

## Basic Field Equipment and Techniques

This is a partial listing of some of the more common (and some not so common) pieces of equipment you might use in field experiments. Just looking through the list may give you some ideas for questions to investigate. Many of the equipment items are available through supply catalogs such as **Bioquip**, **Ben Meadows**, **Carolina Biological**, and **Forestry Suppliers**, among others. Other items are easily found at hardware stores, discount retail stores and office supply stores. Loupes are available through **The Private Eye**. Use your imagination! One of the fun things about ecology in the field is dreaming up and building your own experimental equipment. Just looking through equipment supply catalogs will give you ideas of new observations to make, questions to ask, and experiments to do.

Remember, this is not a complete list of items and it is not recommended that you need all these on hand. These are just some of the more commonly used items and ideas to give you a starting point.

### **Berlese funnel:**

A two part funnel system for separating insects and other arthropods from soil or leaf litter. It consists of a jar on top of a mesh screen over another jar with a funnel. Litter is placed on the screen and a light or heat source applied. This causes the organisms to crawl downward and fall through the funnel into the bottom jar.



### **Black light**

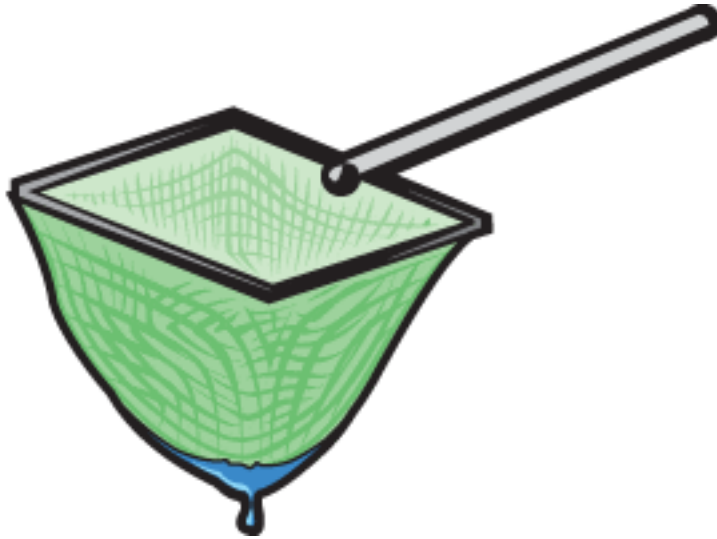
An ultraviolet lamp used to attract night flying insects. The simplest set up is to hang a white sheet on a line and hang a portable black light on one side of the sheet. Insects will land on the sheet and can be tallied, identified or collected.

**Catch box or tray for insects:** Available in SCENE Pond or Ecology kits.

Almost any white plate, tray or sheet will work to catch insects that are beaten or shaken from foliage. Once insects are on the tray they can be collected with an **aspirator**, forceps or camel hair paint brush.

**Collecting containers/vials:** Available in SCENE Pond or Ecology kits.  
Used to hold insects or other specimens temporarily. Best to use clear plastic cups and vials so you can see.

**Dip nets:** Available in SCENE Pond or Ecology kits.  
Nets for collecting aquatic organisms, sediments and plants. Come in a variety of shapes and net thicknesses. May be purchased at pet supply stores.



**Enamel paint**  
Small bottles of bright colors, including white, for marking hard-bodied insects for observational or mark-recapture studies. Depending on the insect body type, use fine brushes to mark the insect in a place that won't interfere with its normal movements.

**Field measuring tape:** Available in SCENE Pond or Ecology kits.  
A 25 or 50 meter measuring tape for measuring longer distances for transects, etc.

**Field notebook**  
Used to collect data, make observations, write down questions, hypotheses, any ideas that come to mind while in the field. This can be any kind of easily portable, easy to write on notebook. There are even waterproof notebooks called "Rite-in-the-Rain". Not very necessary in the desert, though.

**Flagging tape:** Available in SCENE Pond or Ecology kits.  
Colored vinyl tape (non-adhesive) used to mark individual plants, branches, or areas. You see this tape on survey stakes and sometimes on tree branches that are marked by a utility company or land developer. Available in hardware stores.

**Forceps:** Available in SCENE Pond or Ecology kits.  
These are tweezer-like instruments that come in various sizes for safely picking up organisms and objects.

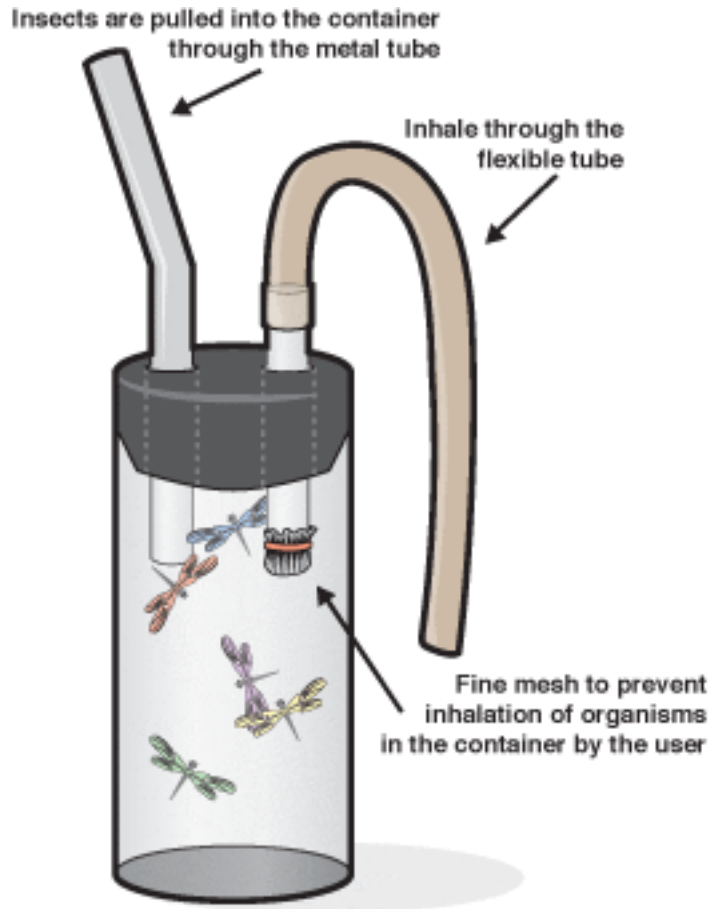
**Hand counters**  
Also known as a tally meter. These are small, portable, handheld units for counting specimens, objects or events. Much easier and more accurate than counting in your head or on paper if you need to keep your eyes on the action.

**Insect marking materials**  
Various materials are used to mark insects. These include paint, liquid correction fluid, fluorescent powder,

permanent markers and others. The type chosen is determined by (1) the animal being marked and (2) the purpose and duration of the marking.

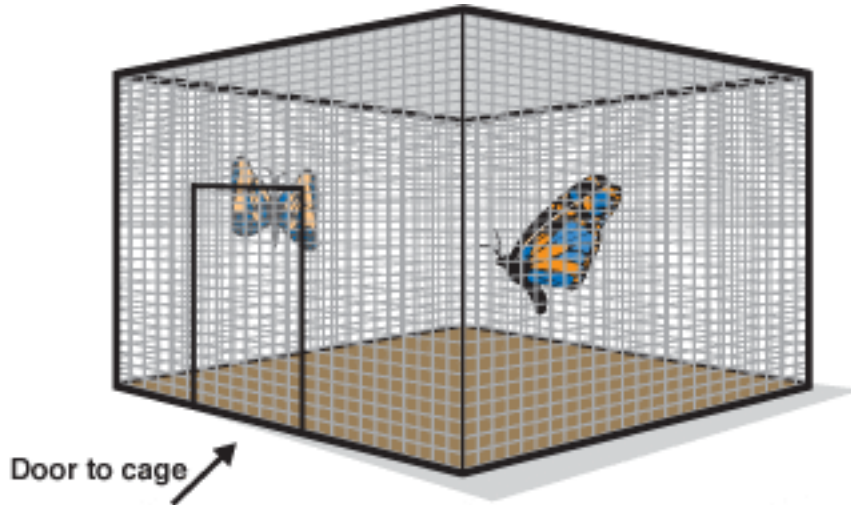
### **Insect aspirator**

This is a vial with tubing used to collect insects too small to be safely picked up with forceps. You can make one with a plastic cup with a lid and straws.



### **Insect rearing cages**

Cages of various sizes made of mesh over a wood, plastic or metal frame. Used to rear insects in captivity. These can be made using nylon mesh fabric available at a fabric store and a frame of your chosen material. Good project to practice geometry, math and construction skills.



**Loupes, hand lenses:** Available in SCENE Pond or Ecology kits.

Usually have magnification from 2x to 20x. Small, easily carried and used. They are available as folding magnifiers, jewelers loupes, or small, clear boxes with the magnification lens in the lid.

**Netting to cover plants**

Used to include or exclude birds, insects, reptiles or mammals. The type of netting will be determined by its intended purpose. For example, netting with very small weave will keep out insects and birds; a large, open weave will keep out only birds.

**Paint brushes**

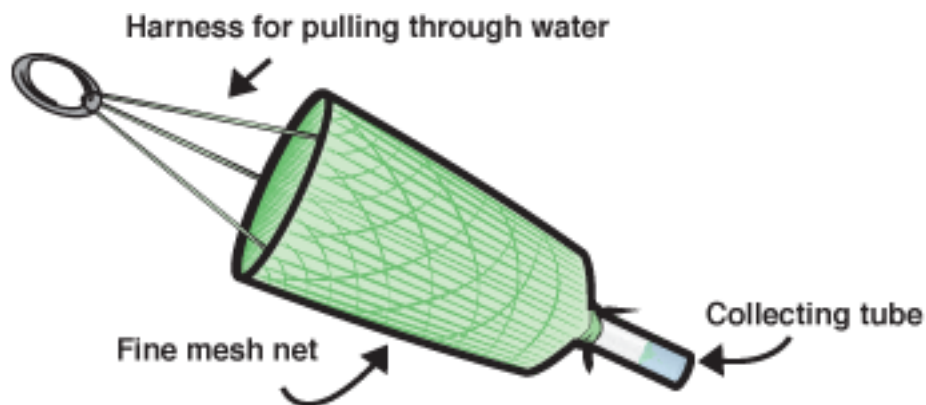
Brushes of various sizes are used to paint marks on insects for mark-recapture studies and for picking up tiny insects too small to be safely picked up with forceps.

**pH test kit:** Available in SCENE Pond or Ecology kits.

pH refers to the acidity or alkalinity of a substance such as water or soil. pHydriion papers are widely used and easily carried. A variety of test kits exist.

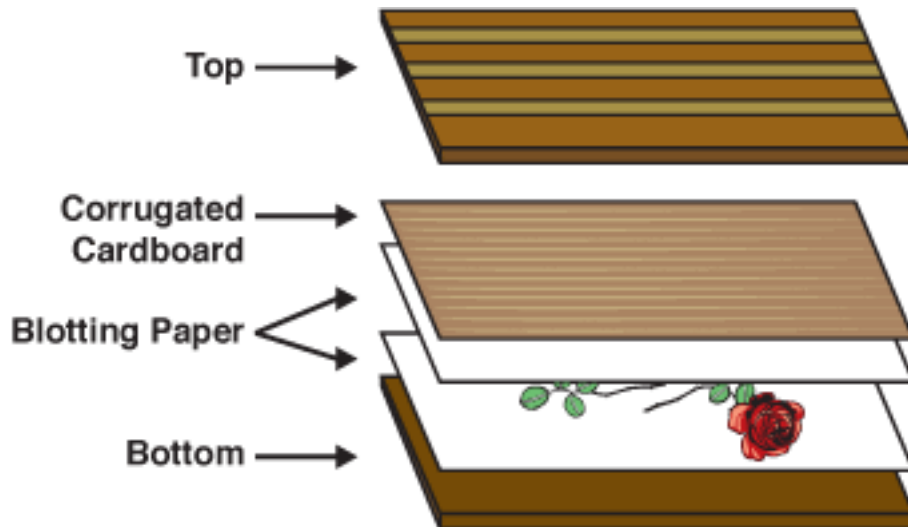
**Plankton net** (pond/stream use only)

This is a cone-shaped net with very fine cloth that permits water to pass through but not microscopic organisms. These organisms (plankton) are collected in a removable, plastic, conical tube at the end of the net.



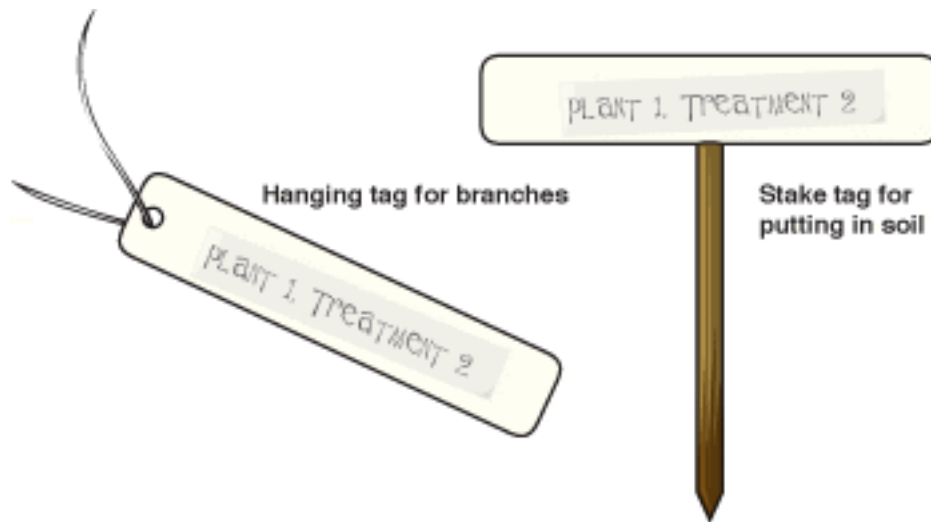
**Plant press:** Available from SCENE.

Used to press and dry plant specimens. Consists of two outer covers with heavy blotting paper interleaved with corrugated cardboard. The plant sample (excluding roots) is placed between two sheets of heavy blotting paper that are then placed between two pieces of cardboard. Multiple plant specimens are then placed between the outer covers that are strapped together. Plants are allowed to dry.



### Plant tags

Plant tags are used to label and mark individual plants or parts of plants. They can be made of plastic or aluminum. A rectangle about 30 x 10 that can be written on and has a hole in one end works fine. The hole is for tying the tag to the plant.



### Plastic bags

Reclosable plastic bags such as Ziploc bags are great for many things, such as collecting seeds and soils. For aquatic purposes whirl-pak bags are best. They do not leak and are more puncture resistant.

**Plastic pipettes:** Available in SCENE Pond kit.

Clear eye droppers used to transfer small aquatic organisms. They have lots of uses.



**Pots and Potting soil**

Used for germinating seeds and growing plants.

**Protractors**

Used to measure angles.

**Psychrometer:** Available from SCENE.

Equipment used to measure the relative humidity in the air. Of course, humidity in the Sonoran desert is usually low, but it is a simple instrument, easy to use, that is excellent for taking year-long data.

**Rain gauge:** Available from SCENE.

A marked container for measuring rainfall.

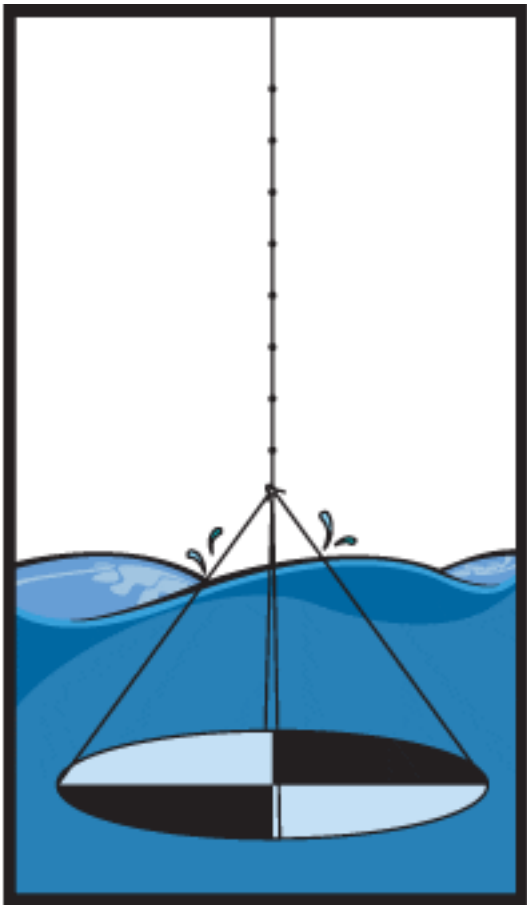


**Rulers/Meter sticks**

Useful for many measuring activities.

**Secchi disk**

This is used to estimate the degree of visibility in freshwater. It is a 20cm diameter circle marked in alternating quadrants of white and black. It is weighted on the bottom so it will sink, and has a rope that is marked in half meter segments.



**Soil sieves:** Available in SCENE Ecology kit.

These are sieves of various mesh sizes used to separate soil samples and for finding insects in soils. Usually comes as a stacked set with four graduated mesh sizes.

**Soil test kit:** Available in SCENE Ecology kit.

Used to test the soil for pH and the nutrients phosphorus, potassium and nitrogen.

**String and wire**

Numerous uses.

**Sweep nets**

Nets used to collect aerial insects.

**Tanglefoot**

A trapping adhesive used to collect crawling insects as they move on a surface, such as a plant stem. It is thick and gooey.

**Thermometers:** Available in SCENE Pond or Ecology kits.

Used to measure temperature in many projects.

**Trowels:** Available in SCENE Pond or Ecology kits.

Useful for many projects that involve digging soil or leaf litter.

**Water test kit:** Available in SCENE Pond kit.

Used to test characteristics of the water such as pH, dissolved oxygen, and nitrogen.

**Whirl pak bags**

Plastic bags with a built-in twist tie at the opening. Fill the bag with water and aquatic organisms, fold it over the twist tie several times, and twist it shut. Hold water better than zip type bags.



**Wind gauge**

Used to measure wind speed, an abiotic factor.