

# Biology Lab



### Overview:

Embark on a captivating journey into the microscopic realm with our Microscopy Laboratory. Unlock the secrets of the compound light microscope as you explore its intricate parts and master the art of focusing. Discover the fascinating phenomenon of inversion as you observe the world through a new lens. Immerse yourself in the microscopic world, observing the letter "e" in mesmerizing detail. With each step, you'll unravel the mysteries of magnification and gain a deeper understanding of the hidden wonders that lie beyond our naked eyes. Unleash your curiosity and embark on a microscopic adventure like no other.

### How to Find the Experience

Once logged in on the VXRLabs homepage, navigate to the "Subjects" tab, select the "Biology" option from the left-side menu, then select the "General Biology" option, then select the "Microscopy" option

### Next Generation Science Standards (NGSS)

Visit the link below or scan the provided QR code to see specific standards and acknowledgments.



#### Applications of Microscopy in Science Education

<https://www.tandfonline.com/doi/abs/10.1080/00219266.2020.1720772?journalCode=rjbe20>





### Gameplay Instructions

#### Experimental Procedure: Focusing the Compound Light Microscope Using Lowest Power

1. Turn the nosepiece so that the lowest power objective on the microscope is in straight alignment over the stage.  
The student should always begin focusing with the lowest power objective on the microscope (4x [scanning]).
2. With the course-adjustment knob, lower the stage (or raise the objectives) until it stops.
3. Place a slide of the letter “e” on the stage and stabilize it with the clips. Pinch the spring of the slide arms on the mechanical stage and insert the slide. Center the e as best as you can on the stage or use the two control knobs located below the stage.
4. Be sure that the lowest power objective is in place. As student looks from the side, he should decrease the distance between the stage and the tip of the objective lens until the lens comes to an automatic stop or is no closer than 3 mm above the slide.
5. While looking into the eyepiece, the student will rotate the diaphragm to give the appropriate amount of light.
6. Using the course adjustment knob, the student will slowly increase the distance between the stage and the objective lens until the object (the letter e) comes into view/focus.
7. Once the object is seen, the student may need to adjust the amount of light. To increase or decrease the contrast, rotate the diaphragm slowly.
8. Student will use the fine-adjustment knob to sharpen the focus if necessary.

#### Experimental Procedure: Observation-Inversion

1. Student will draw the letter e as it appears on the slide (with the unaided eye, not looking through the eyepiece). The letter should be in the normal position.
2. Student will draw the letter e as it appears while looking through the eyepiece. The letter should be upside down and reversed.
3. Student should record the differences she notices. The letter is inverted—that is, it appears to be upside down and reversed compared to its appearance when viewed by the unaided eye.
4. Student will move the slide to the right and note which way the image appears to move. When moved to the right, the image appears to move to the left.
5. Student will move the slide towards himself and note which way the image appears to move. When moved toward you, the image appears to move away from you.

#### Experimental Procedure: Focusing the Compound Light Microscope Using Higher Powers

Once the object is in focus with the lowest power, it should be almost in focus with the higher power.

1. Bring the object into focus under the scanning power by following the instructions in the previous section.
2. Be sure that the letter e is centered in the field of the lowest objective.
3. Move to the next higher objective (low power [10x], then [40x]) by turning the nosepiece until it \*clicks into place.
4. If any adjustment is needed, use only the fine-adjustment knob.
5. Student will observe the letter e under this magnification and once finished, rotate the nosepiece until the lowest-power objective clicks into place, Remove the slide.