



## RESEARCH IN THE FIELD



Some science is best carried out in nature. Studies where you need to identify all the different plant species in a habitat, count the number of pollinators that come and go from a certain kind of plant, or track changes in the color of autumn leaves might require outdoor trips to an interesting site. Some studies might involve data collection in your own back yard, school garden, or neighborhood park. Other studies may involve a single trip to collect seed or plant samples for more careful work in the lab.

### Field Work Depends on Good Planning!

As for any other type of science, you should have a complete experimental plan for field research before you start any hands-on work. Planning can be especially important for good field work. Once you reach your field site, you may not be able to leave until the rest of your team or class is also ready! Figure out as many details as you can as your team writes any experimental plan involving field work.

Your team will need to answer questions about the organisms you plan to study:

- ✓ How will we identify each species we want to study?
- ✓ At which sites is/are our key species found?
- ✓ In what habitat do the organisms usually live?
- ✓ If we will be studying plants, will our species be dormant, germinating, flowering, or setting seed when we go to the field site?
- ✓ If we will include pollinators or herbivores in the study, at what time of day are we most likely to see them?

Choosing a field site lays the groundwork for the rest of the experimental plan:

- ✓ What locations could our team visit?
- ✓ Will we need a permit or somebody's permission to be at the site, take photos, or collect samples?
- ✓ If we need permits or someone's permission, how will we get approval?

The procedures for field research are just as important as those used in lab research:

- ✓ What samples or data will we collect at the site?
- ✓ How many times and how often will we need visit the site?
- ✓ Will the time of day we visit matter for our experiment?
- ✓ Can we or do we need to change any lab procedures to use them in the field?

**Thought Exercise:** Suppose your team wants to study the blooming of dogwood flowers. How often might you need to visit your field site to collect data? Which month would be the best time to start if you lived in New York? In Georgia?



## Gear for the Field

The night before or day that you will go to the field site, you should pack supplies so that you will be ready for anything! After you pack your bag, check it twice to make sure you have remembered all that you need.

Bring along research materials:

- ✓ You might be able to make your work easier with tape measures, digital watches, string to mark plants or study plots, plastic or paper bags for collecting soil or seeds, a spade to dig up roots, or newspaper to wrap and carry plant samples.
- ✓ Pack a field notebook and pen or pencil so you can record the conditions at your site and any data you will collect.
- ✓ Bring a written copy of any detailed procedures you will be doing at the field site.
- ✓ Test all equipment you will use in the field before you pack it. You don't want to get out to your study site and discover you aren't sure how to use a new GPS unit!
- ✓ If some items can be used up, such as pens or batteries, bring fresh extras. This way you can complete your work without running out of ink or electricity.



Plan for field conditions and possible weather changes. Insect repellent, drinking water, and a snack are usually helpful to have on hand. Other items depend on your situation. If you will be:

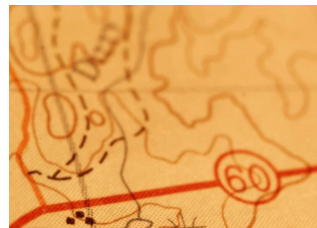
- ✓ Out for more than three hours, pack a lunch.
- ✓ Working in or crossing a wetland or stream, pack mud boots.
- ✓ Working in the dark, bring a flashlight.
- ✓ Working in the sun, bring a hat and sunscreen.
- ✓ Possibly working in the rain, bring a raincoat and a way to protect your field notebook.

## Field Safety

Safety in the field is just as important as it is in the lab. Although you will be less likely to encounter strong acids or bases, outdoors work has unique hazards. You also may not be able to get help as quickly as you can in a classroom laboratory.

Some basic ways to stay safe in the field are:

- ✓ Checking the weather report before you leave and being prepared for any unexpected changes, especially severe weather.
- ✓ Knowing how to identify poisonous or allergy-causing organisms like poison oak, copperhead snakes, or bees.
- ✓ Bringing a basic first aid kit with an epi-pen for insect allergies, bandages, and antibacterial cream.
- ✓ Bringing a compass and map of the site to find your way.



Communication is especially important for safety!

- ✓ Always make sure someone knows where you are going and when you plan to return.
- ✓ Bring a fully charged cell phone and know who to call for help if something goes wrong.
- ✓ Whenever possible, bring at least one of your teammates with you.

## Additional Resources

### Web Pages:

*Biodiversity in Your Backyard*, by the Nuffield Foundation. This lesson plan describes a field experiment to measure species diversity on school grounds. It could be easily modified for use in a nearby park. A plant identification key provided, but covers common UK species.

<http://www.nuffieldfoundation.org/practical-biology/biodiversity-your-backyard>

*Discover Life*, by The Polistes Foundation. Here you can search for specific species, identify sites where a species has been found, and learn to identify an organism from photos based on its location and traits. Some educational resources are also available.

<http://www.discoverlife.org/>

*Encyclopedia of Life*. This resource, which was first thought up by the well-known biologist E.O. Wilson, is a searchable knowledge base that aims to include all species living on Earth. Search for a species by its scientific or common name and find photos, a scientific description, and its conservation status.

<http://www.eol.org/>

*Project Budburst<sup>SM</sup>: Timing is Everything!* by the National Ecological Observatory Network, Inc., and the Chicago Botanic Garden. Here you can learn about phenology, the study of the timing of natural events. Project Budburst is an ongoing project, so you can map your own field observations here and find out what other “citizen scientists” have seen.

<http://budburst.org/>

*Tree of Life*, by the Tree of Life Project. This is a good resource for identifying relationships among different species based on current science on evolution. This site also includes photos and descriptions of biological families and genera.

<http://tolweb.org/tree/phylogeny.html>

*The C.V. Starr Virtual Herbarium*, by the New York Botanical Garden. This site shows plant samples from the NYBG's William and Lynda Steere Herbarium; it currently has about 225,000 images from over 1.3 million specimens. A glossary of botanical terms is included.

<http://sciweb.nybg.org/science2/VirtualHerbarium.asp>

*Field Techniques Used by Missouri Botanical Garden*, by R. Liesner. This page lists a set of articles describing the methods professional field botanists use to find and collect plant specimens, then prepare them for storage in an herbarium.

<http://www.mobot.org/MOBOT/Research/Library/liesner/tpage.html>

*Books and Articles:*

Brayshaw, T.C. 2010. *Plant Collecting for the Amateur*. Victoria, British Columbia: Royal British Columbia Museum. 48 pp.

Mori, S., Berkov, A., Gracie, C.A., and E.F. Hecklau (eds.). 2011. *Tropical Plant Collecting: From the Field to the Internet*. TECC Editora. Florianopolis, Brazil.

Tilton, B. 2005. *Outdoor Safety Handbook*. Mechanicsburg, PA: Stackpole Books. 144 pp.

Young, J.A. and C.G. Young. 2009. *Collecting, Processing and Germinating Seeds of Wildland Plants*. Portland, Oregon: Timber Press. 236 pp.