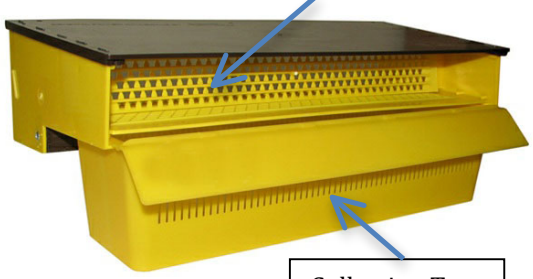
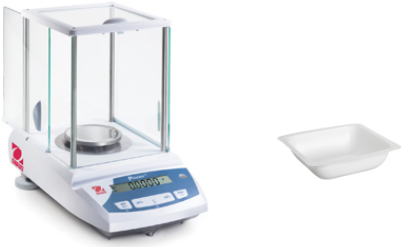
Pollen Collection



1. Observe the pollen trap at the base of the hive. The trap is separated into two main components; the gridded screen which knocks off pollen as bees enter the hive, and the collection tray, where the pollen pellets are gathered.
2. Remove the pollen tray from your hive.



3. Place a weighing container on a balance pan and record the weight.
4. Tare the container so the analytical balance reads 0.00g.
5. Add the pollen to the weighing container and record the weight of the pollen.

6. Remove your weighing container from the balance pan, and count out 200 pollen grains from your weighing container.
7. Sort the 200 pollen grains by color, and record the general color of each group.
8. For each color group use the pantone color wheel to determine the specific RGB color, and record the RGB values for each color group.

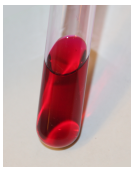
Pollen Slide Preparation

1. After determining the RGB color of each group, fill one test tube with pollen, per color group.
2. Add water to each test tube until the water level is clearly above the pollen.

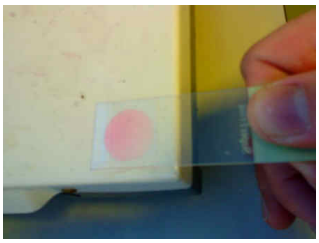
3. Vortex each test tube for twenty-thirty seconds to form a homogenous, aqueous solution.
4. Wait at least five seconds, and centrifuge for an additional five seconds to ensure your solution is mixed thoroughly.

5. Place a clean, sterile microscope slide on your lab bench.

6. Obtain a pipette, and adjust the volume 15µl using the friction ring.
7. Attach a pipette tip by gently poking the pipette vertically into the tip.



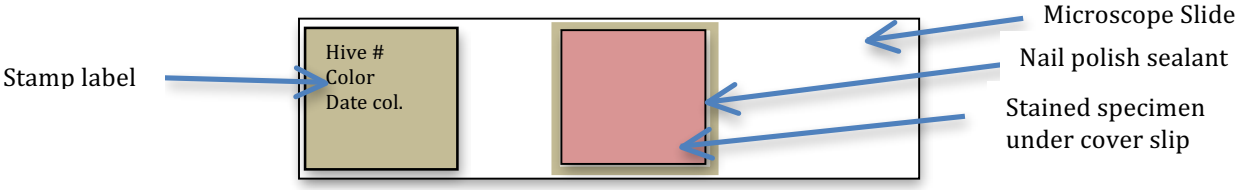
8. Obtain the fuschia dye from your lab space.
9. Press the plunger button on your pipette to the first stopper. Pressing down the plunger to the first stopper allows you to take in liquid. Do not press down the plunger button all the way!
10. While holding the button down to the first stop, place the pipette tip in the fuschia dye, and release the button to collect the dye.
11. Release the dye onto your microscope slide by pressing down the button to the second stop (all the way down).
12. Using a toothpick, place the tip of your toothpick into one of your water-pollen solutions.
13. Dip the tip of the pollen-covered toothpick into the fuschia dye you placed on your microscope slide.



14. Obtain a cover slip, and place the cover slip down over your slide. To minimize air bubbles forming in your slide, place down one end of the cover slip down onto your slide, and then slowly lower the other end of your cover slip.

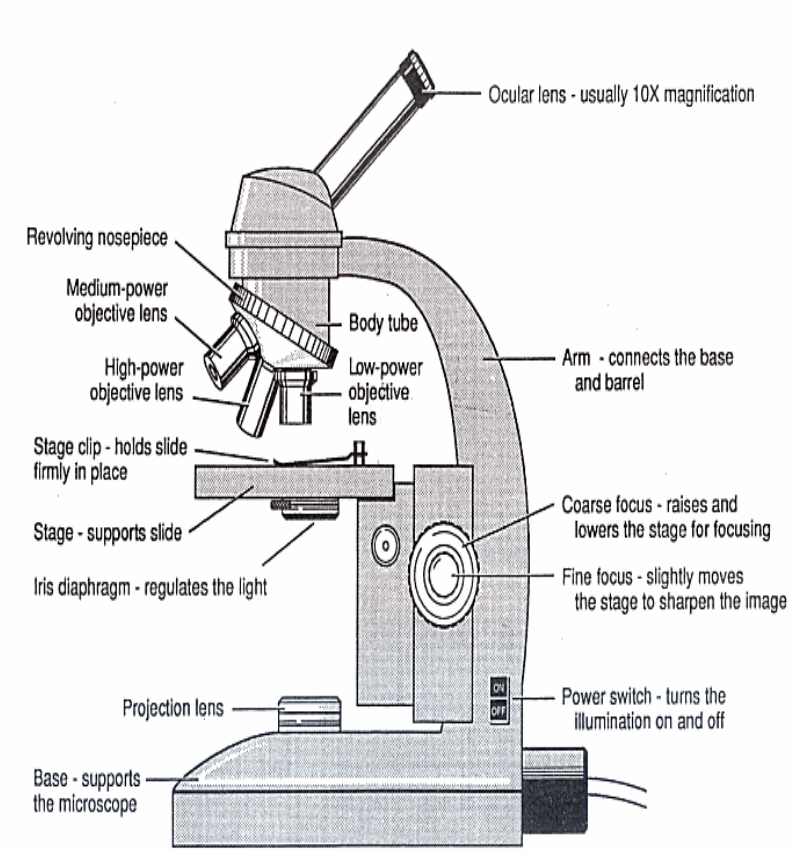
15. Obtain nail polish from your lab bench/
16. Seal the cover slip to your slide by gently tracing the perimeter of your cover slip with the nail polish.
17. Label your slide noting the Hive number, general color, and date of preparation for the slide.
18. Repeat steps 9-18 for each color group.

Final Slide



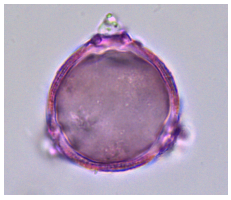
Pollen Photography

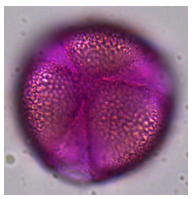
1. Turn on the microscope by switching on the green button at the base of the microscope stand.
2. Ensure that the microscope is at its lowest level of magnification (4x).
3. Adjust the light source to the 4x magnification.
4. While looking under the microscope, navigate the microscope slide using the stage control knob until you find pollen spores (they should be stained purple).
5. Using the fine adjustment knob (the smaller of the two adjustment knobs) adjust the image until the image appears sharp.
6. Repeat the previous three steps for each level of magnification (10x and 40x)
7. Take 5-10 pictures of clear pollen spores (or groups of spores) at the 40x magnification level.

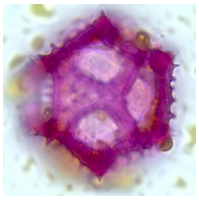


8. Before moving to 100x magnification, immersion oil must be applied to both the lens, and the magnification objective.
9. Place one droplet of immersion oil on the microscope slide.
10. Using the remnants on the immersion oil dropper, rub the tip of the dropper on the magnification objective.
11. After oil has been applied to both the microscope slide and the magnification objective, move to the 100x magnification scale.
12. Take 10-15 pictures of several pollen spores at 100x magnification.

Sample Bee-collected Pollen Pictures

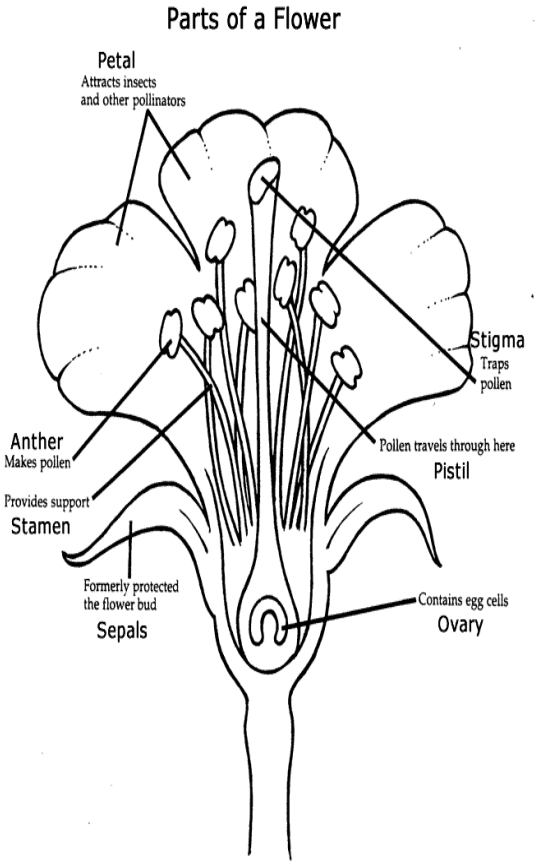




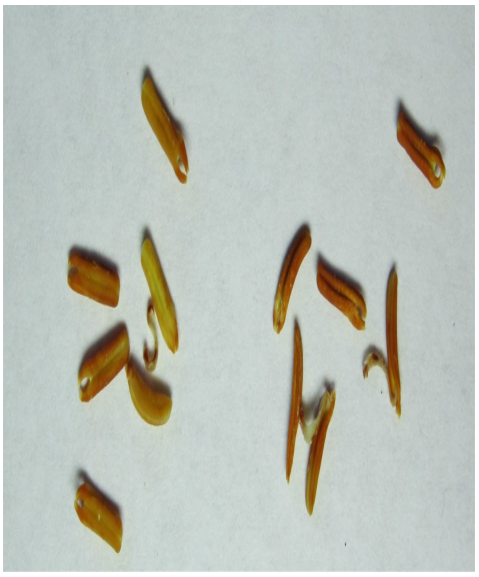


Floral Dissection

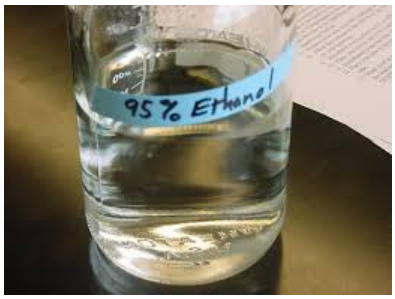
1. First, obtain a single flower from a labeled envelope and hold it under the light microscope. (Note: Hold onto the envelope for later, as it will be used for cataloging the flower).
2. Using the coarse and fine adjustment knobs, focus your image until you can see the parts of your flower clearly. Observe your flower observe it carefully, and notice how each flower is arranged in a series of whorls, meaning that the flower parts are arranged in a circular pattern.
3. The outermost whorl of the flower is the sepal, the small leaflets at the bottom of the flower. The sepals should not block your view of any other flower parts, so observe, but do not remove the sepals from your flower.
4. The next whorl you will encounter upon dissecting your flower is the calyx, or the petals of the flower. Using your forceps, you may want to remove the petals of the flower, especially if they are blocking your view of other flower parts closer to the center.
5. After the petals, you will encounter the androecium, or the stamens of the flower. The stamen contains the male flower parts, including the anthers, the pollen baring part of the flower atop the stamen.
6. Remove 3-5 stamens (anther + filament) from your flower using your forceps, and place them down on a clean microscope slide.
7. For the purpose of this lab, you no longer need your flower. If you'd like to examine your flower further, you can observe the innermost whorl of your flower, the gynoecium. The gynoecium contains the female flower parts including the stigma, style and ovary.



Stamens removed from flower



8. With your stamens and anthers on a clean microscope slide, apply one drop of ethanol to your stamens. The alcohol is used to separate pollen from the anthers, and remove waxes from the pollen.
9. With your stamens suspended in the alcohol, gently poke the stamens with your forceps. This helps to further separate the pollen from the anthers.



10. Remove the excess flower parts from your slide, and observe the pollen under your microscope while the ethanol evaporates. The pollen spores should be visible as small white/cream grains on your slide.
11. After the alcohol has evaporated, apply one drop of fuschia stain to your slide. The fuschia stain will make it easier to identify certain features of your pollen spores under the microscope.

12. Finally, label the slide using a labeling stamp. Label the slide like so:

Genus species
Col. Dd/**mm**/yyyy
Prep. Dd/**mm**/yy
Ascension # (if applicable).
NOTE: Record month using roman numerals. i.e. April= iv, may= v, june= vi, etc.

Final Slide