

## **Performance-Based Assessment 1**

**Key Organizing Question: Can a substance be a liquid and a solid?**

### **Performance Task I:**

Rachel Ray, the famous chef from the Food Network, needs your help. A recipe she wants to include in her new cookbook calls for cornstarch to be added into the mixture. This seemed easy enough to her but something strange happened. She accidentally spilled some water into the cornstarch—the new substance she created was interesting, but now she doesn't know how to explain what state of matter it is in her description. Help Rachel decide if cornstarch is a liquid or solid by conducting your own investigation. Is it possible for this new solution to both a liquid and a solid?—you decide!

Your teacher prepared a mixture of cornstarch and water in a resealable plastic baggie. 60mL of cornstarch and approximately 30mL of water was placed in each bag. Make a prediction. Is the new substance a liquid or a solid?

Observe and feel the mixture in the bags. Answer the following questions.

What happens to the mixture when you squeeze the bag?

What happens to the mixture when you let go?

Do you think this mixture is a solid or a liquid? Why?

Describe two ways in which the mixture is like a liquid.

Describe two ways in which the mixture is like a solid.

If you wish, empty the contents of the bags into plastic trays. Feel the mixture and describe its properties. Share your observations.

What did you conclude? Is the new substance a liquid or a solid? Be sure to note the reasons why you gave the answer you did regarding whether or not you think the mixture is a liquid or a solid.

**Performance Task II:**

Now it's your turn! Gather the following materials: 1 cup of cornstarch, 1 cup of water,  $\frac{1}{2}$  cup of cooking oil, and a resealable baggie. Experiment with adding portions of the cornstarch, water, and cooking oil into the baggie.

Consider the following questions.

How has the texture of the new substance changed?

What happens when you squeeze the bag?

What happens to the mixture when you let go?

Do you think this mixture is a solid or a liquid? Why?

Describe two ways in which the mixture is like a liquid.

Describe two ways in which the mixture is like a solid.

Can you think of an original way for this new substance to be used?

## **Performance-Based Assessment 2**

Key Organizing Question: Can salt change the temperature at which something freezes?

Performance Task: Have you ever wondered why people sprinkle a salt substance on their sidewalks, driveways, etc. when it's icy? What is it about salt that can change solid ice to a liquid? Can something change the temperature at which something else freezes? Explore with salt and water mixtures to see if you can determine if salt will change the temperature at which water freezes. Good luck!

Make a prediction. Does salt change the rate at which water can freeze?

Keep in mind that water freezes at  $0^{\circ}\text{C}$ . Take one cup. Pour water to the fill line and add four spoonfuls of salt.

Take the other cup and pour water to the fill line. Do not add salt.

Place the cups in the freezer. Set a timer for 2 hours.

Reflect. Do you think the cups will freeze at the same time? Explain your reasoning.

After 2 hours, check the cups. Observe the substances in the cups. Consider the following questions.

Did the water freeze?

Did the salt and water freeze?

What did you conclude? Does salt affect the rate at which water freezes? Why?

What other purposes could salt be used for?