

SeaPerch 2026 | Pool Course Build Guide

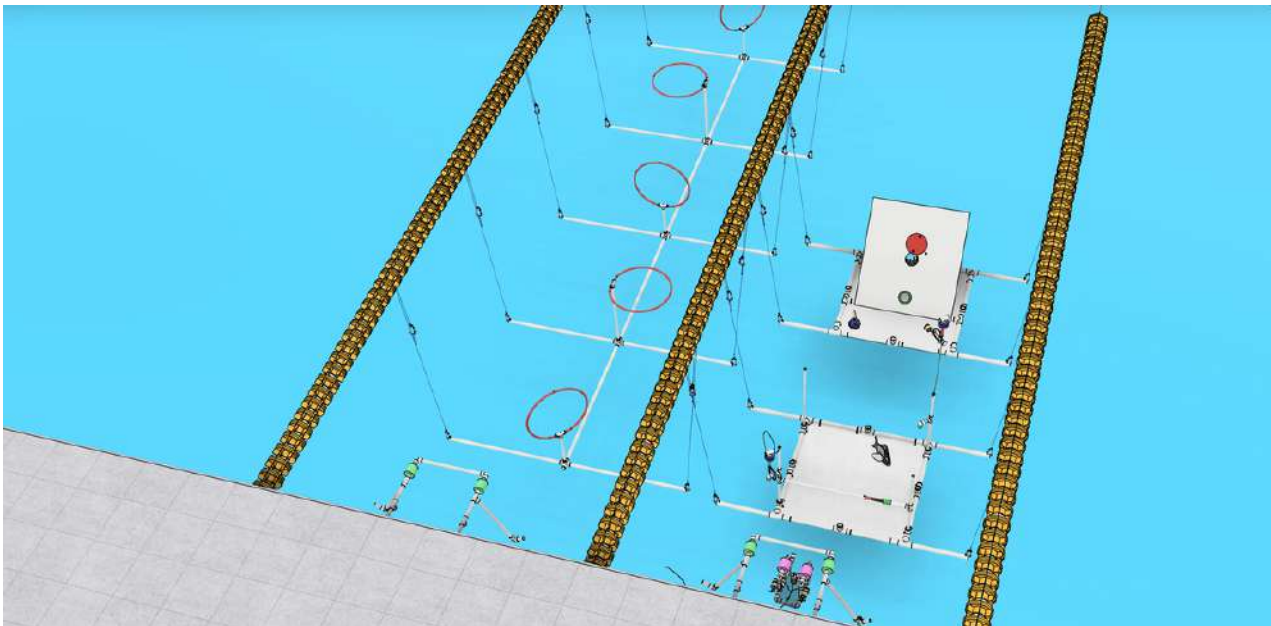
Introduction & Resources

Welcome to the International SeaPerch Challenge!

This Build Guide includes instructions for building the [Obstacle Course](#) and [Mission Course](#) for the 2026 International SeaPerch Challenge.

At the International Challenge: the obstacle courses and mission courses will be suspended from the pool's lane dividers with the lower frames for the courses being approximately 5 to 6 feet below the water surface.

i **Regional Events:** This build guide is specific to the courses that will be used at the **2026 International SeaPerch Challenge**. Please check with your [local regional competition coordinator](#) for course information for that specific event, which may differ from the International SeaPerch Challenge organized by RoboNation.



Mission and Obstacle Course Setup

Resources

Parts List



41KB

2026-SPC-Master-Parts-List_v1.0.xlsx



Download

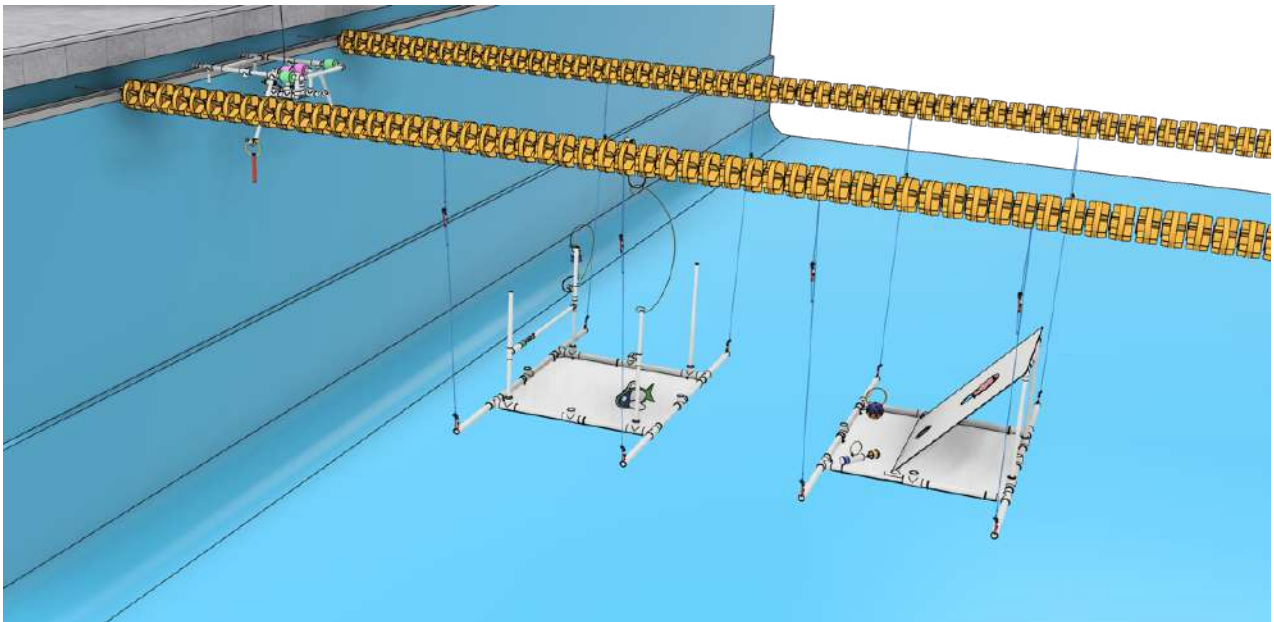


Open

This master parts list is a configurable Excel spreadsheet that will calculate the total components needed based on the number of courses built.

CAD Model: Full Mission Course

- Available at: [2026 Mission Course](#) ↗ (for viewing only)



General Notes

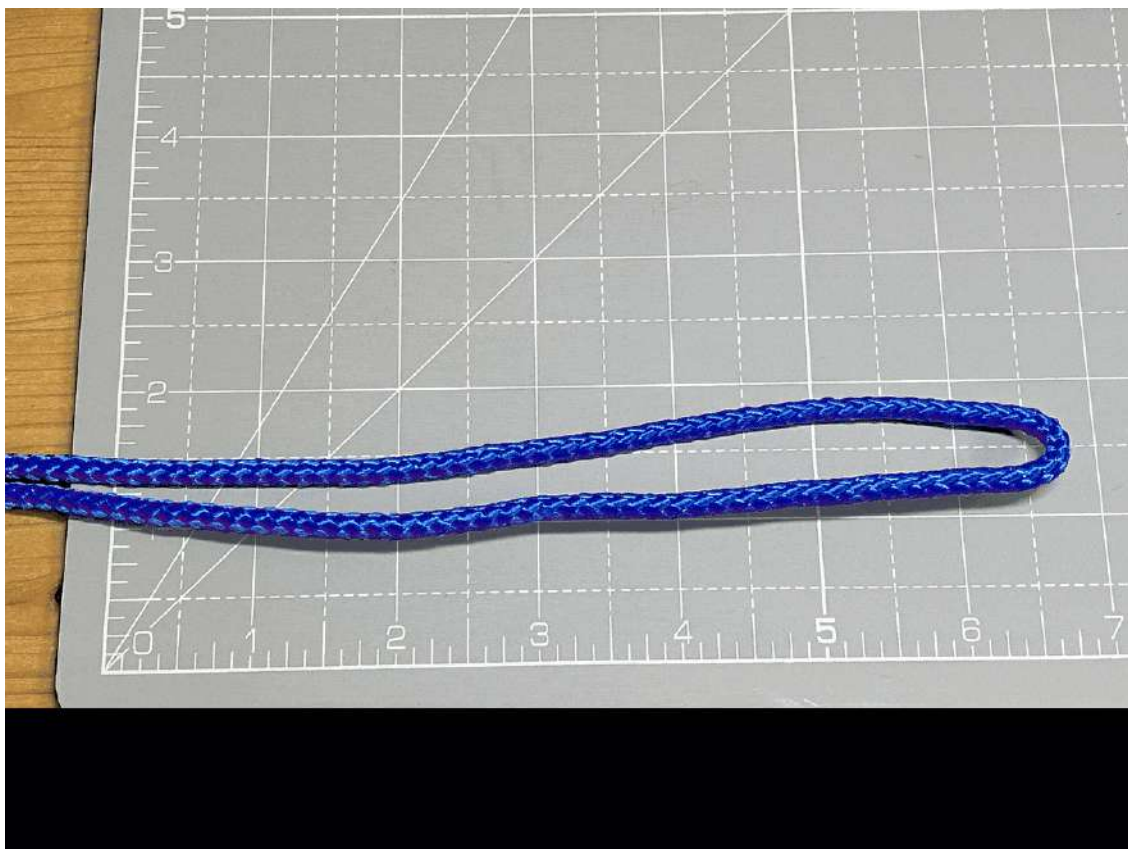
1. It is recommended that all pipe joints be secured with self-drilling screws. Recommended screws are listed in the parts lists.
2. Pipe fittings with the potential to trap air should have drain/vent holes drilled with 1/4" or larger drill bits.
3. Pipe fitting specifications vary from one manufacturer to the next. The assembled sizes of structures could vary from the dimensions listed in this guide due to these differences. You may need to adjust the pipe lengths slightly as you construct the assemblies to ensure mating assemblies line up.
4. Anything requiring buoyancy needs to be tested and adjusted for the pool that the course will be used in.
5. Objects that must be lifted and transported have been weighed in air and in water. Weights may vary slightly in the pool that the course will be used in.
6. If the course is set on the pool floor, then it may be helpful to use weights on the platforms to keep the platforms from being moved by the ROVs during competition.

Construction Tips

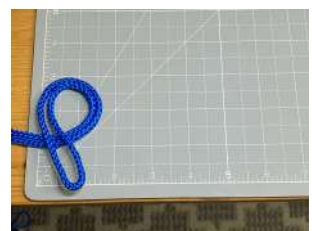
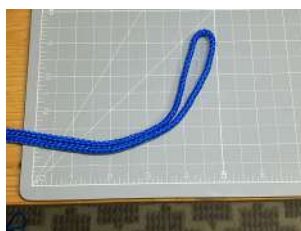
Knots for Suspension Ropes

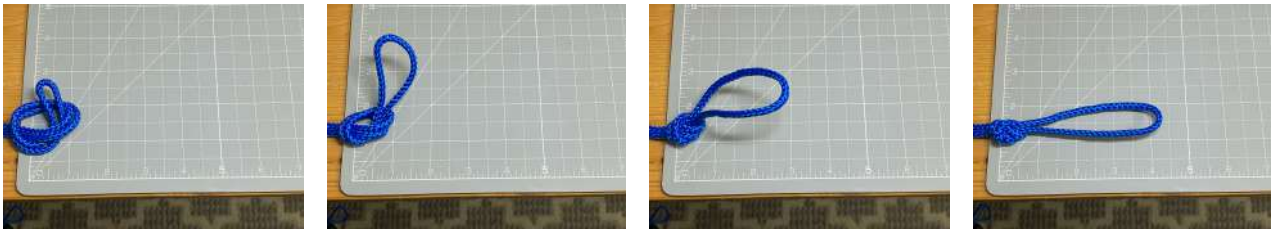
Suggested loop knot. Start with 6-1/2" loop. Tie as shown. Tighten to form 4" long loop from knot to end when pulled tight.

Midline loop knot



Loop Knot





Carabiner Knot

Suggested knot to fasten the rope to the carabiners.

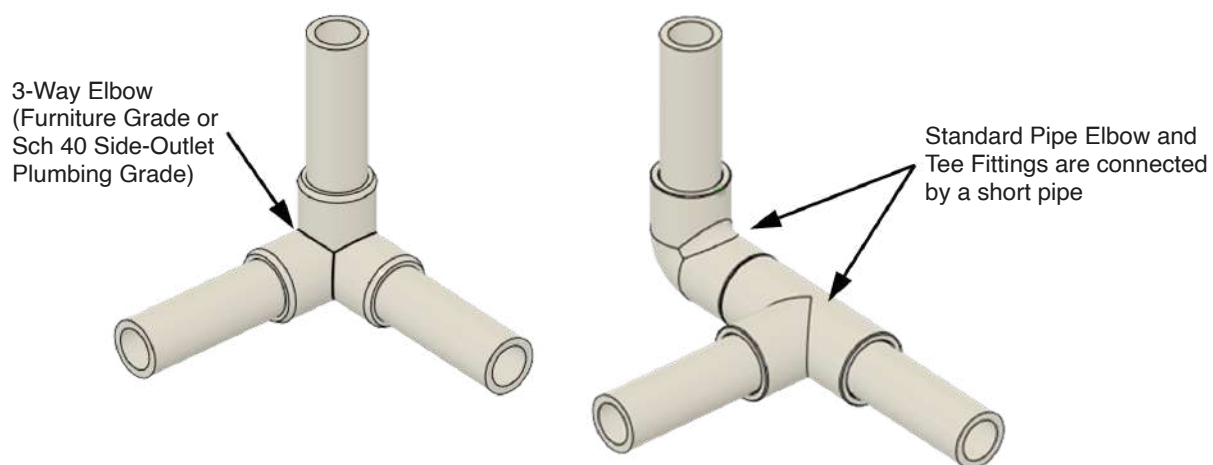




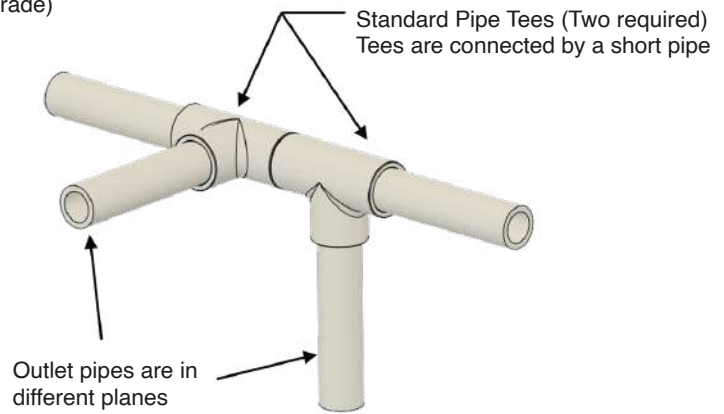
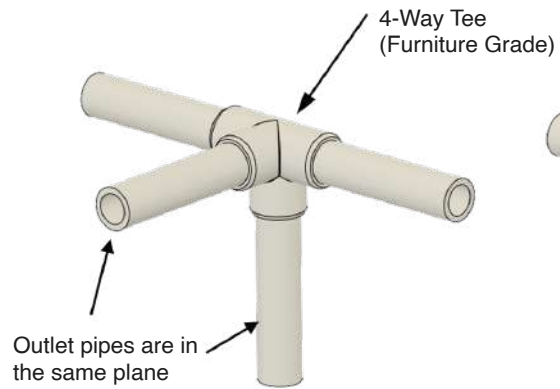
Alternatives to Special Fittings

Special fittings such as 3-way elbows, 4-way tees, and 5-way crosses are used in the construction of the pool courses. These fittings save time when building multiple courses. The fittings are available from online vendors and "big box" home improvement stores.

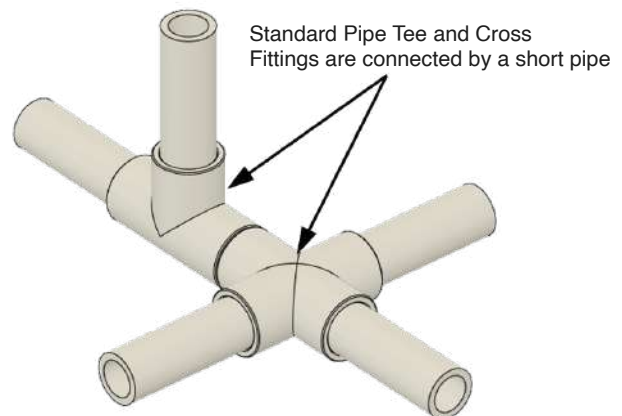
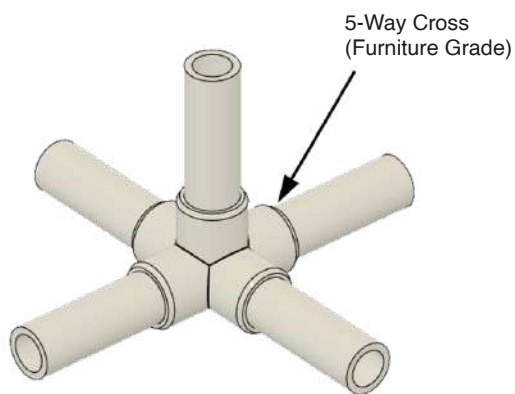
3-Way Elbow Alternative



4-Way Tee Alternative

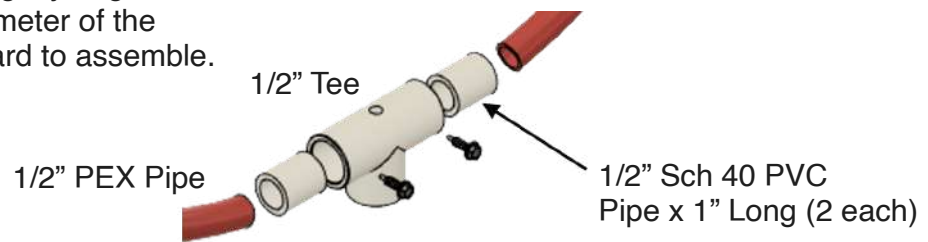


5-Way Cross Alternative

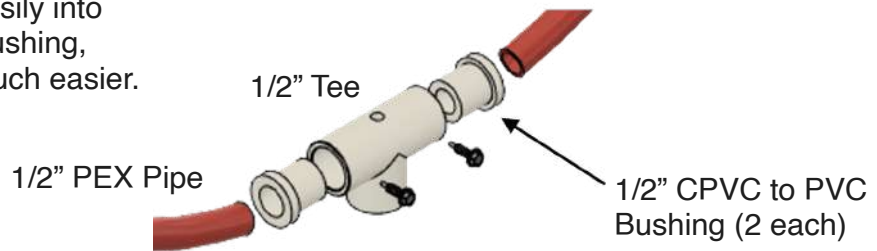


PEX to PVC Fitting Connection Options

The PEX pipe is slightly larger than the inside diameter of the PVC pipe and is hard to assemble.



The PEX pipe fits easily into the CPVC to PVC bushing, making assembly much easier.



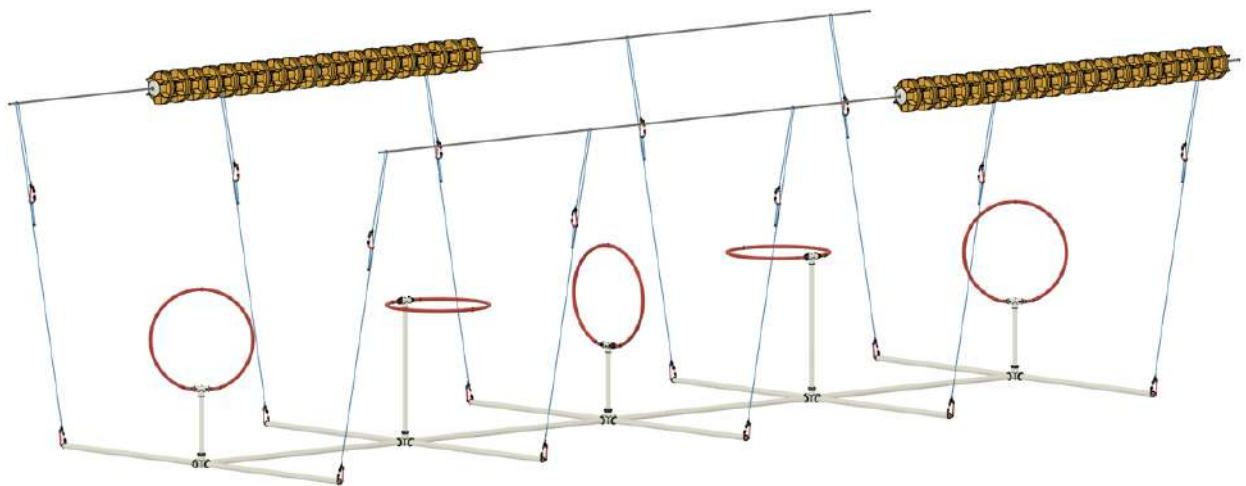
Section 1: Obstacle Course Build Guide

Obstacle Course Design Options

Both designs use the same hoops and have approximately 4-foot spacing between the hoops. This guide provides details on both designs.

Option 1: Suspended Design

Designed to be suspended from the swimming pool lane ropes.

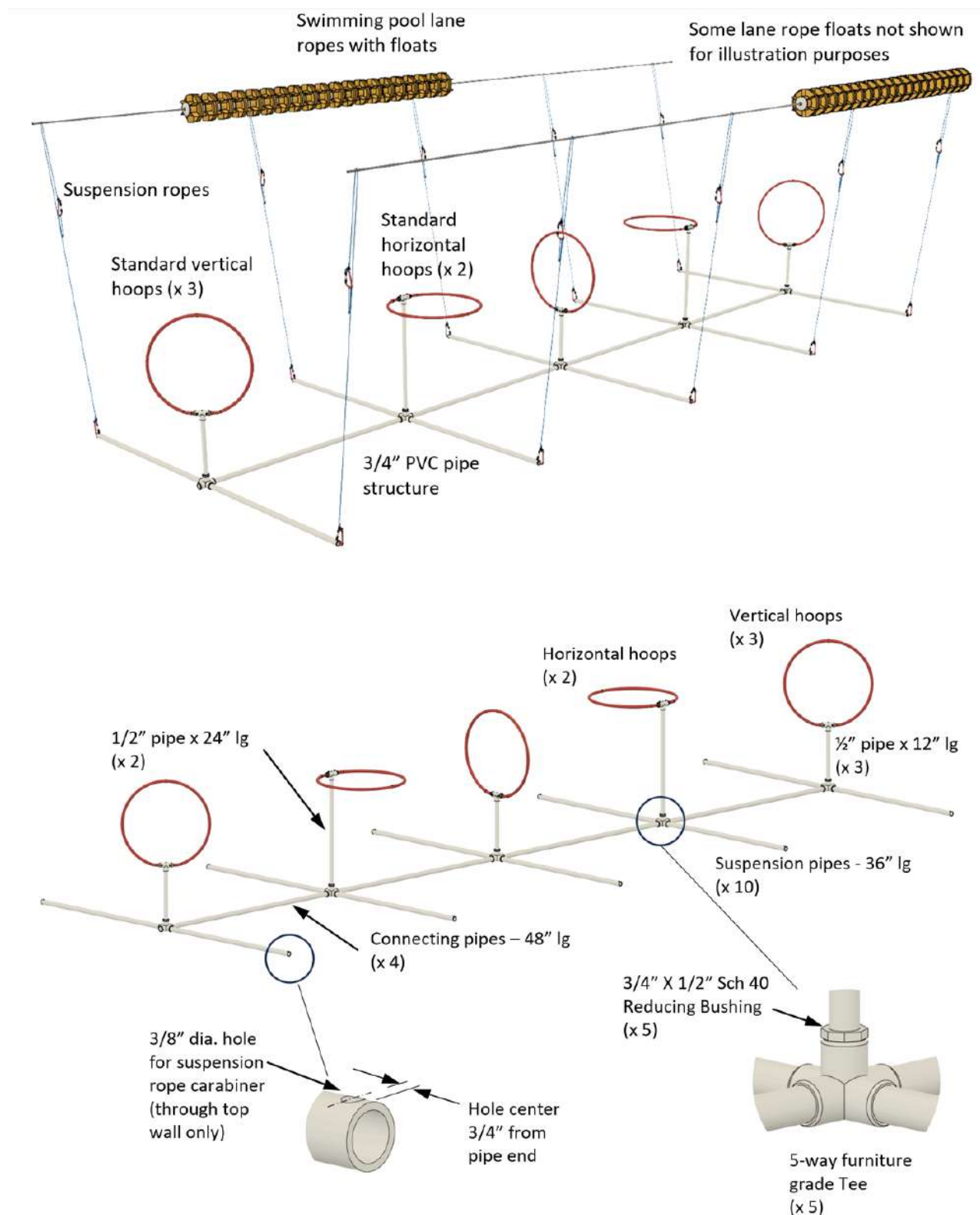


Option 2: Pool Floor Design

Designed to be placed on the pool floor. This is a common design used at regional competitions.



1.1 Suspended Obstacle Course



Construction Details



Hoop and Frame Connection

Suspended Obstacle Course Frame Parts List

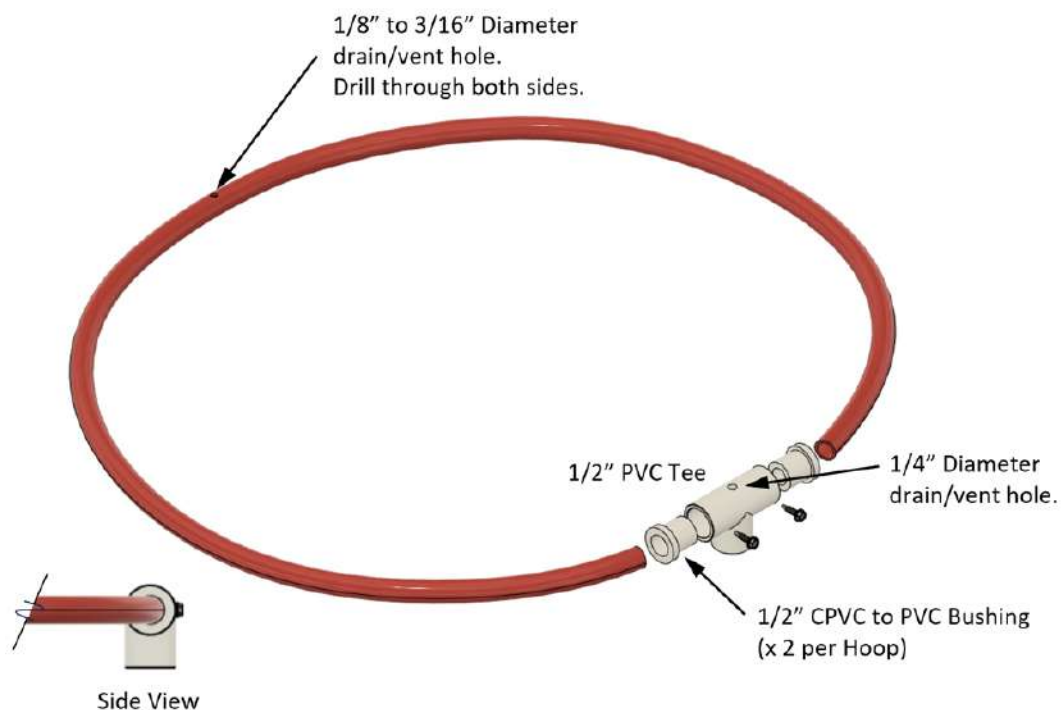
Item	Unit	Qty.
1/2" Sch 40 PVC Pipe x 12"	Each	3
1/2" Sch 40 PVC Pipe x 24"	Each	2
3/4" Sch 40 PVC Pipe x 36" long	Each	10
3/4" Sch 40 PVC Pipe x 48" long	Each	4
3/4" 5-Way Furniture Grade Tee	Each	5
3/4" x 1/2" Sch 40 Reducing Bushing	Each	5
#8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw	Each	28
Suspension Rope Assembly	Each	10

1.2 Obstacle Course Hoops

The obstacle course hoops are identical for the suspended design and the pool floor design.

The parts used for the horizontal and vertical hoops are identical.

Assure that the PEX pipe is fully inserted into the bushing and bushings are fully inserted into the tee before securing with screws.



Horizontal Hoop Details

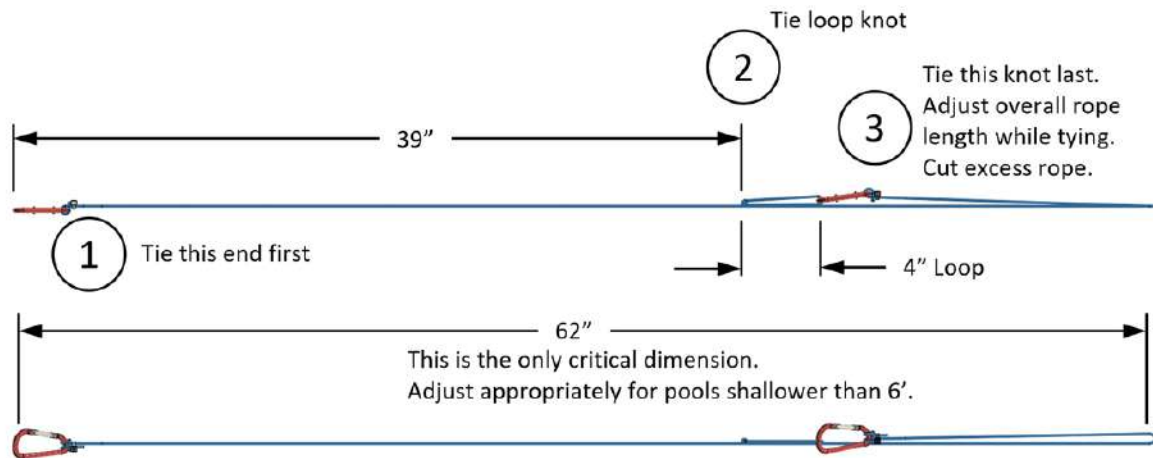


Obstacle Course Hoops Parts List

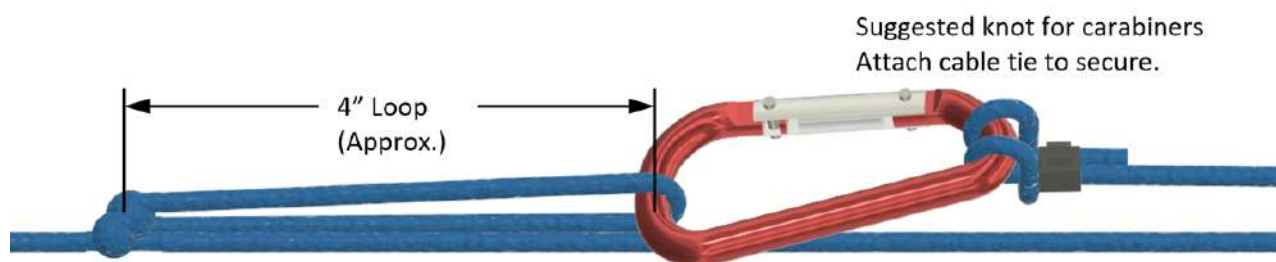
Item	Unit	Qty.
1/2" Sch 40 PVC Tee	Each	5
1/2" CPVC to PVC Bushing	Each	10
1/2" PEX Tubing (Red) X 57" Long	Each	5
#8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw	Each	10

1.3 Suspension Ropes

The suspension ropes are identical for the obstacle course and mission course.



Suspension Rope Details



Carabiner Knot/Mid-line Loop Details

See the Construction Tips page for suggested knots and visual knot tying aids.

Construction Tips



Suspension Rope Parts List

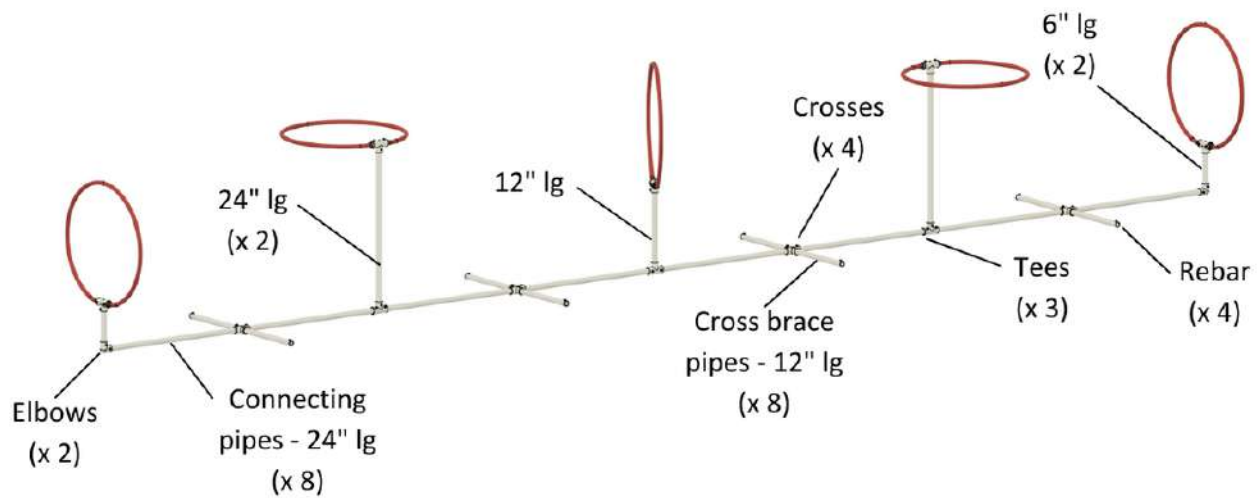
Each obstacle course uses 10 suspension ropes.

Each mission course uses 8 suspension ropes.

The quantities in the parts list are for each suspension rope.

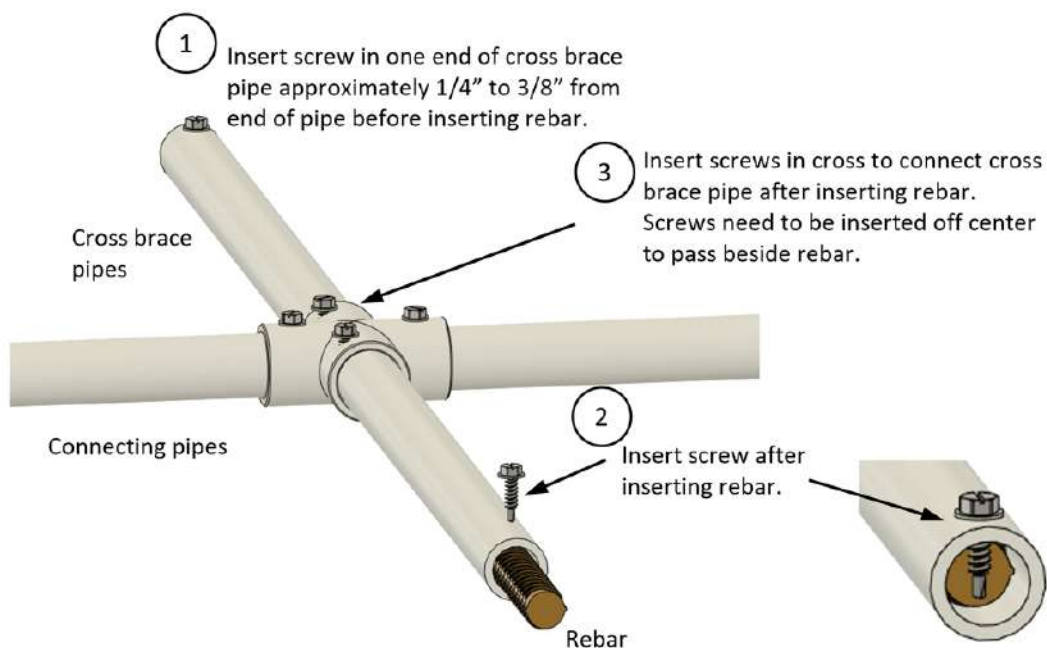
Item	Unit	Qty.
5/32" Diameter Polypropylene Diamond Braided Rope	Feet	9
5/16" Springlink Carabiner	Each	2
6" to 8" Cable Tie	Each	2

1.4 Pool Floor Obstacle Course



Obstacle Course Construction Detail

- ① Rebar provides a convenient method of weighting the obstacle course, however weights may be used.



Rebar Installation Detail



Hoop Installation

Pool Floor Obstacle Course Frame Parts List

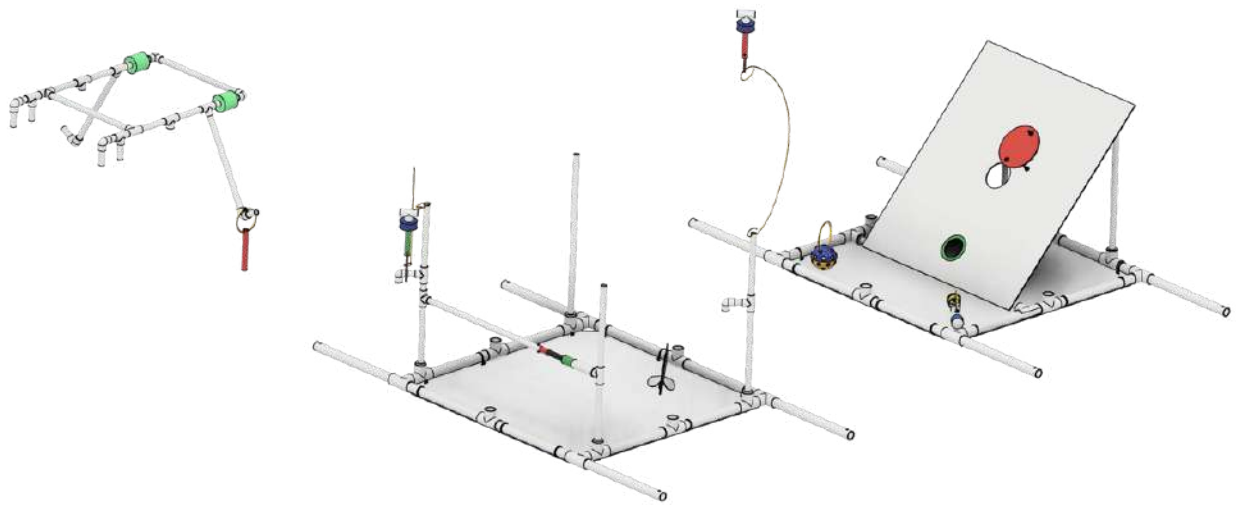
Item	Unit	Qty.
1/2" Sch 40 PVC Elbow	Each	2
1/2" Sch 40 PVC Cross	Each	3
1/2" Sch 40 PVC Tee	Each	3
1/2" Sch 40 PVC Pipe X 6" Long	Each	2
1/2" Sch 40 PVC Pipe X 12" Long	Each	9
1/2" Sch 40 PVC Pipe X 24" Long	Each	10
#4 Rebar (1/2" Dia.) X 24" Long	Each	4
#8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw	Each	42

Section 2: Mission Course Build Guide

Mission Course Overview

The mission course is built upon two standard SeaPerch Challenge task frames. The frames were first used for the 2019 International SeaPerch Challenge and have been used as the foundation for the mission courses since then.

Some elements of the mission course are reused from previous years to help reduce the cost and effort of building the courses.

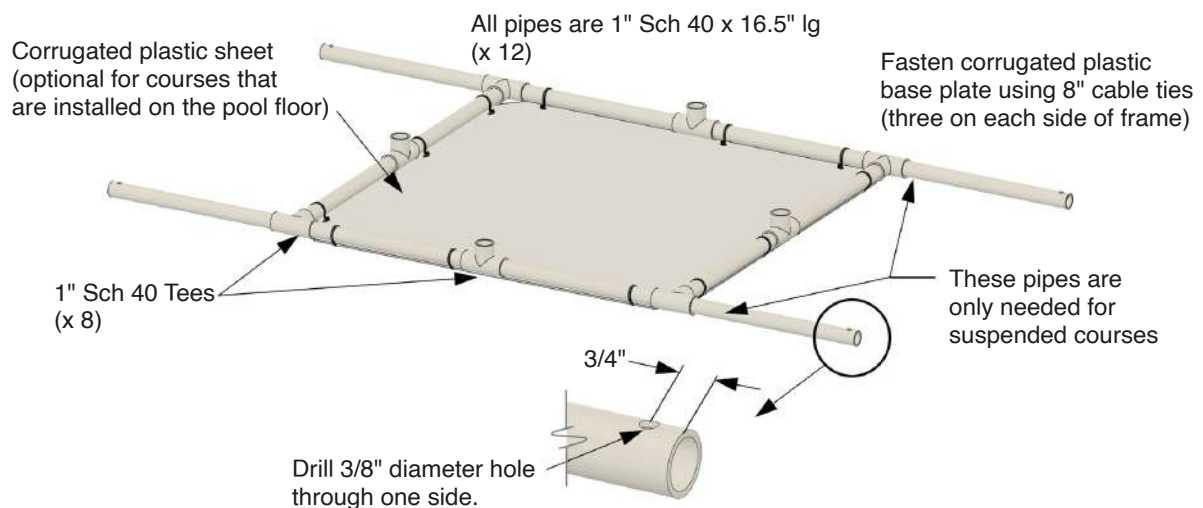


2.1 Task Frame Assembly

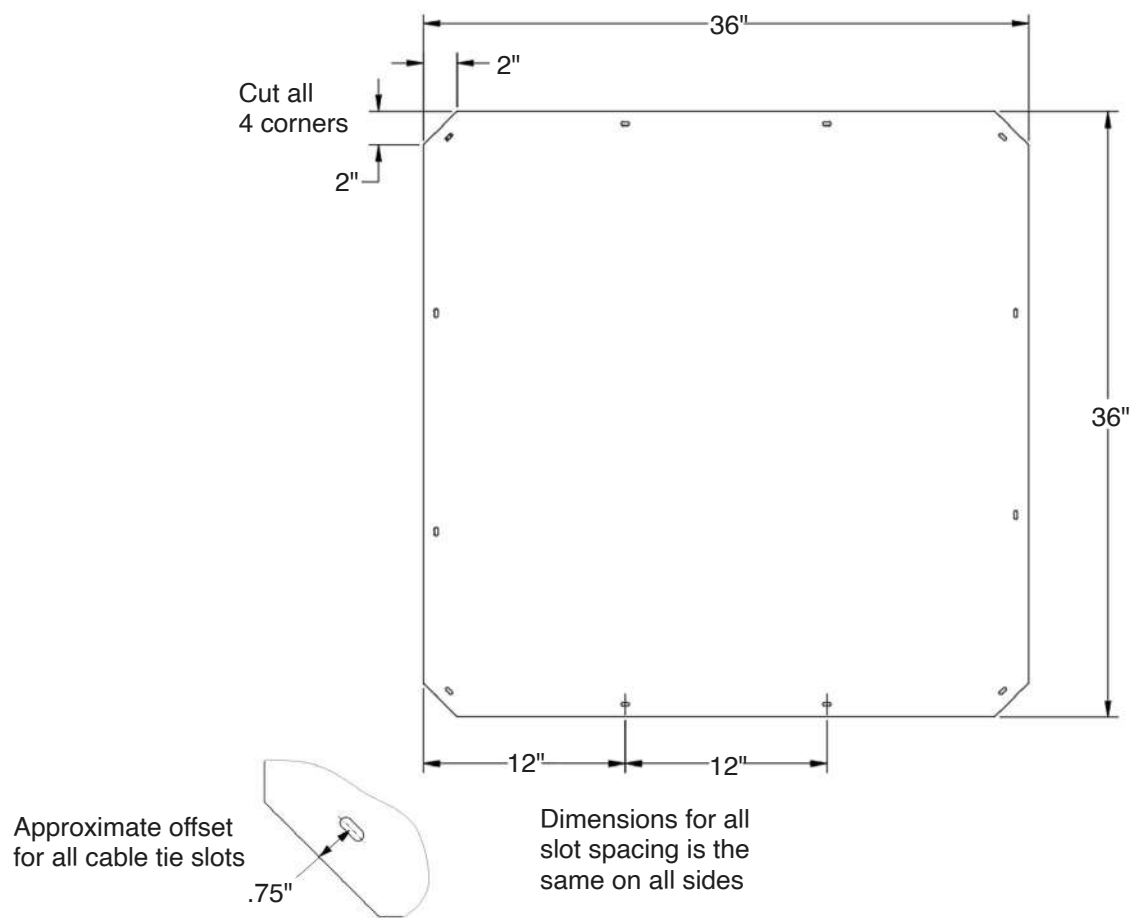
Task Platform Frame

Two task platforms are required for the mission course. Use the following illustration as a guide to construct the two task platforms.

Use frame as guide to position cable tie slots. Cable tie slot dimensions are non-critical. Assure slot is large enough for cable tie. Punch or cut slots for cable ties. A large flat blade screwdriver works best for punching slots in plastic sheet.



Task Platform Base Plate (Front and Back)

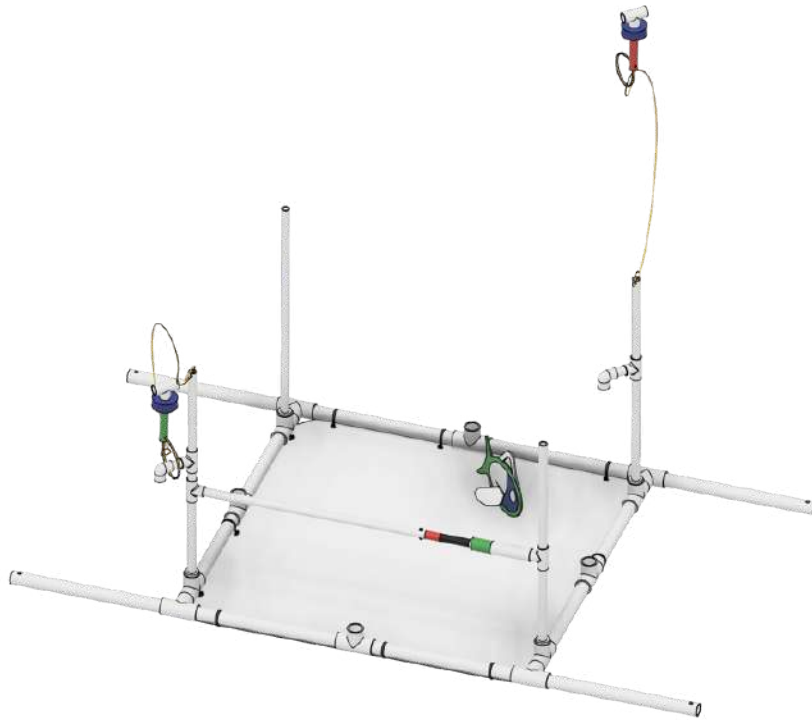


Task Platform Parts List (quantities are for two platforms)

Item	Unit	Qty.
1" Sch 40 PVC Tee (DURA brand – may be substituted with other brands, but refer to item 3 in the General Construction Notes section above)	Each	16
1" Sch 40 PVC Pipe x 16.5" long (16 needed if not suspending course)	Each	24 <i>(Suspended)</i> 16 <i>(Not Suspended)</i>
Polypropylene Corrugated Sheet, 0.157" Thick, 36" X 36" <i>(Optional for pool floor course)</i>	Each	2
#8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw	Each	40
8" Cable Tie <i>(Only needed if using Polypropylene sheet)</i>	Each	24

2.2 Front Platform Assembly

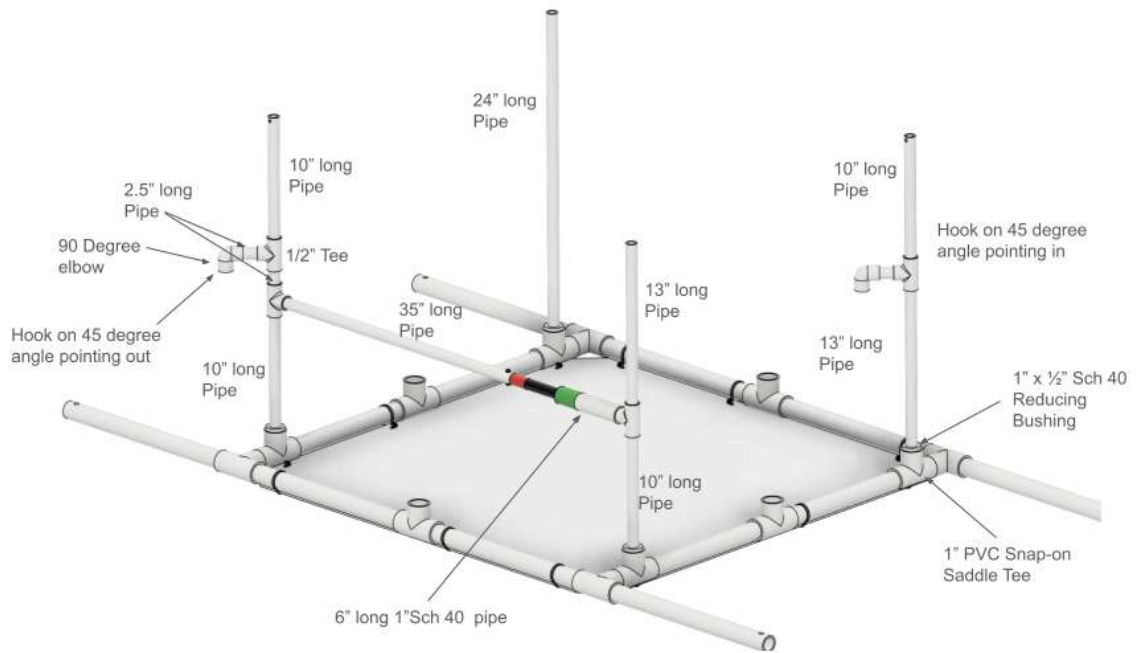
Overview



Fully Assembled Front Platform

Bridge Inspection and Beam Repair Assembly

Be sure to use self tapping screws an all joints to prevent movement during usage. The 2 Snap-on Tees in the back of the frame need to be secured with self tapping screws to prevent rotation in towards or out from the frame.



Bridge Pillar Marker Float Hooks

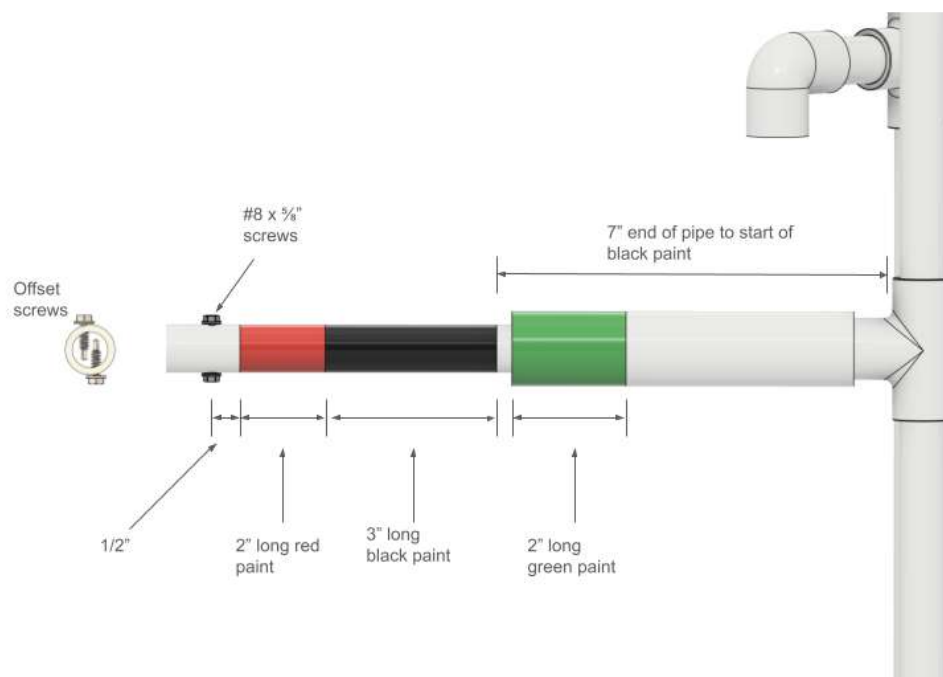
Ensure the Marker Float hooks are rotated 45 degrees to the left when looking at the frame from the pool deck. This allows for students to have a better perspective. Tie a 48" long rope to the top of each Bridge Pillar with a Marker Float Hook.

The back Marker Float is red and the front Marker Float is green.



Beam Repair Assembly

Do not use tape on the 1/2 " pipe. Tape will hinder the movement of the 1" pipe sleeve making the task not possible to complete.

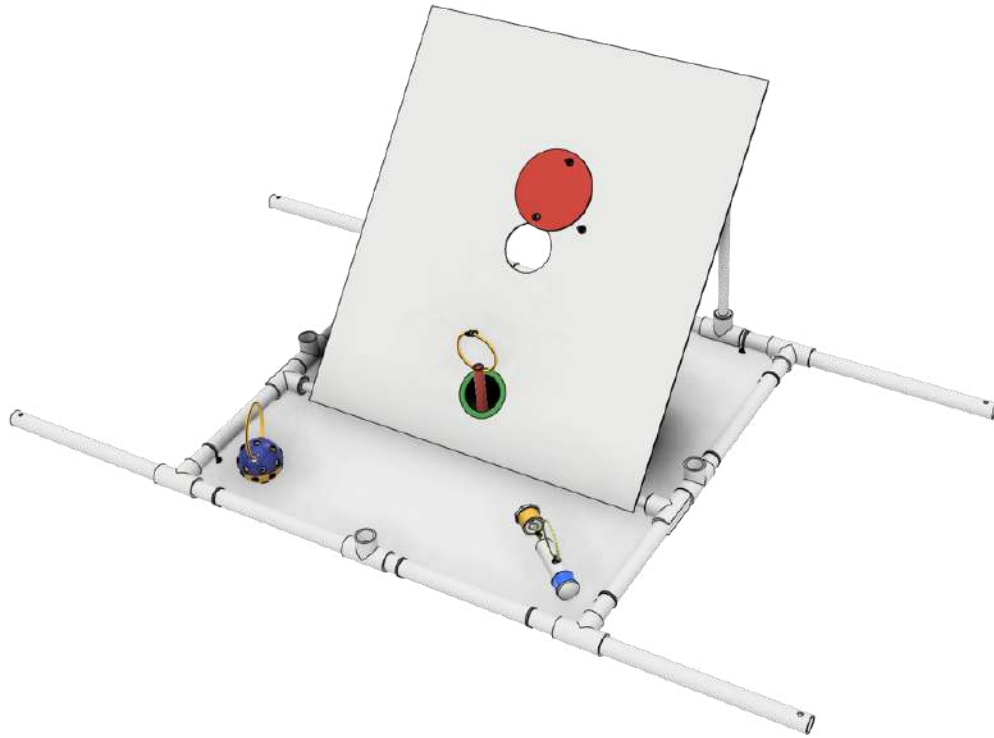


Front Platform Assembly

Item	Unit	Qty
Back Task Platform with Solid Base Plate	Each	1
1/2" Sch 40 PVC Elbow	Each	2
1/2" Sch 40 PVC Tee	Each	4
1" x 1/2" Sch 40 Reducing Bushing	Each	4
1" PVC Snap-On Saddle Tee	Each	4
1/2" Sch 40 PVC Pipe X 2.5" Long	Each	2
1/2" Sch 40 PVC Pipe X 10" Long	Each	4
1/2" Sch 40 PVC Pipe X 13" Long	Each	2
1/2" Sch 40 PVC Pipe X 24" Long	Each	1
1/2" Sch 40 PVC Pipe X 35" Long	Each	1
1" Sch 40 PVC Pipe X 6" Long	Each	1
#8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw (optional as needed to secure pipe connections)	Each	24

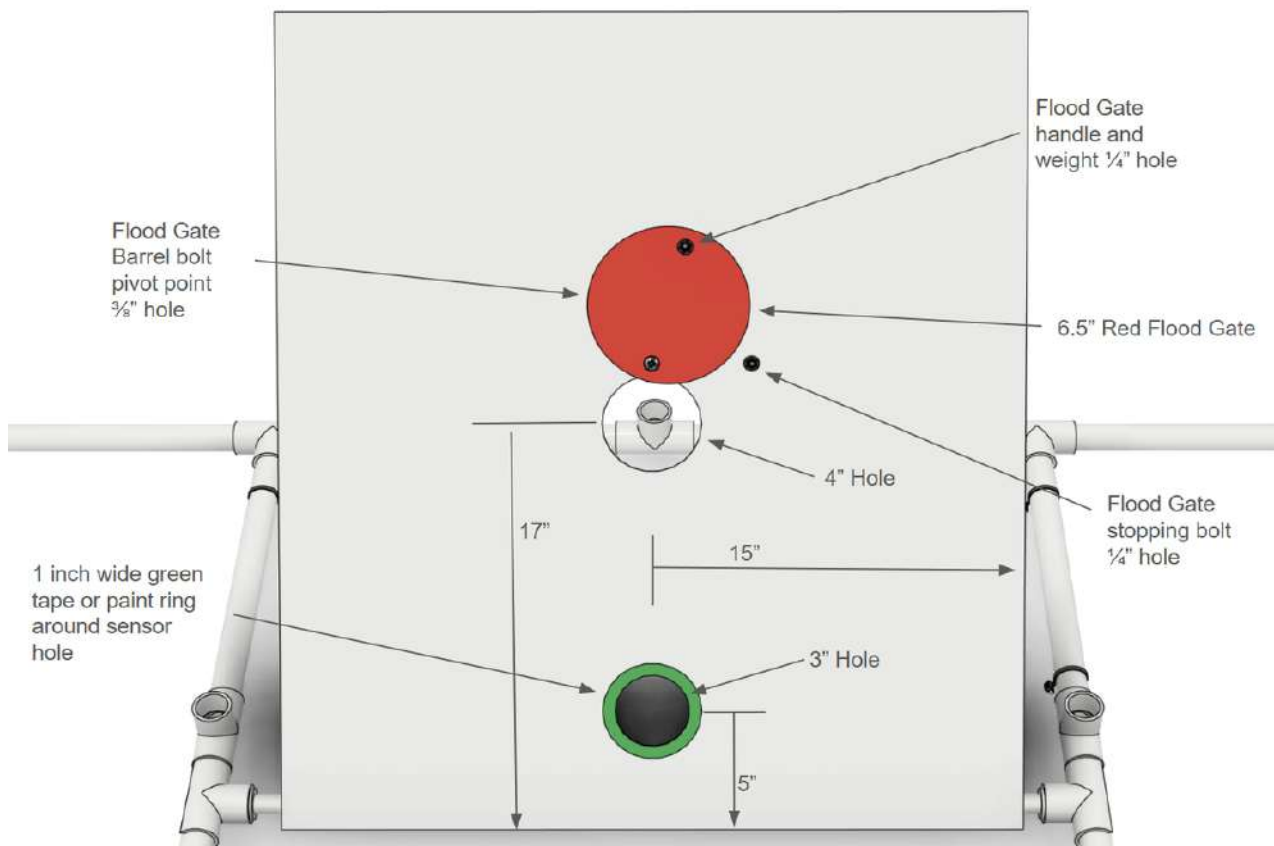
2.3 Back Platform Assembly

Overview

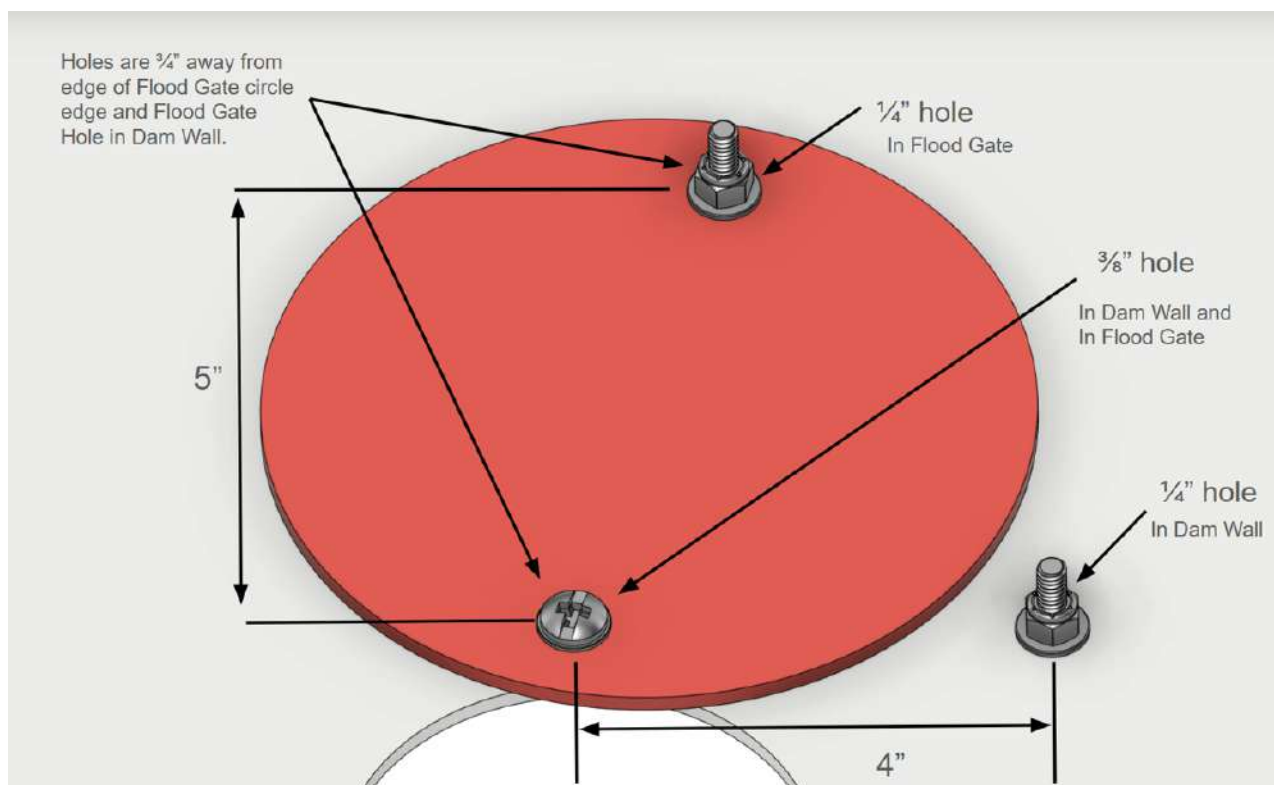


Fully Assembled Back Platform

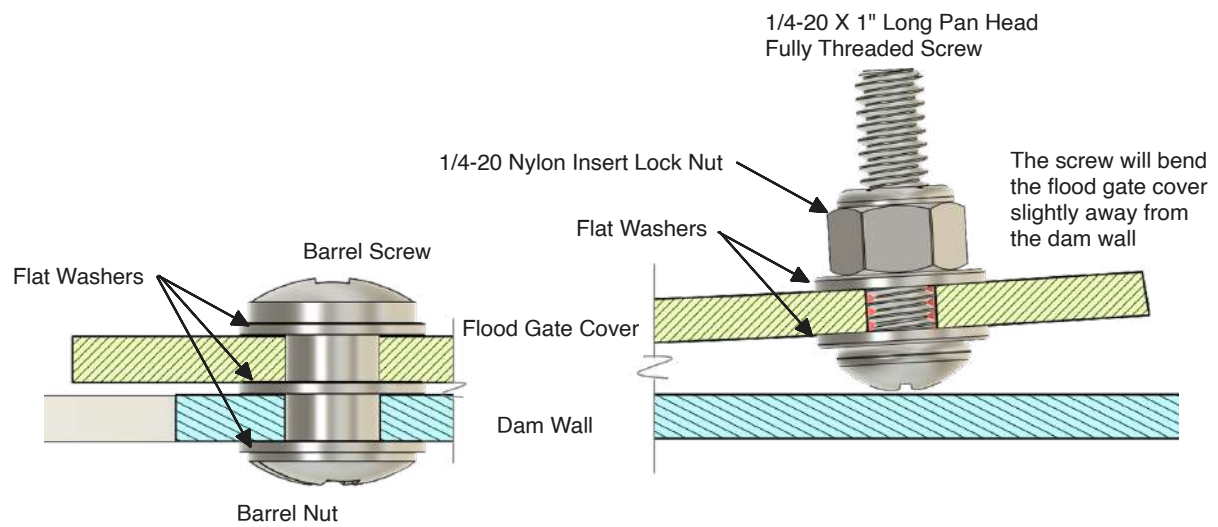
Dam Wall Assembly



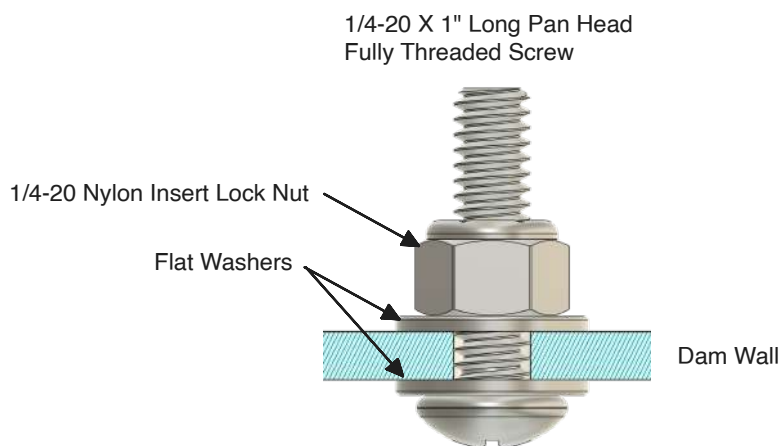
Flood Gate: Hole Locations and Sizes



Bolt Assemblies

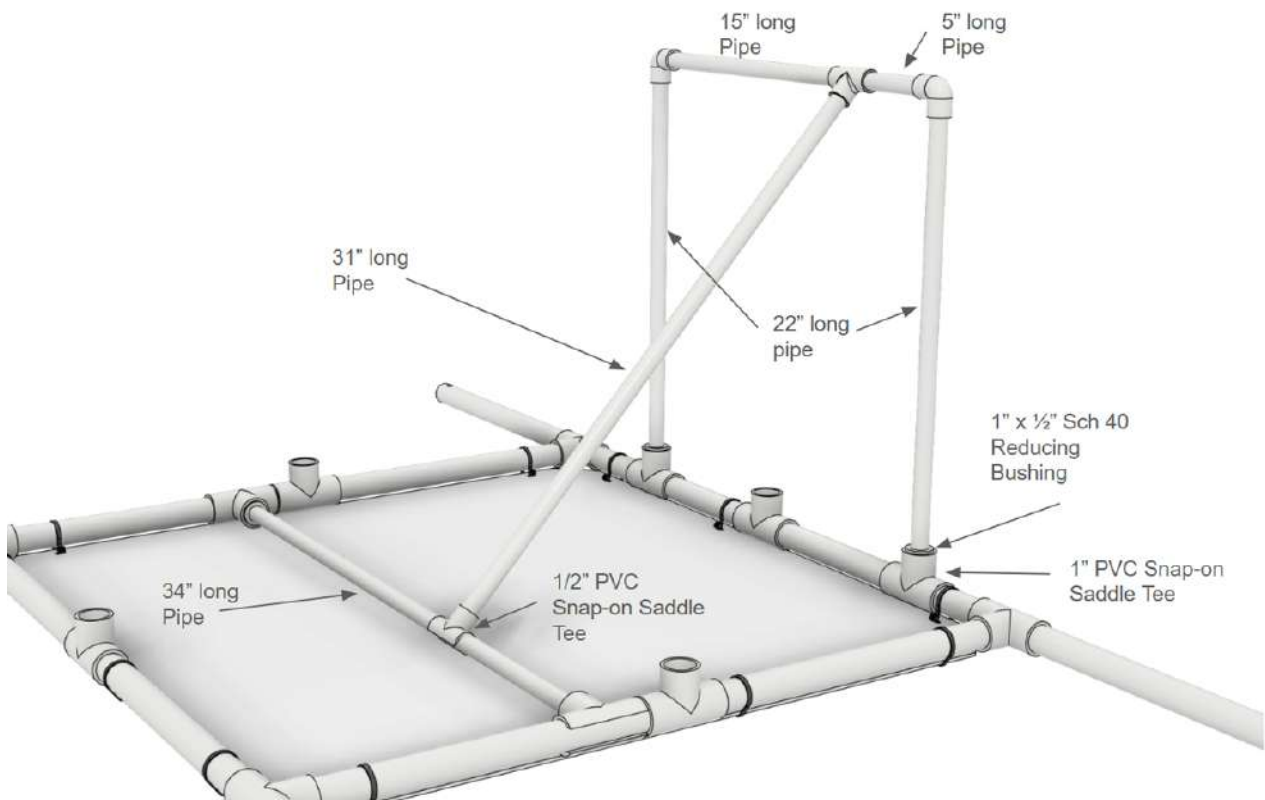


Flood Gate Pivot Point and Handle Screw Assemblies



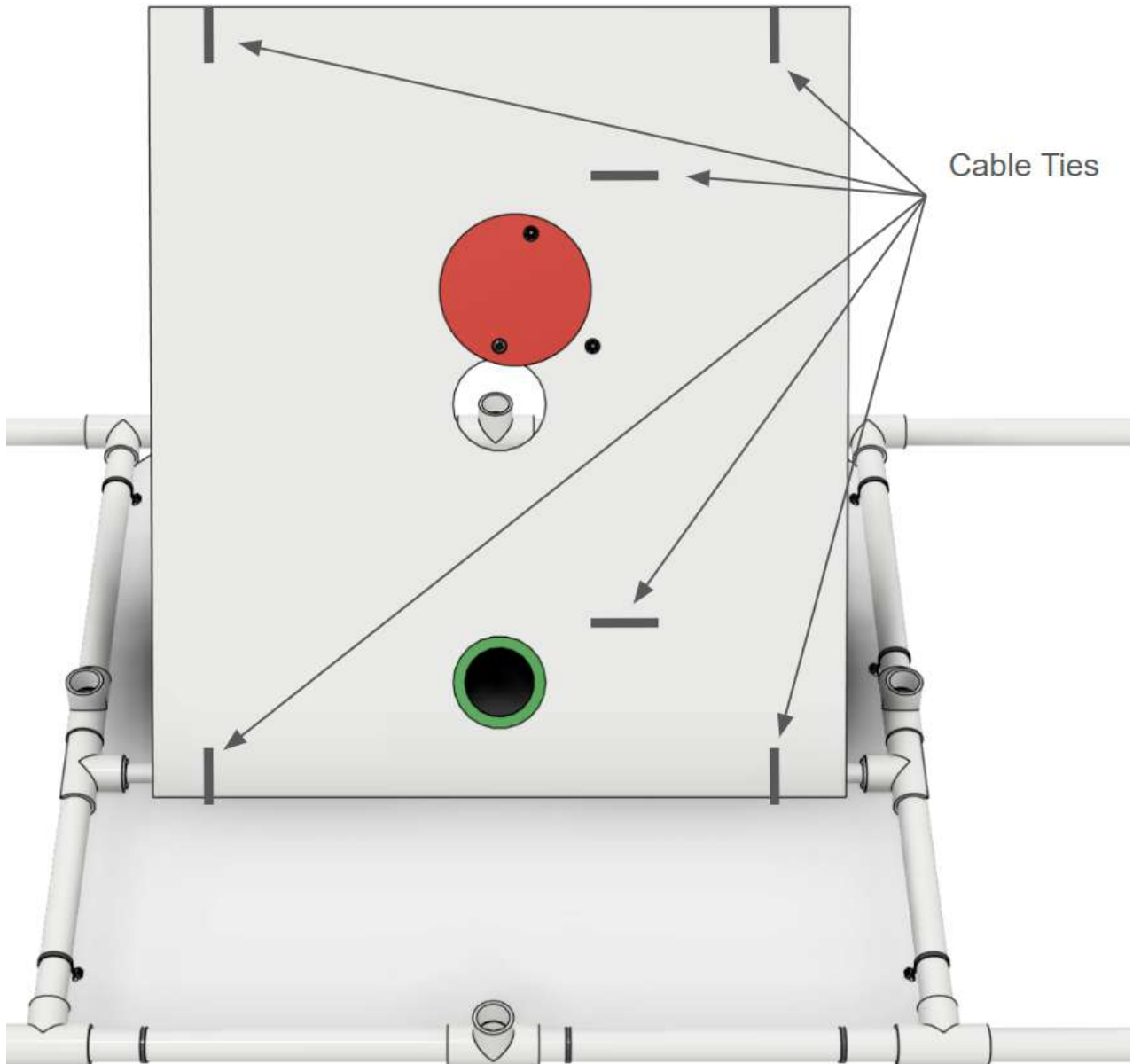
Flood Gate Stopping Bolt Assembly

Dam Wall Support Pipe Assembly



Dam Wall Assembly onto Frame

Attach the Dam wall to the pipe frame using 6 cable ties. Ensure the cable ties will not interfere with the flood gate movement. place Cable ties well above and well below the flood gate.



Back Platform Assembly

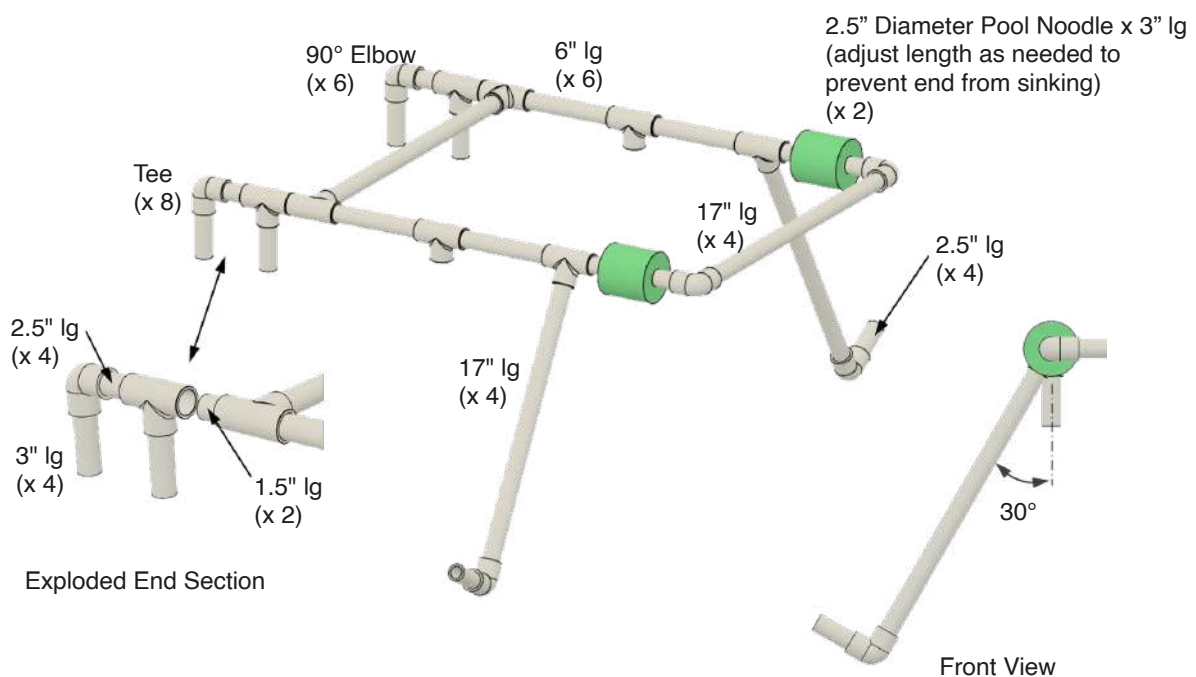
Item	Unit	Qty
Back Task Platform with Solid Base Plate	Each	1
1/2" Sch 40 PVC Elbow	Each	2
1/2" Sch 40 PVC Tee	Each	1
1" x 1/2" Sch 40 Reducing Bushing	Each	4
1/2" PVC Snap-On Saddle Tee	Each	1
1" PVC Snap-On Saddle Tee	Each	4
1/2" Sch 40 PVC Pipe X 34" Long	Each	1
1/2" Sch 40 PVC Pipe X 31" Long	Each	1
1/2" Sch 40 PVC Pipe X 22" Long	Each	2
1/2" Sch 40 PVC Pipe X 15" Long	Each	1
1/2" Sch 40 PVC Pipe X 5" Long	Each	1
1/4"-20 Pan Head Screw x 1" Long	Each	2
1/4"-20 Nylon- Insert Locknut	Each	2
1/4" General Purpose washer	Each	4
1/4"-20, 3/8" long Barrel Screw assembly	Each	1
#17 General Purpose Washer, 0.328" ID, 0.625" OD	Each	4

Polypropylene Corrugated Sheet, .157 Thick, 30" X 34"	Each	1
4" or 6" Cable Tie	Each	6
#8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw (optional as needed to secure pipe connections)	Each	13

2.4 Surface Vessel

The Surface Vessel is used in the International SeaPerch Challenge as the start and stop area for the ROV. The Surface Vessel is designed to clamp over the overflow drain in the side of the pool. The Surface Vessel may not be used in local or regional challenges. If you are a regional host coordinator and intend to use the Surface Vessel, you may need to reconfigure it to work with your pool.

 The Surface Vessel is the same design as was introduced and used in the 2025 International SeaPerch Challenge.



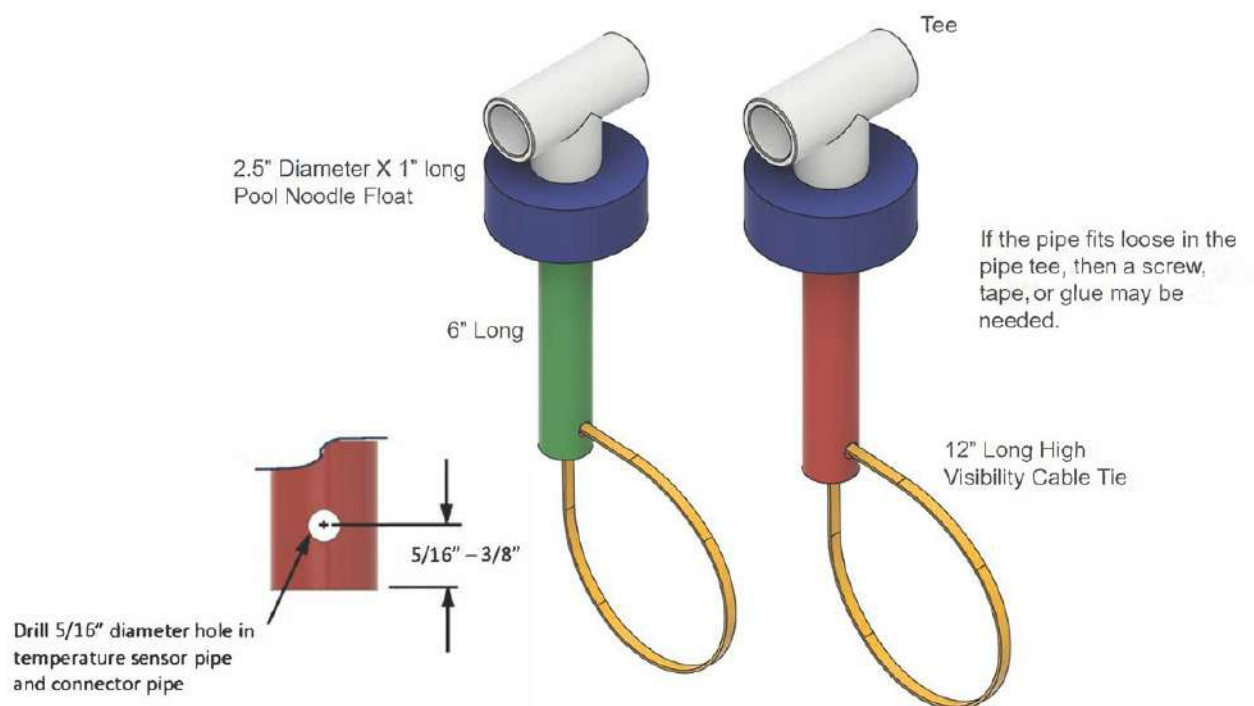
Surface Vessel Parts List

Item	Unit	Qty
1/2" Sch 40 PVC Elbow	Each	6
1/2" Sch 40 PVC Tee	Each	8
1/2" Sch 40 PVC Pipe X 1.5" Long	Each	2
1/2" Sch 40 PVC Pipe X 2.5" Long	Each	4
1/2" Sch 40 PVC Pipe X 3" Long	Each	4
1/2" Sch 40 PVC Pipe X 6" Long	Each	6
1/2" Sch 40 PVC Pipe X 17" Long	Each	4
2.5" Diameter Pool Noodle x 3" lg (adjust length as needed to prevent end from sinking)	Each	2
#8 X 5/8" Stainless Steel Flanged Head Self-Drilling Screw (optional as needed to secure pipe connections)	Each	34

2.5 Marker Float

The Marker Float used at the International SeaPerch Challenge are made from PVC pipe, pool noodle, and large cable ties. There will be two floating markers, one with green pipe and one with red pipe, both with blue pool noodle floats.

 The Marker Floats are the same design as the sample return elevator marker used in the 2024 International SeaPerch Challenge.



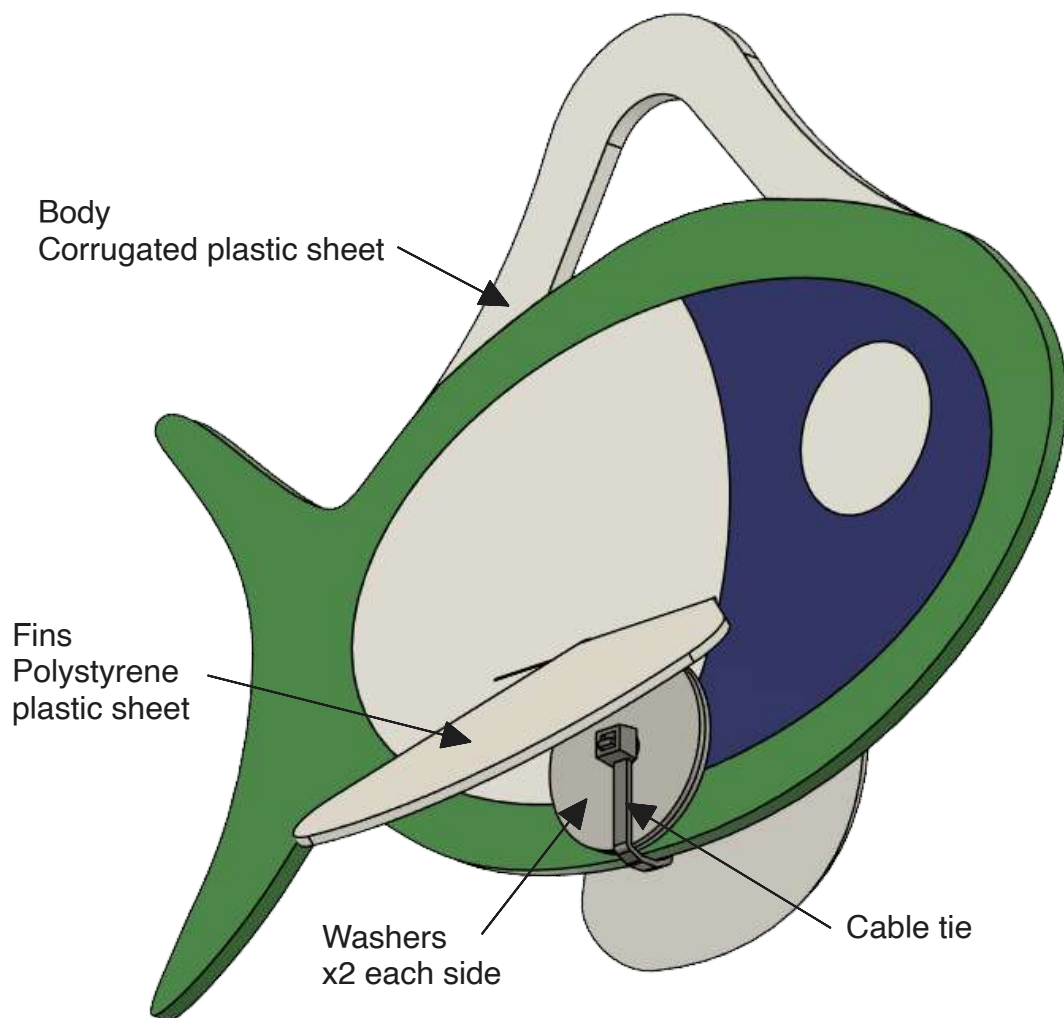
Marker Float Parts List

Item	Unit	Qty.
1/2" Sch 40 PVC Tee	Each	2
1/2" Sch 40 PVC Pipe X 6" Long (Red/Green - see options note below)	Each	2
5/32" Polypropylene Diamond Braid Rope x 48" Long	Each	2
12" High Visibility Cable Tie	Each	1
2.5" Outside Diameter x 3/4" Inside Diameter x 1" Long Pool Noodle	Each	2
<i>Options for coloring pipe: use colored PVC pipe, colored duct tape, or waterproof paint</i>		

2.6 Marine Life

The Marine Life used at the International SeaPerch Challenge is made from Polypropylene Corrugated Sheet and will be painted as shown. The body and fin of the Marine Life may be constructed from other suitable materials.

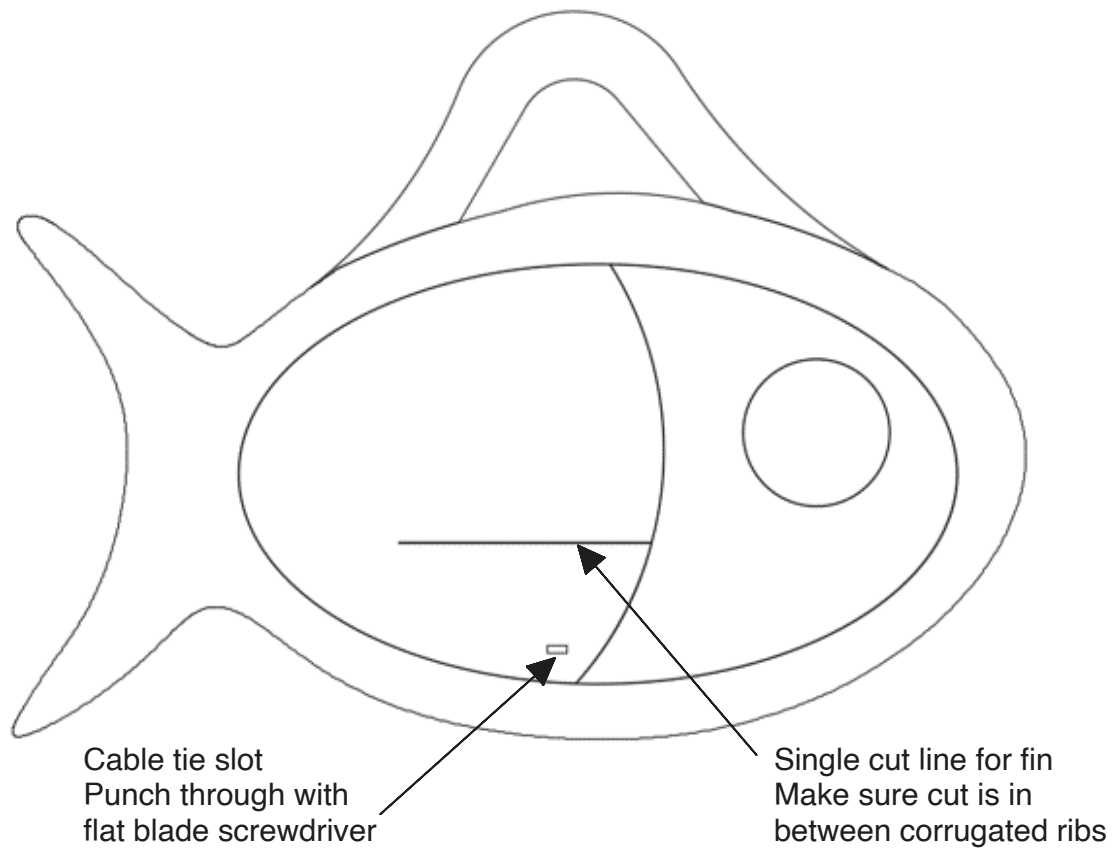
 The Marine Life is the same design as the new species used in the 2025 International SeaPerch Challenge.



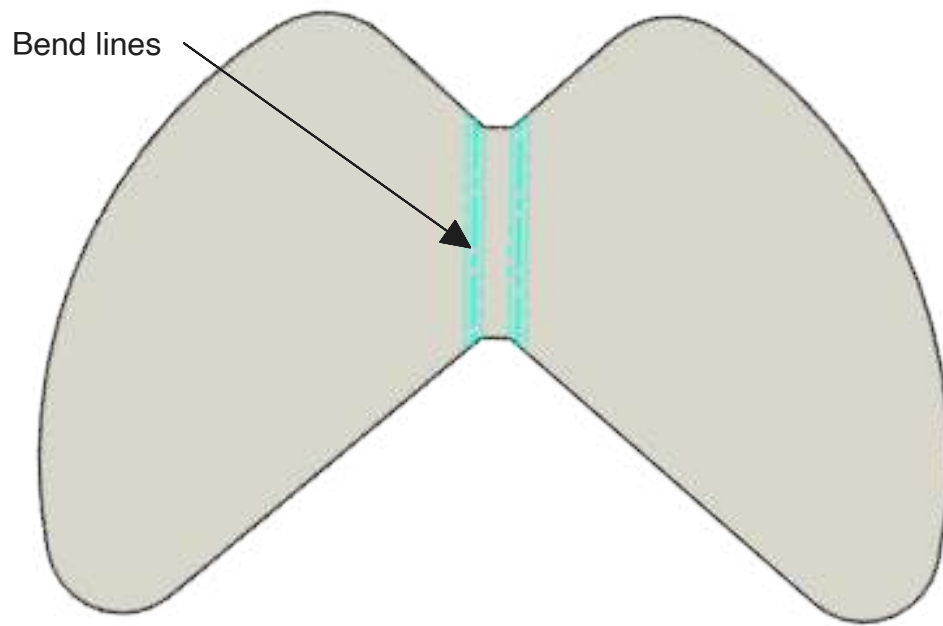
Completed New Species

Use the "Marine Life Full Size Pattern.PDF" file provided below as a pattern for marking, cutting, and painting.

If using 0.06" thick sheet for the fin cut a single line as shown in the following illustration. If using corrugated plastic sheet for the fin, cut a slot wide enough to accommodate the fin.

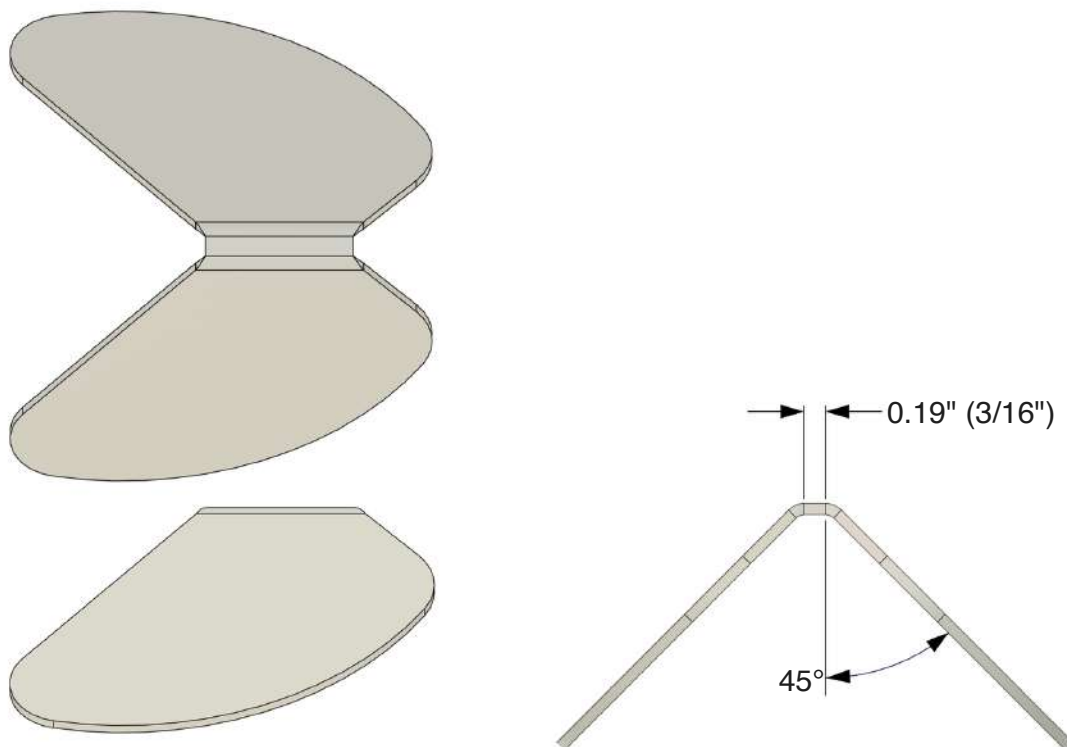


Use the "Marine Life Fin Full Size Flat Pattern.PDF" file provided below as a pattern for marking and cutting.



Fin Flat Pattern (not to scale)

The polystyrene sheet can be heated using a hot air blower and bent into shape. Use safety precautions when working with a heat gun.

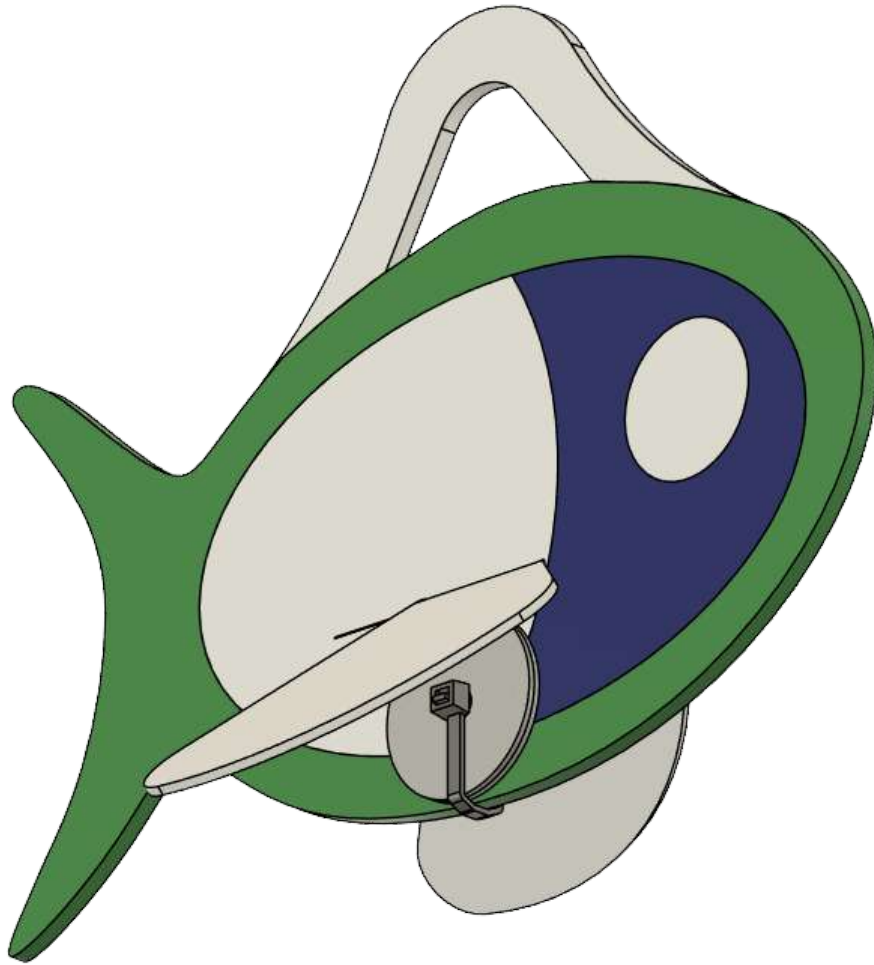


Fin - Final Shape

Push the fin through the slit in the body. Cut the "flap" on both sides of the body as shown.



Attach two (2) washers on each side of the body using a cable tie. Cut the excess cable tie end.



4KB

Marine Life Fin Full Size Flat Pattern.pdf
PDF



Download



Open



6KB

Marine Life Body Full Size Pattern.pdf
PDF



Download



Open

Marine Life Parts List

Item	Unit	Qty.
Polypropylene Corrugated Sheet, 0.157" Thick, 9.25" x 6.25"	Each	1
Polystyrene Sheet, 0.06" Thick, 5" x 3.25" (can substitute with polypropylene corrugated sheet or other suitable material)	Each	1
4" to 6" Cable Ties	Each	1
1/4" Bolt Size x 1.5" Outside Diameter x 0.55" Thick Stainless Steel Fender Washers (these are the washers used in previous mission courses in the canisters and other components) (can substitute with other materials and other sizes)	Each	4

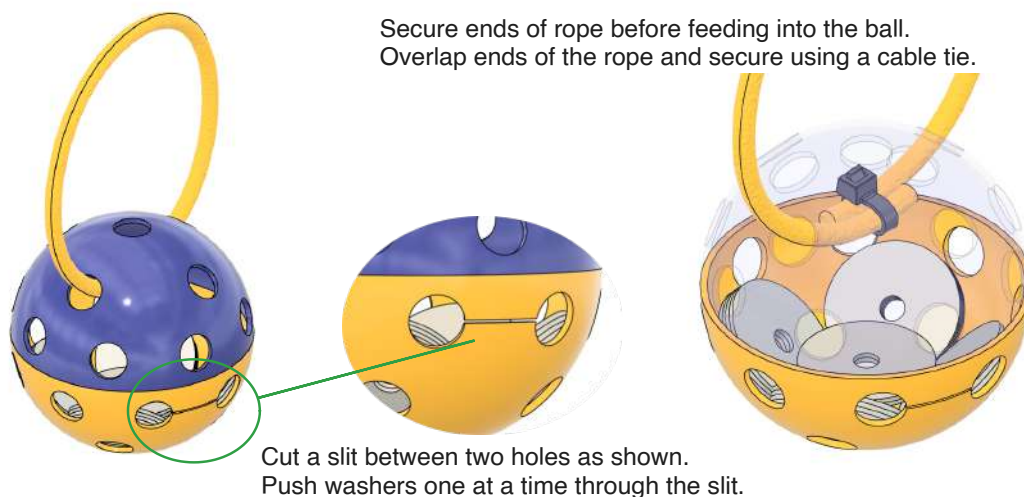
2.7 Heavy Debris

The Heavy Debris used at the International SeaPerch Challenge is made from a baseball size plastic practice ball, washers, and polypropylene rope.

- Weight in air = 268 Grams
- Weight in water = 187 Grams

 The Heavy Debris is a modification of the design used for the rock samples in the 2024 International SeaPerch Challenge.

Heavy Debris Assembly



Arrange the washer to be as low inside as possible. Use cable ties to hold washers in place.

Heavy Debris Parts List

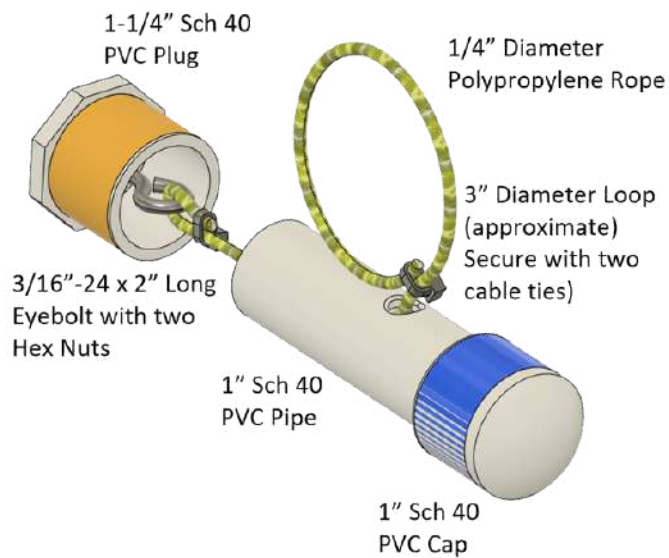
Item	Unit	Qty.
Baseball Size Plastic Practice Ball, 2.86" Diameter	Each	1
1/4" Bolt Size X 1.5" Diameter X 0.055" Thick Stainless-Steel Fender Washer	Each	18
6" or 8" Cable Tie	Each	5
1/4" Diameter x 14" Long Polypropylene Rope	Each	1

2.8 Water Sampler

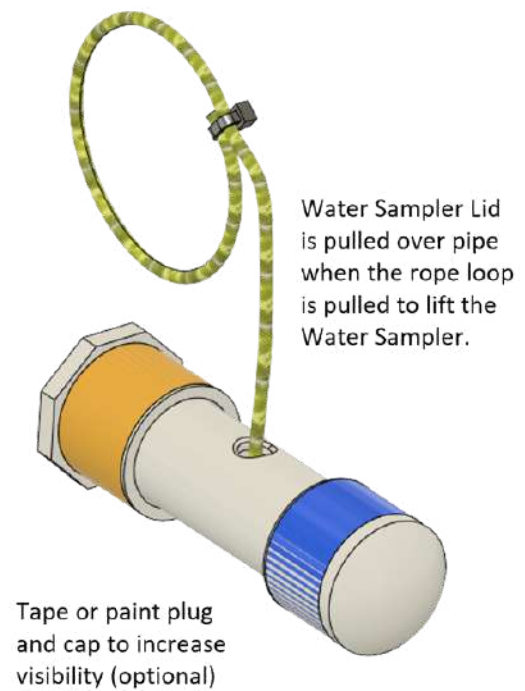
The Water Sampler used at the International SeaPerch Challenge is made from PVC pipe, plug, and end cap. If the 1" cap does not fit securely on the pipe then it should be glued or taped to the pipe.

- Weight in air = 150g
- Weight in water = 45g

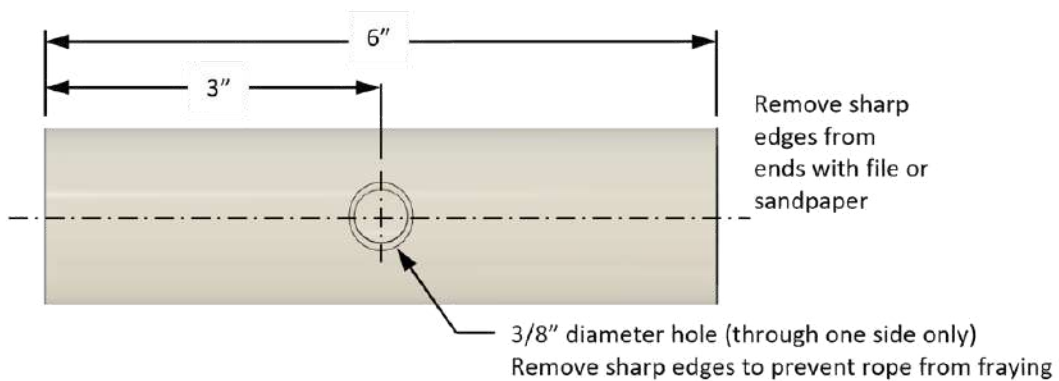
 The Water Sampler is the same design as the water sampler used in the 2024 International SeaPerch Challenge.



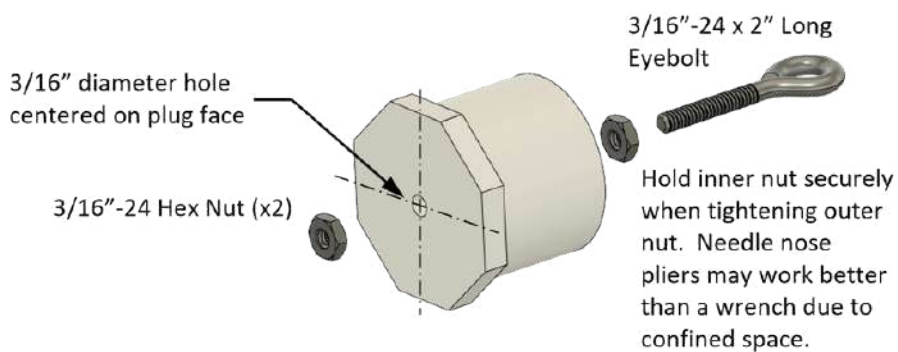
Water Sampler - Opened



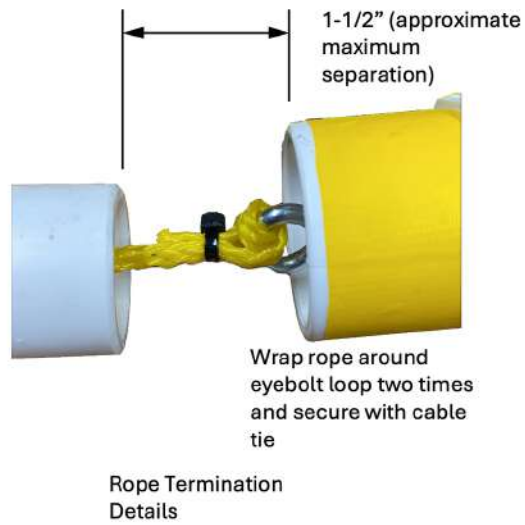
Water Sampler - Closed



Pipe Details



Lid Details



Water Sampler Parts List

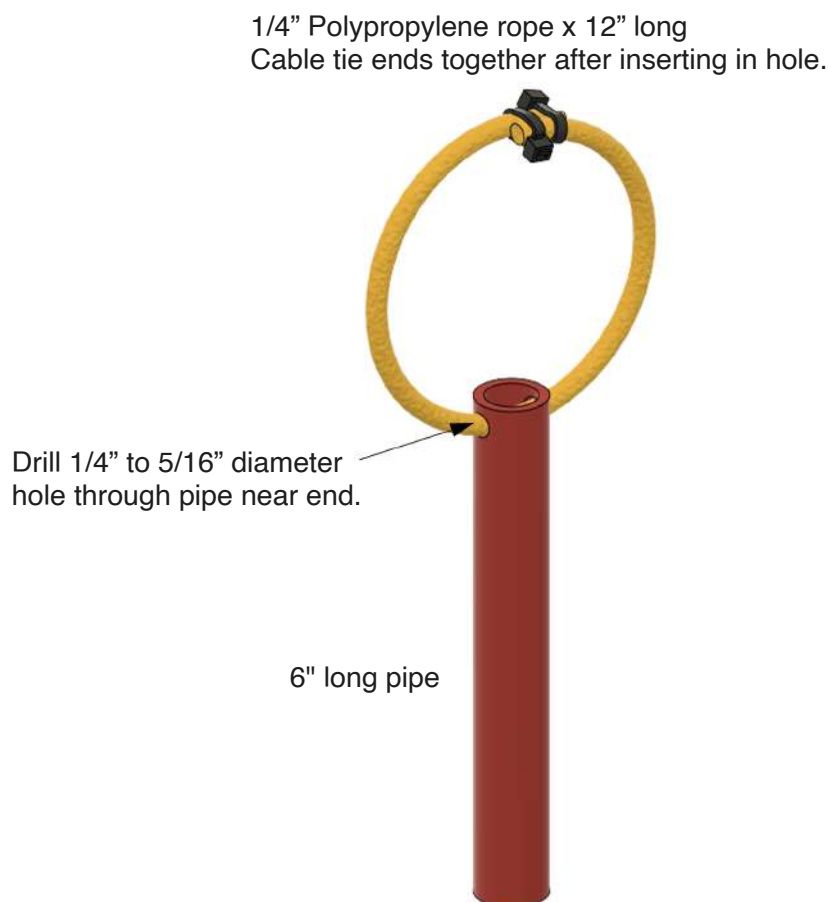
Item	Unit	Qty.
1-1/4" Sch 40 PVC Plug	Each	1
1" Sch 40 PVC Pipe X 6" Long	Each	1
1" Sch 40 PVC End Cap	Each	1
3/16"-24 X 2" Long Eye Bolt	Each	1
3/16"-24 Hex nut	Each	2
1/4" Polypropylene Diamond Rope 18" Long	Each	1
4" or 6" Cable Ties	Each	3
Colored Duct Tape or paint (optional)		

2.9 Plug

The Plug used at the International SeaPerch Challenge is made from red PVC pipe. This is not required for regional competitions. Painting the pipe or applying high visibility tape will help with visibility if colored PCV pipe is not used.

- Weight in air = 40g
- Weight in water = 8g

 The Plug is the same design as the sensors used in the 2025 International SeaPerch Challenge.



Plug Parts List

Item	Unit	Qty.
1/2" Sch 40 PVC Pipe X 6" Long (red or other color scheme)	Each	1
4" to 6" Long Cable Tie	Each	2
1/4" Polypropylene Rope x 12" Long	Each	1