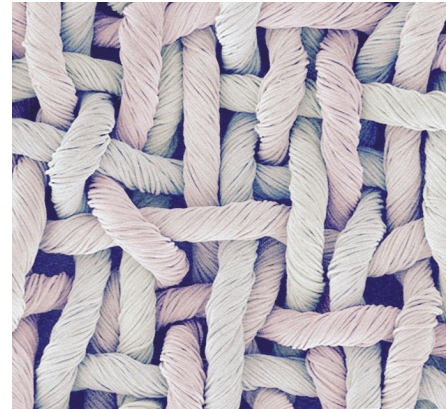


## Lesson 6: How Was It Made?

### Summary

This is a lesson that you might choose to do if you would like your students to have more practice focusing the microscope and interpreting what they see. It also gives students a chance to think about how everyday materials are made and provides a nice connection to manufacturing.



### Next Generation Science Standards

#### Disciplinary Core Ideas

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

#### Science and Engineering Practices

- Constructing explanations
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

#### Cross Cutting Concepts

- Patterns, similarity, and diversity
- Structure and function
- Scale, proportion, and quantity

### Materials

- ★ microscopes (ideally 1/pair, but 1/table would work)
- ★ hand lenses, one per student

Small pieces of the following for each table:

- ★ color newspaper comics
- ★ dollar bills
- ★ paper towels
- ★ fabric

- ★ video clip of paper manufacturing or textile manufacturing process (optional, for Elaborate/Extend)

## Engage (5 min.)

### OPENER

- ❖ Examine each of the 4 types of material at your table with your “naked eye” and with a hand lens. How would you describe each one?
- ❖ What are the similarities and differences between them?
- ❖ How do you think each one was made?

→ You can skip the class discussion of the Opener. The Opener leads naturally to the Explore section.

## Explore/Evaluate (20 min.)

→ Students now use a microscope to examine the same four materials.

1. Now examine each material under the microscope. Label each drawing, and next to each one write notes about things you noticed.
2. What are the similarities and differences between how the objects appear under the microscope?
3. Do they appear to be made in the same way? If they are colored, can you tell how the color was applied?

→ **PERFORMANCE EVALUATION** Circulate through the room while students are focusing and drawing. The students’ drawings will tell you whether they are seeing the level of detail they should.

## Explain/Elaborate (15 min.)

- Discuss as a class. Encourage detailed drawings and accurate observations. Project some examples of good drawings and encourage students to take their time to observe and draw details.
- Discuss students’ hypotheses about how these items are made and how the color might be applied. Encourage students to argue from evidence.

- (Optional) Ask if students have visited a paper mill or textile mill, or show a video clip. Ask them to describe the process by which wood, cotton, or wool become paper and cloth. Assign further research (see Extend below).

## Extend

For students who finish early:

- ❖ Focus on and draw the ripped edge of the paper. Describe how this might help you to figure out how paper is made.

- Have students research how textiles and paper are manufactured.

## Homework

### **HOMEWORK**

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