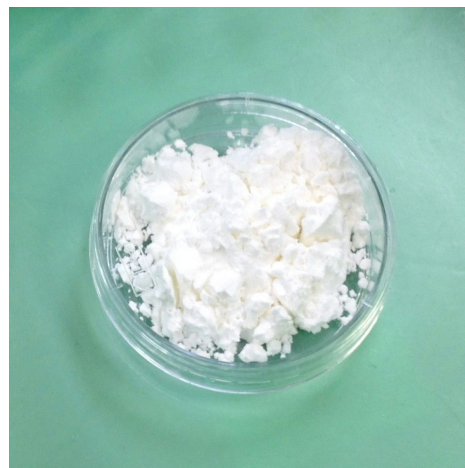


## Lesson 7: Mystery Substances

### Summary

This is an additional lesson in which students practice focusing the microscope and interpreting what they see. Students play the role of detectives as they look at various white powdery substances and try to identify a mystery substance.



### Next Generation Science Standards

#### Disciplinary Core Ideas

- ETS.2.A: Interdependence of Science, Engineering, and Technology

#### Science and Engineering Practices

- Analyzing and interpreting data
- Constructing explanations
- Obtaining, evaluating, and communicating information

#### Cross Cutting Concepts

- Structure and function

### Materials

- ★ microscopes (ideally 1/pair, but 1/table would work)
- ★ small petri dishes for each table to hold the four substances below, labeled with the name of the substance (*only a tiny amount of each substance is needed*)
- ★ labels for petri dishes (label each dish and cover, or place a card inside each dish)
  
- ★ salt
- ★ sugar
- ★ baking soda
- ★ cornstarch
  
- ★ one additional petri dish of “mystery substance” or baking soda, for the Opener

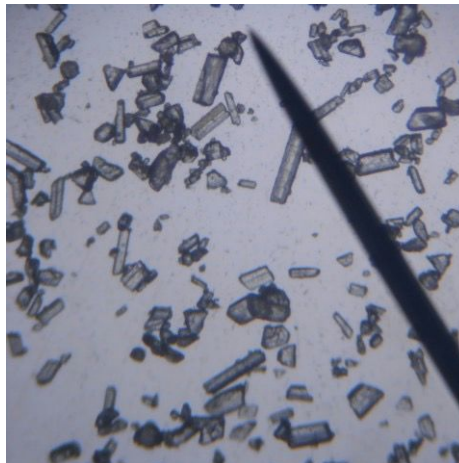
- ★ a few additional petri dishes of a different “mystery substance,” either salt or a mixture of two of the substances, for the Extend

## Engage (5 min.)

- Project the microscopic image of a mystery substance on the screen.

### OPENER

- ❖ This is an image of something seen under the microscope. In your notebook, draw and describe what you see on the screen. **The substance seems to be made up of tiny crystals of different shapes and sizes. Some are long and rectangular, others are trapezoidal or irregular.**



- ❖ What do you think this substance might be? **Answers will vary.**

- Discuss ideas with class, without telling students if they are correct. Ask students if they can give a reason for their guess.

## Explore/Evaluate (20 min.)

→ *Make sure students only have a tiny amount of powder in their petri dish. They will need to remove the cover of the petri dish and slide it carefully under the microscope. They can shake the dish to spread out the powder into a thin layer. They will not be able to see well through a thick layer, and there is more chance of getting powder on the lens.*

1. Focus on and draw each of the 4 items at your table. Label each drawing, and next to each one write notes about things you noticed.
2. Try to identify the mystery substance from the Opener. What evidence do you have that you are correct?

→ Encourage students to write down evidence for their guesses.

→ **PERFORMANCE EVALUATION** Circulate through the room while students are focusing and drawing. Evaluate their developing proficiency at operating the microscope.

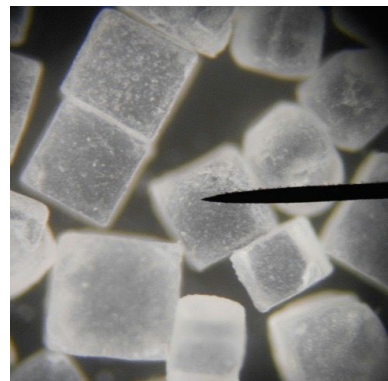
## Explain/Elaborate (15 min.)

→ Discuss as a class. When students make a claim, ask them for evidence.

## Extend

For students who finish early:

→ Give them a new mystery substance (salt) and have them draw it and write their guesses about which substance it is, and give evidence. Or for more of a challenge, use a mixture of any two of the substances.



## Homework

### **HOMEWORK**

- ❖ Study your microscope study guide and the procedures for focusing the microscope. (There will be a quiz on \_\_\_\_\_.)