

Terrariums

A terrarium is a tightly closed, clear glass or plastic container filled with small plants (Figure 1). It also has come to mean an open, transparent container for growing and displaying plants. Terrariums are most useful for small plants that do not adapt well to normal home atmospheres. When properly planted and located, they provide a novel way to grow many plants with minimal care.

Brief history

The use of transparent containers for growing plants dates back at least 2,500 years in Greece. In the United States, terrarium culture is believed to have originated in New England, where housewives placed squawberry (partridge berry) plants in handblown glass bowls.

The invention of the terrarium as we know it is credited to Dr. N.B. Ward, a 19th-century London physician. A plant enthusiast, Ward was interested in growing many types of ferns in his backyard but had not been successful. While studying a sphinx moth emerging from a chrysalis he had buried in moist earth in a closed bottle, he was amazed to see a seedling fern and some grass growing inside. He watched them grow for four years, during which time not one drop of water was added nor was the cover removed.

Ward continued his observations with other plants in containers and, in 1842, published a book called *On the Growth of Plants in Closely Glazed Cases*. This led to development of “Wardian cases,” which were large, enclosed containers for growing delicate plants in the home or transporting precious plants over long distances. The terrariums most often used today are small ornamental versions of the Wardian case.

Planning a terrarium

Closed, open or dish garden?

The first step in planning a terrarium is to decide whether it will be open (no lid or cover) or closed. Closed terrariums retain the most humidity, followed by open terrariums and then dish gardens. Open terrariums and dish gardens require more frequent watering than do closed, but danger of disease buildup is greater in the latter because of higher humidity.



Figure 1. A terrarium is a good way to grow plants indoors with minimal care.

Containers

A terrarium container should be made from clear glass or plastic. Tinted or cloudy glass greatly reduces light transmittance and interferes with plant growth. As long as it is clear, almost any type of container may be used: an empty fish bowl, fish tank, brandy snifter, old glass jar, jug, bottle. Containers specially designed for use as terrariums are also available.

Closed containers should have transparent covers. Containers with small openings also are quite satisfactory. Containers with large openings without covers can be used but will require more frequent watering to maintain the high humidity needed by some plants. However, open terrariums are drier and less subject to disease. Containers with low sides are suitable for dish gardens and need not be transparent.

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Growing medium

The growing medium used in terrariums must be clean, well drained and high in organic matter. A prepackaged peat-lite mix (blend of peat moss, vermiculite and perlite) is an excellent choice. Potting soils sold at garden centers and nurseries where plant supplies are sold are sterilized and ready for use.

Growing medium also can be prepared at home. Mix one part peat moss with one part rich garden soil. Sterilize the mixture by moistening it, covering it with aluminum foil to keep it from drying out while being heated, and placing it in oven at 200 degrees F for about 30 minutes or until it is heated through. The exact time needed depends on the quantity of soil. Using clean tools, spread the soil on clean papers to cool. For planting, the soil should be moist enough to cling in a ball when it is squeezed tightly.

Adding fertilizer to the growing medium usually is not necessary because plants in terrariums should not grow rapidly. If soilless mixes are used or if the soil used is known to be exceptionally low fertility, light fertilization with a houseplant fertilizer may be done after plants are established.

Plants

Decide on a theme for the terrarium: woodland, tropical or desert. When making this decision, consider the temperature and light where the terrarium is to be located. Select plants that suit the location.

Many plants are suitable for growing in terrariums. Plants that have a low and dense growth habit usually are best. Larger plants may be used but must be kept small in terrariums by cutting back the tips.

Don't mix plants requiring widely different light, temperature and moisture conditions. Succulent plants and cacti are less desirable for terrariums because moist conditions promote rot. Don't mix desert plants with moisture-loving tropicals.

Table 1 lists some plants suitable for terrarium or dish garden use and describes some of their cultural requirements. Use this table as an aid in selecting plants with similar cultural needs. Plants are listed alphabetically by common name, but because of the variation in and duplication of common names in the plant world, scientific names are included, also. The following points are described in the table:

Height. Terrarium plants often are divided into three size groups: small (1 to 6 inches), medium (6 to 12 inches) or tall (over 12 inches). Because small plants are preferred in terrariums, Table 1 places more emphasis on them. Some small plants actually are creeping or climbing vines that may grow tall in nature, but their height can be limited in the terrarium to form a groundcover. Most plants listed in the tall category need occasional cutting back to be kept low.

Light. Most terrarium plants are in the medium light requirement category and need to be placed near a window with good light. If light from the window is low, supplement

with artificial light. Ideally, a terrarium should be placed within several feet of a bright window but not in direct sun.

Few plants tolerate low-light conditions for extended periods. For plants listed as low light in Table 1, a location no more than about 10 feet from a bright window should suffice.

Terrarium plants requiring bright light should be located close to a window, often in direct sun. Cacti or succulents in a dish garden benefit from such exposure. But do not put closed containers in full sun.

Container type. A true terrarium is tightly closed, as was Dr. Ward's original case. Many plants suited for terrariums require high humidity. Plants that prefer this condition are listed in Table 1 as closed.

An open container is one with high sides, generally at least as tall as the plants contained. The opening at the top is not covered. Plants not needing high humidity can be used.

Dish refers to a container with sides that are lower than the plants, so that the entire planting is subjected to normal conditions in the room. Plants tolerating low humidity are most suitable for this type of planting.

Temperature. Many terrarium plants are tropical in nature and well suited for normal house temperatures. Plants in Table 1 listed as warm respond well to night temperatures of 65 degrees F and day temperatures normally about 10 degrees higher.

The cool designation primarily fits woodland plants in woodland terrariums. These plants should have night temperatures of about 50 to 55 degrees F. Locations with these temperatures may be difficult to find in the home, but in the winter, when plants are placed on a windowsill close to the glass with the drapes pulled behind them, a pocket of cool air will develop. Day temperatures also should be cool but are not as critical.

Comments. Conditions or characteristics peculiar to the plant are identified in the comments section.

Tools

Only a few tools are need to plant a terrarium.

- **Long sticks**, either bamboo or ¼-inch dowel rods. Use to dig holes, move items and support plants while they are being planted. The appropriate length depends on the height of the container.
- **Household scissors.** Use to prune plants before planting them.
- **Large kitchen spoon.** Use when placing growing media and drainage material in the container. A **funnel made from paper or aluminum foil** can be helpful for placing the growing media into a container with a very small opening.
- **Atomizer or bulb-type sprayer.** Use when misting and watering the terrarium. A kitchen bulb baster may be used for watering hard-to-reach spots.
- **Stick with a wire loop on the end.** Use for lowering plants into large containers with small openings.

Accessories

Rocks, gravel and other natural materials — such as sticks, wood, seedpods and bark — provide pleasing accessories in designing terrariums. Ceramic figures of frogs, mushrooms or snails can help to suggest a natural setting. The accessories added are a matter of individual taste. However, avoid using too many accessories or ones with vivid, unnatural colors. Also, be careful not to introduce insects or disease with the accessories.

Assembling the terrarium

Design. When arranging plants, variation in size, color and texture is desirable. Because terrariums usually are viewed from one side, the growing medium should be sloped for viewing from that side and plants arranged so that taller plants are toward the back. Use rocks, sand, wood and other natural materials to create cliffs, rock ledges, dry streambeds or lush tropical forests. Undulations representing hills and valleys will make the scene more interesting than a flat surface. Sketching a design of the terrarium before actually assembling it can be helpful.

Prepare the container. Before planting, clean and disinfect the inside of the container by washing it with hot, soapy water and rinsing thoroughly. Make sure the inside of the container is dry before planting. If a commercial glass cleaner is used, allow the open container to air for several days before planting.

Add drainage material and growing medium. In general, about one quarter of the terrarium's volume should be used by the growing medium and drainage material. These can be added easily with a spoon, funnel or other convenient tool.

Drainage. Activated charcoal and pebbles should be placed in the bottom of the container for drainage. These may be mixed together, but the charcoal usually will be most effective in eliminating chemicals that could prove to be toxic to plants if placed in a ½-inch layer above the layer of gravel, crushed pots, marble chips or other drainage material. Charcoal is especially important in closed terrariums, which prevent the natural escape of chemicals. Sphagnum moss, placed over the layer of gravel and charcoal, prevents the growing medium from sifting into the drainage area.

Growing medium. Next, add the growing medium. It should be slightly moist so that it doesn't stir up dust but not so moist that it is muddy and sticks to the sides. For most containers, a minimum depth of 1½ inches is necessary to provide sufficient volume.

Adding plants. Select only healthy, disease-free plants because closed terrariums represent an ideal environment for plant diseases to flourish. If there are disease concerns, enclose plants in a plastic bag and place in bright light for about two weeks before planting in the terrarium. If any diseases are present, they normally will become visible on the foliage or stems.

Before adding the plants, arrange them in an open area about the size of the container to get an idea of relative sizes and textural patterns. A low, coarse-textured plant is often desirable for a dominant focal point near the front. Don't build a collection of variegated or unusual plants. They compete with each other and don't create a unified pattern.

To assemble the terrarium, take the plants from their pots and remove extra growing medium to expose the roots. Trim off any leaves that are yellowed or damaged or that show any indication of disease or insects. Trim off some roots from plants that were extremely pot-bound.

Promptly place each plant in the container so that the exposed roots do not dry. In a closed container, try to keep foliage from touching the sides of the container. Leaves touching the glass will collect water and be more subject to decay.

Plants may be placed in deep terrariums using long slender tongs or a stick with a wire loop on the end. Deep containers with small openings will require considerable patience and practice in planting. For such containers, a common practice is to wrap the plant in a piece of paper for protection before inserting it through the small opening. Once the plant is in the container, unwrap it and remove the paper. This practice also helps keep the inside of the container clean. Before inserting the plants, dig holes in the growing medium with a pointed stick. After a plant has been placed in a hole, fill in with growing medium and tamp to firm it. A long stick with a cork fixed on the end makes a good tool for lightly tamping the growing medium. After the plants have been positioned, add gravel, sand, moss or other materials to give a finished appearance. Accessories also may be added at this time.

After planting. After planting, mist the plants to wash off growing medium that has stuck to leaves or sides of the container. If the medium was properly moist at planting, heavy watering will not be necessary. The water misted over the leaves is adequate to settle the medium. Don't cover the terrarium initially. Instead, repeat the misting process after one day. Allow the container to remain open until the foliage is thoroughly dried. Then, if the terrarium is the closed type, apply the cover.

Observe terrarium closely for the first few weeks after planting. Diseases often appear at this time. Any leaves that die or plants that begin to wilt or decay should be removed promptly before the problem spreads to other plants. Root rots often are associated with too much moisture. If rots develop in a closed terrarium, remove the cover to allow more drying. If a fungus seems to be spreading from a plant through the growing medium, it may be beneficial to remove a portion of the medium in the infected area and replace it. Application of a general fungicide also may help to reduce spread of a disease.

In most cases, after a few weeks the terrarium is established and the threat of disease is reduced. Continue to watch for fallen leaves, however, or any plant parts that begin to decay.

Care of the terrarium

Watering. A closed terrarium normally will not need water for 4 to 6 months. The failure of condensation to form on the inside of the container or the presence of wilting plants indicates the need for water. Open terrariums need watering occasionally but not as frequently as other houseplants. A dish garden, unless it is the desert type, will need frequent watering. Waterings must always be light. Because terrariums have no external drainage, heavy waterings result in standing water in the gravel and charcoal, which encourages root diseases. The gravel and charcoal may help overcome occasional light overwaterings, but frequent heavy watering will inactivate the system. When watering a closed terrarium, don't replace the cover until wet foliage has dried.

Caution: Never overwater. Excess water is almost impossible to remove. Better a little too dry than too wet.

Light. An open or closed terrarium should not receive direct sunlight. However, a dish garden that contains plants needing bright light may be placed in direct sun. Direct sunlight on a closed or a tall, open container will cause heat buildup that will injure most plants. As previously mentioned, most plants suitable for terrariums don't require extremely bright light but do well in good light. If the terrarium is in a low-light location, supplement with artificial light. A 100-watt bulb placed close to the terrarium or fluorescent tubes placed over the terrarium will be helpful. Supplemental artificial light should be operated 16 to 18 hours a day.

Plants receiving light from a window gradually will face that direction. To keep the terrarium attractive from the desired view, turn it occasionally to keep the plants growing normally.

Pruning. Many plants in a terrarium will gradually outgrow their limited space. A little trimming quickly brings them into bounds and often promotes side-shoot growth that fills out plants. Pinching out tips before plants become too tall results in better growth than severe cutbacks. Be sure to remove all trimmed vegetation from the terrarium.

Fertilization. Because plants in terrariums should not grow rapidly, terrariums seldom need fertilizer. Do not fertilize for at least a year after planting. If after the first year the plants appear yellowish and seem to lack vigor without any other apparent problems, a light fertilization may be necessary. Use a water-soluble houseplant fertilizer at about one-fourth the rate recommended for normal houseplants. Do not allow any of this fertilizer solution to remain on the foliage.

Other care. Although a terrarium is designed for growing plants indoors with minimum care, it is not an inanimate object. Some plants will thrive, and others may die. Occasionally, it will become necessary to remove certain plants or add others. When adding plants, take all precautions described for planting the new terrarium. Adding new problems is always possible when adding new plants.

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Table 1. Favorable conditions for plants growing in terrariums.

Plant	Height	Light	Containers	Temperature	Comments
African violet, <i>Saintpaulia</i> spp	1–6"	Medium	Open, dish	Warm	Must have good drainage
Airplant, <i>Kalanchoe pinnata</i>	Over 12"	Medium, bright	Open, dish	Warm	Prefers full sun
Aluminum plant, <i>Pilea cadierii</i>	6–12"	Medium	Closed, open, dish	Warm	Gets leggy in poor light
Ardisia, Coral berry, <i>Ardisia crispa</i>	Over 12"	Medium	Closed, open	Warm	Very slow grower
Arrowhead plant, <i>Syngonium podophyllum</i>	Over 12"	Medium	Closed, open, dish	Warm	Fast growing climber
Artillery plant, <i>Pilea microphylla</i>	6–12"	Medium	Closed, open, dish	Warm	Grows fast, may need pruning
Asparagus fern, <i>Asparagus plumosus</i>	6–12"	Medium, bright	Open, dish	Warm	Good drainage. Low light causes leaf drop
Baby tears, <i>Helxine soleirolii</i>	1–3"	Medium	Closed, open	Warm	Vigorous ground cover
Begonia, <i>Begonia</i> spp	Over 6"	Medium	Closed, open, dish	Warm	Many types
Bird's nest Sansevieria, <i>Sansevieria trifasciata hahnii</i>	3–6"	Low, medium, bright	Open, dish	Warm	Very tough plant
Bloodleaf, <i>Iresine herbstii</i>	6–12"	Bright	Closed, open, dish	Warm	Pinch back occasionally
Bunny-ears cactus, <i>Opuntia microdasys</i>	Over 12"	Bright	Open, dish	Warm	
Chinese evergreen, <i>Aglaonema</i> spp	3–6"	Low, medium	Closed, open, dish	Warm	Very durable; can be cut back

Plant	Height	Light	Containers	Temperature	Comments
Club moss, <i>Lycopodium</i> spp	3–6"	Medium	Closed	Cool	Woodland plant
Creeping fig, <i>Ficus pumila</i>	1–3"	Medium	Closed, open, dish	Warm	Forms dense mat, clings to rough surface
Croton, <i>Codiaeum variegatum</i>	Over 12"	Bright	Closed, open, dish	Warm	Foliage colorful
Dwarf gloxinia, <i>Sinningia pusilla</i>	1–3"	Medium	Closed, open	Warm	Very dainty; keep warm
Dwarf natal plum, <i>Carissa grandiflora nana compacta</i>	6–12"	Medium	Open, dish	Warm	Easily pruned
Dwarf pomegranate, <i>Punica granatum nana</i>	6–12"	Bright	Open, dish	Warm	May need pruning; fruits in bright light
Earth stars, <i>Cryptanthus</i> spp	1–3"	Medium	Open, dish	Warm	Foliage may be colorful
Emerald Ripple, <i>Peperomia caperata</i>	3–6"	Medium	Closed, open, dish	Warm	Avoid overwatering
English ivy, <i>Hedera helix</i>	Over 6"	Medium	Closed, open, dish	Warm	Low, creeping, but will vine upward
False aralia, <i>Dizygotheca elegantissima</i>	Over 12"	Medium, bright	Closed, open, dish	Warm	Needs pruning to keep low
Flame violet, <i>Episcia cupreata</i>	3–6"	Medium	Closed, open	Warm	Grow as African violet
Foam flower, <i>Tiarella cordifolia</i>	6–12"	Medium, bright	Closed, open	Cool	Woodland plant
Gold dust dracaena, <i>Dracaena godseffiana</i>	3–6"	Medium	Closed, open, dish	Warm	Slow growing
Goldfish vine, <i>Columnnea microphylla</i>	1–3"	Medium	Closed, open	Warm	Trailing plant
Haworthia, <i>Haworthia</i> spp	1–6"	Medium, bright	Dish	Warm	Best for desert garden
Heart-leaved philodendron, <i>Philodendron scandens oxycardium</i>	Over 12"	Medium	Closed, open, dish	Warm	Climber or trailer
Hen and chicks, <i>Echeveria</i> spp	1–3"	Bright	Dish	Warm	Best for desert garden
Hepatica, <i>Hepatica americana</i>	3–6"	Medium	Closed, open	Cool	Woodland plant
Impatiens, Sultana, <i>Impatiens walleriana</i>	Over 12"	Medium, bright	Closed, open, dish	Cool	Needs pruning to keep low
Irish moss, <i>Selaginella</i> spp	1–3"	Low, medium	Closed, open		Groundcover; likes most organic soils
Jade plant, <i>Crassula argentea</i>	Over 6"	Bright	Dish	Warm	Don't overwater; for desert garden
Maidenhair fern, <i>Adiantum cuneatum</i>	6–12"	Medium	Closed, open	Warm	Dead fronds may need removal
Miniature holly, <i>Malpighia coccigera</i>	Over 12"	Medium	Closed, open, dish	Warm	Avoid overwatering
Miniature peperomia, <i>Pilea depressa</i>	1–3"	Medium	Closed, open	Warm	Avoid overwatering
Miniature sweet flag, <i>Acorus gramineus variegates</i>	6–12"	Bright	Closed, open, dish	Warm	Grasslike with white stripes
Moss sandwort, <i>Arenaria verna</i>	1–3"	Bright	Open, dish	Cool	Needs excellent drainage
Nerve plant, <i>Fittonia</i> spp	3–6"	Medium	Closed, open	Warm	Leaf veins white or pink
Oxalis, <i>Oxalis</i> spp	3–6"	Bright	Closed, open	Cool	Cloverlike foliage
Panda plant, <i>Kalanchoe tomentosa</i>	3–6"	Bright	Dish	Warm	Suitable for desert garden
Parlor palm, Neanthe bella palm, <i>Chamaedorea elegans</i>	Over 12"	Medium	Closed, open, dish	Warm	Slow growing
Parrot leaf, Joseph's coat, <i>Alternanthera</i> spp	Over 12"	Bright	Closed, open, dish	Warm	May be kept compact by pruning

Plant	Height	Light	Containers	Temperature	Comments
Partridge berry, <i>Michella repens</i>	1–3"	Medium	Closed, open	Cool	Groundcover
Piggy-back plant, <i>Tolmiea menziesii</i>	3–6"	Medium	Open, dish	Warm	Small plants grow on old leaves
Pygmy cactus, <i>Rebutia</i> spp	1–3"	Bright	Open, dish	Warm	For desert garden
Pipsissewa, <i>Chimaphila umbellata</i>	1–3"	Medium	Closed	Cool	Woodland plant
Podocarpus, <i>Podocarpus macrophylla</i>	Over 12"	Medium	Closed, open, dish	Warm	Slow growing
Polka dot plant, <i>Hypoestes sanguinolenta</i>	Over 12"	Bright	Closed, open	Warm	Pinch back to prevent legginess
Pothos, Devil's ivy, <i>Epipremnum aureum</i>	Over 12"	Medium, bright	Closed, open, dish	Warm	Variegated foliage, climbs
Prayer plant, Rabbit's tracks, <i>Maranta</i> spp	6–12"	Medium	Closed, open	Warm	Leaves fold together at night
Rattlesnake plantain, <i>Goodyera pubescens</i>	1–3"	Medium	Closed	Cool	Woodland orchid
Red bird, Devil's backbone, <i>Pedilanthus tithymaloides</i>	Over 12"	Medium, bright	Closed, open, dish	Warm	Foliage variegated
Rosary vine, String of hearts, <i>Ceropegia woodii</i>	1–3"	Medium, bright	Open, dish	Warm	Low light trailing vine
Sander's dracaena, <i>Dracaena sanderiana</i>	Over 12"	Medium	Closed, open, dish	Warm	Cornlike plant with white stripes
Satin pellionia, <i>Pellionia pulchra</i>	1–3"	Medium, bright	Closed, open	Warm	Creeping vine
Spider plant, airplane plant, <i>Chlorophytum comosum "Vittatum"</i>	3–6"	Low, medium	Closed, open, dish	Warm	Forms new plants on runners
Spotted wintergreen, <i>Chimaphila maculata</i>	1–3"	Medium	Closed	Cool	Woodland plant
Stonecrop, <i>Sedum</i> spp	1–3"	Bright	Dish	Warm	For desert garden
Strawberry begonia, <i>Saxifraga sarmentosa</i>	1–3"	Medium	Closed, open, dish	Warm	Runners like strawberry
Sundew, <i>Drosera</i> spp	1–3"	Bright	Closed	Warm	Insectivorous plant
Swedish ivy, <i>Plectranthes australis</i>	1–3"	Low, medium	Closed, open, dish	Warm	Low, creeping, very durable
Sweet olive, false holly, <i>Osmanthus heterophyllus</i>	Over 12"	Bright	Open	Cool	Hollylike leaf; may need pruning
Table fern, Victoria fern, <i>Pteris</i> spp	6–12"	Medium	Closed, open	Cool	Tropical fern
Tahitian bridal veil, <i>Gibasis geniculata</i>	3–6"	Medium	Closed, open, dish	Warm	Low light creeper or trailer
Variegated ovalleaf peperomia, <i>Peperomia obtusifolia variegata</i>	3–6"	Medium	Closed, open	Warm	Colorful foliage
Venus fly trap, <i>Dionaea muscipula</i>	1–3"	Bright	Closed, open	Warm	Insectivorous plant
Waffle plant, <i>Hemigraphis "Exotica"</i>	Over 12"	Medium, bright	Closed, open	Warm	Purplish leaves
Watermelon peperomia, <i>Peperomia sandersii</i>	3–6"	Medium, bright	Closed, open, dish	Warm	Avoid overwatering
Wintergreen, <i>Gaultheria procumbens</i>	1–3"	Medium	Closed, open	Cool	Woodland plant