Microscope Slide-Making Kit

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Viewing Slides

Scan a slide at low power (usually 40X) to get an overview of the specimen. Center the part of the specimen you want to view at higher power. Adjust your lighting until the slide specimen has clear, sharp contrast. Then switch to medium power (usually 100X) and refocus to observe tissue and cell variations. Repeat at high power (usually 400X).

Making Your Own Slides

Whole Mounts:

Whole mounts are made by placing small objects or specimens whole on a blank slide and then covering them with a coverslip. If your specimen is thick, a concavity slide will work better. You can make whole mounts of many things. Here are some ideas:

Colored thread	Feather (piece)	Thin plant leaf	Print (letters)
Cloth fibers	Hair strand	Small insects	Dust
Algae	Pond water	Thin paper	Insect parts

Whole mount specimens must be thin enough to allow light to pass through them. Do not use large, hard objects like rocks, as they can break your slides and microscope lenses.

Sections:

Section mounts are made by slicing a very thin section of specimen. A cross section is made by slicing across the width or diameter of the specimen. A longitudinal section is made by slicing across the length of the specimen.

It is difficult to make sections thin enough without an instrument called a microtome. You can make a simple microtome with a thread spool, a 1/4" diameter bolt at least 2" long, and a 1/4" nut. Find an empty thread spool with flat ends and remove the paper labels. Glue the 1/4" nut on one end of the spool so that the hole in the nut is centered over the hole in the spool. Use epoxy or other strong adhesive. When the adhesive is dry, screw the bolt into the nut so the tip of the bolt enters the spool.

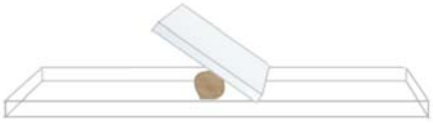
To use your microtome, cut a specimen that will fit snugly at least 1/4" of the way into the center hole of the spool. Tighten the bolt until it just begins to push against the specimen. Use a single-edge razor blade or a scalpel to slice the specimen off even with the edge of the spool. Now turn the bolt 1/4 turn and slice the specimen again even with the end of the spool. This will give a very thin section. You can adjust the thickness of the section by how far you turn the bolt.

Here are some ideas for making sections:

Plant stem	Celery stalk	Carrot	Potato
Piece of fruit	Leaf (rolled up)	Plant root	Insects

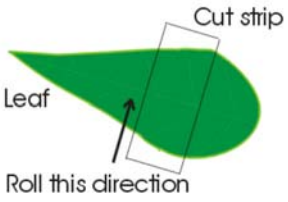
Example 1: Wet Mount Cork Section

Carefully cut a very thin slice of cork using a razor blade or scalpel. To make a wet mount of the cork, put one drop of water in the center of a plain glass slide—the water droplet should be larger than the slice of cork. Gently set the slice of cork on top of the drop of water (tweezers might be helpful for this).



Take a coverslip and hold it at an angle to the slide so that one edge of it touches the water droplet on the surface of the slide. Then, being careful not to move the cork, lower the coverslip without trapping any air bubbles beneath it. The water should form a seal around the cork. Use the corner of a paper towel to blot up any excess water at the edges of the coverslip.

Example 2: Leaf Section



Before you begin, make sure the leaf is clean and dry. Lay it out flat on your working surface and slice a 1" section crosswise out of the center using a sharp knife. Then, starting at one of the short ends (the edges that you did not cut), tightly roll the leaf section. Carefully make several very thin slices off one end of the roll. The slices should look almost transparent. The cells surrounding the central vein of the leaf are what you will want to look at; depending on the size of the leaf, you might have to cut the slice again so that the central part is the part you will actually see on your slide. Make a wet mount on a plain slide with the inner part of the leaf section facing up (so the inner cells are visible). Look at the slide with the 10x objective to see the general structure, and higher power to see details of cells.

Smears:

Smears are made by spreading the specimen in a thin layer across the slide and then covering it with a coverslip. You can make smears of cheek cells, blood, pond water and other liquid or semi-fluid specimens.

To make a cheek smear, take a clean, flat toothpick and gently scrape the inside of your cheek. Then wipe that part of the toothpick in the center of a clean slide. Hold a coverslip with one end flush on the slide and gently wipe the edge of the coverslip along the length of the slide. This will smear the cells along the slide, making a layer thin enough to view clearly. Let the smear air dry, then add a drop of methylene blue stain. Gently set a coverslip over the smear.

To make a blood smear, prick your finger with a lancet or sterile needle and place a drop of blood in the center of a clean slide. Slide one edge of a coverslip along the slide until the edge just touches the drop of blood. Now pull the coverslip away from the blood droplet, keeping the coverslip edge flat on the slide. This will draw the blood evenly across the slide.

Stains

Stains can be applied in several ways. Firm sections and whole mounts can be stained by dipping. Dip the specimen in a small dish containing the stain and then rinse the specimen in a second dish of water.

Firm smears and sections can be stained by putting a drop of stain on the specimen and then gently rinsing it with water a few minutes later. A second stain can be applied after rinsing the first stain.

Liquid smears or sections can be stained by first placing a coverslip over the specimen. Then put a drop of stain along one edge of the coverslip. Draw the stain under the coverslip by placing a corner of paper towel along the opposite edge of the coverslip. A second stain can be drawn across the specimen in the same way.

These are some common stains and their uses:

Methylene Blue: A general-purpose blue stain used to stain bacteria, blood, and acidic or protein-rich cell components (nucleus, ribosomes, endoplasmic reticulum).

Eosin Y: A general-purpose pink/red stain. It is useful for staining blood, plants, and alkaline animal cell components (cytoplasm).

Neutral Red: A specific red stain useful for staining alkaline cell components (cytoplasm).

Toluidene Blue: A specific blue stain used to stain acidic or protein-rich cell components, especially nuclei during mitosis.

Iodine-Potassium Iodide or Lugol's Iodine Solution: A specific dark stain useful for staining carbohydrates in plant and animal cells. It stains starch dark blue and glycogen red.

Permanent Slides

All of the slides discussed so far are temporary; they will quickly dry out and be unusable. A permanent slide can be made by adding a drop or two of slide mounting fluid on the specimen before placing the coverslip down. Stains must be applied before this step. You can also use a small paintbrush to seal the edges of the coverslip with slide mounting fluid if desired.