



Lend Me A Lens!

K - 12th Grade

Lesson Plan by E. Dominic Black, MA Ed.

DURATION

Pre-Visit: 15 minutes

Visit: 45 minutes

LOCATION

[SEM Lab/Gem & Mineral Hall](#) at NHM or offsite/outdoor locations

MATERIALS

- [Worksheet](#)
- [Pre-Visit Slides](#) (optional)
- Hand lenses
- Pencil or colored pencils
- Clipboards

STANDARDS

VAPA

PK.VA:Cr1.1

Prof.VA:Pr5

NGSS

Scale, Proportion & Quantity (MS-PS1-1, MS-LS1-1)

VOCABULARY

- Scanning Electron Microscope
- Hand lens
- Focus

Overview

Scientists use specialized tools like the scanning electron microscope (SEM) to do research and make observations. While not everyone has the access to or training for using the SEM, a hand lens can be used by anybody to reveal the details around them! Scientists record careful observations as drawings in order to share their work with others. You can, too!

Objectives

- Students will create and share scientific illustrations as research based on their observations.
- Students will learn how to use a hand lens for close inspection.
- Students will understand that personal interest is important when selecting a research subject.

Concepts

- Scientists use specialized tools to do research and make observations.
- While the SEM requires special access and training, a hand lens can be used by anybody to reveal details in the miniature world.
- Recording observations with drawings allows a researcher to share their work with others and is a valid and important part of the scientific method.

Outline

1. Pre-Visit: Briefly introduce the SEM Lab. You may look at these [Pre-Visit Slides](#), as they provide an overview.
2. During a trip to the Museum, students will observe a specimen with their own eyes and through a hand lens, recording their observations with drawings.
3. *Time permitting:* allow students to explore further with the hand lens and draw what they see.
4. Post-Visit: Students create a classroom display of the artworks, modeled after the SEM Lab display at the Museum.

Pre-Visit

A **Scanning Electron Microscope** (SEM) is a powerful instrument that uses electrons to create a detailed image of incredibly small specimens. The Museum's [SEM Lab](#) features the microscope itself and highlights the scientists who use it for their research. You may choose to introduce this instrument in your classroom prior to your Museum visit. The [Pre-Visit Slides](#) are a resource for this introduction. You can also share with your students that they will be using scientific tools and art tools to work as scientific researchers and illustrators.

Visit

Begin your visit in the SEM Lab, which is located in the Gem & Mineral Hall. Explain that the SEM is a powerful tool used by scientists and that it requires special training and procedures for use. You can then introduce the hand lenses as tools available to everyone to help explore one's surroundings more closely.

Explain the worksheet and read the instructions aloud for younger learners. Distribute the worksheets, pencils hand lenses, and clipboards (if available). Students will choose one specimen from the Gem & Mineral Hall to study and draw. Students will first draw the specimen by looking at it without the hand lens. Next, they will draw a portion of the specimen as seen through the hand lens. Encourage students to label their work. Once students have had sufficient time to complete their drawings, collect supplies and continue with your Museum visit.

Post-Visit

Ideally students will finish their drawings on location while looking at their specimens. You may choose to allow students to take photos of their specimens and finish drawing after the Museum visit. Back in the classroom, students are encouraged to create a display of their artworks.

Variation & Extension Ideas

- Students can complete this activity in any area of the Museum. The SEM Lab is a logical place to start, due to its topic of magnification and its proximity to the Gem & Mineral Hall—another excellent place to explore “hidden worlds.” Other areas of the Museum are suitable as long as students are able to observe from one arm’s length away. Consider insect displays in the Discovery Center, the Nature Gardens, and objects in the *Becoming Los Angeles* exhibit.
- If a Museum visit is not possible, this activity can be done in any classroom, so long as students have access to items or specimens they can observe in-person and close-up.

Other Considerations

- Visually impaired students with limited sight might especially appreciate using hand lenses to explore their world up-close.
- Although hand lenses are a scientific tool, there are many inexpensive styles available.
- Some of the minerals on display in the Gem & Mineral Hall are touchable. Students with sensory sensitivity might select one of these specimens to complement their visual observations with information learned through touching.

SEM Lab FAQs

1. Will my students be able to use the Scanning Electron Microscope during their visit?
 - a. No, the SEM is a powerful research tool used only by Museum staff who have specialized training and expertise. The SEM is always visible to Museum visitors through the window in the SEM Lab.
2. Will a scientist be demonstrating how the Scanning Electron Microscope works during our visit?
 - a. There may be a Museum scientist working with the SEM during your visit, but there is no scheduled programming. You will be able to look at the SEM from behind glass and learn how the SEM works through exhibit pictures and text.