

## Lesson 5: Focusing the Microscope

### Summary

Students will learn how to focus the microscope.

### Next Generation Science Standards

#### Disciplinary Core Ideas

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

#### Science and Engineering Practices

- Asking questions
- Constructing explanations

#### Cross Cutting Concepts

- Structure and function



### Vocabulary

procedure

### Materials

- ★ Microscopes (ideally 1/pair, but 1/table would work)
- ★ sheets with the letter e, one for each microscope

Engage (5 min.)

#### OPENER

- ❖ What do the knobs on the side of the microscope do? Why is that important?

→ Discuss the **function** of the knobs.

## Explore/Evaluate (20 min.)

1. Try to focus on the letter e. Draw what the e looks like under the microscope, in detail.
2. Write a description of what you see, including anything unusual.
3. Write down a list of steps that you used for focusing the microscope.

- As you circulate, see if students notice that the e appears upside down.
- Ask students to move the e around while looking through the eyepiece, and see what is unusual. The e moves in a direction that is opposite where you think it will go. Point out that it is important to remember that everything is upside down and backwards when looking through a microscope.
- If students haven't finished answering question 3, it will be completed together as a class in the Explain section.
- **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 (15 min.)

- Ask students to describe what they saw and see if they can come up with explanations. See if students can make the connection to the hand lens activity from Lesson 1, when they saw that further away, the object is magnified more but it is upside down.
- Let students know that the "list of steps" is called a **procedure**. Come up with a procedure for focusing the microscope. Have students copy this procedure into their lab notebooks.

## Elaborate (5 min.)

- Be sure to point out equipment concerns, like the chances of the high power objective hitting the stage. Have the class figure out why that might happen, and how to avoid it. Incorporate those steps into the class procedure.
- Remind students to turn off the light when they have finished using the microscope.

## Extend

For students who finish early:

### EXTENSION

- ❖ Try to focus on a piece of your hair. What makes this a difficult task? Draw your hair on low, medium and high power. When might it be best to use low power, and when might it be best to use high power?
- ❖ Draw the e on medium power, and then on high power. Explain how and why the image looks different.

## Evaluate (5 min.)

- You might choose to go over this Evaluate in class to make sure everyone understands the answers.

### EXIT CARD

- ❖ You should always look from the side when you are switching objective lenses. Why is this important? **To make sure the lens is not hitting the stage. This is especially important with the longer high power lens.**
- ❖ When you are on the high power lens, you should only use the fine adjustment knob. Why is this important? **To make sure the lens is not hitting the stage. Also, only minor adjustments are needed going from medium to high power, so the fine adjustment knob will work better.**
- ❖ Suppose you look through the microscope and you see this. What might cause you to see this through the microscope? **The objectives are not clicked into place, or the diaphragm is not clicked into place. Have students try moving those 2 parts on their microscope to see what this looks like.**

[image of dark crescent moon and part of letter e]

## Homework

- Set a date for the quiz. We recommend giving it on the same day as Lesson 7. Students should begin to learn the names so they can communicate accurately about what they are doing and seeing.

### **HOMEWORK**

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