DIY Neutral Buoyancy Lab & DIY Maneuvering Tool

List of Materials

DIY Neutral Buoyancy Lab

(1) Storage tote (recommended 45 gallons)
(1) Industrial Velcro 2" x 4"
(1) Corrugated plastic 18" x 24"
(1) Epoxy or marine silicone

DIY Maneuvering Tool*

(2) 30" PVC pipes
(2) 2" PVC pipes
(2) ½" PVC elbows
(1) ½" PVC Tee

Tools for use to build the EVAs:

Ruler * Marker * Hot glue gun * Knife * Scissors * Pipe cutter * Drill * Drill bit * Screwdriver

*alternative tool to perform the EVA if you do not have a SeaPerch ROV

EVA simulation using ROVs – EVA 1

List of Materials

SeaPerch ROV or DIY Maneuvering Tool*

PVC Tees, elbows, or any other available material that can be added to the front of the robot to create a tool, or to improve the DIY maneuvering tool.

EVA 1 – Installing HD camera, replacing camera, and fuse change (Expedition 53/54)

(1) Industrial Velcro 2" x 4" (roll)
(1) Corrugated plastic 18" x 24"
(1) Mini storage crate
(1) Cable ties 8" (package)
(1) 12" CPVC pipe
(1) ½" CPVC cap
(1) ½" CPVC elbow
(1) 24" of ¼" Polypropylene rope or 4 pipe cleaners
Locknuts or something to create ballast (fuse)
(1) Roll of Duct tape
(1) Paint (optional) to differentiate the fuses
(1) Drill and ¼" drill bit to make a hole in the PVC pipe.
(2) Small plastic food storage containers (different sizes recommended)
Fender washers or something to create ballast (food containers)
(1) Hot glue gun
(1) Hot glue sticks
(1) Epoxy or marine silicone

*alternative tool to perform the EVA if you do not have a SeaPerch ROV

EVA simulation using ROVs
List of Materials

DIY Neutral Buoyancy Lab

(1) Storage tote (45 gallons recommended)

(1) Industrial Velcro 2" x 4"

(1) Corrugated plastic 18" x 24"

(1) Epoxy or marine silicone

DIY Maneuvering Tool*

(2) 30" PVC pipes

(2) 2" PVC pipes

(2) ½" PVC elbows

(1) ½" PVC Tee

EVA 2 – CETA Cart Mission (STS 119)

Mission Course Assembly – International Space Station Truss Segment

Materials

(1) Corrugated Plastic Sheet 15" x 24"

(2) CPVC ½" elbows

(6) CPVC ½" wing elbows

(4) CPVC ½" tees

CPVC ½" pipe:

- (2) Pipes of 3 cm (join the elbow to the elbow wing)
- (1) Pipe of 52 cm for the truss segment rail
- (4) Pipes of 4 cm to connect the Tee with the elbow wing
- (2) Pipes of 3 cm to join the tees

(26) Screws 8 x ½ or 8 x ¾

Drill

*alternative tool to perform the EVA if you do not have a SeaPerch ROV

EVA simulation using ROVs
List of Materials

DIY Neutral Buoyancy Lab

(1) Storage tote (45 gallons recommended)

(1) Industrial Velcro 2" x 4"

(1) Corrugated plastic 18" x 24"

(1) Epoxy or marine silicone

DIY Maneuvering Tool*

(2) 30" PVC pipes

(2) 2" PVC pipes

(2) ½" PVC elbows

(1) ½" PVC Tee

EVA 2 – CETA Cart Mission (STS 119)

Mission Course Assembly – Brakes

Materials

(1) PVC ½" elbow

(2) PVC ½" sling tee

(1) PVC ½" tee

PVC ½" pipes (2) of 2.5"

(4) Screws 8 x ½ or 8 x ¾

Drill

Industrial Velcro 4" x 2"

Epoxy

(1) Pool noodle

(1) Pipe cleaners

(1) Corrugated plastic 5 cm x 5 cm

*alternative tool to perform the EVA if you do not have a SeaPerch ROV

EVA simulation using ROVs
List of Materials

EVA 2 – CETA Cart Mission (STS 119)

Mission Course Assembly – Crew and Equipment Translation Aid (CETA) Cart

Materials

Corrugated plastic sheet (31 cm x 39.5 cm)

(36) CPVC ½" elbows (you can substitute the elbows and pipes to do the "squares" with straws and secure it with hot glue, no need for tie wraps or drill)

(32) CPVC ½" pipes of 3 cm

(1) CPVC ½" pipe of 5.5 cm

(1) CPVC ½" pipe of 8 cm

(2) CPVC 1" connector

(32) Tie wraps of 8" and (4) of 4"

(2) Pool noodle of 13 cm x 5 cm

(1) Spray paint (white) (optional)

Letters A-H (mine are stickers from Dollar Tree, but you can write it with permanent marker)

Hot glue sticks

Hot glue gun

Drill

8 Screws

*alternative tool to perform the EVA if you do not have a SeaPerch ROV

EVA simulation using ROVs
List of Materials

DIY Neutral Buoyancy Lab

(1) Storage tote (45 gallons recommended)

(1) Industrial Velcro 2" x 4"

(1) Corrugated plastic 18" x 24"

(1) Epoxy or marine silicone

DIY Maneuvering Tool*

(2) 30" PVC pipes

(2) 2" PVC pipes

(2) ½" PVC elbows

(1) ½" PVC Tee

EVA 2 – CETA Cart Mission (STS 119)

Mission Course Assembly – Test tank

Materials

1 Storage tote 45 gal. (I recommend the blue wheeled one because is strong and easy to carry).

4 corrugated plastic sheet (22" x 2")

6 pieces of industrial Velcro (4" x 2")

Epoxy

(4) Screws with nuts

Tape

*alternative tool to perform the EVA if you do not have a SeaPerch ROV

EVA simulation using ROVs – EVA 3
List of Materials

SeaPerch ROV or DIY Maneuvering Tool*

PVC Tees, elbows, or any other available material that can be added to the front of the robot to create a tool, or to improve the DIY maneuvering tool.

EVA 3 – Artemis Mission, Gateway NASA HERMES

For this EVA you will be recycling all the materials from EVA 1. The following materials are "add on" for EVA 3 - HERMES.

Industrial Velcro 2" x 4"
Cable ties 8
(1) Plastic mason jar or can (cylinder shape)
(1) Plastic lid smaller than the jar or can
(2) 1.5" CPVC pipes
(2) ½" CPVC tees
(2) ½" PVC caps
¼" Polypropylene rope or 2 pipe cleaners
(2) Locknuts or something to create ballast

*alternative tool to perform the EVA if you do not have a SeaPerch ROV

EVA simulation using foam boats*
List of Materials

DIY Neutral Buoyancy Lab

(1) Storage tote (45 gallons recommended)

(1) Industrial Velcro 2" x 4"

(1) Corrugated plastic 18" x 24"

(1) Epoxy or marine silicone

Materials for the EVA

(1) Industrial Velcro 2" x 4" (roll)
(1) Corrugated plastic 18" x 24"
(1) Pool noddle
(1) Cable ties 8" (package)
(1) Jumbo Straw
(2) Straws (bended)
(1) Styrofoam (4" x 3" approximately)
Sticker letters (optional, you can write it with a Sharpie)
(1) Hot glue sticks
(1) Epoxy or marine silicone

Materials for the foam boat

Popsicle sticks
(1) Jumbo Straw
(2) Straws (bended)
(1) Styrofoam (4" x 7" approximately) or pool noddle
Sticker letters (optional, you can write it with a Sharpie)
Hot glue sticks
(1) Epoxy or marine silicone
(2) Mini spoons (optional)

Tools:

Ruler * Marker * Hot glue gun * Knife * Scissors

*alternative EVA for those on a budget or could be for distance learners