Building an in-ground biodiversity pond

In this guide:

By Dean Holbrook

Mansfeld Magnet Middle School

FAQ's

Why build an in-ground biodiversity pond?

Adding a pond feature to your school site can engage students in meaningful ways. Ponds can be helpful to model scientific inquiry. Daily observations can be made, and long-term trends analyzed.

Is this project right for you?

A pond is a perfect tool for a hands-on teacher looking to engage students outside of the classroom walls. It will require manual labor and maintenance that can be performed alone or with the help of your students. Physical construction of the pond can be accomplished in under 20 hours. Site planning can take 2 weeks to 2 months for approval. If you enjoy the challenge of new projects and value engaging students with nature, then a pond may be right for you.

What maintenance will be required?

Every pond will have unique maintenance needs, but all are very manageable. Pond maintenance will include water parameters and biodiversity needs. The most regular maintenance is evaporation refilling. Adding water manually is not ideal especially for summer months when evaporation is the greatest and teachers are not necessarily on campus. Automatic refilling can be accomplished with a simple automatic hose timer to top-off water. Other maintenance items include keeping the water healthy for your biodiversity. This may include adding corrective chemicals and removing unwanted debris.

How big should the pond be?

The pond outlined here is 6 feet long, 3 feet wide, and 2.5 feet deep. Deeper ponds are not required as most biodiversity can be observed in the shallow water, however, deeper portions are helpful to add water volume for stability. Deep areas offer cooler temperatures for aquatic life.

What are the financial costs?

The pond outlined here has a cost of about $1000. Multiple sources of funding are available from the Arizona Department of Fish and Wildlife or DonorsChoose.org. One established, very little expense is required for maintenance.

Where can I put a pond?

Choosing a suitable location may be the hardest obstacle for new pond builders. For safety reasons, the pond will need to be behind a locked 6ft fence. Some schools have garden space that may be available, or unused areas still enclosed within a fence. Debris can add maintenance so plan for your pond to not be situated under the canopy of a tree. Also, plan for a location that has at least 6 hours of daily sunlight to encourage native plant growth. Lastly, make sure the pond has space around it for you and your students to visit and make observations!

Planning and Paperwork

Your school principal will need to approve your pond project before the district can approve your project. Talk with your principal about your proposal to agree on the location and use of the pond. This guide will cover the forms required for TUSD. Most districts will have a site construction form, the one for TUSD is called a Site Improvement Plan.

Specialty materials needed:

Lily Plant Pots for Pond, 6Pack Aquatic Pond Planter for Pond, Durable Breathe Reusable Fabric Plant Pots for Aquatic Plants, Potato, Carrot, Onion, Flower
by FFNIU (Kitchen)
4.5 ★★★★½ 72
$19.95 prime FREE One-Day
Style : Antique 6PCS

Aquatic planting to keep soil separated from pond.

Aquascape 89002 Pond Potting Media for Aquatic Plants, 10 Pounds | 890, 215 cubic inches, Brown
by Aquascape (Unknown Binding)
4.5 ★★★★½ 3,259
$25.44 prime FREE One-Day

Special soil for planting underwater.

10 x 15 Pond Underlayment and Landscape Fabric
by American Pond
4.5 ★★★★½ 44
$57.95 FREE delivery for Prime members

This fabric goes between earth and the pond liner. It prevents any hard edges from damaging the pond liner. It feels like felt.

Aquascape Fish-Safe Pond and Fountain Liner PRO Grade 45 MIL EPDM 12 x 10, 120 sq ft, Black
by Aquascape (Lawn & Patio)
4.5 ★★★★½ 169
$298.91 ✓prime
Size : 12-ft x 10-ft

This pond liner is EPDM (Ethylene Propylene Diene Monomer) which is a good quality material. It feels like a rubber mat. It excels in both durability and flexibility. Choose EPDM for good quality or RPE (Reinforced Polyethylene) for best quality. PRE is more puncture resistant, and an underlayment is not required.

NFESOLAR 15W Solar Pond Aerator, Solar Aerators for Ponds with 4400mAh Battery 2 Outlets and Power Display, 3 Mode Solar Air Pump for Fish Pond Stock Tank Hydroponics No Noise
by NFESOLAR (Sports)
4.4 ★★★★☆ 55
$83.99 ✓prime FREE One-Day

Use a solar powered pomp to aerate the water without the need of an electrical outlet. Solar powered fountains are popular too, but I choose not to use one. Wind can blow the fountain water out of the pond, and fountains do not look natural.

RAINPOINT Sprinkler Timer Outdoor, Water Timer for Garden Hose Faucet Timer, Programmable Watering Irrigation Timer with Rain Delay/Manual, V2, 2024 Release

by RAINPOINT

4.4 out of 5 stars 1,126

15% off Limited time deal

$25.49 prime FREE One-Day

Typical price: ~~$29.99~~

Garden hose water timer to compensate for evaporation. Adjust seasonally.

Construction:

Site layout, per the Site Improvement Plan

Hand tools used: pick axe, shovels, rake, level.

Approx. 6ft (L) x 3ft (W) x 2.5ft (D)

Dug into the side of a hill, the excavated dirt was used to form the outside edge of the pond.

Gentle slope to the NW corner. Shelfs cut into the dirt to layer rocks on.

Excavation complete, no sharp stones exposed.

Underlayment fabric

Pond liner

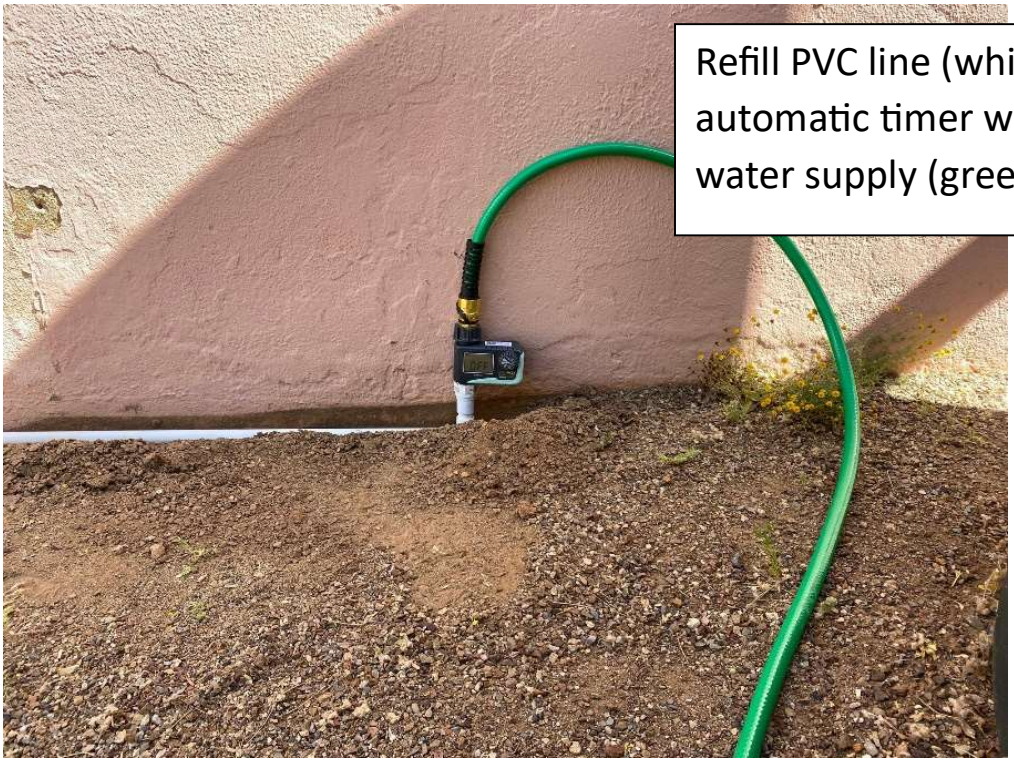
Use rocks to hold the pond liner in place. Begin to fill with water.

Fill the pond to check the fill height. Remove rocks and liner and repack the dirt to correct high or low spots. Make an intentional low point where you want excess water to go.

Surround the pond with rocks of various sizes. Position rocks on pond ledges. Run the hose to overflow the pond and check for any low spots/leaks. Notice the overflow route.

Trim the liner and fabric

Layer small stones and rake dirt up to the pond edge. Trench and PVC for the refill line.



Refill PVC line (white) connects to automatic timer which connects to water supply (green).

Water supply can be a hose bib but in this case a rain cistern was used.

Check automatic refill system. *use 1 inch PVC pipe for longer gravity runs. This water pressure is effective, but weak. If you are using a hose bib then ½ in. is fine.

Use stones to hide PVC outlet into pond.

Aquatic and riparian plants added.

Monitor water refill system to ensure adequate refill time each day. Let water stabilize before adding aquatic life.

Start enjoying your new pond!