



Terrariums

At a Glance

Container: suited to the space it will occupy, as well as the plants it will house

Background: should you choose one, may conceal wiring, etc.; plan which angles of terrarium will be visible

Base Layer: must allow drainage; can be coarse sand/gravel, preferably “Hydroton”, a lightweight, ceramic pellet material

Substrate Divider: divides base layer from soil (weed barrier fabric, coffee filter, etc.); layer charcoal on top, below soil

Soil (Substrate): above charcoal, all-purpose indoor soil **without** added fertilizers

Landscape: rocks or wood accent

Plants: appropriate for the environment you create (arid, humid, etc.)

Accents: lichens, moss, etc.

Water: watering can with a long spout, water against glass until it reaches the base layer, repeating in different areas until all soil looks hydrated; don’t over water!

Fertilizer: only while growing (2-3 times/year); all-purpose fertilizer at half-strength

Lighting: 2-3 hours indirect sunlight daily (2-3 feet from window), rotate monthly; if using artificial, create 12-14 hour days

Temperature: average household temperatures are fine (above 60° F); dormancy period 6-10 weeks (below 60° at night)

Grooming: tame aggressive vines, remove dead plant material

Dry Climate: for plants suited to drier climates (cacti, succulents); leave open for air circulation; some will need higher light

In 1842, Dr. N. B. Ward of London invented the Wardian Case.

This consisted of flat glass panels and lead that comprised what is essentially a miniature greenhouse. It is small enough to be mobile. This allowed people to grow plants that required humid conditions in otherwise dry, indoor climate. Because they require less watering and feeding, terrariums are ideal for forgetful gardeners.

There are many different ways of constructing a terrarium, but we feel that a **terrarium should have the following features: 1)** Simple maintenance, **2)** natural-looking, **3)** simple construction, **4)** correct environment for specific plants used (humidity level), **5)** have a healthy environment for adding a frog or lizard if you plan to do so.

Choose the Right Container:

Is space limited? For example, will the terrarium be in an office cubicle or small apartment? Consider where you will have the terrarium and choose your container to fit that space.

Because the conditions within terrariums are naturally moist, it’s possible to grow filigreed ferns and other dainty plants that require very high humidity levels. Use a goldfish bowl, tall clear vase, large brandy snifter, or an aquarium tank. These can be completely closed, or open at the top, it doesn’t matter.

Do you have orchids that need a lot of humidity? A larger Wardian Case would be ideal. Before planting, wash the container with clean, soapy water and dry thoroughly.

Background:

Backgrounds aren’t crucial, but can provide a natural appearance while concealing wiring, etc. (for artificial lighting, water feature pump or heater for lizard/frog). Is the terrarium going to be viewed from multiple directions or just from the front? Depending on the situation, you may not need a background. Some popular backgrounds are tree fern stalks, sand blasted grape vine wood or Manzanita twigs, simulated or real rocks, and cork bark slabs (make sure that they are clean and disinfected to avoid any contamination of your ecosystem). These can be secured to the rear of the tank using clear silicone, or left loose. If there are animals in your tank, you will

want to seal openings with coco fiber so that crickets and pests can’t hide behind them.

Base Layer:

Every terrarium needs to have drainage in order to keep plant life healthy and productive, as well as preventing harmful bacteria (root rot). Over-watering is a leading cause of plant death. It is very important that excess water drain to keep the soil from becoming soggy, and roots from rotting. The water line in the gravel should always be at least 1/2 inch below the soil substrate. By virtue of capillary action, the water will slowly wick back into the soil or slowly evaporate and produce humidity.

In the past, coarse gravel/sand was a popular choice but is extremely heavy and provides only limited drainage and air space. There is a new product called **Hydroton**-a very lightweight, baked ceramic pellet that provides drainage



and air flow and doesn't decompose or alter the soil ph. **Hydroton** should be used as the first layer at the bottom of the terrarium and should be between 1" to 2" thick.

Substrate Divider:

On top of the base layer, a divider should be used. This is usually a weed barrier fabric, coffee filter, or fiberglass window screen cut to dimensions of the tank and placed between the base layer and the substrate (soil media). This layer is important for preventing the soil from settling and clogging the base layer.

- **Charcoal:** A thin layer of horticultural grade charcoal is placed on top of the substrate divider
- **Substrate:** (Soil media) Many different mixes and soils can be used, but some hold onto too much moisture, have unnecessary ingredients (fertilizer) or last only a few months. An all-purpose indoor soil media that doesn't contain added fertilizers is fine, but be careful of over watering.
- If you plan on including animals in your terrarium, a coco mat will be useful. It's made up of ground coconut fiber that offers great drainage, but is moisture retentive. It can be used alone or with tree fern fiber or coarse sphagnum moss (**Angel Moss**). A (safe) liquid fertilizer can be used sparingly to help feed the plants as long as you don't over-fertilize. Use half strength or weaker. The thickness of this layer will vary depending on the type of plants you will be growing as well as the layout. It should be at least 1" to 2" deep, and can be sloped into hills and valleys to add interest. The best way to avoid the growth of fungi and/or disease is to start with clean (sterilized) and unopened material. Avoid using old, used, or open bags of soil.

Landscaping:

This is where you can really start using your imagination. Wood or rocks can serve as a focal point, but may also function as climbing, hiding or basking areas for animals, or mounting areas for epiphytic plants (bromeliads). If you have room you can make multiple levels using cork, wood, or rocks to form terraces. These can be planted with trailing and creeping plants to add interest.

Keep scale and visible perspective of the scene in mind during this process. Using a few pieces of the same type of wood in varied sizes creates a much more natural look than using one large piece or mixing multiple types of wood together. Miniature garden accessories such as trellises, tools, furniture, or small animals can top off the perfect garden look. Have fun with it!

Plants:

The types of plants you incorporate should correspond with the type of habitat you want to create (desert, rainforest, etc.), the overall size of your terrarium, and the type of animal (if any) you will be keeping. Again, it is important to keep scale in mind when choosing plants. Larger plants should be in the rear of the tank with smaller plants in the foreground. Trailing and creeping plants are best displayed where they can spill over or fill an area as a ground cover.

A balance of both terrestrial and epiphytic species can create an interesting display, but avoid using too many different types together in smaller tanks. A few individual "feature" plants accompanied by a couple "filler" plants looks more natural than many different kinds all put together.

It is best to "dry fit" (test) the plants while still in their pots before actually planting them. Once you are happy with their placement, make a hole in the soil large enough to accommodate the roots. Remove the plant from the pot and gently loosen the roots (from original root/pot shape). You may have to cut 2 to 3 places on the bottom of the root ball to loosen the lower roots. If the soil is too shallow for the plant you selected for that particular area, you will need to cut the root ball. Use a sharp clean knife and cut from the bottom in the middle of the root ball up about 2/3. Keep the root ball intact but allow the root to flair out horizontally to fit in the shallow area. You should be able to reduce the depth of an average root-ball in a 3" pot and conform it to fit an area that is only 1 ½ to 2" deep.



Next, *lightly* tamp down the soil to keep from eroding. This ensures that all roots are firmly in contact with the soil. If the area is tight, use a wine cork stuck onto the end of a bamboo skewer to tamp the surface of the soil. A spray bottle or mister can be used to rinse off any soil that is on the leaves or glass.

Accents:

In some cases, the difference between a nice terrarium and an extraordinary terrarium is the use of accents. Lichens, mosses, fake and real mushrooms and other accent items, such as miniature bridges, etc. complete the illusion of a miniature scene. Keep in mind the durability of each accent piece to hold up in a wet environment.

Lichens are generally easy to use and add a nice finishing touch. Small pieces of bark or shredded cedar (as long as there won't be animals present) can cover open ground. Sheet moss works well, especially with live frogs or lizards. Live mushrooms and lichens can be attached to bark by using hot glue. Accents should be sparse and simple, used for adding a little interest rather than stealing the show.

Water:

Water the plants against the edge of the glass by using a watering can with a long spout, so you can see the water penetrating the soil from the outside. Once the water has reached the base layer (water pools at the bottom of the terrarium in the reservoir), move to another area. Repeat until all the soil looks hydrated. If the container is too small to water this way, use a spray bottle to dampen the soil.

Watch the plants for signs that they need more water, but air on the dry side. Especially in an enclosed terrarium, it is very difficult to get rid of excess water. Check for moisture needs about every two to three weeks. The top 1/3rd of the soil should dry out before watering. The soil should look lighter in color and no water will be in the reservoir area.

Fertilizer:

When the plants are actively growing, add an all-purpose houseplant fertilizer to the water, mixing it at half the ratio recommended on the container.

Light:

Light is one of the most important aspects of a terrarium. Too often, plants suffer due to insufficient sunlight. Fluorescent grow lights with full spectrum bulbs can help. Keep the light on for 12 to 14 hours a day. Setting a timer can help you to keep the light cycle consistent. If growing orchids, the day length should fluctuate to mimic the 4 seasons. Avoid placing terrariums in direct sunlight or near heating vents. If using natural sunlight, keep about 2 to 3 feet away from a window so it gets about 2 to 3 hours of light (check back throughout the day to monitor this). Rotate the terrarium monthly to give all the plants adequate light.

Temperature:

Temperature is also very important. Most tropical plants will do just fine in average household temperatures, and shouldn't need additional heating unless nighttime temperatures fall below the low 60s for several days. Keep in mind that even fluorescent lights will add some heat. Some plants will need defined rest/dormancy periods wherein temperatures and moisture levels will need to be adjusted. Some plants may need to be removed in order to accommodate this. Six to ten weeks below 60 degrees F night temperature is usually sufficient.

Humidity and Air Circulation:

Balancing moisture and ventilation is crucial to achieving adequate humidity levels. This may require a little trial and error in the beginning, but is important to the health and vitality of plants. If your terrarium will have a lid/top, you may want to try using a screen or partial glass with screen (especially if animals are present). Plastic or glass over the top can increase the humidity, and adjustments may be necessary to meet your target moisture level. Be careful not to over water and saturate the soil while attempting to increase the humidity. If moisture droplets form on the glass, remove the lid to increase airflow. Once the droplets evaporate, close the top again and wait to see if they reappear. Keep doing this until it has evaporated to the right humidity level.



Grooming:

You will need to prune your plants periodically so that aggressive vines won't take over the whole terrarium, choking out smaller plants. Remove withered, dead leaves and foliage to discourage growth of disease and pests. If the plants grow too large, either cut them back or remove them and install a smaller replacement. Try a different type of plant to avoid having the same issue again in the future.

Dry-Climate Terrariums:

Not all terrariums are humidity chambers. You can also grow a terrarium made up of tiny succulents and cacti- a good way to enjoy prickly plants with no risk that spines will hurt people or pets. Arid terrariums should be left wide open to allow air circulation, which is also necessary in the bright light situations these plants prefer. Enclosed terrariums kept in high light will overheat without proper airflow.

Basic materials checklist

Container
Background Material
Hydroton (Baked Ceramic)

Substrate Divider
Charcoal
Soil Media

Landscape Materials
Plants
Decorations (bridge, figurines, etc.)