

# Microscopes Science Game Plan

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## eCamp Physics Lab

**Objective** If you've ever wondered what you're eating for dinner, how many toes ants have, or if caterpillars have armpits, then this is the lab for you. We're going to discover how to prepare slides, handle a compound microscope, and have a fun time peeking into the tiny world of microorganisms.

**About the Experiments** This lab is focused on *how* to work a microscope and the techniques for preparing slides. Figuring out exactly *what* you're looking at is totally up to you. A trip to the library or local college student lab might be a very good investment of your time, once you've learned how to handle the basics we're going to cover here.

**The How and Why Explanation** The compound microscope is really just a set of lenses stacked so they work together to make things look bigger. For example, if you're using a 10x eyepiece (where your eye looks into) and a 40x objective (the lens near the slide), then you're using a 400x power setting.

Not only is it important to learn how to work the scope, but you need to learn how to sketch what you see, or the information on the slide is only useful to one person – you. Make sure you always add a border (so your viewer knows where your drawing starts and ends), title (so you know what you were looking at), power of magnification (so you can do it again if needed), and keep your proportions accurate when you draw the image.

You can use either a dry or wet mount to get your specimens ready for viewing. A dry mount doesn't use any chemicals, water, or glue... and sometimes not even a coverslip. Just stick it on the slide and you're good to go. This is a great place to start when first using a scope.

A wet mount is used for living things, like the stuff found in pond scum. By keeping the organisms wet (and in their environment), you can watch how they move, eat, breathe, and interact. When specimens are hard to see (even after adjusting your diaphragm) you can use staining (like Lugol's stain or dark iodine) to add contrast and bring it into view. Protoslo can be used when specimens move too fast to view.

Heat fixes are used when the specimens move all over the place when stained (like yeast). By drying out the specimen and fixing it to the slide, you can easily stain it several times to bring out the contrast and view the structure. (Very good for viewing bacteria.)

When you want to keep your specimens for a longer time (like a couple of months), apply a drop of superglue to the top of the slide before adding the coverslip. Press gently with a toothpick (not your fingers!) to squish out any bubbles.

**Questions to Ask** When you've worked through most of the experiments ask your kids these questions and see how they do:

1. Point out the following on your own microscope:
  - a. eyepiece
  - b. coarse adjustment knob
  - c. fine adjustment knob
  - d. mirror (or lamp)
  - e. diaphragm
  - f. stage
  - g. aperture
  - h. objective lenses
  - i. arm
  - j. legs
  - k. nose
  - l. body
2. What would you do to look at a fast-moving cheek cell?
3. How would you view a transparent onion cell?
4. How could you view a copper penny with your microscope?
5. What's the highest power of magnification on your microscope? Lowest?
6. Where are the two places you should NEVER touch on your microscope?
7. What things must be present on your drawing so others know what they're looking at?
8. Have your student prepare the following slides for you (the parent) to view:
  - a. A wet mount of the letter 'W' from a newspaper at lowest magnification
  - b. A heat fix and stain from yogurt at 100X magnification