



STEP 1 - Locating and Installing a Pond

The most important decision in planning the water garden will be the location. Try to place it where you can enjoy it the most. For example, place it near a patio or window from which you can view the pond year-round. Ponds do best with 6 - 8 hours of sunlight, and away from overhanging trees. If you must place the pond under trees, remember to select pond plants that can tolerate shade and to clean the fallen leaves out of the water regularly.

Installing a Prefabricated Pond

1. Select the sight.
2. Measure the outline.
3. Excavate the soil to the determined depth.
4. Line the bottom with approximately 1 inch of sand.
5. Place the pond in the excavation and level the top of the pond.
6. Fill the pond with water while you backfill around the outside with sand.
7. Add a decorative edging such as stone or brick - then landscape around it.

Installing a Flexible Liner

1. Outline the pond's shape with a rope or garden hose.
2. Measure the pond and buy the right size liner. (See below)
3. Excavate the pond site. Pond depth should be at least 16 inches to allow for overwintering plants and fish. (Check local building codes to determine if fencing is required).
4. Line the hole with sand and a pond underliner.
5. Level the top edge.
6. Install the liner.
7. Slowly fill the pond with water, making adjustments as needed to the liner.
8. Conceal the top with your choice of edging, such as large, flat rocks.

Helpful Formulas

- Determining Liner Size

Liner width = pond width plus 2 times depth plus at least 2 feet.

Liner length = pond length plus 2 times depth plus at least 2 feet.

- Determining Volume of Pond

Multiply the length by the width by the height in feet, then multiply the resulting number by 7.5 to estimate the number of gallons of water in the pond.

STEP 2 - Determining the Size of Pump Needed

Rule of thumb: When recirculating water through a filter, the pump should circulate the volume of the pond every two hours (a 1000-gallon pond would require a pump rated at 500 gallons per hour).

However, when choosing pumps you must consider many factors such as how much sunshine the pond receives every day, added water features (fountains and waterfalls) and the depth of the water, which may force you to install a larger pump. When in doubt, buy a pump larger than you think you need. You can always slow it down, but you can not make it any stronger. The table below provides a guideline for waterfalls. Consult with Behnke Nurseries' staff for further advice on pump selection.

• Estimating Waterfall Flow Rates

You can duplicate a given waterfall flow rate by filling a standard two gallon bucket with water and pouring it out as evenly as possible:

Pours Out In	Gallons Per Hour
1 minute.....	120
40 seconds.....	180
30 seconds.....	240
20 seconds.....	360
12 seconds.....	600

STEP 3 - Choosing The Plants

Floating Plants

Floating aquatic plants simply float on the top of the water with their roots suspended freely. Many floating plants multiply quickly to cover the surface of a pond. These plants provide hiding places for fish, shade the water and keep it cooler, and help to reduce the growth of algae. Floating plants such as water lettuce and water hyacinth are tropical and will not survive the winter.

Hardy Water Lilies & Lily-like Aquatics

Water lilies are the mainstay of water gardening. Available in shades of yellow, white, pink and red, most bloom from late spring until late summer. They provide valuable leaf cover to shade the water during the summer, which helps to reduce algae growth. For best results, space pots to provide coverage of 50% to 60% of your pond surface with these plants. Hardy water lilies need to be placed in a water depth of at least 16 inches in the winter to survive.

Marginal Plants

Marginal plants, such as sweet flag, pickerel rush and cattails, grow in boggy or flooded areas. Place in the shallow end of the pond, with no more than 1-inch of water over the top of the pot. They provide a vertical accent to the

horizontal surface of the pond, and they also provide some shade and protection for fish, depending on the plant species. Marginal plants are available in many different growth habits and bloom colors.

Lotus

Lotus are spectacular plants with incredibly large blossoms held high above the water surface. Lotus are hardy and treated as perennials. Lotus do not like deep water. They prefer to be submerged 4 to 6 inches.

Tropical Water Lilies

Tropical water lilies start to bloom when the weather gets very warm. The water temperature must also get to 70°F before they start to grow. Tropical lilies come in red, white, pink, yellow, blue and purple. Their blooms are much larger and more fragrant than those of the hardy water lilies. The flowers usually stand above the water surface. Day-blooming tropicals open mid-morning and close at dusk, and night-bloomers open at dusk and close in the morning. Once tropicals start blooming, they will bloom until the fall. The tubers, which are removed in the fall, are usually discarded.

Submerged Plants

Submerged aquatic plants, such as *Cabomba* and *Anacharis*, are also known as oxygenating plants. They provide oxygen for the fish, but their most important function is that of absorbing nutrients from the water, which will help keep algae growth to a minimum. One bunch of oxygenators per 1 to 2 square feet of water surface is adequate.

STEP 4 - Care Tips

Pond Care

• Spring

Pull off pond nets, clean out any leaves and other debris that have fallen into the pond over the winter, and remove the de-icers. Inspect the pond to see if you just need a water change or a complete cleaning. If your water is relatively clean, you may want to do a partial 25% water change. When changing the water use a chlorine and chloramine neutralizer to make the water safe for the fish and critters. If you are using well water, add a chlorine and heavy metal neutralizer. To help get rid of the sludge on the bottom of the pond, use Pond Zyme. You should also consider using a stress coat to help the fish adjust to a stronger water disinfectant. Also it is *very important* to clean the pump especially the intake area and check the filter pads. They may need to be replaced. When the water temperature reaches 60°F you can add biological filters and beneficial bacteria to the water.

• Fall/Winter

An electric pond de-icer is a good idea to keep the surface of your pond from freezing solid. This allows oxygen to enter and water gases to escape. And pond nets will make it easier to clean out debris in the Spring.

Plant Care

Spring is also a good time to get your plants ready for the new season. Most aquatic plants need to be divided every 2 to 3 years. During the growing season, remove all spent blooms and unsightly leaves.

• Repotting

We sell only pre-planted aquatics. If you need to repot, consider the following: a good, heavy garden soil is the best soil for planting your aquatics. A soil mix that is too high in organic matter, such as most commercial potting mixes, will leach into the pond and cloud the water. After planting, cover the soil with about an inch of gravel to help hold the soil in the container and keep large fish away from the plant.

When repotting in the spring, it is best to place the plant close to the water surface where the water is warmer and lower it to its desired depth over a several week period. Tropical plants should not be planted until the water temperature is at least 70°F.

• Fertilizing

Aquatic plants are heavy feeders and will need to be fertilized monthly, with aquatic plant food, during the summer growing season. Proper water pH is important for healthy fish and plants. The pond pH should be between 6.5 and 7.8 for best results. Test every 2 weeks with a water test kit.

• End of Season

In the fall, keep up with falling leaves and other debris with a skimmer or pond net. Place your hardy lilies at the bottom of the pond and remove all tropical plants. (Consult a book on water gardening for detailed information on overwintering tropicals.)

Feeding Fish

• Spring

When the water temperature reaches 42-45°F you can start feeding the fish again. Don't forget that the water temperature will be different from the air temperature. Check it with a thermometer. You should feed the fish a food formulated for the cooler water temperature which is easily digested as fish come out of dormancy (Pond Care Spring and Autumn Food or Tetra Wheat Germ are good choices).

• Fall/Winter

When water temperatures drop below 45°F, you should stop feeding your fish, as they have difficulty digesting food.

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