

Instructions for Photographing and Documenting Samples (for Barcode Long Island and Urban Barcode Project Student Teams)

As you begin to catalogue your collected organisms, it is extremely important to take clear and close-up images of your specimens. These images will be associated with your organism on the DNA Barcode Sample Database, which can be viewed by the public and provide information for additional scientific studies. Further, clear pictures are necessary for taxonomic identification. This is especially true when the entire organism is used to extract DNA. We recommend use of a microscope to take photos, if appropriate, to maximize image quality. Follows are guidelines for taking high-quality photos of organisms.

General Information

1. At least four photos should be taken of each organism, including images of the organism's natural habitat (when collecting), the organism on graph paper and/or with a ruler or size reference indicator and sample ID number, and *at least* two well-lit, close-up, high-quality photos of the top and bottom of the organism.
2. Photos of organisms should be taken while alive, if possible. An organism's morphology can change drastically after death, resulting in challenging taxonomic identification. If it is difficult to get a clear picture of a mobile organism, students have found that taking a short video of the organism and using a frame shot or screen grab of the video works well. If the photo is still suboptimal, take the best pictures possible while alive, and additional, higher-quality photos after death. Be sure to upload both sets of photos to the Sample Database.
3. Lighting and background are important. Be sure to place dark organisms on light colored backgrounds, and vice-versa, when appropriate, to maximize the organism's features. Adjust lighting to avoid dark or shadowy pictures.
4. There is no limit to the number of photos that can be uploaded per sample to the Sample Database, so we recommend more than less!

Using a Microscope and Digital Camera or Smartphone

The instructions below are adapted from the paper "Taking Photographs with a Microscope" in The American Journal of Tropical Medicine and Hygiene (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2843439/>)

1. Place the organism in a petri dish or appropriate vessel to view under a microscope.
2. Center the sample under the microscope, and adjust the magnification to maximize the size of the sample while still keeping the entirety of the organism visible. It is crucial to make sure that the organism is in focus—blurry pictures affect taxonomic identification.
3. Increase the light source to maximum intensity.
4. Position the lens (from camera or phone) against the microscope eyepiece. A rubber cup over the eyepiece helps to hold the camera steady. A small circle of light will be seen on the camera's or phone's LCD screen.

5. Use the camera's or phone's zoom function to increase the size of the circle, as needed. The most difficult step is moving the camera or phone lens small distances across the eyepiece to center the circle. The device's autofocus should then self-adjust to give a clear image.
6. Adjust the fine focus of the microscope to maximize image clarity.
7. If the image is too dark or grainy and you are using a camera, the ISO setting should be increased (usually 100 or 200 will suffice) or the "darkness" or "night time" setting selected, depending on the model of camera. Note that generally, the higher the ISO, the more difficult it is to obtain a clear image.
8. While holding the camera or phone very still, take the photograph and examine the image to confirm the quality. Excessive blur from camera shake can be minimized by attaching the camera to the microscope with sticky tape or bungee cords, or by constructing a frame to hold the camera in place.

Using a Camera Lens Attachment on a Smartphone

Depending on the size of the specimen, it may not be appropriate to use a microscope to take specimen photographs. Instead, students can use tools to magnify their sample image with their cell phone cameras. Below are some suggestions for zoom lenses that can be fastened to a smartphone camera. Note that there are many different types of these products available from numerous websites.

Example 1: Clip-On Phone Lens ([link](#))

Example 2: Micro Phone Lens ([link](#))

Helpful Tutorial: Smart Phone Microscopic Photography YouTube Tutorial ([link](#))

Reference

Maude, Richard J., Gavin C. K. W. Koh, and Kamolrat Silamut. "Taking Photographs with a Microscope." *The American Journal of Tropical Medicine and Hygiene* 79.3 (2008): 471–472. PMC. Web. 10 Jan. 2017.