

# DIY Neutral Buoyancy Lab & DIY Maneuvering Tool

## 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

### Tools for use to build the EVAs:

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

# 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) Duct tape
- (1) Paint (optional) to differentiate the fuses
- (1) Drill, screwdriver, or something pointy to do a hole and attach a cable tie to the corrugated plastic.
- (2) Small plastic food storage containers (different sizes recommended)
- Fender washes 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

## **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

# 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

# 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

# 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
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### Materials for the EVA

- (1) Industrial Velcro 2" x 4" (roll)
- (1) Corrugated plastic 18" x 24"
- (1) Pool noodle
- (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 noodle
- 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**