

Terrariums

A Terrarium is a most worthwhile unit for every classroom because it offers an opportunity to study and arrange an unlimited variety of plant and animal groups. The purpose in maintaining a school terrarium may be of a two-fold nature: to represent native flora and fauna as objects of general interest or to have it form a definite part of the classwork - to show the interrelationship of such environmental factors as food habitats, temperature and moisture upon plant and animal association. The student's interest is stimulated greatly if he makes his own collection of native plants and animals and if he arranges and cares for the terrarium.

For the terrarium case in which the plant and the animal groups are to be placed, one may use almost any container large enough to accommodate the group, for example: a wide-mouth gallon jar, a battery jar, a fish bowl, an old aquarium or a specially built terrarium case. However, the size of the case will limit the number of plants, for instance, a six by eight inch battery jar will accommodate only a small amount of stone and soil, one clump of moss, a fern and a small partridge berry plant. Such small terrariums are usually short lived and useful for only a few weeks of study.

Experiences with terrariums have proven that a large case is easier to plant and maintain than a small one. A six- to ten- gallon aquarium or a specially built terrarium case with slanting glass front is the most practicable terrarium receptacle. The terrarium should hold water for it may be desirable to include bog and semi-aquatic plants. It should have a glass cover so as to maintain the proper humidity, to avoid sudden changes of temperature, and to protect the plants from drafts or harmful gases in the air.

Just as the size of the tank will determine the number of plants and animals, which will thrive successfully in it, so also will the type of habitat to be illustrated affect the specimens to be used in it? It is well to strive to reproduce, as nearly as possible as the natural habitat of the plants and animals and to arrange them accordingly. A dry woodland terrarium should not include bog plants such as the Venus' flytrap and sphagnum moss; neither should an animal which, normally lives in moist situations, such as a red-spotted newt, be placed in a desert terrarium.

A battery of four to six terrariums will enable the teacher to demonstrate many living ecological groups. Typical habitats easily reproduced in laboratory terrariums are: desert, dry woodlands, wet woodlands, bog and semi-aquatic. The contents of such terrariums may be varied to suit the season and teaching requirements. The main factors to be considered in establishing and maintaining terrariums are: humidity, light and temperature, soil mixtures and suitable living specimens.

The problem of humidity control in the terrarium, when it is situated in a dry and overheated laboratory, is simplified when a glass-covered case, as described above, is used. The glass cover should fit rather closely but should not entirely prevent the circulation of air. To demonstrate the necessity for a humid condition, remove the glass cover from a terrarium in which *Selaginella* (*moss like plant*) is growing. Within a day or two the plant will begin to wilt and the addition of water to the roots will not change the unhealthful appearance. After two or three days replace the top and in a very short time the plant will return to its original healthful appearance. By controlling the humidity properly one will be able to keep delicate ferns, mosses, liverworts, tree frogs and salamanders for long periods of time.

Desert and dry region forms, such as cacti and lizards may be kept in glass tanks, which are covered with screen instead of a glass plate.

In general, the terrarium should receive plenty of light. The north window is an ideal location for woodland groups consisting of ferns, mosses, newts and tree frogs because direct sunlight is not essential. On the other hand, cacti, alligators, lizards, turtles and most snakes require sun and will not thrive unless they can be kept in a sunny location.

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The bog, woodland and semi-aquatic terrariums should be kept at a temperature 65° to 72° F. for this is conducive to the normal growth of both the plants and animals. Higher temperatures have a tendency to force the plants; overheating may even kill them and thus make it necessary to restock the tank. Extremely low temperatures (near freezing) retard the plant growth and the animals do not feed properly, either. The plants and animals of the desert terrarium will thrive if the temperature is maintained at from 80° to 90° F. It is sometimes necessary to suspend an electric light over the terrarium in order to maintain this temperature.

In the preliminary preparation of the terrarium for planting, the foundation or base material is of utmost importance. Plants require air at the roots as well as around their leaves. A heavy soil mixture and poor ventilation of the base are often more at fault in a poorly growing terrarium than the factors of light and temperature. Sufficient coarse material should be included in the base to allow for good drainage and aeration. Suggestions as to soil mixtures will be given in each discussion of the different terrarium habitats.

In setting up the terrarium there are always a few unwanted guests in the soil mixture, which damage plants and animals and destroy the beauty of the finished planted garden. It is possible to sterilize the base mixture by heating it in an oven or by pouring boiling water over the entire mass. Although these procedures are usually successful in removing pests, they also remove the bacteria and fungi beneficial to the life of the plant. If the tank is too large the best plan is to keep on alert for pests and remove them when they appear, or to spray the plants with some insecticide.

The base material should be slightly moistened and may be arranged in any desired manner. It should cover the entire bottom to one-fourth the height of the container. An attractive terrarium is one in which the soil is arranged unevenly with hills and hollows, high in the back and low in the front and a few pieces of stone and wood placed here and there to vary the scene.

The Desert Terrarium

The simplest group to assemble and one, which requires the least amount of attention is the desert terrarium. The tank bottom may be covered over with one and one-half inches of coarse sand and topped with one-half inch of real desert sand. A few stones and a shallow pan of drinking water for desert animals may be added-the pan should be partially buried in the sand so that its top edge is even with the surface. The lower layer of coarse sand should be moistened slightly when it is placed in the tank; but the top layer should be kept reasonably dry.

The desert scene may now take form. The cacti may be planted; the larger kinds should be handled carefully. The roots of the cacti should be moistened before planting and, after all plants are satisfactorily placed, sprinkle the surface about them with water. One or more desert animals add considerable life to the desert scene, collared lizards and small snakes (common desert species) as well as scorpions, will live in the terrarium with minimum amount of attention. The top of the terrarium should be covered with wire screen rather than the glass plate. The desert group should be kept in a warm place-temperature range 68° to 85° F. is satisfactory.

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The Woodland Terrarium

The woodland terrarium offers an unlimited number of possibilities and may include a variety of combinations representing various kinds of habitats. The foundation layer should consist of one part sand, three parts humus and one part coarse gravel thoroughly mixed; or the gravel may be placed on the bottom of the terrarium and the mixture of sand and humus placed on top of this drainage material. In either case, the soil mixture should be moistened sufficiently so that it will cling loosely together without caking. After the soil mixture has been properly arranged, dampen the roots of the plants, and group them to achieve the desired scenic effect. Those plants whose leaves have a tendency to spread should be centered so that their leaves may grow without touching the sides of the tank, or obstructing a part of the group from view. An instructive as well as attractive terrarium may be arranged with mosses, liverworts, lichens, club mosses, *Selaginella* and wood ferns. Overcrowding of the terrarium should be avoided; but if the space is available the addition of the evergreen plants-twin flower, creeping snowberry, partridgeberry with its scarlet berries – is worthwhile and attractive. If a large variety of plants are essential, small or dwarfed plants should be used or, better still, use a larger aquarium. After the planting is completed, the plants should be trimmed, all broken stems and leaves as well as debris removed, and the glass given a final cleaning. The entire group should be sprinkled with a fine spray, the glass cover placed on top, and the terrarium placed in a cool location.

Animals may be included in the woodland habitat; among those to be considered are the common newt, toads, tree frog, chameleons, small snakes, snails, beetles and many others. Toads and salamanders dig under the moss and into the soil, often causing considerable damage to the attractive terrarium; but the opportunity to study their living and feeding habits is well worth this slight destruction. The common newt and the small green grass snake and garter snakes probably cause the least damage. When chameleons are to be placed in the terrarium, a stout stemmed plant should be included as one of the plants to offer support for this agile animal.

Basic construction of the woodland terrarium and improved methods for keeping a healthy, growing condition has been experimented with. The basic change made was to provide for an air space beneath the foundation layer by using a piece of hardware cloth of ½-inch mesh to form a false bottom. The hardware cloth was caught slightly wider and longer than the tank, and the ends and sides were folded under so that at the back it was 1 ½-inches high and at the front ½ - ¾ inch, thus giving the false bottom a forward slope. A small strip of wire was placed in the angles of the two back corners from the tank bottom to just beneath the plant line to form a channel for the circulation of air from the bottom to the top of the terrarium. On top of the wire was placed a layer of stone coarse enough to prevent its passing through the mesh. The sand and soil mixture was placed upon the stone layer and the plants arranged. The tank was watered thoroughly, and excess was allowed to collect on the bottom. After the soil had absorbed as much moisture as possible, the excess was piped off the bottom of the terrarium through one of the back corners.

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The Bog Terrarium

The plants in a bog terrarium, require acid conditions and the foundation must supply this need if the plants are to grow and develop normally. There are two possibilities: the bog plants may be planted in a terrarium with a layer of gravel for drainage and covered with a soil mixture of one part Sphagnum and two parts acid soil; or the gravel layer may be covered with a two-inch mat of Sphagnum, using either living or dried material. In either method, the bog terrarium should be thoroughly soaked, with an excess of moisture being allowed to remain in the gravel layer. Where the soil mixture is used as a base, the roots of the bog plants should be wrapped with some Sphagnum; the Venus' flytrap and the Pitcher Plant should be planted deep, Sundew is a shallow-rooted plant and should be planted accordingly. Where the Sphagnum base is used, the Sphagnum should be pressed firmly around the roots of the plants. The bog terrarium should be covered with a glass top and placed in a cool location. Any animals, which prefer moist surroundings, will do well in a bog terrarium. The group includes newts, toads, salamanders and frogs.

The Semi-Aquatic Terrarium

The planting and planning of a semi-aquatic terrarium is more painstaking than that of the woodland or bog terrarium. Here one is able to combine the aquatic and the terrestrial habitats into one demonstration unit. The aquatic portion of this terrarium may be arranged to give a swamp-like effect, with a shallow pool of water at one end of the tank; the other end is built up a few inches higher, with a bog or woodland base, and planted accordingly with the appropriate materials. A semi-aquatic terrarium may be used to demonstrate a group of insectivorous and bog plants. For instance, Bladderwort may be planted in the water, live Sphagnum on the shoreline, and Sundew, Venus' flytrap, Butterwort and Pitcher plant placed in the bog region. Dragonfly and damselfly larvae, as well as mud minnows and tadpoles may be introduced into the water. If the aquatic section of the terrarium represents a truly aquatic picture, then the depth of the water must be increased from 6 to 10 inches and the woodland or bog section should be raised correspondingly. The soil line of the terrarium section should be above the water level of the aquatic portion and can be built up with stones and sticks. The aquatic section of this terrarium can be arranged as a regular aquarium planted with Elodea, Vallisneria, Ludwigia, Cabomba and dwarf water-lilies; snails, tadpoles, insect larvae, crayfish, minnows and sunfish can be used to complete the balance. The terrarium portion should be planted with mosses, lichens, ferns or bog plants, and the animals for this region can be semi-aquatic, such as turtles, newts, small water snakes and tree frogs.

Notes on Terrarium Care

One should keep in mind that excessive moisture and temperature extremes are the basic causes for terrarium troubles. Mold developing on plants is often the result of too much water; dusting the tank lightly with powdered sulfur may check this condition. Where plant stems are badly damaged, treat them with powdered charcoal. An excess of heat produces weak and spindly plants. When the plants become overcrowded, trim them back and remove the cover part of each day if there is too much moisture, or make a space under it for the circulation of air.