How-To-Do-It

Photography in the Classroom

B. Kevin Collins

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A good 35mm camera with a minimal amount of accessories can be worth its weight in gold when it comes to making audiovisual materials. In this article, I will go over some simple applications of photography that I use in my classroom and the accessories that I use to do the job. A short list of suggested reading materials that may be of use to a science teacher new to photography is also included.

Several years ago I became disenchanted with commercial filmstrips and rental films. The filmstrips never quite covered materials the way I would have liked. Films, which must be reserved far in advance, were hard to get on the day or days when they could be used most effectively. Since that time, I have been developing a set of 35mm slides that follow and expand upon my life science curriculum. These slides are not only accessible any time I want them, but I update them constantly to improve the overall quality of the collection.

Probably the single biggest drawback to doing classroom photography is the purchase cost of a camera and accessories. I was lucky in that my wife and I were both interested in photography as a hobby. We purchased a Pentax Spotmatic II 35mm camera in 1974 and are still using that same camera for family, hobby and school projects. Considering the initial cost and the fun we've had with it, the camera has been a worthwhile investment.

A limited number of accessories can greatly increase the versatility of your camera. My basic tools are close-up lenses or extension tubes, a small flash unit, a flash extension cord, a cable release, an adapter to join my camera to a microscope and a small tripod that gets used only occasionally. I also use two filters: a skylight filter to protect the front surface of the lens and a polarizing filter to cut glare in pictures through glass and water. These totaled about $85.00 spread out over several years. Each additional piece of equipment was purchased only as a definite need for it was identified.

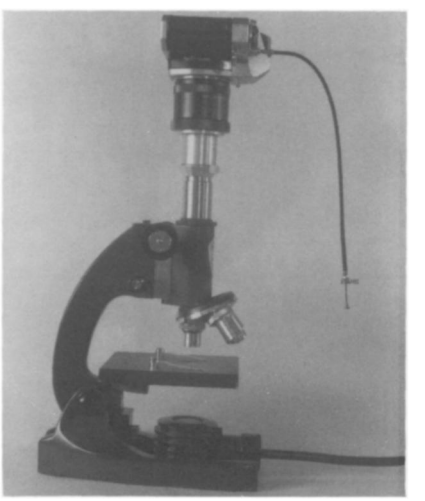
Basic equipment for classroom photography (from left to right) back row: microscope adapter, camera, extension tubes; front row: flash cord, close-up lenses, flash, and cable release.

The camera itself can do quite a bit. Pictures of apparatus used in a demonstration, of students working on lab projects, documenting ecological changes, seasonal or environmental, are all possible. Pictures of this type really add interest to a class if they include people or an area familiar to students.

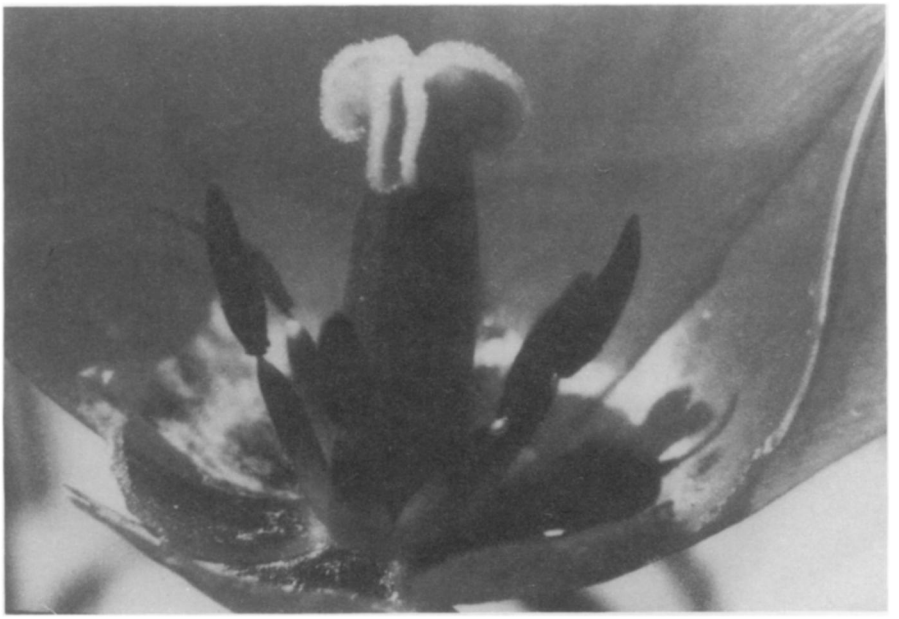
Getting Close to Your Subject

When the object you wish to photograph is small, you need to get your camera closer to your subject. I use close-up lenses or extension tubes to do this. Other accessories are also available to do the same job, such as a bellows unit or a macro lens. The close-up device you choose is a matter of personal preference and budget limitations. Close-up accessories open many new possibilities. Close-ups, copy photography and making your own title slides all have potential use in a classroom.

For example, one spring, using close-up lenses over a period of two weeks, I took a picture of the same maple bud every 12 hours. When these pictures were edited, I had a set of about 10 slides showing the



Camera adapted to a microscope, ready for photography. Note: by adding a 36mm extension tube between the camera body and the microscope adapter, full frame pictures are possible.



Tulip showing floral parts, using close-up lenses.

changes that take place externally in a bud as it breaks dormancy and starts to grow. This process definitely is not available for observation all through the year.

Using a Flash For Close-ups

If the situation permits, I take my picture with available light. If light is poor, I use the flash unit. For normal use, all you need to do is follow the instructions included with the unit. For close-up work using a flash, things are a bit more difficult, yet, with a bit of experimentation, a technique can be developed. The procedure I use for close-ups using a flash is to connect the camera to the flash by a 90cm (3 ft.) flash cord. This gives me complete flexibility on flash angle and flash distance in relation to the subject.

I have developed a table that I use to position the flash according to subject distance (Table 1). I focus as close to the specimen as possible and add the close-up lens that gives me the picture I want. I then set my camera at f/16 to give maximum depth of field.

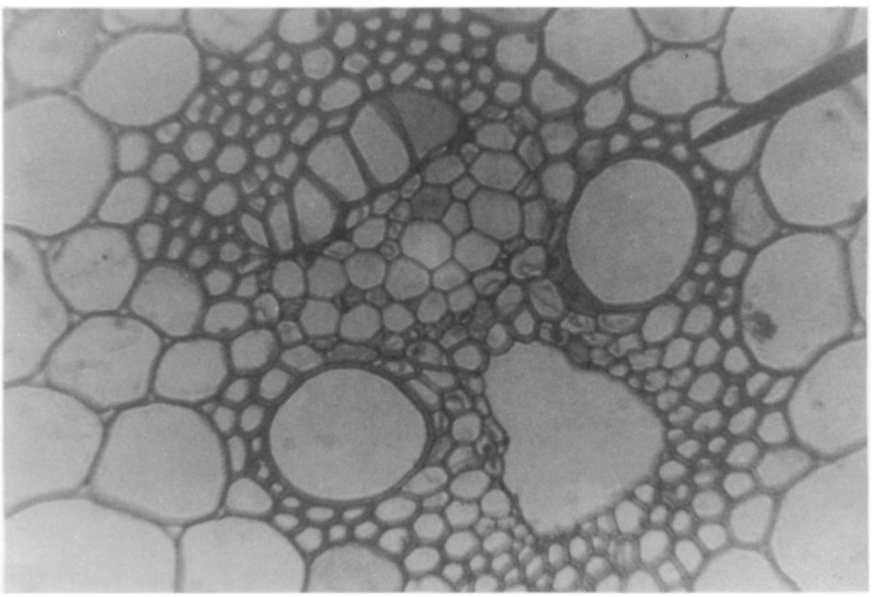
Next I connect the flash to the camera using the flash cord, position the flash at the proper distance from my specimen using the information from Table 1 and take my picture. Just to be safe, I often take two more pictures at f/11 and f/8 to make certain I get the picture I want.

Depth of field is the area in front of and behind the subject of your picture which will be in focus at a given f/stop. As a general rule, the larger the f/stop number (i.e. f/16 or f/22), the greater the depth of field.

Photomicrography

Another attachment that gets a lot of use is my microscope adapter. For a more complete discussion of the technique that I use, see the article "Taking Pictures through a Microscope—on a Budget" in the further reading list. Briefly, I attach the camera to the microscope with the adapter and take my picture. To figure exposure time, I use a table I have developed (Table 2). I often take three pictures, one at the recommended exposure and one each at the next longer and shorter exposure. This is called bracketing and helps to guarantee getting at least one usable picture.

Now that I've done my own photography for several years, I have a set of some 600 slides in my teaching collection. Because I'm not bound by time limits the way I would be with rented materials, I'm free to use the slides in many ways—to introduce or review class work, to prepare students



Photomicrograph of vascular bundle in corn (Zea mays) taken from a prepared slide.

Table 1. Flash distances for close-up photography

ASA 160/200	*Lens to subject distance (cm)*	*Flash to subject distance (cm)*
Regular lens	Closest focus	125
+1 Lens	25	73
+2 Lens	20	70
+4 Lens	15	66

Note: This table was formed using a Vivatar 100 flash connected to the camera with an approx. 90 cm flash cord. All distances recorded are to the nearest whole centimeter.

for lab work and as items for test questions. The final benefit is the joy of having a challenging and satisfying hobby.

Suggestions for Further Reading

Collins, B.K. (1980). Taking pictures through a microscope—on a budget. *American Biology Teacher, 42*(9), 561.

Kodak Publication AN-18. (1981). *Photography in your science fair project*. Rochester, NY: Kodak.

Kodak Publication N-9. (1973). *Basic scientific photography*. Rochester, NY: Kodak.

Moldvay A. (1981). *National Geographic photographers field guide*. Washington, D.C.: National Geographic Society.

Owens, W.J. (1975). *Close-up Photography*. Los Angeles, CA: Peterson Publishing Co.

Table 2. Exposure table for photomicrographs. Disk diaphragm at widest opening.

	Exposure time	*1/125*	*1/60*	*1/30*	*1/15*	*1/8*
Magnification						
40×		X				
100×			X			
400×						X

Using Ektachrome 64 film and a Swift Model 950 microscope with a built in light.