. One property is how long it takes heat to flow through a material.

An investigation is conducted to measure how quickly heat flows through three different materials used to make drinking containers. Each container is filled with the same amount of water. For each of the three containers:

* The starting temperature of the water is measured.
* After 20 minutes, the final temperature of the water is measured.
* The total amount of heat loss is calculated.

**Table 1** describes the observable properties of the three different drinking containers **A**, **B**, and **C**. It also shows the property of heat flow as the amount of heat lost by the water in each drinking container after 20 minutes.

Table 1. Properties of Drinking Containers

|  |  |  |
| --- | --- | --- |
| **Drinking****Container** | **Property of Material** | **Amount of Heat Lost (in Degrees Fahrenheit** |
| **A** | * clear, blue color
* stiff
 | 41°F |
| **B** | * white color
* bends slightly
* goes back into shape without breaking
 | 38°F |
| **C** | * bright silver
* bendable
* bending results in a dent
 | 48°F |

Materials with high heat flow lose heat much faster than materials with low heat flow.

Use **Table 1** to identify the drinking container with the **highest** rate of heat flow. Compare data from all three drinking containers to explain your answer.

The drinking container with the **highest** rate of heat flow is\_\_\_\_\_\_\_\_\_.

I know this because\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

### Prompt 3

## Part A.

**Table 2** shows the properties of three different materials used to make drinking containers.

Table 2. Properties of Drinking Container Materials

|  |  |
| --- | --- |
| **Material** | **Properties** |
| Foam | * extremely light weight and flexible
* usually white in color
* very low heat flow
 |
| Metal | * moderately light material
* shiny surface
* high heat flow
 |
| Plastic | * light weight material
* may be transparent
* low heat flow
 |

Use the results from **Table 1** and information from **Table 2** to identify the material used to make **one** of the drinking containers used in the investigation. Compare the data from all three drinking containers to explain how you identified the material.

The material used to make **Drinking** **Container** \_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

I know this because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

## Part B.

Which measurements **AND** observations are the most useful to identify the material used to make the drinking container?

The most useful measurements are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The most useful observations are\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

SIPS Grade 5 Unit 1 EOU Assessment Task 2 Rubric (5-PS1-1, 5-PS1-2, 5-PS1-3)

| **Prompt** | **Score Point 0** | **Score Point 1** | **Score Point 2** | **Score Point 3** | **Score Point 4** |
| --- | --- | --- | --- | --- | --- |
| **Prompt 1****Part A.**  | No aspect of the response is correct | Response includes **one (1)** of the **two (2)** aspects | The response includes the following aspects:* Model 1 shows the arrangement of water vapor particles spread widely apart and distributed throughout the drawing
* Model 2 shows the arrangement of liquid water particles spread slightly apart and limited to one area of the drawing
 | NA | NA |
| **Prompt 1****Part B.**  | No aspect of the response is correct  | Response includes **one (1)** of the **three (3)** aspects | Response includes **two (2)** of the **three (3)** aspects | Response includes the following aspects: * Indicates that condensation is the movement of particles in the air to a surface
* References the drawings of particles arrangements for water vapor and liquid water
* Uses evidence to support an explanation that a single water particle is too small to be seen
 | NA |
| **Prompt 2** | No aspect of the response is correct  | Response includes **one (1)** of the **two (2)** aspects | Response includes the following aspects:* **Container C** has the highest rate of heat flow
* Explains how the data supports the conclusion
 | NA | NA |
| **Prompt 3 Part A. & Part B.** | No aspect of the response is correct  | Response includes **one (1)** of the **three (3)** aspects | Response includes **two (2)** of the **three (3)** aspects | Response includes the following aspects:**Part A*** Correctly identifies the material of **one** of the containers
* Evidence to support the determination of the material for **one** container is based on information from Table 1 **and** Table 2

**AND****Part B*** Measuring change in temperature or rate of heat flow as the most useful measurement **and** surface description as the most useful observation to identify the material
 | NA |

## Student Exemplar(s)

Student exemplars represent high-quality responses that align to full-point rubric scores. The exemplar responses are intended to assist educators’ understanding of the nature and expectations of each prompt. Note the exemplars serve as examples of high-quality responses, and students may respond with equally relevant, scientifically accurate responses and ideas that meet the expectations of a full-point rubric score.

### Prompt 1

### Part A.

*When water is a gas, it is called water vapor. When water vapor cools, it forms liquid water.*

## *Use Model 1 to draw the particle arrangement of water particles in water vapor.*

## *Use Model 2 to draw the particle arrangement of water particles in liquid water.*

* *Use the symbol of a particle in the key to draw the particles.*





**KEY**

 **Particle**

### Part B.

*Explain how the process of condensation supports the idea that all single water particles are too small to be seen. Use your particle arrangement drawings to support your response*.

When condensation happens, the water particles in water vapor cool and move closer together. Then it becomes liquid water droplets on the glass. That means the water particles in a gas that I cannot see are the same water particles that form liquid water. My drawings show how the water particles are spread out more in a gas than in a liquid. That is why I can see liquid water. But I can’t see single water particles because each one is too small to be seen.

### Prompt 2

*Use* ***Table 1*** *to identify the drinking container with the* ***highest*** *rate of heat flow. Compare data from all three drinking containers to explain your answer.*

*The drinking container with the* ***highest*** *rate of heat flow is* C*.*

*I know this because* Container C lost the most amount of heat from start to finish.

### Prompt 3

### Part A.

*Use the results from* ***Table 1*** *and information from* ***Table 2*** *to identify the material used to make* ***one*** *of the drinking containers used in the investigation. Compare the data from all three drinking containers to explain how you identified the material.*

*The material used to make* ***Drinking Container*** A*is* plastic. *I know this because* it is stiff and has a clear blue color. Of the three containers, it was second best at keeping the temperature of the water warm.

***OR***

*The material used to make* ***Drinking Container*** B*is* foam.

*I know this because* it is described as white in color and loses the least amount of heat or has very low heat flow.

***OR***

*The material used to make* ***Drinking Container*** C*is* metal. *I know this because* it has a shiny silver surface and loses the most amount of heat or has a high rate of heat flow.

### Part B.

*Which measurements* ***AND*** *observations are the most useful to identify the material used to make the drinking container?*

*The most useful measurements are* taking the temperature to find heat flow rates*.*

*The most useful observations are* the descriptions of what the surface of each container looks like*.*

 **SIPS Grade 5 Unit 1 EOU Assessment Task 3: Change or Not?**

# Student Worksheet

This task is about the results of mixing materials.

# Task

Mr. Carter and his students design an investigation to determine if mixing different substances can result in a new substance. The students ask if the total mass of the combined substances will stay the same if a new substance is formed. Mr. Carter says, “Great question! Let’s investigate to find out what happens.”

### Prompt 1

Mr. Carter has a solution of water and soda ash in Jar A and a solution of water and Epsom salt in Jar B. Mr. Carter slowly combines the solutions from Jar A and Jar B into Jar C.

Table 1 shows the students’ record of their observations.

## Table 1. Record of Observations

|  |  |  |
| --- | --- | --- |
| Solution in Jar A | Solution in Jar B | Solution in Jar C |
| After mixing the soda ash and water, the solution is clear. | After mixing the Epsom salt and water, the solution is clear. | After mixing the two clear solutions together, a white solid is seen on the bottom of the jar. |

## Part A.

Did mixing the two solutions together cause a new substance to form? Circle your answer.

**A new substance IS formed. A new substance IS NOT formed.**

## Part B.

Use **Table 1** showing the students’ observations of Jar A, Jar B, and Jar C to support your answer to **Part A**.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

### Prompt 2

In Table 2 and Table 3, Mr. Carter writes the mass, in grams, of the materials in Jar A and Jar B on the board.

 Table 2. Table 3.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mass of Solution in Jar A

|  |  |
| --- | --- |
| Substance | Mass (in g) |
| Water | 40 |
| Soda ash | 13 |

 | Mass of Solution in Jar B

|  |  |
| --- | --- |
| Substance | Mass (in g) |
| Water | 40 |
| Epsom salt |  8 |

 |

**Part A.**

Graph 1 shows the total mass of the materials in Jar A.

Use the data in **Table 3** to complete **Graph 1** to show the total mass of the solution in Jar B.

**Graph 1.** **Mass of the Solution in Jar A and the Mass of the Solution in Jar B**



**Mass of Solution in Jar B**

**Mass of Solution in Jar A**

**Part B.**

Mr. Carter tells the students that the total mass of the combined solutions in Jar C is 101 grams. Then, Mr. Carter writes the following sentence on the board:

**When a new substance is formed by mixing different materials, the total mass of the new substance is equal to the combined masses of the original materials.**

Do you agree with Mr. Carter's description of the results of the investigation?

Circle your answer. **YES NO**

Use the information from **Graph 1** and the total mass of **Jar C** to support your answer to **Part B**.

Graph 1 shows\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The total mass of the solution of Jar C is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

So, when the solutions were mixed and a change occurred, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 SIPS Grade 5 Unit 1 EOU Assessment Task 3 Rubric (5-PS1-2, 5-PS1-3, 5-PS1-4)

| **Prompt** | **Score Point 0** | **Score Point 1** | **Score Point 2** | **Score Point 3** | **Score Point 4** |
| --- | --- | --- | --- | --- | --- |
| **Prompt 1**  | No aspect of the response is correct  | Response includes **one (1)** of the **three (3)** aspects | Response includes **two (2)** of the **three (3)** aspects | Response includes the following aspects:**Part A*** Circles “**A new substance IS formed.**”

**AND****Part B*** Describes the solutions in Jars A and B as being clear
* Describe the solution in Jar C as changed to white and cloudy
 | NA |
| **Prompt 2**  | No aspect of the response is correct  | Response includes **one (1)** of the **four (4)** aspects | Response includes **two (2)** of the **four (4)** aspects | Response includes **three (3)** of the **four (4)** aspects | Response includes the following aspects:**Part A** * Completes bar graph to show Solution B as 48 grams

**AND****Part B*** Circles “**YES”**
* Describes the combined mass of solutions A and B as 101 grams and the total mass of Jar C as 101 grams
* Describes that mass is conserved or remains the same after mixing
 |

## Student Exemplar(s)

Student exemplars represent high-quality responses that align to full-point rubric scores. The exemplar responses are intended to assist educators’ understanding of the nature and expectations of each prompt. Note the exemplars serve as examples of high-quality responses, and students may respond with equally relevant, scientifically accurate responses and ideas that meet the expectations of a full-point rubric score.

### Prompt 1

## *Part A.*

*Did mixing the two solutions together cause a new substance to be formed? Circle your answer.*

***A new substance IS formed. A new substance IS NOT formed.***

## *Part B.*

*Use* ***Table 1*** *showing the students’ observations of Jar A, Jar B, and Jar C to support your answer to* ***Part A****.*

The solutions in Jar A and in Jar B were clear. After the solutions were combined, a solid, white substance formed in Jar C. This must be a new substance because the other solutions were clear.

***Prompt 2***

***Part A.***

*Graph 1 shows the total mass of the materials in Jar A.*

*Use the data in* ***Table 3*** *to complete* ***Graph 1*** *to show the total mass of the solution in Jar B.*

**Graph 1.** **Mass of the Solution in Jar A and the Mass of the Solution in Jar B**

**

**Mass of Solution in Jar B**

**Mass of Solution in Jar A**

***Part B.***

*Do you agree with Mr. Carter's description of the results of the investigation?*

*Circle your answer.* **YES NO**

*Use the information from* ***Graph 1*** *and the total mass of* ***Jar C*** *to support your answer to* ***Part B****.*

*Graph 1 shows* the total weight of solution A and solution B adds up to 101 grams.

*The total mass of the solution of Jar C is* 101 grams.

*So, when the solutions were mixed and a change occurred,* the total mass of the new substance is equal to the combined masses of the original materials which is 101 grams.