

2021 SeaPerch Challenge Mini Course

SeaPerch Competition Mission Course Variation

www.seaperch.org

Mini Course Overview

This course is a miniaturized version of the 2021 SeaPerch Challenge mission course. This course:

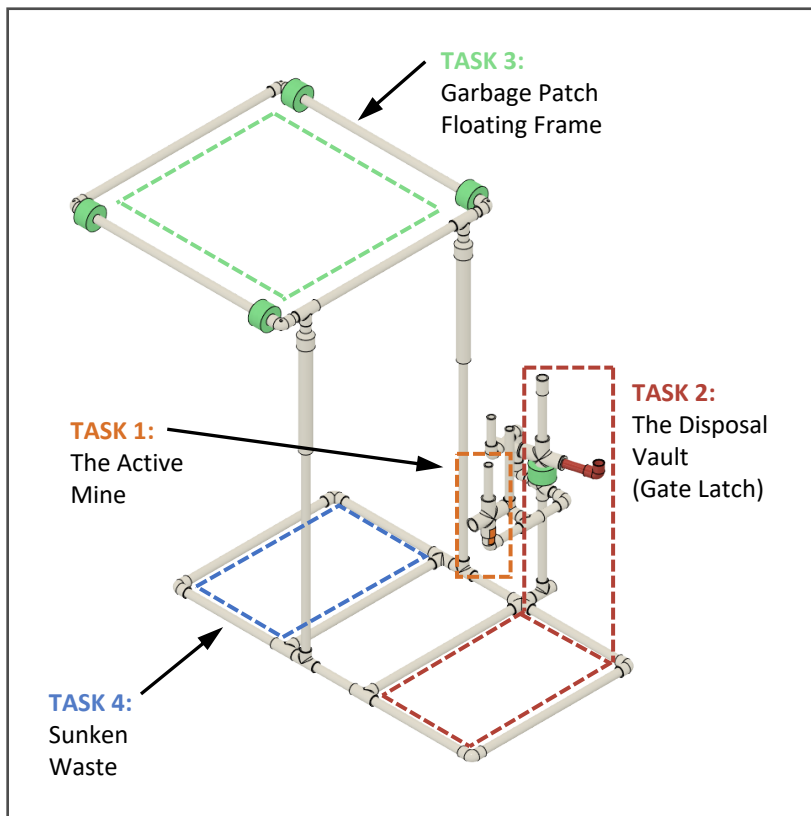
- Is low cost (\$20 for the practice version and \$35 for the competition version)
- Uses standard PVC pipe and fittings
- Can be used in small, shallow pools
- Includes the same general tasks and skills as the full-size mission course

This course is designed for:

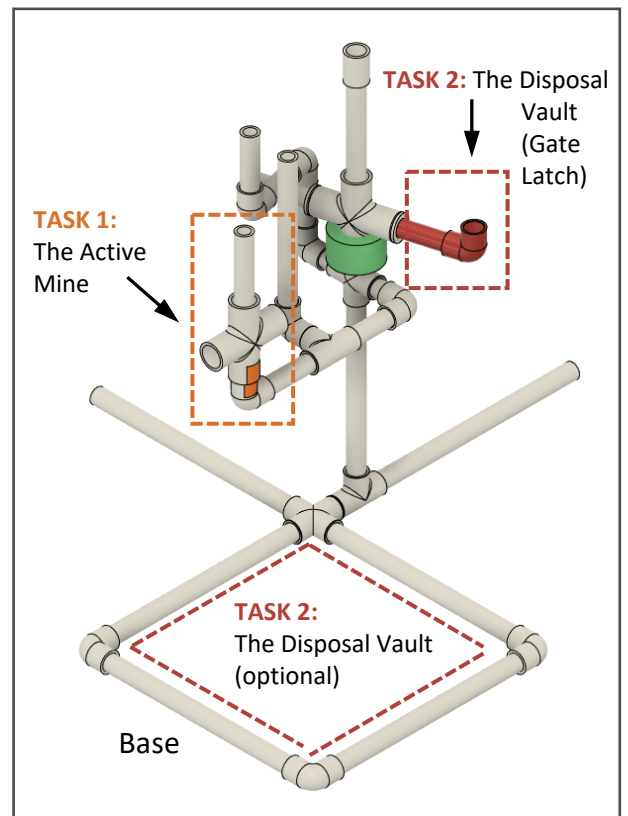
- **Teams** as a practice course
- **Schools and clubs** for skill building, practice, and small competitions
- **Regional competitions** that need a smaller course

The course has two variations, a mini competition course and a mini practice course.

- The mini practice course is intended as a practice or skill building course consisting of Task 1 and Task 2. These tasks require agility in ROV operation as the driver must maneuver to open the Gate Latch and rotate or remove the Active Mine Arming Device.
- The mini competition course includes all tasks from the full-size competition course.
- Both courses include the same support structure for Task 1: The Active Mine and Task 2: Gate Latch.



Mini Competition Course



Mini Practice Mini Course

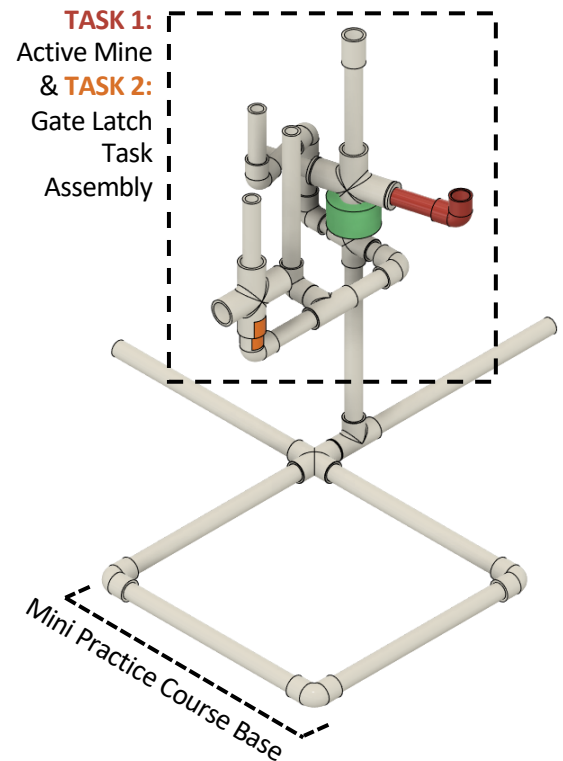
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Mini Practice Course Components

Needed components:

- Mini Practice Course Base (page 19)
- Active Mine Arming Device (page 11)
- Gate Latch Assembly (page 12)
- The Active Mine & Gate Latch Support Structure (page 13)



Mini Competition Course Components

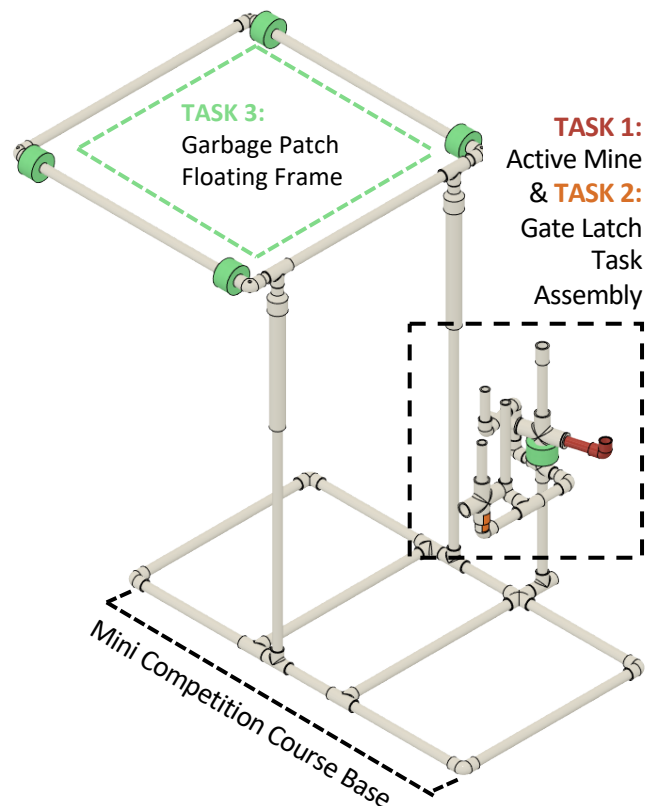
This course will also work as a practice course but is larger and costs more than the mini practice course.

Needed components:

- Mini Competition Course Base (page 20)
- Garbage Patch Floating Frame (page 21)
- Active Mine Arming Device (page 11)
- Gate Latch Assembly (page 12)
- The Active Mine & Gate Latch Support Structure (page 13)

Alternatives:

- Instead of fixing the Garbage Patch floating frame, build the upper frame and tie it to weights or lane dividers.
- Utilize a separate structure for the Garbage Patch Floating Frame.

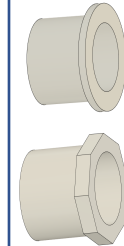


Mini Practice Course: Bill of Materials & Pipe Cutting Guide

Mini Practice Course Bill of Materials (Build List)	
Item	Qty
Base	
1/2" Sch 40 PVC Elbow	3
1/2" Sch 40 PVC Tee	1
1/2" Sch 40 PVC Cross	1
1/2" Sch 40 PVC Pipe x 1.5" Lg	1
1/2" Sch 40 PVC Pipe x 10" Lg	1
1/2" Sch 40 PVC Pipe x 12" Lg	6
Weights - as required (note 1)	
Active Mine Arming Device	
3/4" Sch 40 PVC Cross	1
Gate Latch	
1/2" Sch 40 PVC Elbow	1
3/4" Sch 40 PVC Cross	1
3/4" x 1/2" Sch 40 PVC Reducer Bushing (see note 3)	2
1/2" Sch 40 PVC Pipe x 3.5" Lg	1
1/2" Sch 40 PVC Pipe x 4" Lg	1
Pool Noodle - 2.5" Outside Diameter x 1.75" Lg	1
Active Mine and Gate Latch Support Structure	
1/2" Sch 40 PVC Elbow	6
1/2" Sch 40 PVC Tee	1
1/2" Sch 40 PVC Cross	1
1/2" Sch 40 PVC Coupling	1
1/2" Sch 40 PVC Pipe x 1.5" Lg	1
1/2" Sch 40 PVC Pipe x 2" Lg	2
1/2" Sch 40 PVC Pipe x 3.5" Lg	4
1/2" Sch 40 PVC Pipe x 4" Lg	1
1/2" Sch 40 PVC Pipe x 8" Lg	2
1/2" Sch 40 PVC Pipe x 10" Lg	1

Notes:

- The structure must be weighted down with rebar, bricks, dive weights or other suitable weights. If rebar is used, use two to four 1/2 dia. X 1' long pieces.
- Securing all pipe joints using screws is recommended but may not be necessary depending on the application of the course. Recommended screws are #8 x 1/2" Lg stainless steel self tapping flanged hex head screws.
- The 3/4" x 1/2" Sch 40 PVC Reducer Bushing is available in two styles, either style is acceptable.



Reducing Bushing - Plain flange type

Reducing Bushing - Flat flange type

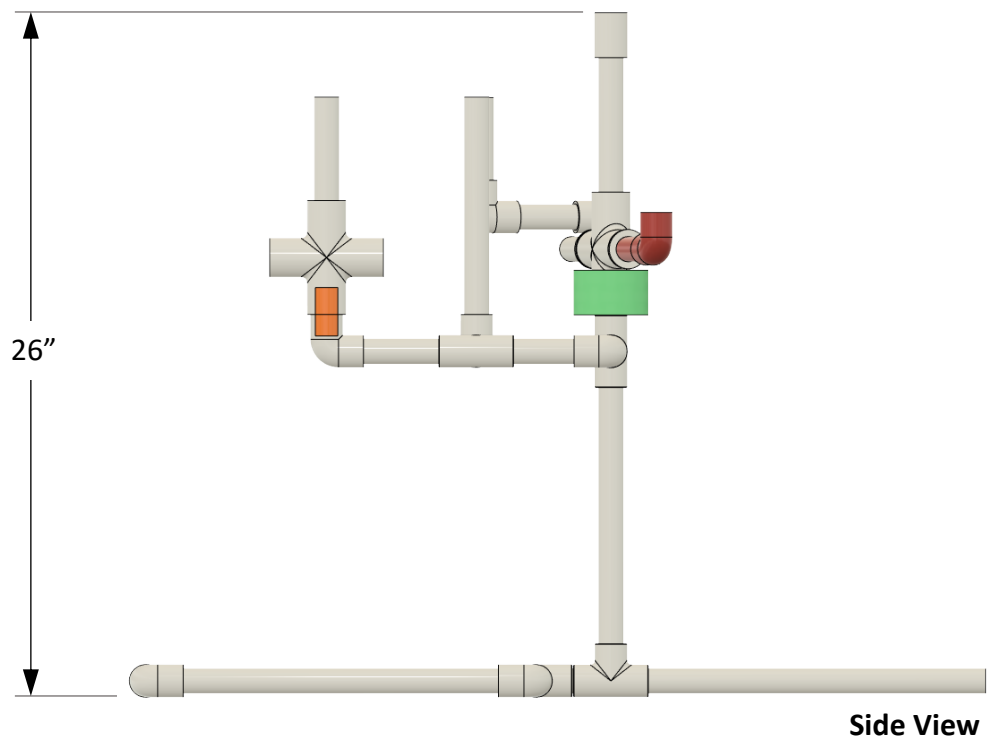
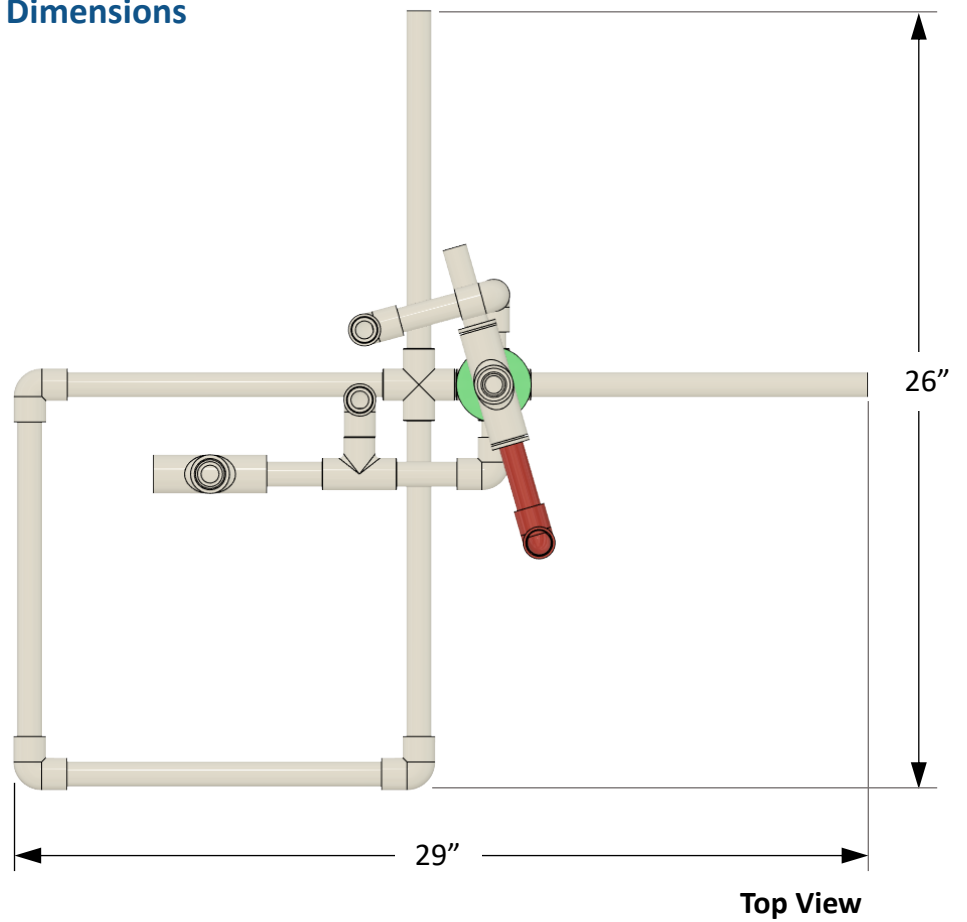
Pipe Cutting List

Pipe Size	Length	Qty
1/2" Sch 40 PVC Pipe	1.5"	2
"	2"	2
"	3.5"	5
"	4"	2
"	8"	2
"	10"	2
"	12"	6

Pipe Cutting Guide

10' Pipe																
1.5"	1.5"	2"	2"	3.5"	3.5"	3.5"	3.5"	3.5"	4"	4"	8"	8"	10"	10"	12"	12"
12"	12"	Leftover if cut from 10' long pipe. Can cut from 2' long pipe (available from most hardware/supply stores)														

Mini Practice Course: Overall Dimensions



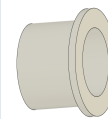
Mini Competition Course: Bill of Materials & Pipe Cutting Guide

Mini Competition Course Bill of Materials (Build List)

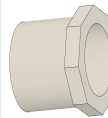
Item	Qty
Base	
1/2" Sch 40 PVC Elbow	4
1/2" Sch 40 PVC Tee	6
1/2" Sch 40 PVC Cross	1
1/2" Sch 40 PVC Pipe x 1.5" Lg	3
1/2" Sch 40 PVC Pipe x 6" Lg	2
1/2" Sch 40 PVC Pipe x 12" Lg	4
1/2" Sch 40 PVC Pipe x 18" Lg	4
1/2" Sch 40 PVC Pipe x 24" Lg (length depends on pool depth - see Figure ?)	2
Weights - as required (note 1)	
Garbage Patch Frame Assembly	
1/2" Sch 40 PVC Elbow	4
1/2" Sch 40 PVC Tee	2
1" x 1/2" Reducing Coupling (see note 4)	2
1/2" Sch 40 PVC Pipe x 1.5" Lg	2
1/2" Sch 40 PVC Pipe x 2" Lg	2
1/2" Sch 40 PVC Pipe x 18" Lg	1
1/2" Sch 40 PVC Pipe x 24" Lg	4
1" Sch 40 PVC Pipe x 12" Lg	2
Pool Noodle - 2.5" Outside Diameter x 1.75" Lg	4
Active Mine Arming Device	
3/4" Sch 40 PVC Cross	1
Gate Latch	
1/2" Sch 40 PVC Elbow	1
3/4" Sch 40 PVC Cross	1
3/4" x 1/2" Sch 40 PVC Reducer Bushing (see note 3)	2
1/2" Sch 40 PVC Pipe x 3.5" Lg	1
1/2" Sch 40 PVC Pipe x 4" Lg	1
Pool Noodle - 2.5" Outside Diameter x 1.75" Lg	1
Active Mine and Gate Latch Support Structure	
1/2" Sch 40 PVC Elbow	6
1/2" Sch 40 PVC Tee	1
1/2" Sch 40 PVC Cross	1
1/2" Sch 40 PVC Coupling	1
1/2" Sch 40 PVC Pipe x 1.5" Lg	1
1/2" Sch 40 PVC Pipe x 2" Lg	2
1/2" Sch 40 PVC Pipe x 3.5" Lg	4
1/2" Sch 40 PVC Pipe x 4" Lg	1
1/2" Sch 40 PVC Pipe x 8" Lg	2
1/2" Sch 40 PVC Pipe x 10" Lg	1

Notes:

- The structure must be weighted down with rebar, bricks, dive weights or other suitable weights. If rebar is used, use two to four 1/2 dia. X 1' long pieces.
- Securing all pipe joints using screws is recommended but may not be necessary depending on the application of the course. Recommended screws are #8 x 1/2" Lg stainless steel self tapping flanged hex head screws.
- The 3/4" x 1/2" Sch 40 PVC Reducer Bushing is available in two styles, either style is acceptable.

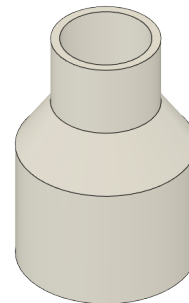


Reducing Bushing - Plain flange type

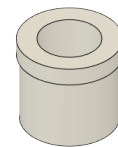


Reducing Bushing - Flat flange type

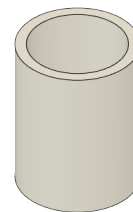
- A 1" x 1/2" Reducing Bushing and a 1" Coupling may be substituted for the 1" x 1/2" Reducing Coupling if the Reducing Coupling is not available.



Reducing Coupling



Reducing Bushing



Coupling

Mini Competition Course: Bill of Materials & Pipe Cutting Guide (continued)

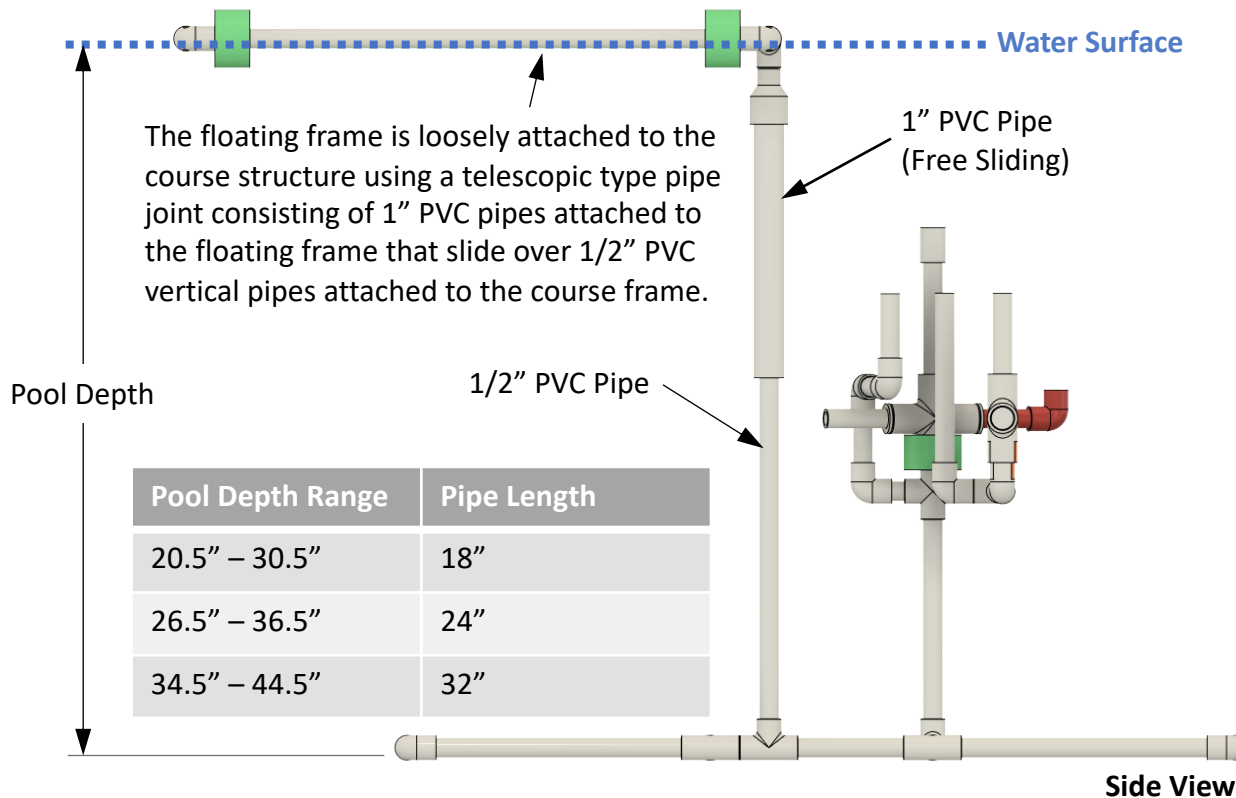
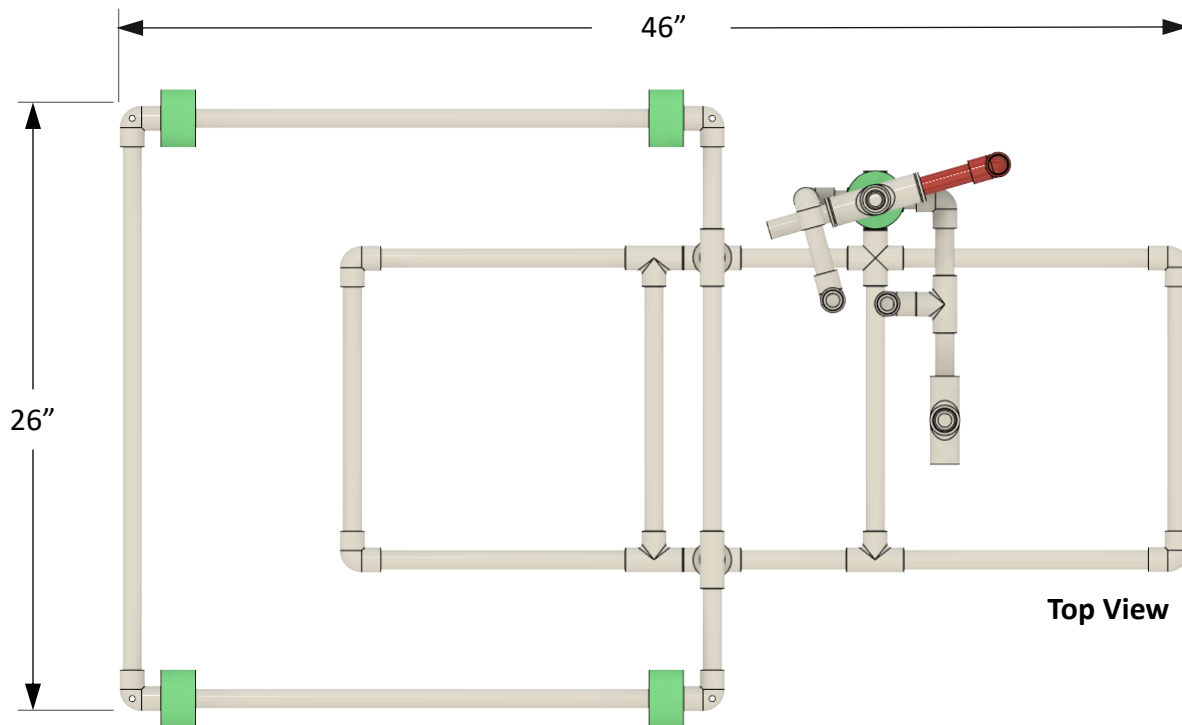
Pipe Cutting List

Pipe Size	Length	Qty
1/2" Sch 40 PVC Pipe	1.5"	6
"	2"	4
"	3.5"	5
"	4"	2
"	6"	2
"	8"	2
"	10"	1
"	12"	4
"	18"	5
"	24"	6
1" Sch 40 PVC Pipe	12"	2

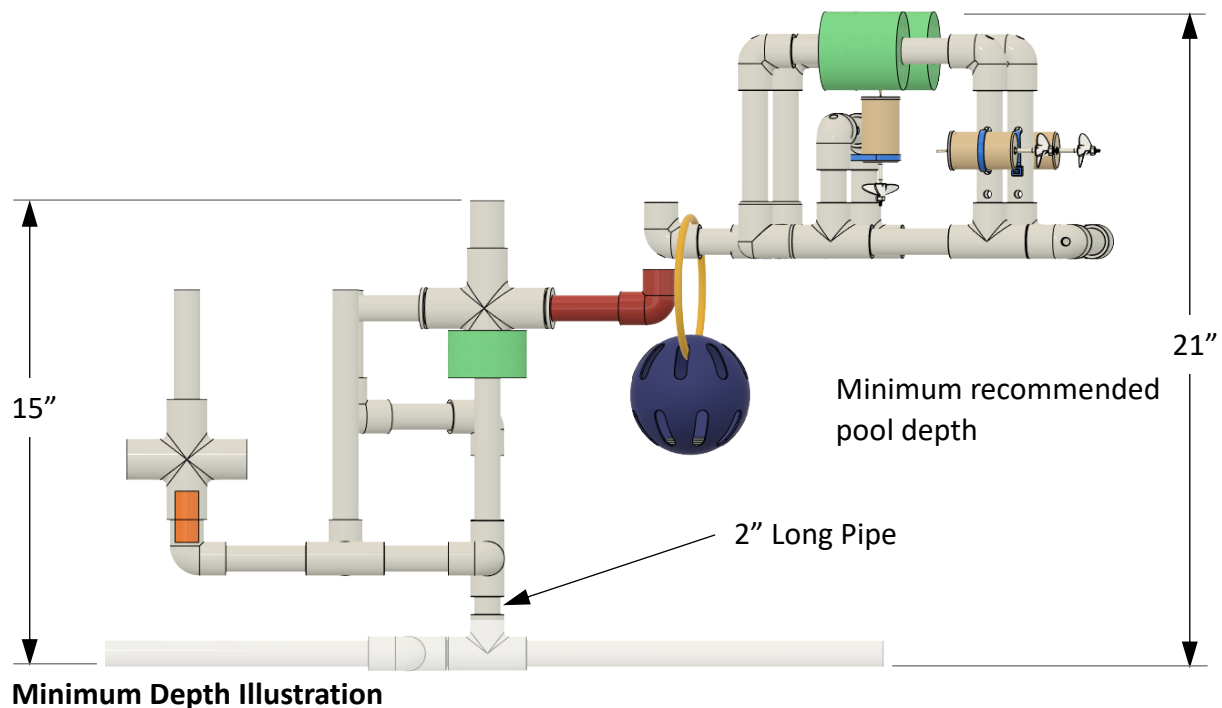
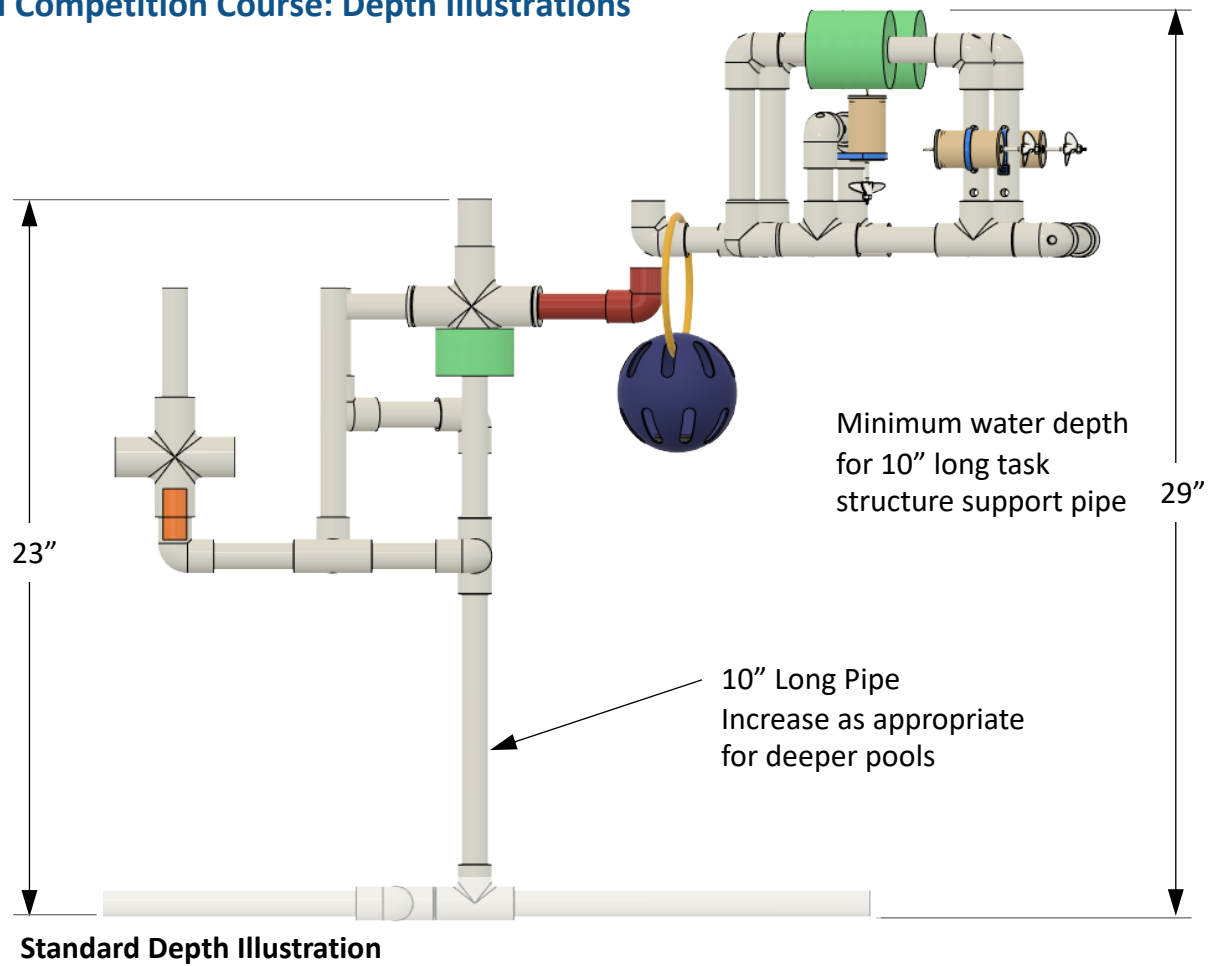
Pipe Cutting Guide

10' Pipe																								
1.5"	1.5"	1.5"	1.5"	1.5"	1.5"	2"	2"	2"	3.5"	3.5"	3.5"	3.5"	3.5"	4"	4"	6"	6"	8"	8"	10"	12"	12"	12"	Leftover
12"		18"			18"			18"			18"			18"			18"			Leftover				
24"					24"					24"					24"					24"				
24"					Leftover if cut from 10' long pipe. Can cut from 2' long pipe (available from most hardware/supply stores)																			

Mini Competition Course: Overall Dimensions



Mini Competition Course: Depth Illustrations

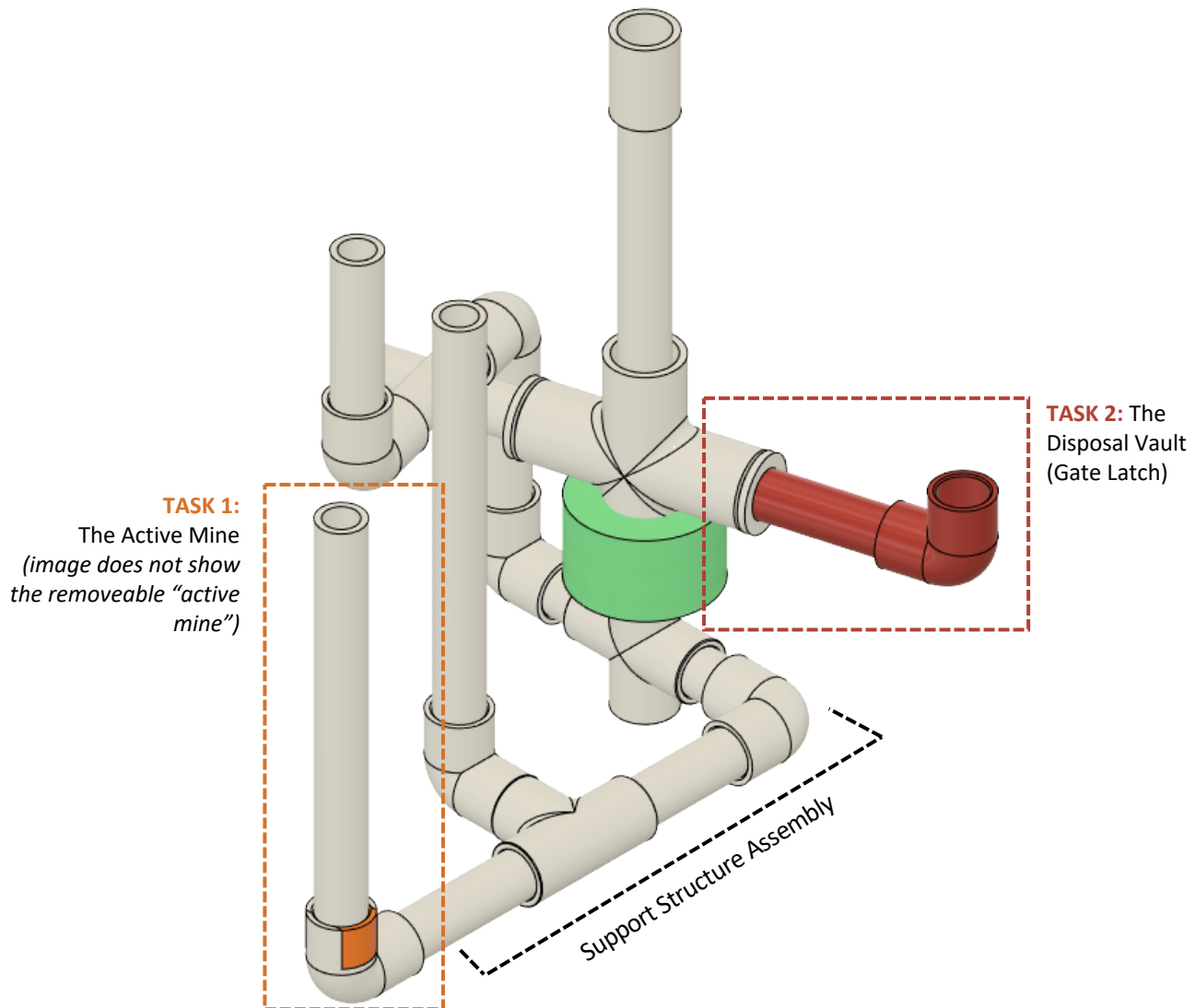


Components for Both Mini Practice & Competition Courses

Task 1: The Active Mine & Task 2: The Disposal Vault (Gate Latch)

Includes the following:

1. Active Mine Arming Device
2. Gate Latch Assembly
3. The Active Mine and Gate Latch Support Structure



Tasks 1: Active Mine & Task: 2 Disposal Vault (Gate Latch) Finished Assembly

Task 1: Active Mine Task Overview

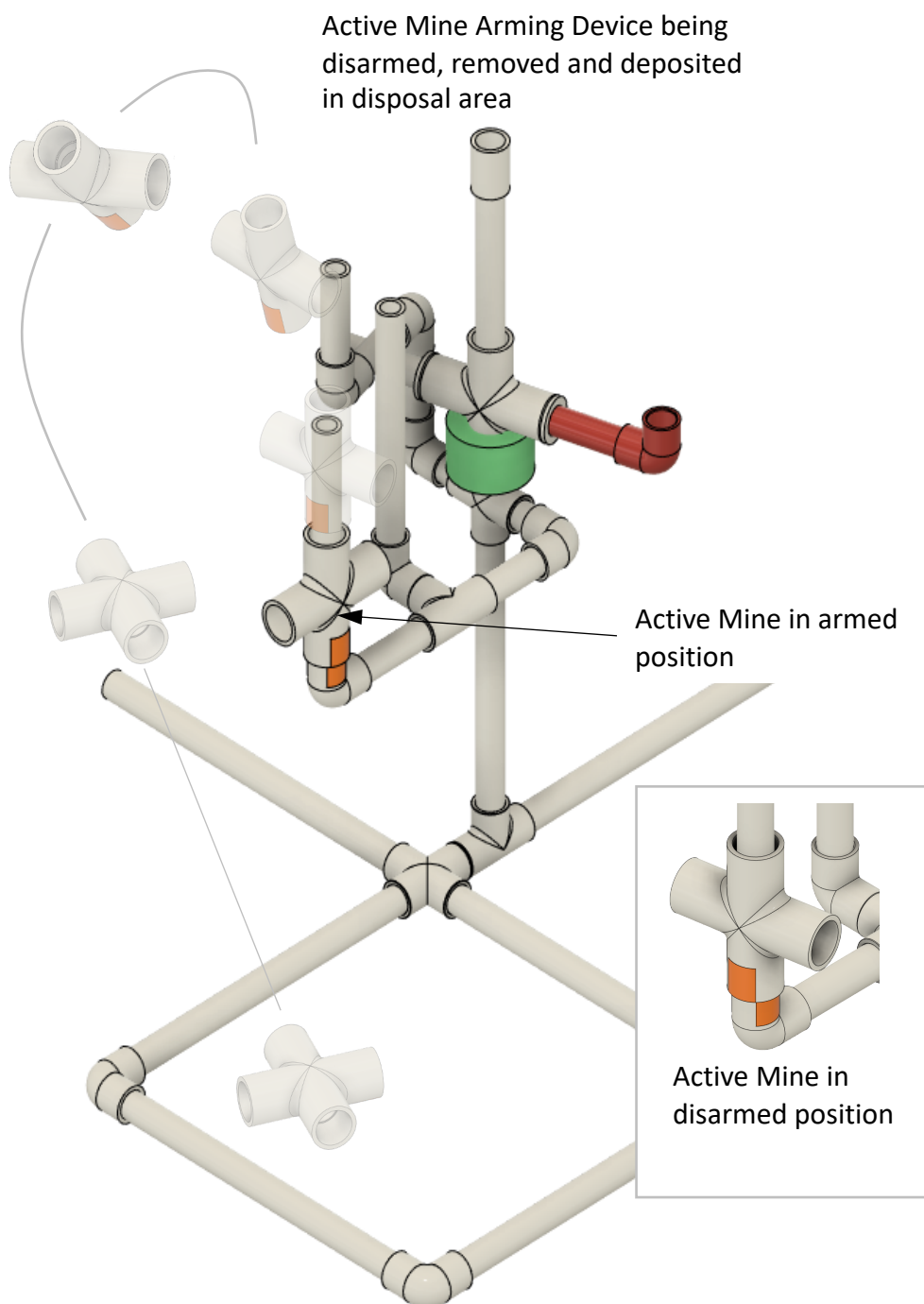
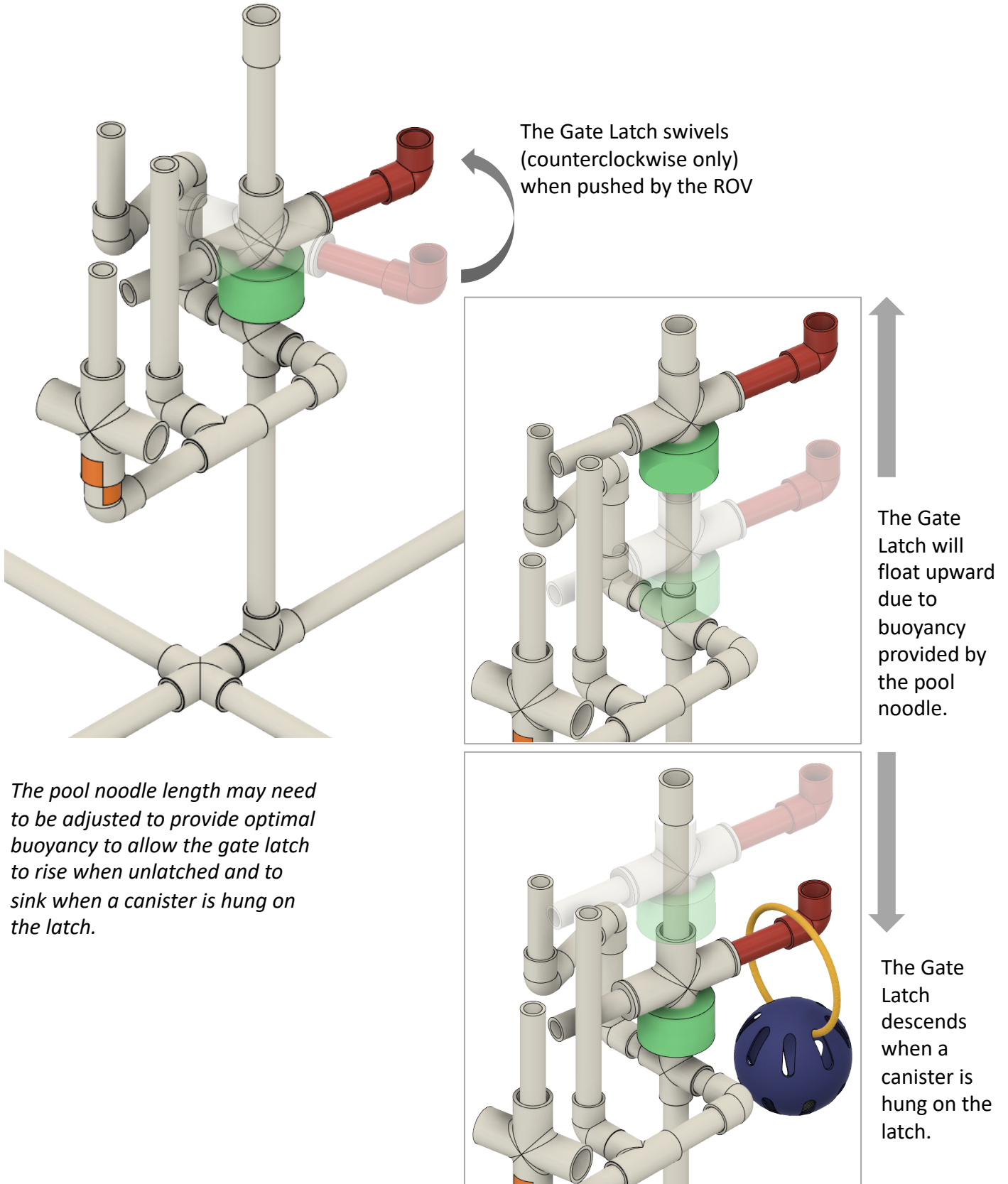


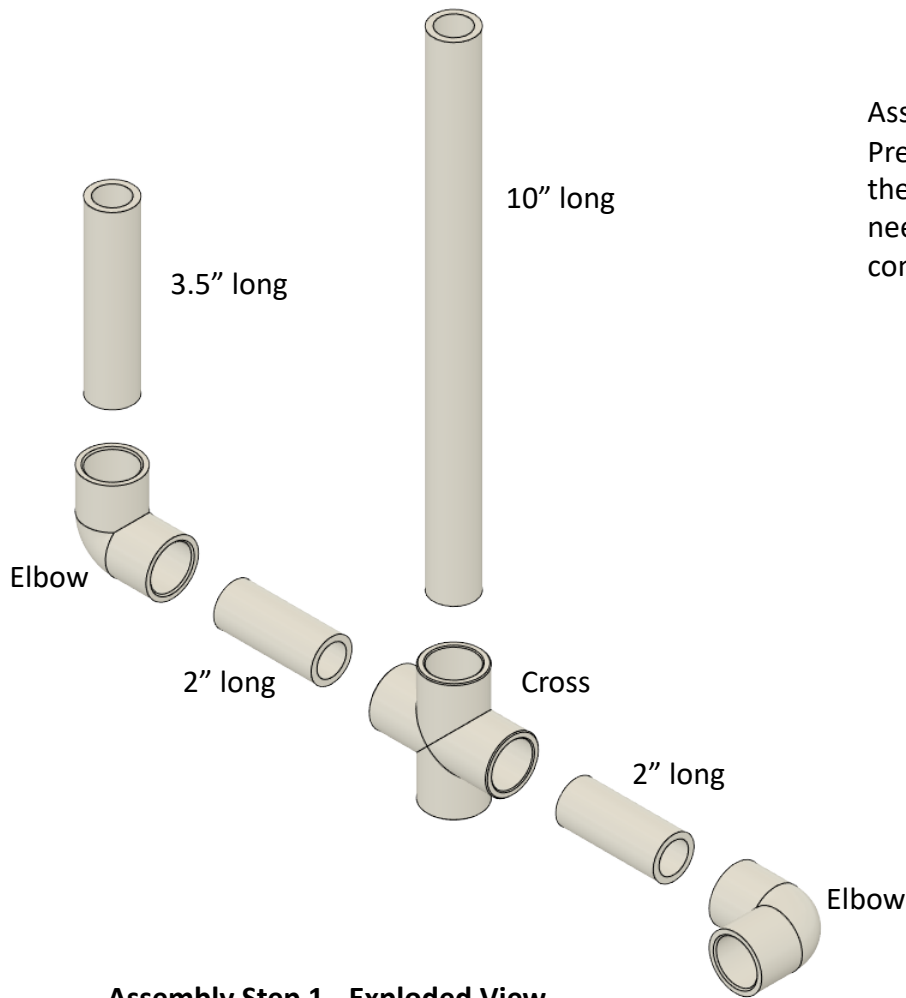
Figure – Active Mine Task Illustration

Task 2: The Disposal Vault (Gate Latch) Task Overview



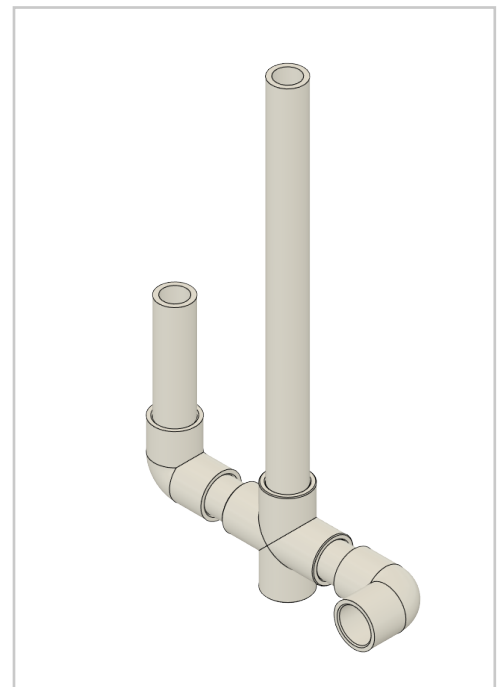
Gate Latch Task Illustration

Task 1 & Task 2: Support Structure Assembly Step 1



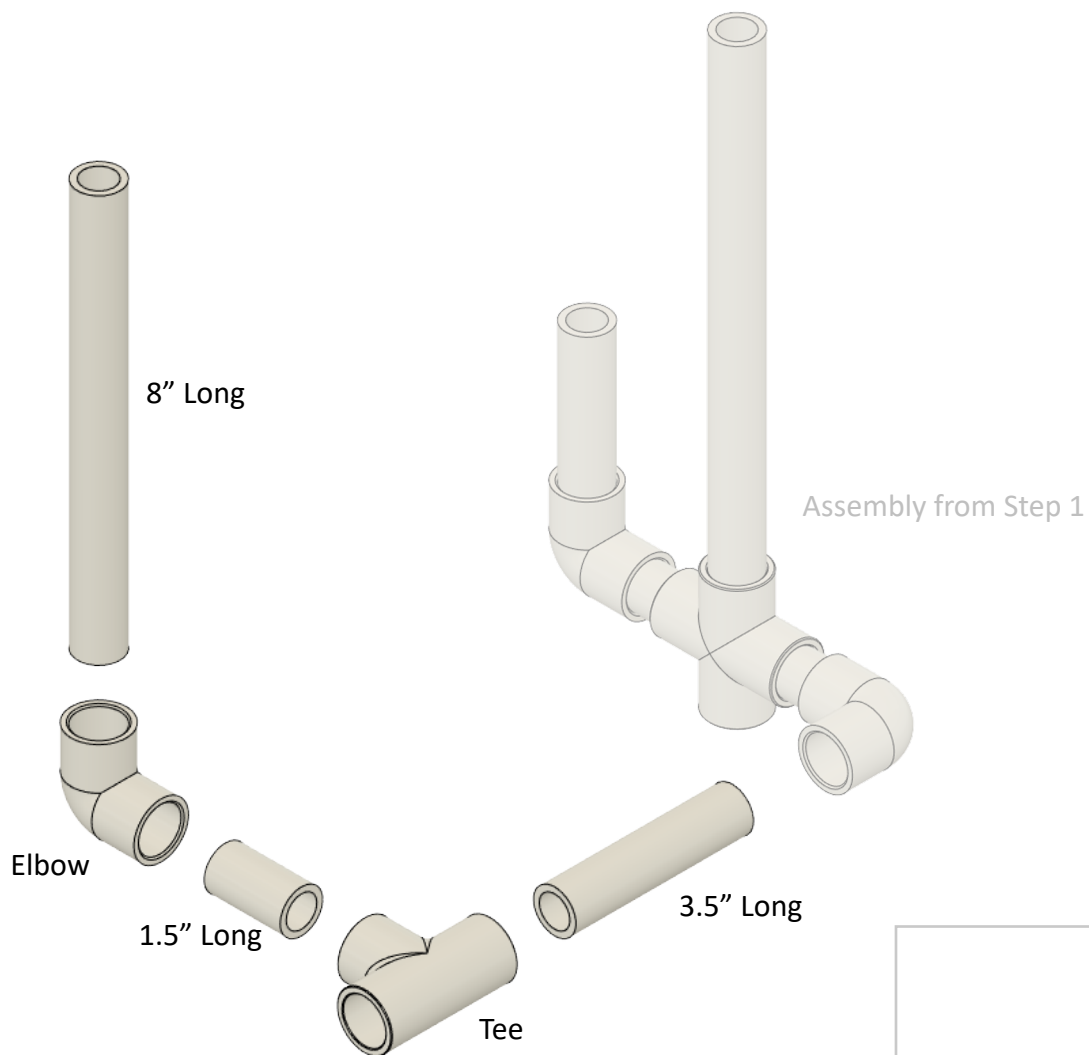
Assembly Step 1 - Exploded View

Assemble the pipes and fittings as shown. Press the pipes into the fittings as far as they will go. A rubber mallet may be needed to assure the pipes are completely seated into the sockets.

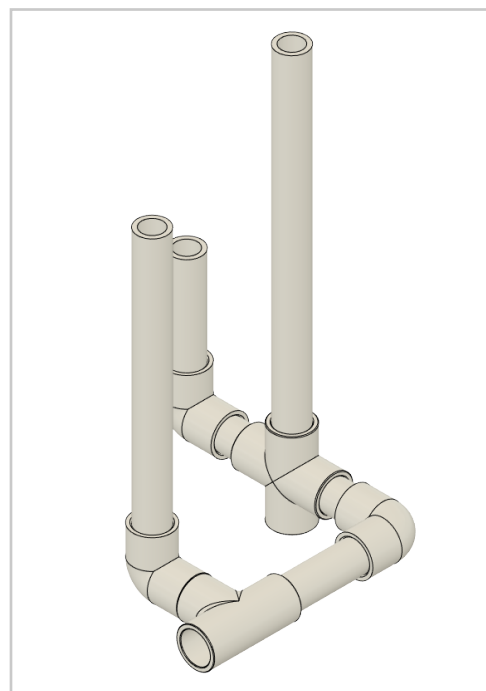


Assembly Step 1 Completed

Task 1 & Task 2: Support Structure Assembly Step 2

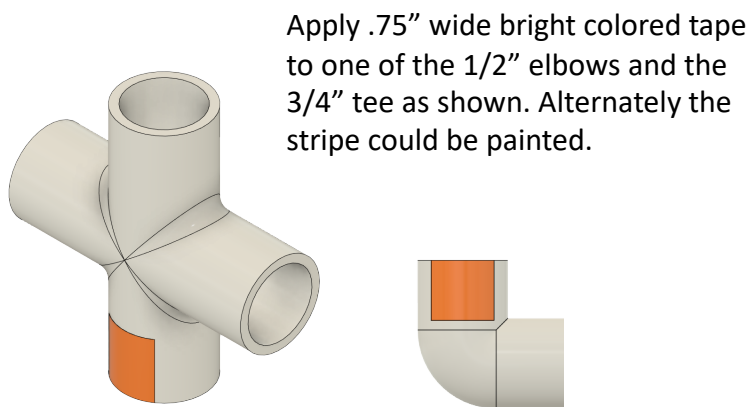
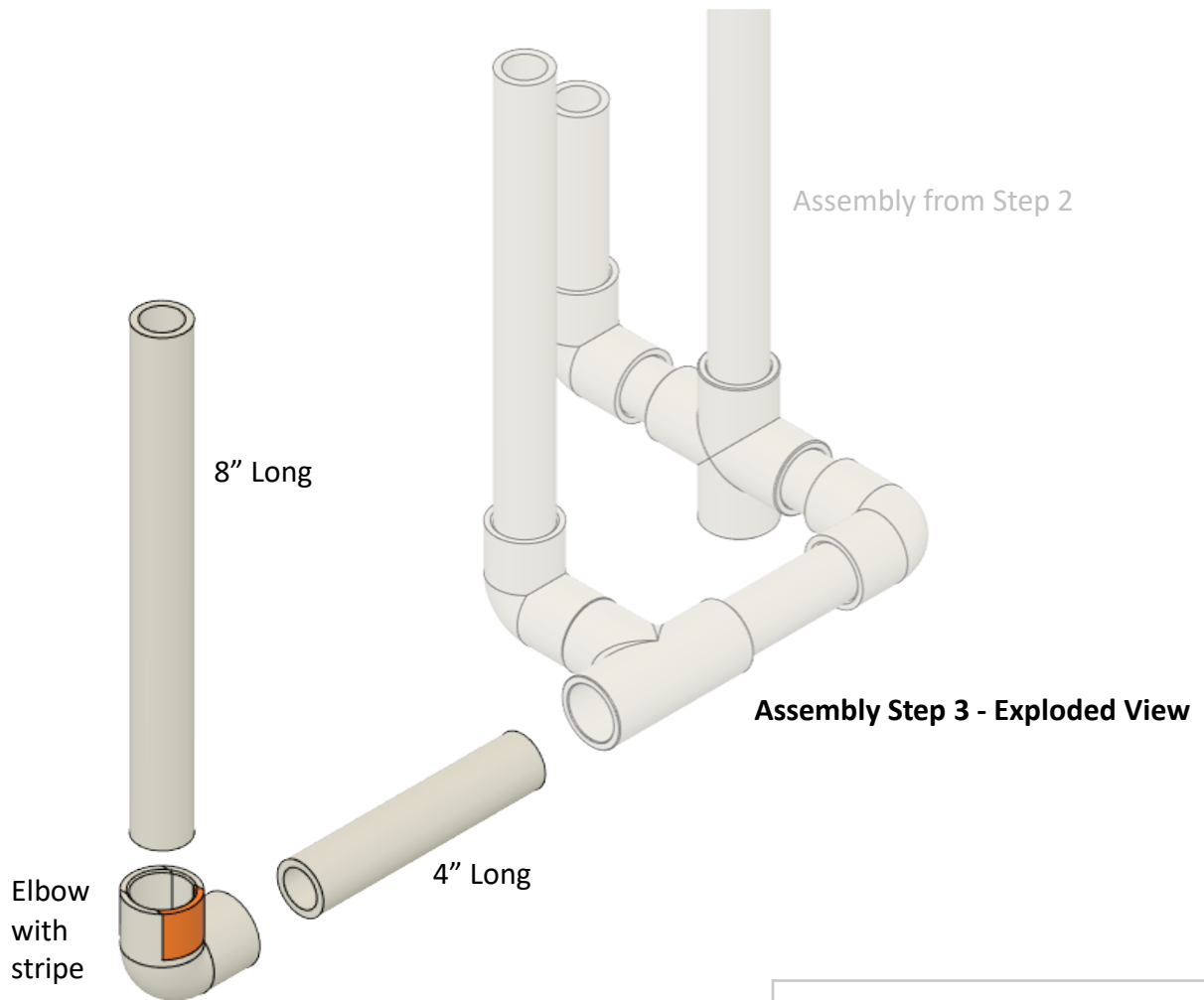


Assembly Step 2 - Exploded View

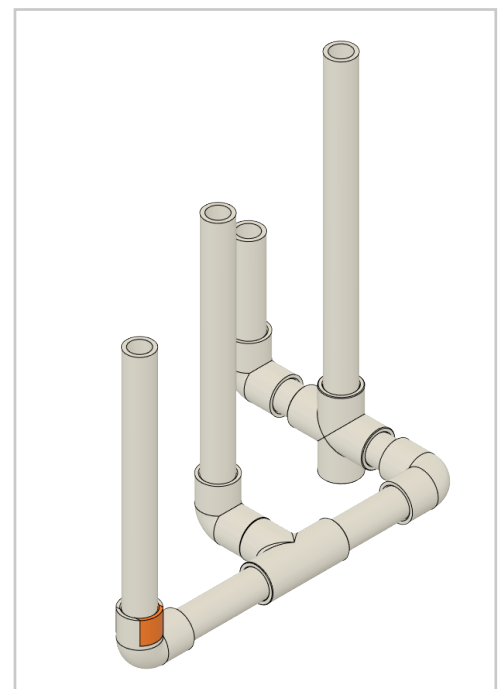


Assembly Step 2 Completed

Task 1 & Task 2: Support Structure Assembly Step 3

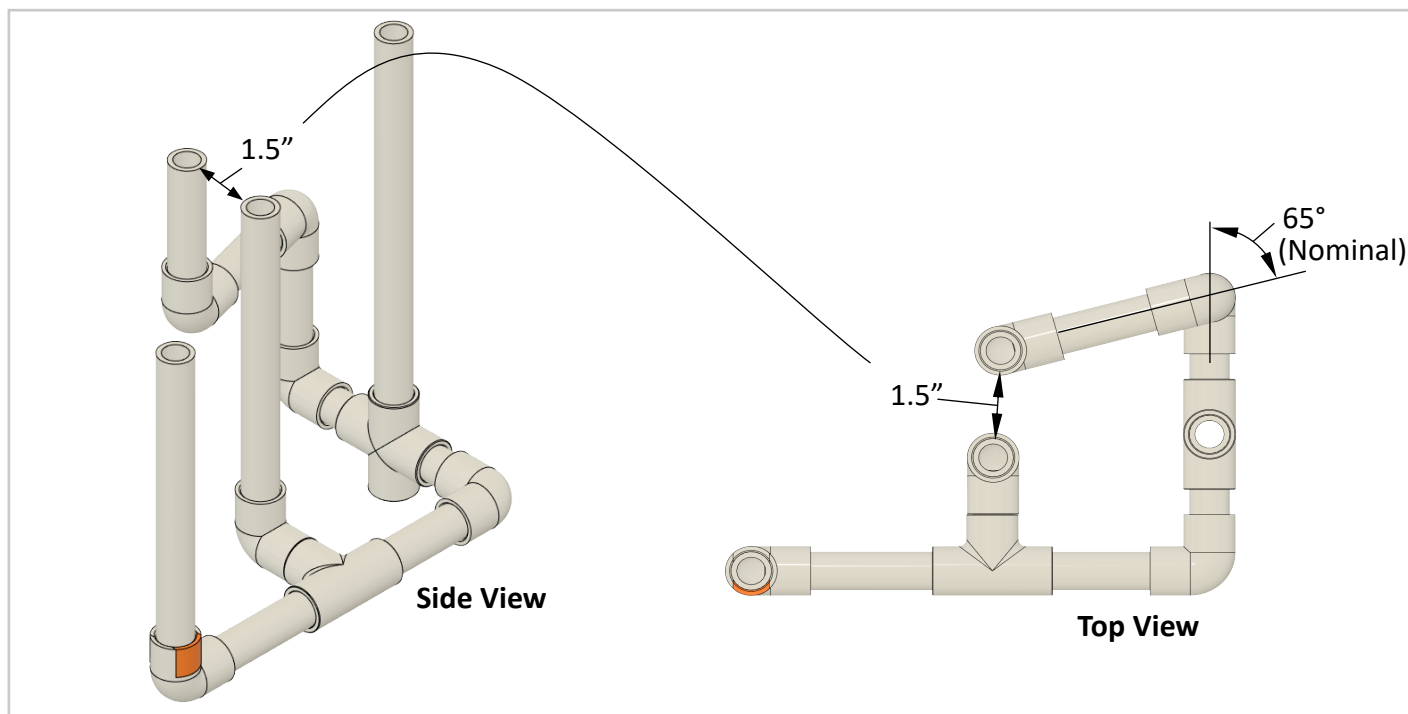
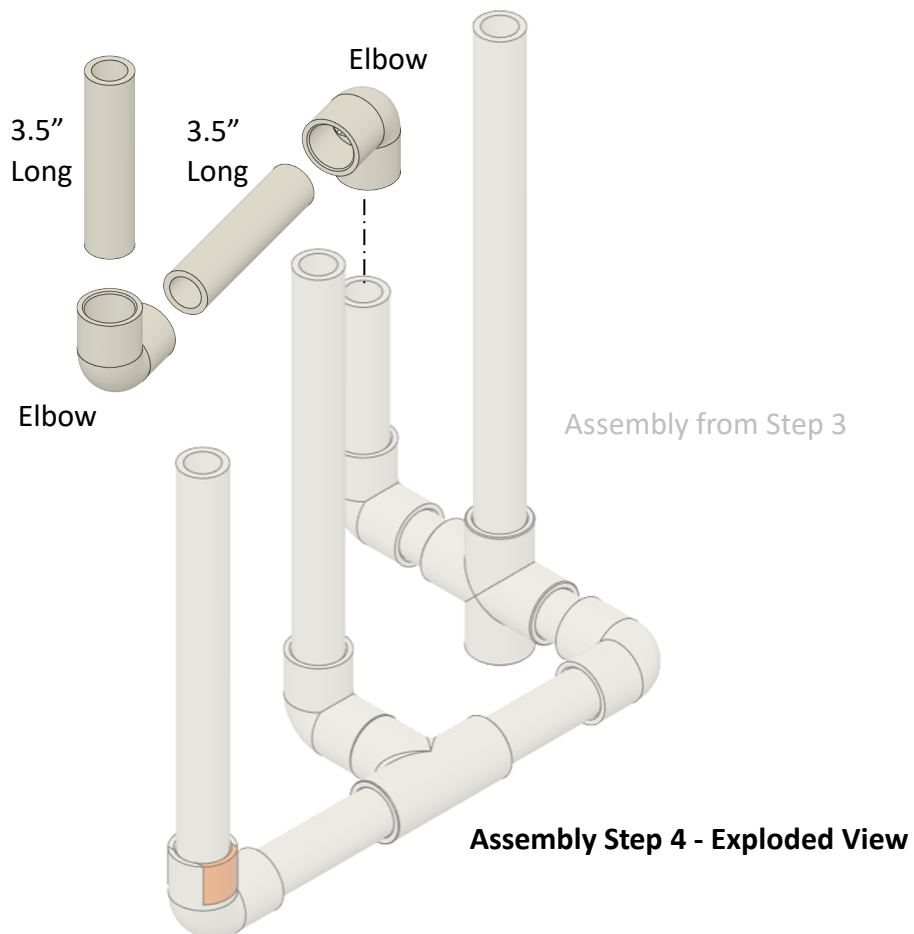


Active Mine Arming Device - Visual Alignment Indicator Stripe



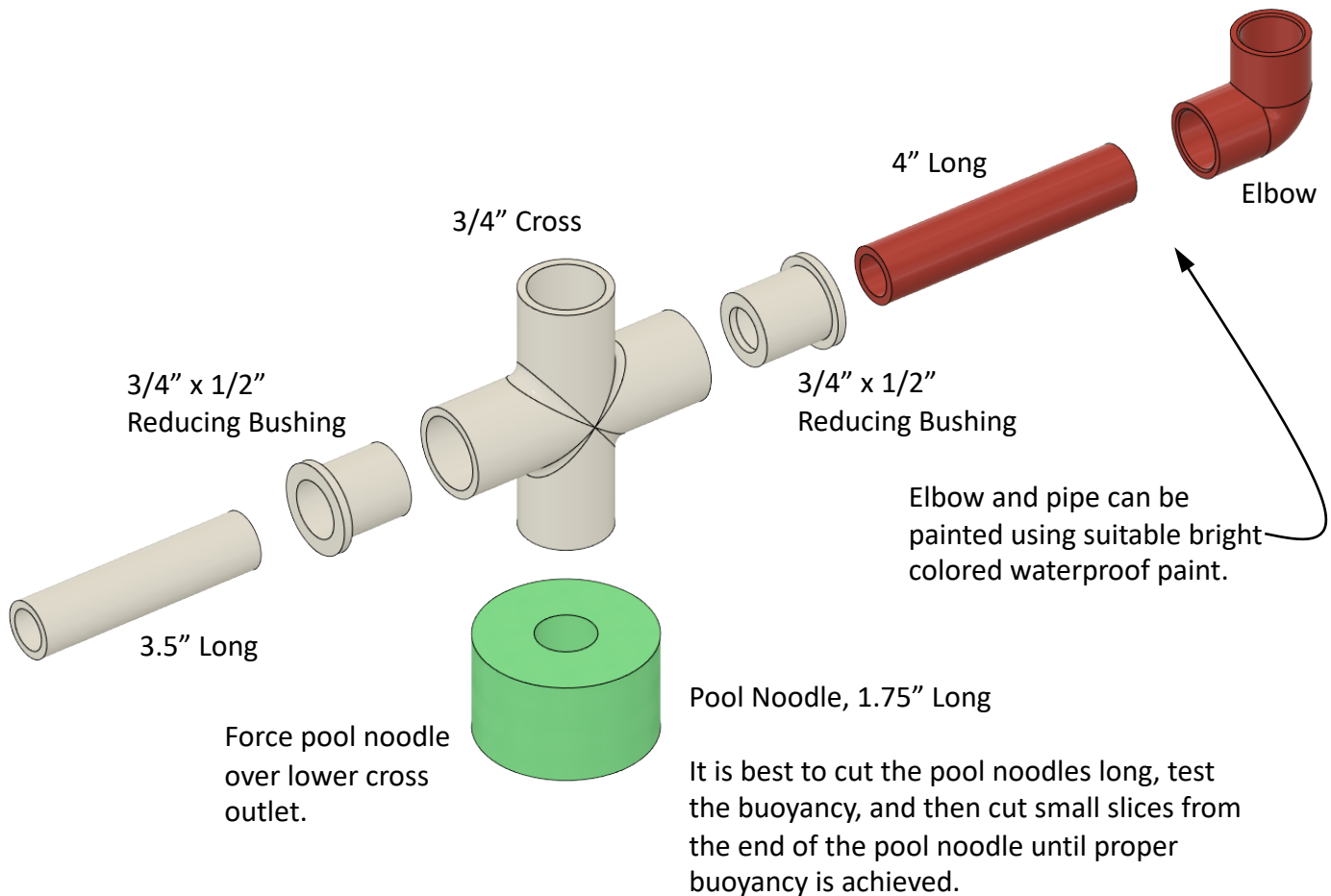
Assembly Step 3 Completed

Task 1 & Task 2: Support Structure Assembly Step 4

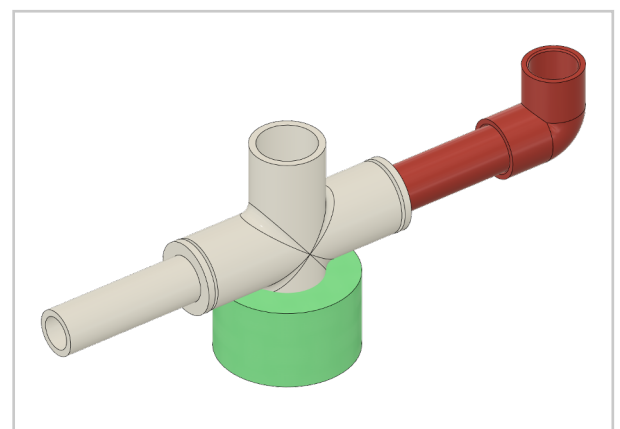


Completed Support Structure Assembly

Task 1 & Task 2: Gate Latch Assembly

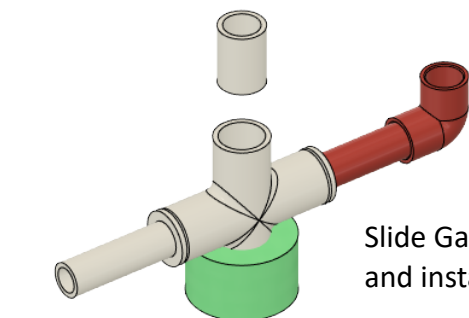


Gate Latch Assembly - Exploded View

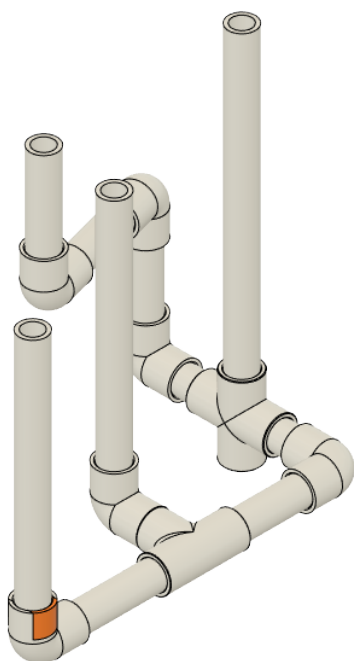


Completed Gate Latch

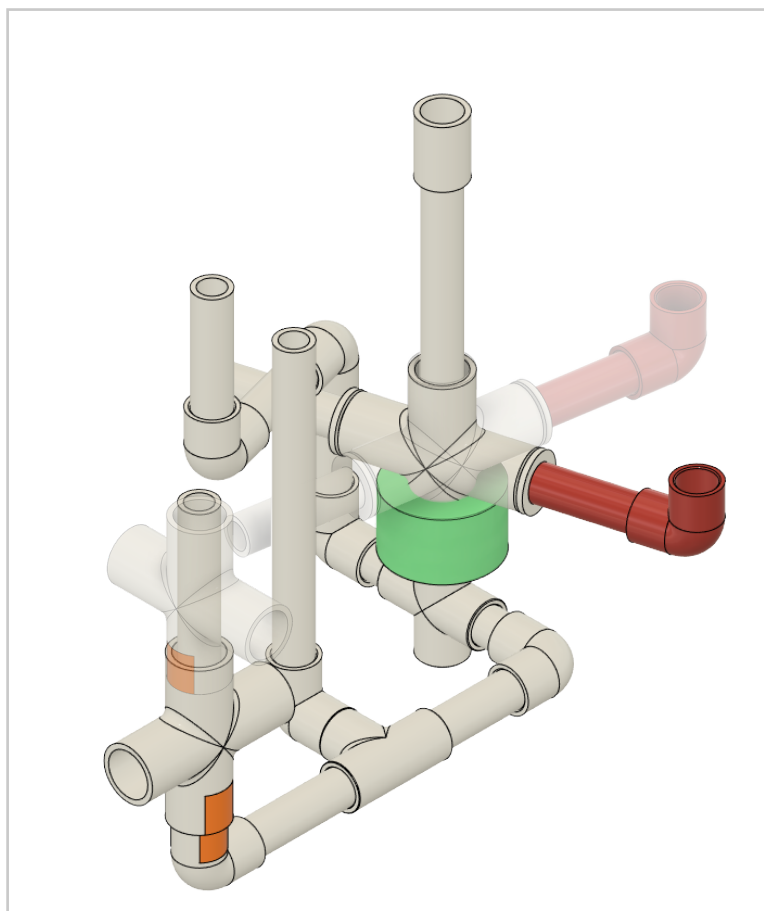
Task 1 & Task 2: Final Assembly



Slide Gate Latch over 10" long upright pipe
and install pipe coupling on end of pipe



Gate Latch Installation

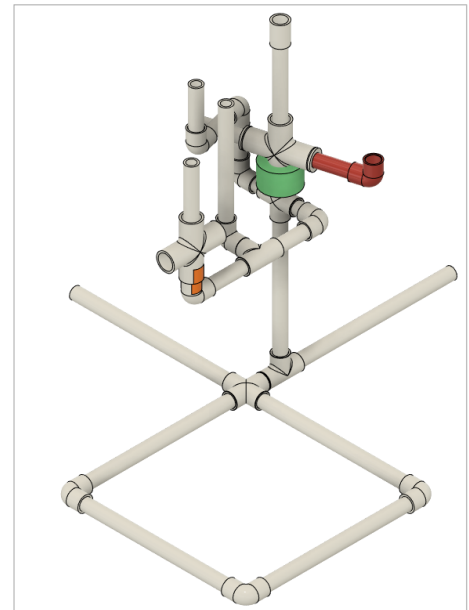


Completed Active Mine and Gate Latch Task Assembly

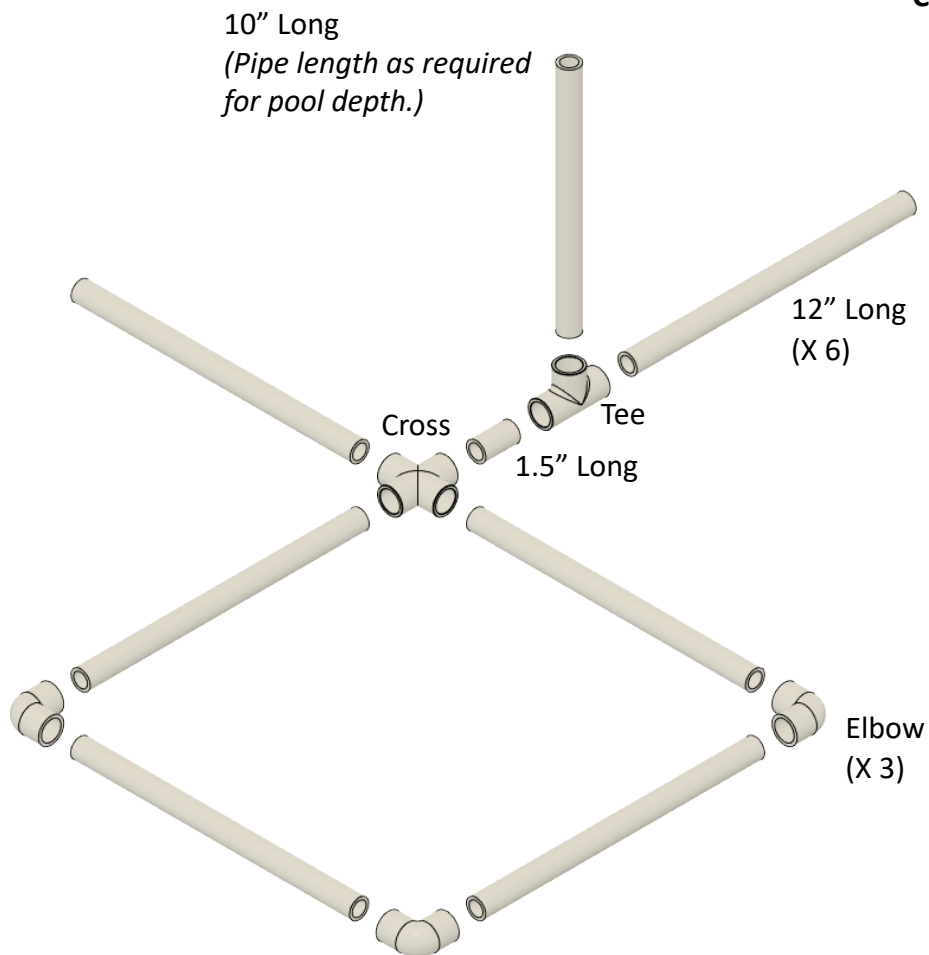
Mini Practice Course: Base Assembly

Notes:

1. Drill .25" diameter drain holes in the three elbows. This allows air to escape and the frame to fill with water quicker when submerged.
2. Screw pipe joints together as required.
3. The base must be weighted down with rebar, bricks, dive weights or other suitable weights.



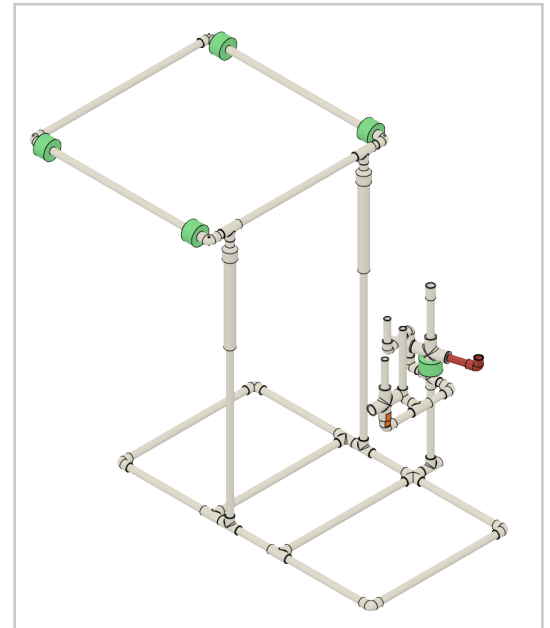
Completed Mini Practice Course



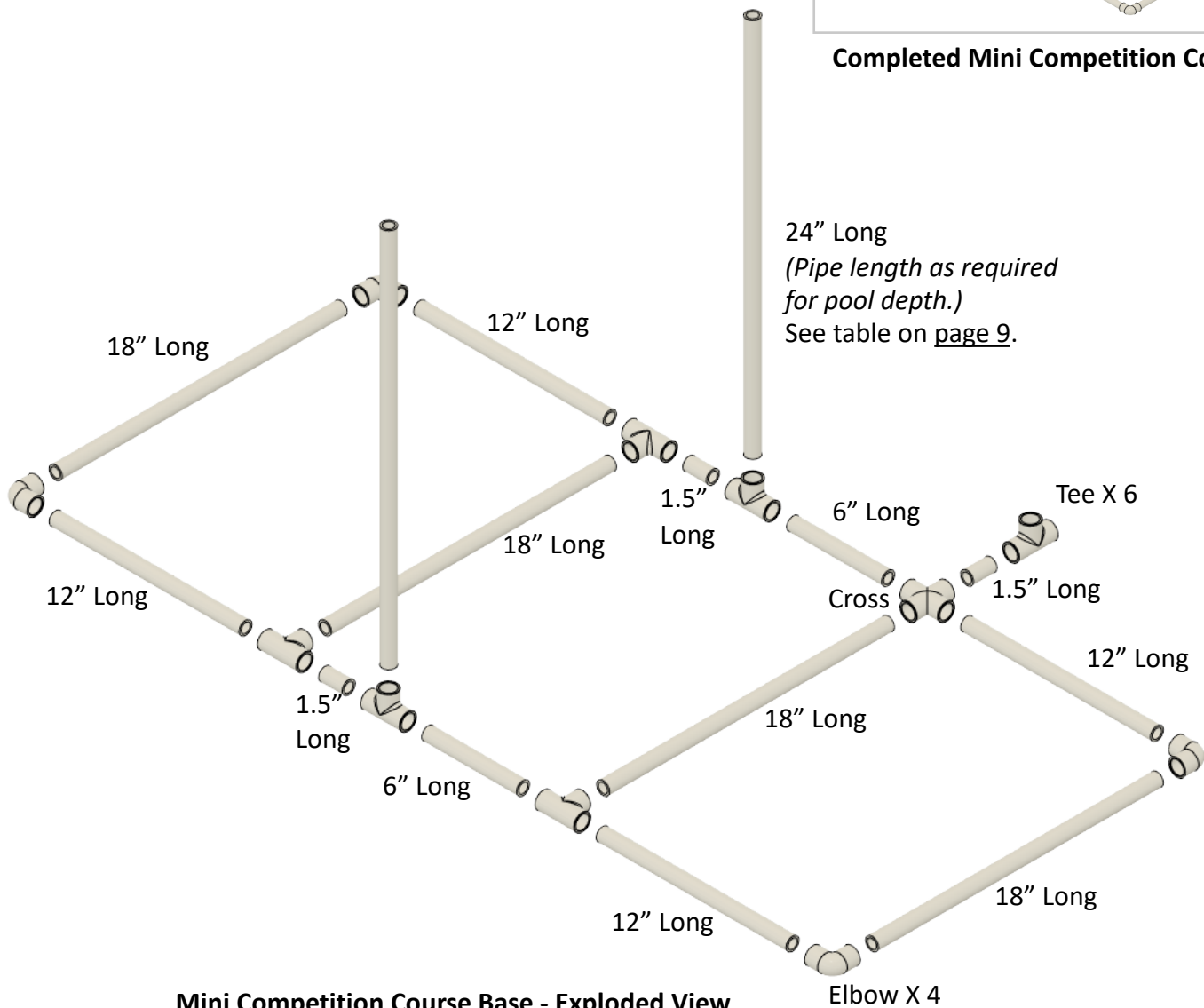
Mini Practice Course Base Assembly Exploded View

Notes:

1. Drill .25" diameter drain holes in the four corner elbows. This allows air to escape and the frame to fill with water quicker when submerged.
2. Screw pipe joints together as required.
3. The structure must be weighted down with rebar, bricks, dive weights or other suitable weights.



Completed Mini Competition Course

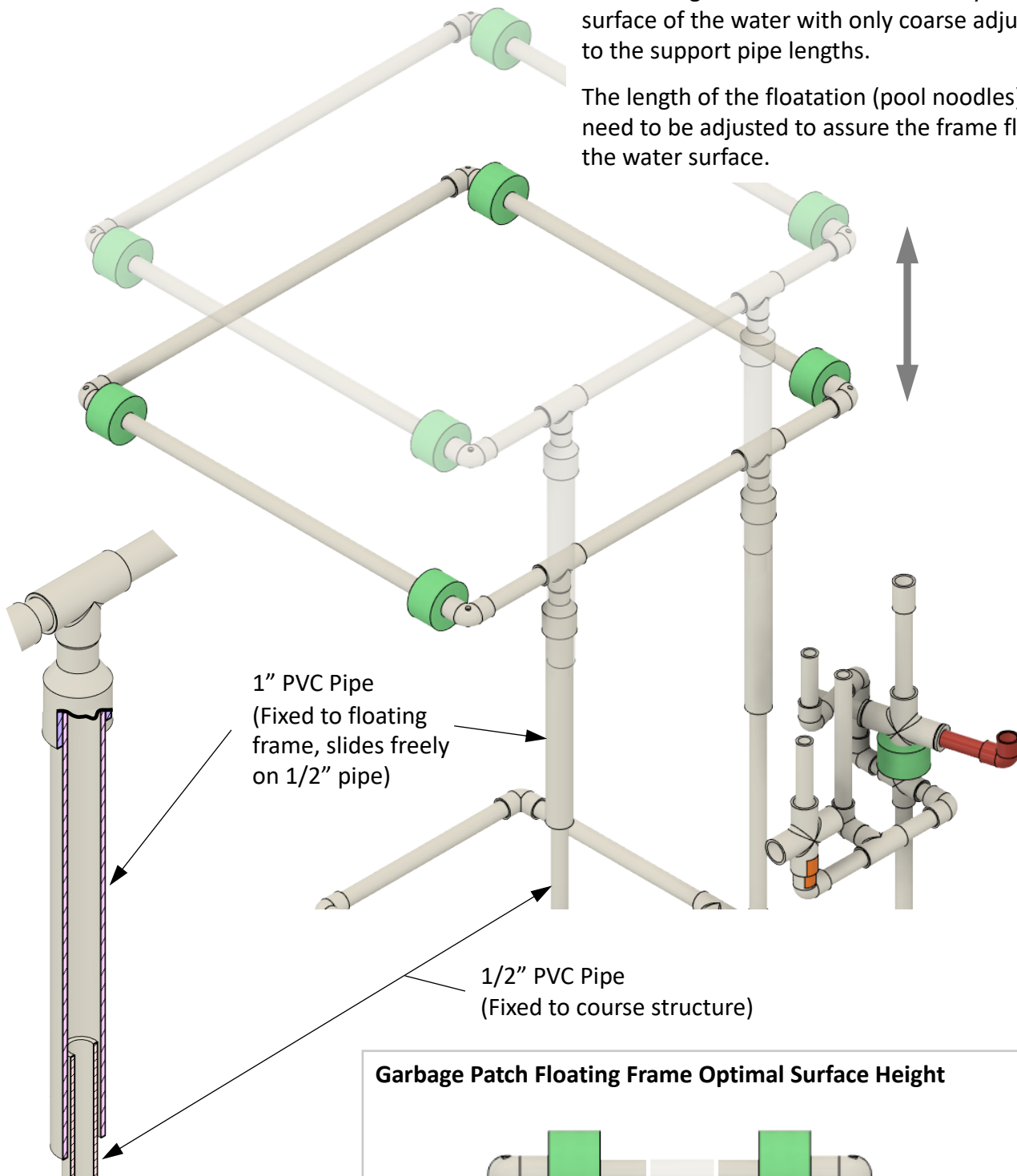


Mini Competition Course Base - Exploded View

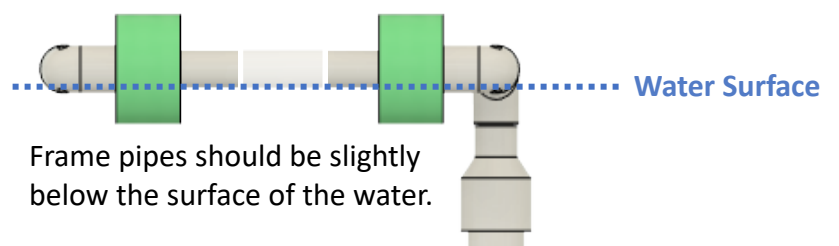
Mini Competition Course Task 3: Garbage Patch Floating Frame Details

The Garbage Patch frame will naturally float on the surface of the water with only coarse adjustments to the support pipe lengths.

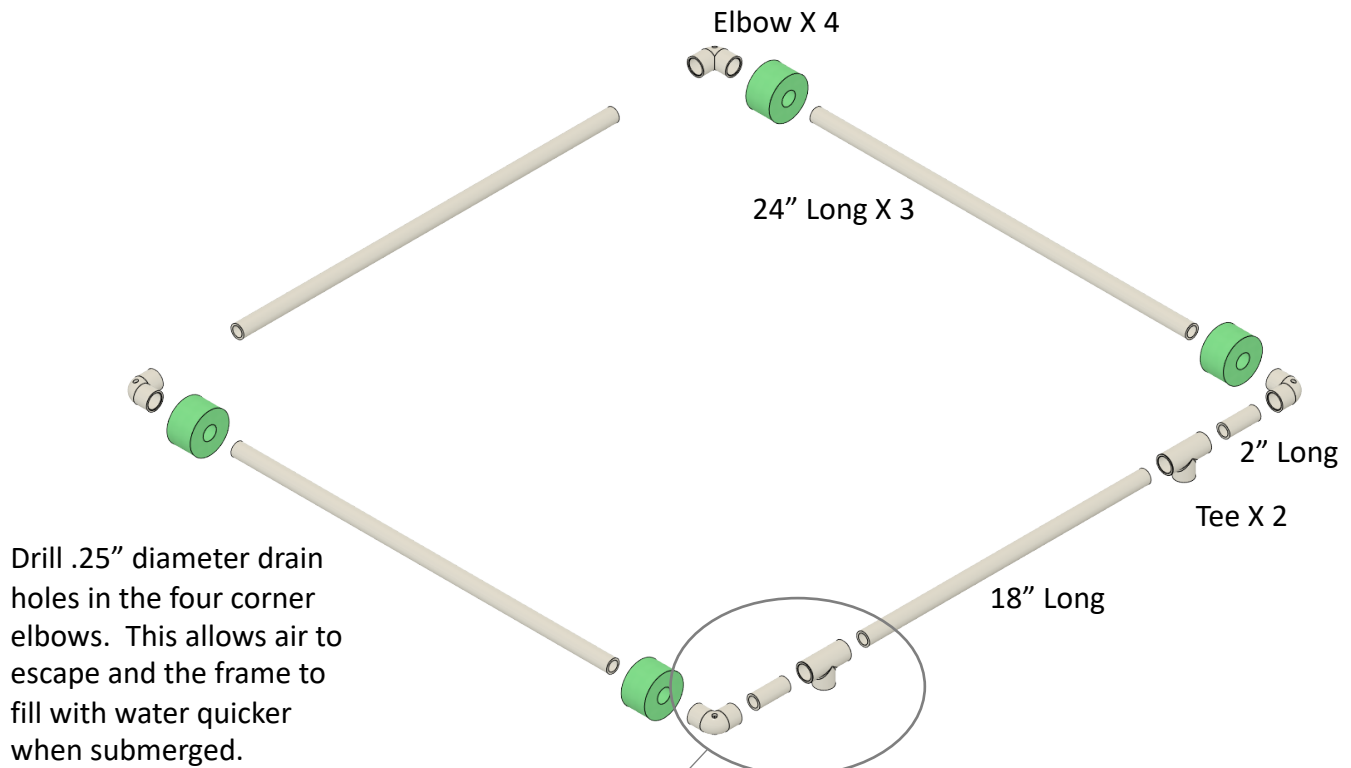
The length of the floatation (pool noodles) may need to be adjusted to assure the frame floats on the water surface.



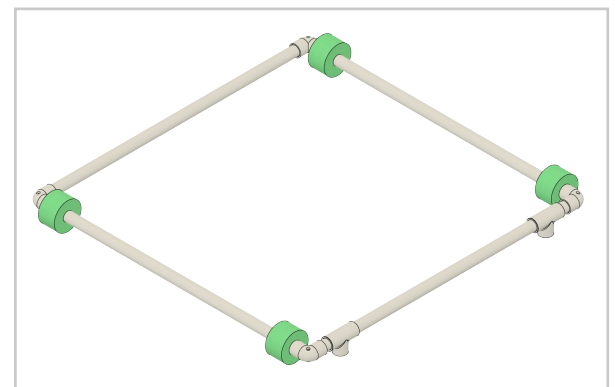
Garbage Patch Floating Frame Optimal Surface Height



Mini Competition Course: Garbage Patch Frame Construction (Step 1)



**Garbage Patch Frame Assembly
(Step 1 - Exploded View)**



**Garbage Patch Frame Assembly
Step 1 Completed**

Mini Competition Course: Garbage Patch Frame Construction (Step 2)

