

# Sea Perch ROV

## Parts and Tools Lists

These lists have been compiled in order to assist you in building the Sea Perch in your classroom and in ordering the necessary parts and tools. Please consult the construction manual and reference your Sea Perch training to verify what you will need.

The suggested vendors have been selected for convenience, price, and/or ease of use. Many of the items may be available at lower cost from other sources, or may be already available at your school (especially tools). Many items come in bulk, or are only available in quantities or packages larger than that needed for a single Sea Perch kit. In these cases, the cost per kit is calculated as a fraction of the minimum order quantity and price. When ordering for multiple kits, verify the quantity needed to order with the quantity needed for each kit and the minimum order quantity. Do not rely solely on the quantity column for the number to order. Many vendors have significant quantity discounts available, and some may have educational discounts.

### Key

Qty.

Quantity - number of items needed for 1 kit, or length needed for items such as wire.

Size

Size or amount of item required, or unit of measure.

Item

Description of item.

Suggested Vendor

Suggested source for purchase of items.

Cat.No.

Catalog Number of item in suggested vendor's catalog

Minimum Package Quantity

Minimum amount available from vendor in a single order - may be more or less than needed for 1 kit

Per Package Cost

Cost of minimum order.

Order Quantity (# Pack.)

Number of packages of minimum order size needed for 1 kit.

Minimum Order Cost

Cost of quantity needed to order (minimum order)

Per Kit Cost

Cost of material needed for 1 kit (ignoring minimum orders)

Notes

Additional information, including quantity discounts and alternative sources

These lists were last updated in August 2007. All items were available from the suggested vendors at that time, but availability may change.

We strongly suggest ordering some extra film cans (sample vials), fuses, and hookup wire, as these items often need replacing.

# Sea Perch

## Master List - Parts for 1 vehicle

Qty.	Size	Item	Suggested Vendor	Cat. No.	Minimum Package Quantity	Per Package Cost	Order Quantity (# Pack.)	Minimum Order Cost	Per Kit Cost	Notes
<b>Vehicle Frame</b>										
1	14 in	3/8", ABS H-Column	Plastruct	H-12	1	\$ 1.45	1	\$ 1.45	\$ 1.45	Quantity discount: 4 for \$5.55
1	5 ft	1/2", Sch. 40 PVC Pipe	McMaster-Carr	48925K91	1	\$ 1.97	1	\$ 1.97	\$ 1.97	
10	each	PVC elbows, 1/2" Sch. 40	McMaster-Carr	4880K21	1	\$ 0.31	10	\$ 3.10	\$ 3.10	
4	each	PVC Tees, 1/2" Sch. 40	McMaster-Carr	4880K41	1	\$ 0.38	4	\$ 1.52	\$ 1.52	
1	12"x8"	Polyethylene Mesh (sold 36" wide, per foot)	McMaster-Carr	9314T33	1	\$ 1.05	1	\$ 1.05	\$ 1.05	
3	each	Conduit straps (motor mounts)	McMaster-Carr	9429T36	50	\$ 5.00	1	\$ 5.00	\$ 0.30	
6	each	#6 x 1/2" stainless steel sheet metal screws	McMaster-Carr	92465A148	100	\$ 7.36	1	\$ 7.36	\$ 0.44	
6	each	#6 stainless steel flat washers	McMaster-Carr	90107A007	100	\$ 4.08	1	\$ 4.08	\$ 0.24	
2	each	Football floats 3"x5"	Aquatic Ecosystems	NF7	1	\$ 1.80	2	\$ 3.60	\$ 3.60	24+ @ \$1.60ea.
4	each	1 oz. and/or 2 oz. large steel nuts (ballast weight)								Or use large fishing sinkers
<b>Thruster Assembly</b>										
3	each	Plastic Sample Vial, 50ml (or use free film cans!)	US Plastics	81037	1	\$ 1.57	3	\$ 4.71	\$ 4.71	Quantity Discount available
6	each	Brass Hex Nuts, 4-40	McMaster-Carr	95130A110	100	\$ 3.13	1	\$ 3.13	\$ 0.19	
3	each	Threaded Coupler 4-40, 0.095" (Propeller Shaft)	Tower Hobbies	GPMQ3832	2	\$ 1.39	2	\$ 2.78	\$ 2.09	
3	each	1/8" plastic propeller 0.19, 0.35	Tower Hobbies	DUMB1860	1	\$ 1.15	3	\$ 3.45	\$ 3.45	
3	each	Motors 12 volt	Jameco	232021	1	\$ 2.25	3	\$ 6.75	\$ 6.75	100+ @ \$1.79ea.
40	ft. long	Cat 5 cable, 4 twisted pair, stranded (by the foot)	Jameco	201582	25	\$ 9.45	2	\$ 18.90	\$ 15.12	Quantity discounts available
<b>Control Box</b>										
1	each	Plastic box 4.9"x2.5"x1.5"	Jameco	18913	1	\$ 3.69	1	\$ 3.69	\$ 3.69	10+ @ \$3.32ea.
2	each	DPDT center off toggle switches	Jameco	21952	1	\$ 1.55	2	\$ 3.10	\$ 3.10	Quantity Discount available
2	each	SPDT mom. push button switches	Jameco	121304	1	\$ 3.59	2	\$ 7.18	\$ 7.18	Quantity Discount available
2	each	Alligator clips	Jameco	256525	2	\$ 0.50	1	\$ 0.50	\$ 0.50	Quantity Discount available
1	each	Insulator for alligator clip - Red	Jameco	248972	2	\$ 0.51	1	\$ 0.51	\$ 0.26	Quantity Discount available
1	each	Insulator for alligator clip - Black	Jameco	248962	2	\$ 0.51	1	\$ 0.51	\$ 0.26	Quantity Discount available
1	each	Fuseholder, In-line, 1.25"x.25" fuse	Jameco	151918	1	\$ 1.19	1	\$ 1.19	\$ 1.19	Quantity Discount available
1	each	Fuse: 10A, slow-blow	McMaster-Carr	7085K15	5	\$ 6.44	1	\$ 6.44	\$ 1.29	Quantity Discount available
6	ft. long	#18AWG speaker wire, 6 foot length	McMaster-Carr	70405K34	1	\$ 0.18	6	\$ 1.08	\$ 1.08	250+ @ \$.09/ft.
<b>Expendable Supplies</b>										
0.5	ring	Wax Toilet Bowl Ring (1/2 ring for each vehicle)	McMaster-Carr	2793K31	1	\$ 1.40	1	\$ 1.40	\$ 0.70	@ HomeDepot: 8 rings for \$3.35
1	each	Epoxy packet & mixing stick	McMaster-Carr	7493A34	10	\$ 12.04	1	\$ 12.04	\$ 1.20	
2	ft. long	#24 stranded hookup wire, red (sold by 100' roll)	McMaster-Carr	7587K921	100	\$ 6.83	1	\$ 6.83	\$ 0.14	
2	ft. long	#24 stranded hookup wire, black (sold by 100' roll)	McMaster-Carr	7587K922	100	\$ 6.83	1	\$ 6.83	\$ 0.14	
15	6 in.	6" cable ties (aka: zip-ties or tie-wraps), black	McMaster-Carr	7130K42	100	\$ 4.14	1	\$ 4.14	\$ 0.62	
3	inches	Butyl Rubber Tape aka. "Monkey Dung" (16 yd. roll)	McMaster-Carr	76385A15	576	\$ 18.25	1	\$ 18.25	\$ 0.10	
1	roll	Electrical tape	Jameco	285587	1	\$ 0.99	1	\$ 0.99	\$ 0.99	Higher quality tape also available
1	roll	Solder, 60/40 rosin core (contains lead)	Jameco	170457	1	\$ 1.39	1	\$ 1.39	\$ 1.39	
1	bottle	Rubbing Alcohol								
1	roll	Paper Towels								
		Newspaper, cardboard or dropcloths to protect waxing table, wall & floor								
<b>Total for ROV</b>					Total for minimum order quantity			\$ 144.92	\$ 69.79	per kit, w/o battery or charger

## Sea Perch

Battery & Charger						
1	12 v	Battery, Sealed Lead Acid (SLA), 12 volt, 7 AH	batterymart.com	SLA-12V7-F1	\$ 14.95	also @ Jameco # 264057, \$18.15 ea.
1		Charger - 12v, 500mA Automatic SLA Charger	batterymart.com	ACC-12BC0500D-1	\$ 15.95	also @ McMaster # 7448K67, \$38.33
1		Cord for Charger	batterymart.com	ACC-D-1766	\$ 1.95	(cord not needed with McMaster Charge above)
<b>Total for Battery and Charger</b>					<b>\$ 32.85</b>	

Individual Tools (suggested for each Sea Perch kit)						
1		PVC Pipe Tubing Cutter (RATCHET Style!)	PlumbingStore.com	4657	\$ 17.88	also available at McMaster #8336A13, for \$44.37
1		Screwdriver, flat, medium	McMaster-Carr	5682A18	\$ 4.46	
1		Screwdriver, phillips, small	McMaster-Carr	5682A27	\$ 3.32	
1		Scissors	McMaster-Carr	3608A14	\$ 11.51	
1		Slip joint pliers (and/or needle-nose pliers)	McMaster-Carr	5624A8	\$ 8.12	
1		Diagonal cutter pliers (wire cutters)	McMaster-Carr	3621A11	\$ 5.81	
1		Wire strippers (for 26-16 AWG Stranded wire)	McMaster-Carr	7294K58	\$ 9.91	
1		Safety Glasses (Eye Protection)	McMaster-Carr	54185T601	\$ 2.30	For over prescription glasses, use #52755T9, \$5.02 ea.
1		Plastic Tote: parts and/or tool container (optional)	McMaster-Carr	4387T51	\$ 4.34	
1		Soldering Iron	Jameco	224611	\$ 7.95	Many options available, for +/- \$
1		Soldering Stand	Jameco	36329	\$ 4.95	
1		Soldering Iron Tip, conical	Jameco	226018	\$ 0.95	
1		Sharpie (marker)	Office Depot, etc.			
1		Ruler	Office Depot, etc.			
1		Pen	Office Depot, etc.			
1		Pencil	Office Depot, etc.			
1		Pad of paper (lab notebook)	Office Depot, etc.			
1		Paint set, enamel, regular colors (optional)	Tower Hobbies	LXHH93	\$ 7.89	
1		Paint brush set (optional)	Tower Hobbies	LXB838	\$ 3.39	
<b>Shared Tools (shared by multiple Sea Perch kits)</b>						
1		Drill bit, 1/4"	McMaster-Carr	2901A124	\$ 2.16	Quantity Discount available, 12+
1		Drill bit, 3/32"	McMaster-Carr	2901A113	\$ 1.06	Quantity Discount available, 12+
1		Twisted Pair Cable Stripper (for tether sheath)	McMaster-Carr	4333K26	\$ 23.28	@ Jameco: #230447, \$18.89
1		Hand drill, variable speed - corded or cordless	Sears, Home Depot, etc.	various	\$ 29.99	Many types available: \$30-\$200
1		Electric Skillet (by Presto)	Ace Hardware, etc.	65987	\$ 29.99	Any Hot plate and pan will do
1		Metal cup or beaker for melting wax				cups with handles suggested
1		Digital Multimeter for debugging (optional)	Jameco	220812	\$ 9.65	
1		Desoldering Pump, aka. "solder sucker" (optional)	Jameco	19166	\$ 4.95	Or use solder wick, Jameco # 41081, \$1.75 ea.
1		Bench vise, 4" (optional)	McMaster-Carr	5310A42	\$ 49.16	cheaper @ HomeDepot, etc.
		Thruster potting holder parts: wood, fine nails, wood glue (optional)				
<b>Total for a complete set of Tools</b>					<b>\$ 243.02</b>	

## Sea Perch

### Web Addresses of Vendors

Ace Hardware	<a href="http://www.acehardwareoutlet.com">www.acehardwareoutlet.com</a>
Allied Electronics	<a href="http://www.alliedelec.com">www.alliedelec.com</a>
Aquatic Ecosystems	<a href="http://www.aquaticeco.com">www.aquaticeco.com</a>
BatteryMart.com	<a href="http://www.batterymart.com">www.batterymart.com</a>
Home Depot	<a href="http://www.homedepot.com">www.homedepot.com</a>
Jameco	<a href="http://www.jameco.com">www.jameco.com</a>
McMaster-Carr	<a href="http://www.mcmaster.com">www.mcmaster.com</a>
Plastruct	<a href="http://www.plastruct.com">www.plastruct.com</a>
The Plumbing Store	<a href="http://www.PlumbingStore.com">www.PlumbingStore.com</a>
Sears	<a href="http://www.sears.com">www.sears.com</a>
Tower Hobbies	<a href="http://www.towerhobbies.com">www.towerhobbies.com</a>
US Plastics	<a href="http://www.usplastic.com">www.usplastic.com</a>

### **Old Suppliers (no longer used in this list, but still useful as backup)**

Radio Shack	<a href="http://www.radioshack.com">www.radioshack.com</a>
Small Parts Inc.	<a href="http://www.smallparts.com">www.smallparts.com</a>
Newark Electronics	<a href="http://www.newark.com">www.newark.com</a>
Contact East	<a href="http://www.contacteast.com">www.contacteast.com</a>
DataComm Warehouse	<a href="http://www.warehouse.com">www.warehouse.com</a>
Go Fishin	<a href="http://gofishin.com">gofishin.com</a>
IWP	<a href="http://www.rubbermaidproducts.com">www.rubbermaidproducts.com</a>

### Optional Accessories for the Sea Perch

#### **Alternative switches**

Some educators have been successfully using larger toggle switches to replace both the toggle and pushbutton switches. They are cheaper and easier to hookup because of their screw terminals. They are available from:

<a href="http://www.kelvin.com">http://www.kelvin.com</a>	Part# 270013	\$1.75 ea.	(\$1.45 ea. for >10)
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#### **Cheaper Tether Cables**

Ethernet cable is available in bulk from various vendors. Searching online will yeild cheaper sources, as prices fluctuate. Be sure to get Cat5 or Cat5e cable with 4 twisted pairs, and STRANDED wires!

#### **Sensors**

Hobo Data Loggers	<a href="http://www.iscienceproject.com/">http://www.iscienceproject.com/</a>	K-12 teachers can sign them out for free!
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#### **Underwater cameras**

Resources Unltd	<a href="http://www.resunltd4u.com/">http://www.resunltd4u.com/</a>	part# GM-300KX-10	\$179
Security labs	<a href="http://spycorder.com/waterproof.htm">http://spycorder.com/waterproof.htm</a>	Model # SLC-131	\$150
Polaris	<a href="http://www.polarisusa.com">www.polarisusa.com</a>		
Matco	<a href="http://www.matco.com">www.matco.com</a>		

#### **Tank for testing ROV (allows for testing during adverse weather)**

Aquatic Eco Systems	<a href="http://www.aquaticeco.com/">http://www.aquaticeco.com/</a>	QT502, \$352, Portable Tank, 450 gallons - 30 inches high, 6ft diameter
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