

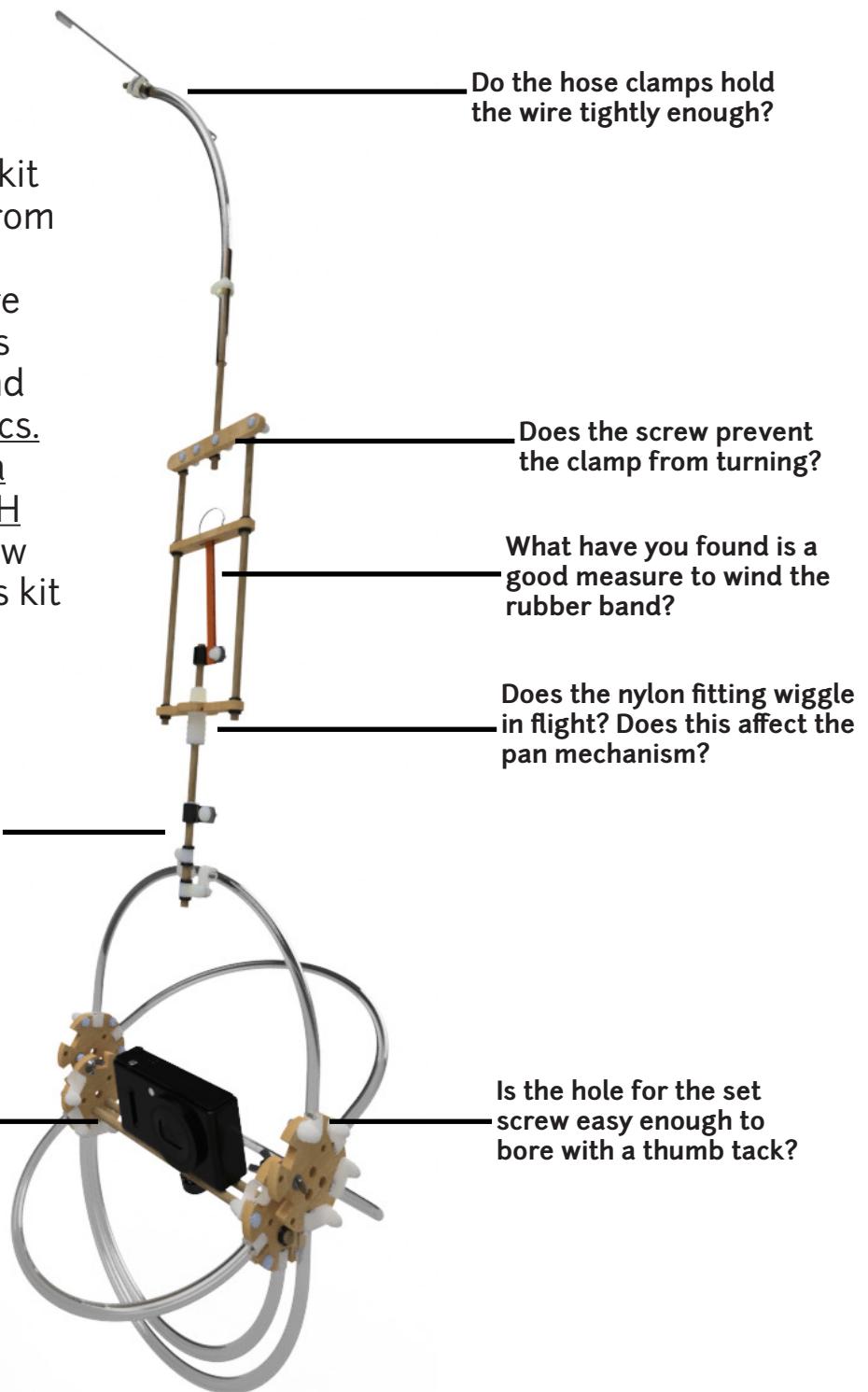
Reconfigurable Rig v.1

Assembly Guide

This is an in development test kit that is open to contributions from collaborators like you. Please visit www.publiclab.org to share your thoughts and experiences by posting a Research Note, and fill out our survey at <https://docs.google.com/document/d/16Y8as8YlxTJgLiycWh7JnT1GPGKhLlyHRLxs-X6lqAA/edit> to let us know what you'd like to see from this kit in the future.

Does rig turn for long enough to get the panoramas you want? Does it skip or miss a certain direction?

Is repositioning the camera angle easy enough? Does it stay at a consistent angle in flight?



Do the hose clamps hold the wire tightly enough?

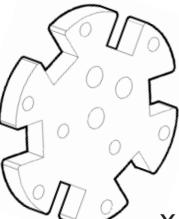
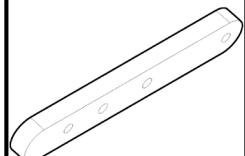
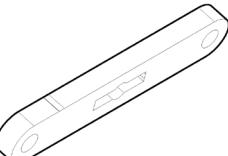
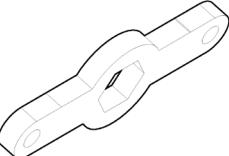
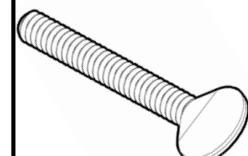
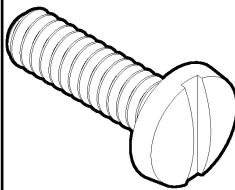
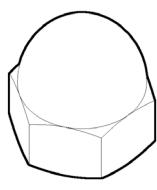
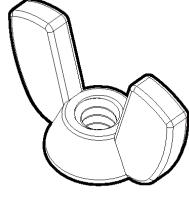
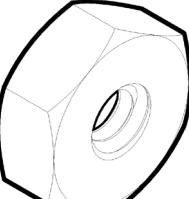
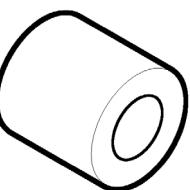
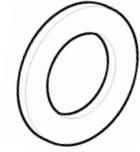
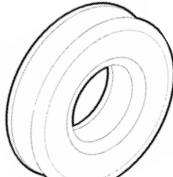
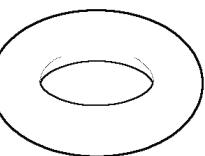
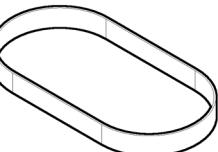
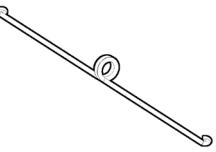
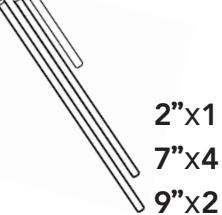
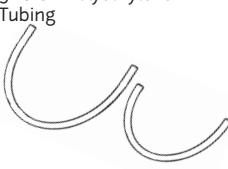
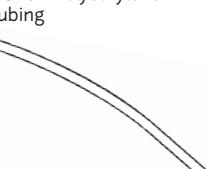
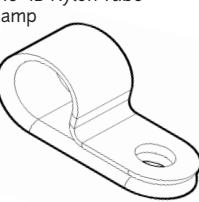
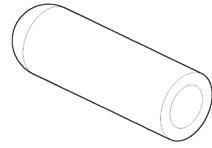
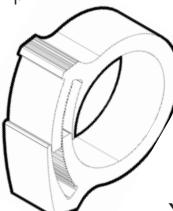
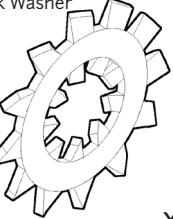
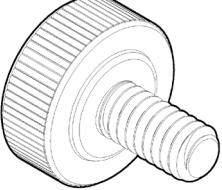
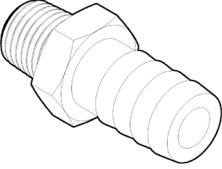
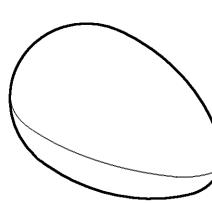
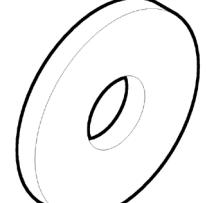
Does the screw prevent the clamp from turning?

What have you found is a good measure to wind the rubber band?

Does the nylon fitting wiggle in flight? Does this affect the pan mechanism?

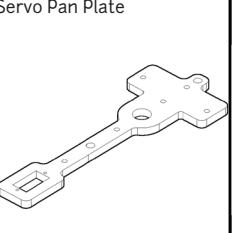
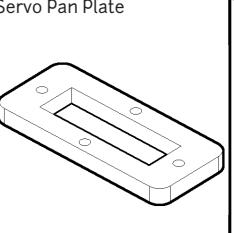
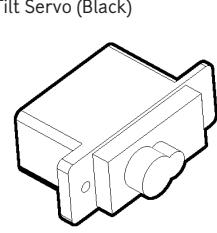
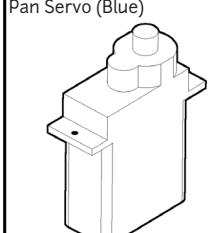
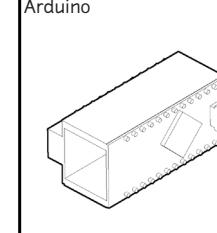
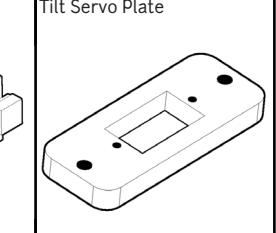
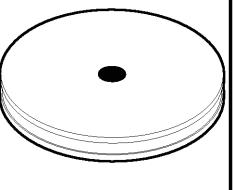
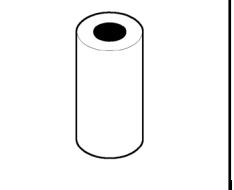
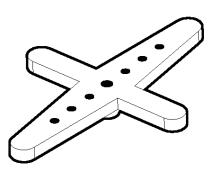
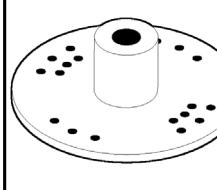
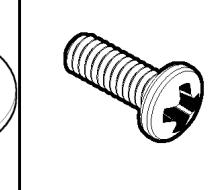
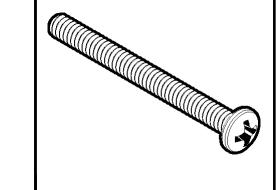
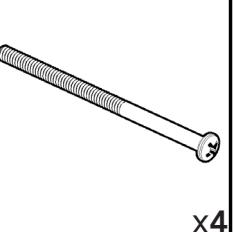
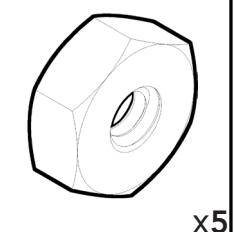
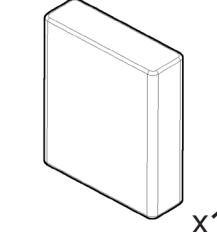
Is the hole for the set screw easy enough to bore with a thumb tack?

Parts List

Plywood Hub  x4	Plywood Plate  x1	Plywood Plate  x1	Plywood Plate  x1	#1x1/4" Wood Screw  x2	6-32x1" Spade Head Thumb Screw  x2
6-32x1/2" Nylon Screw  x24	6-32 Acorn Nut  x19	6-32 Wing Nut  x2	#6 Nylon Hex Nut  x7	#6x1/4" Nylon Spacer  x2	1/4" ID Nylon Washer  x1
#6 Ext. Tooth Lock Washer  x6	X-Profile 1/4" ID O-Ring  x24	1/2" ID Rubber O-Ring  x2	Rubber Band  x2	16 Gauge Coated Aluminum Wire  12"x1	Wooden Dowel  2"x1 7"x4 9"x2
5/16 OD Polyethylene Tubing  14"x4 12"x3	3/8" OD Polyethylene Tubing  12"x1	1/4" ID Nylon Tube Clamp  x7	5/16" ID Nylon Tube Clamp  x16	1/4 ID Vinyl Covered Tube Clamp  x2	1/2" Diameter Key Ring  x1
1/8" ID Vinyl Cap  x2	15/32" ID Nylon Hose Clamp  x3	1/4"-20 Int./Ext. Tooth Lock Washer  x1	3/16" ID Nylon Washer  x1	1/4"-20 Thumb Screw  x1	1/4 ID Pipe-to-Tube Fitting  x1
Silly Putty Egg  x1	#6 Nylon Washer  x2				

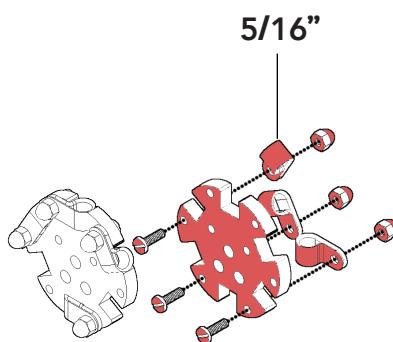
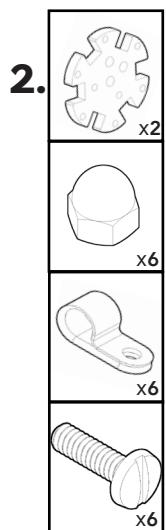
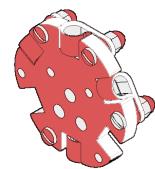
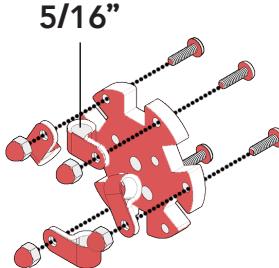
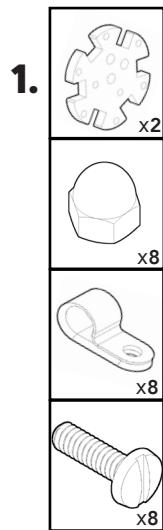
Note: if you have suggestions on ways this guide could be improved, please mark them on the page and upload photos to publiclab.org

Parts List (Servo Option)

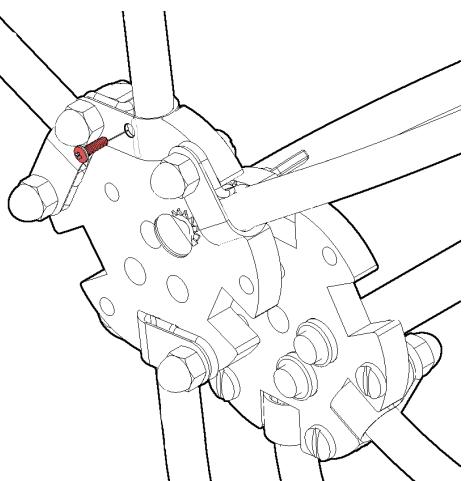
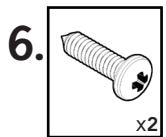
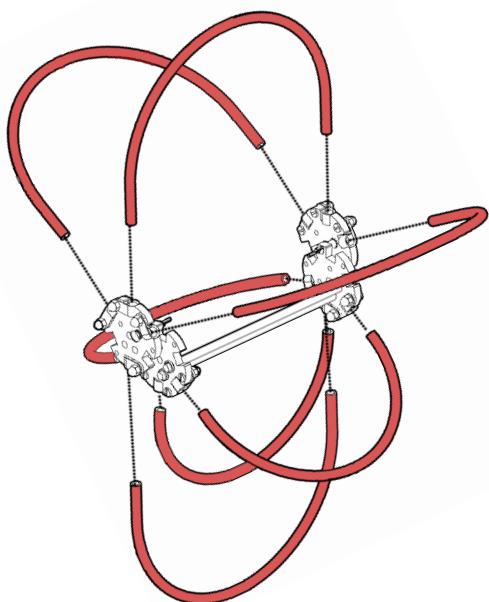
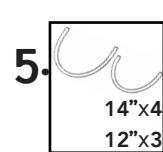
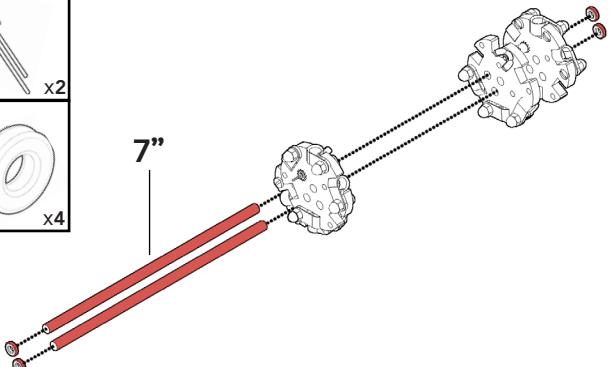
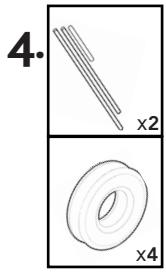
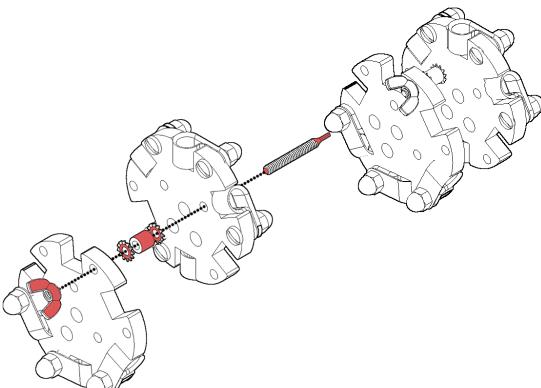
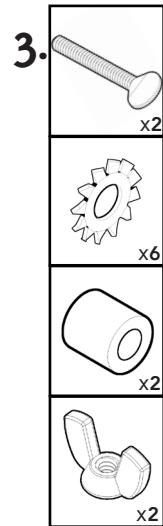
Servo Pan Plate	Servo Pan Plate	Tilt Servo (Black)	Pan Servo (Blue)	Arduino	Tilt Servo Plate
					
x1	x1	x1	x1	x1	x1
1/2" ID Pulley	1/4" IDx1/2" OD Nylon Spacer	Tilt Servo Rotor	Pan Servo Rotor	Servo Screw (various sizes)	6-32x1 1/2" Screw
					
x1	x1	x1	x1	x6	x2
6-32x2 1/2" Screw	6-32 Nylon Hex Nut	4 AAA Battery Pack			
					
x4	x5	x1			

Note: if you have suggestions on ways this guide could be improved, please mark them on the page and upload photos to publiclab.org

Landscape Rig Assembly



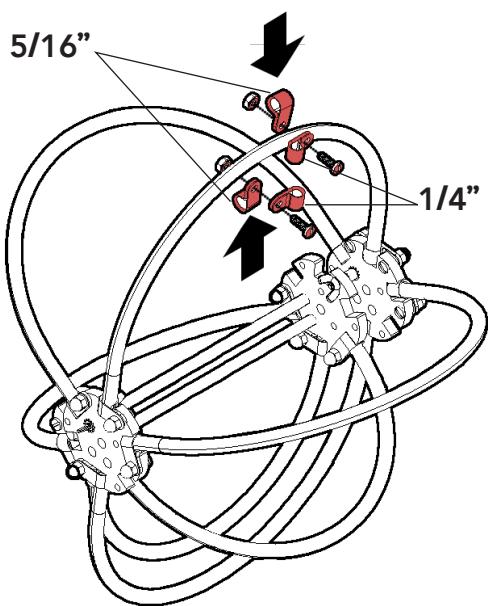
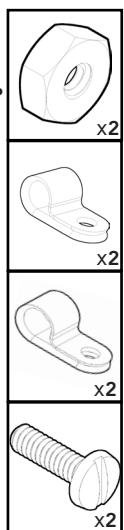
Note: 2nd set should be mirror image of 1st set



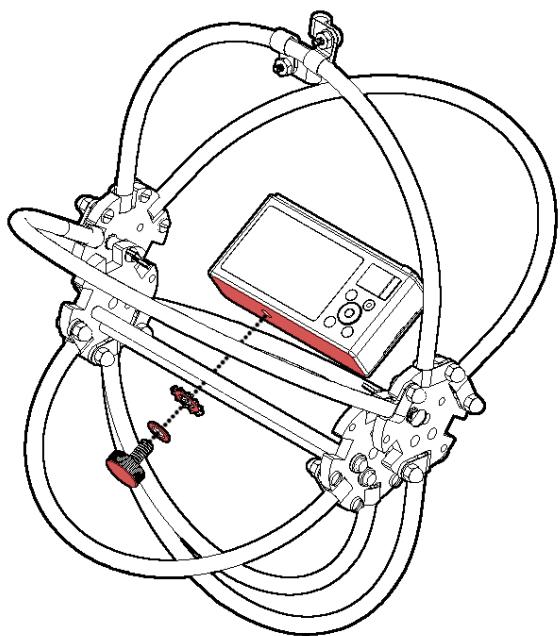
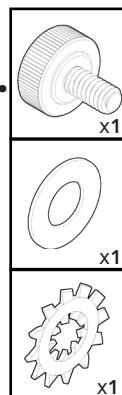
Note: Bore hole through top clamp using thumb tack before inserting screw

Landscape Rig Assembly

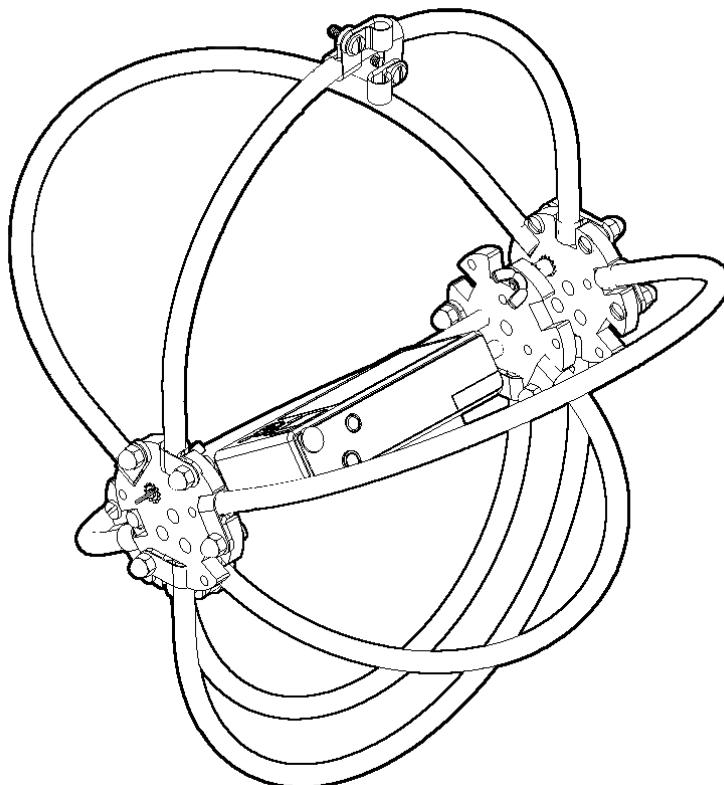
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8.

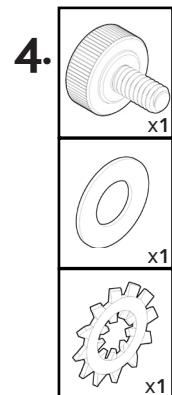
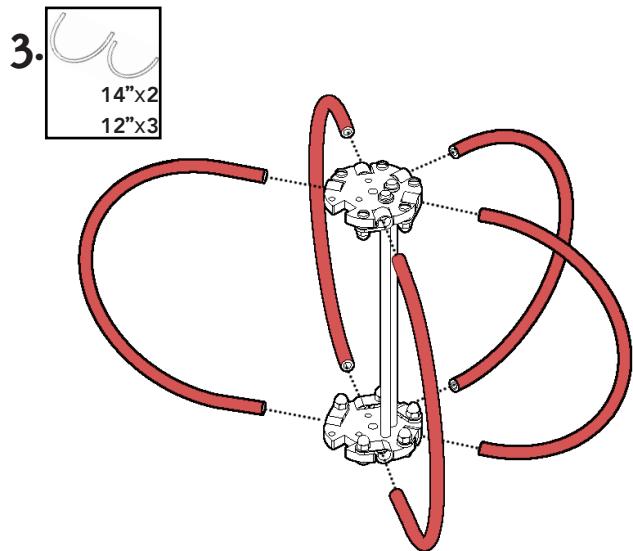
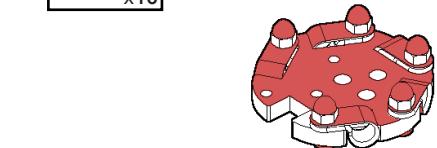
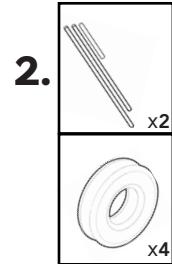
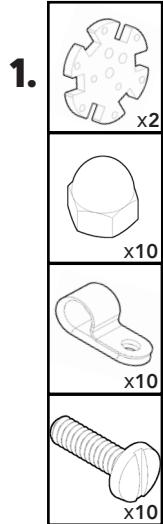


Note: Washer should be threaded through thumb screw (fit will be tight).

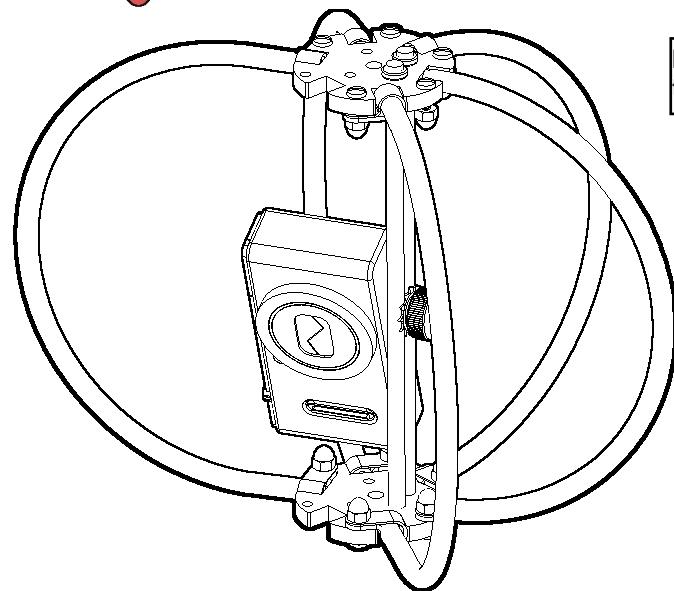


Complete

Portrait Rig Assembly

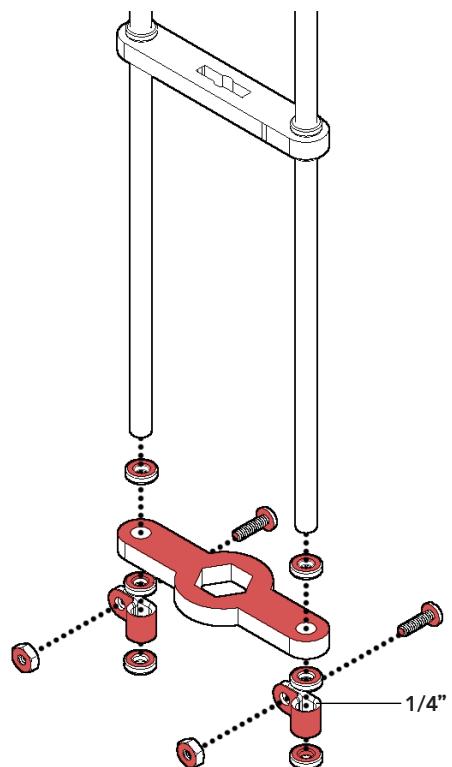
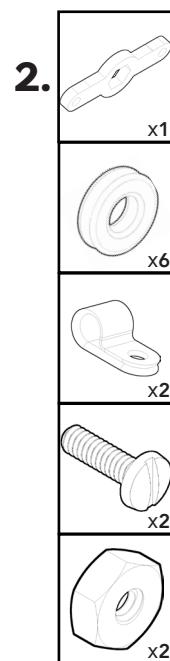
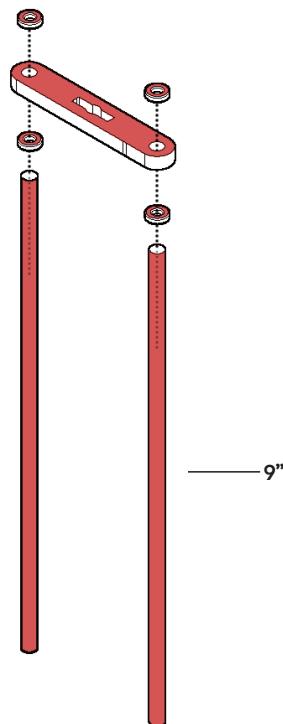
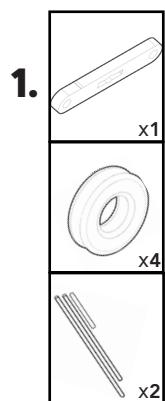


Note: Washer should be threaded through thumb screw (fit will be tight).

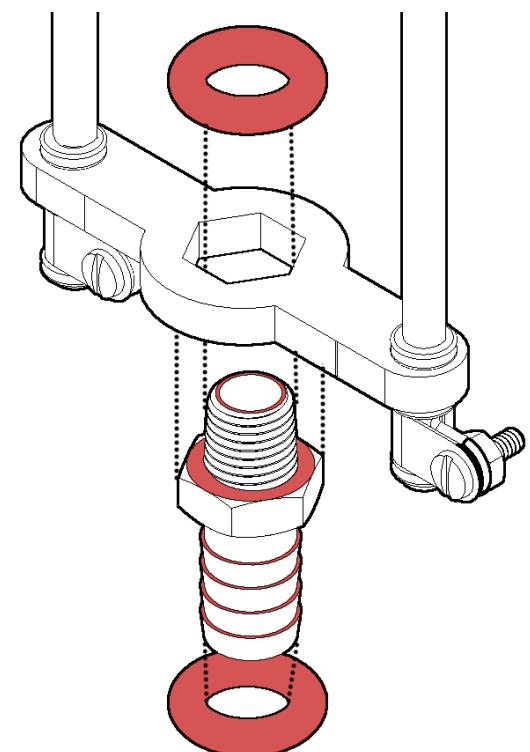
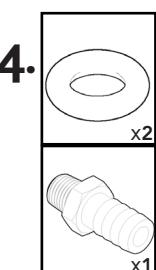
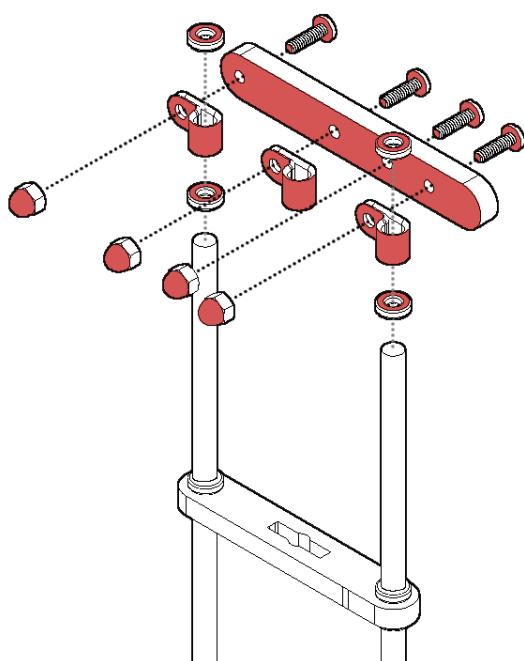
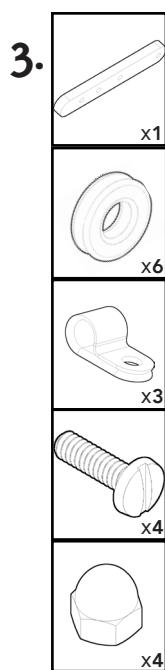


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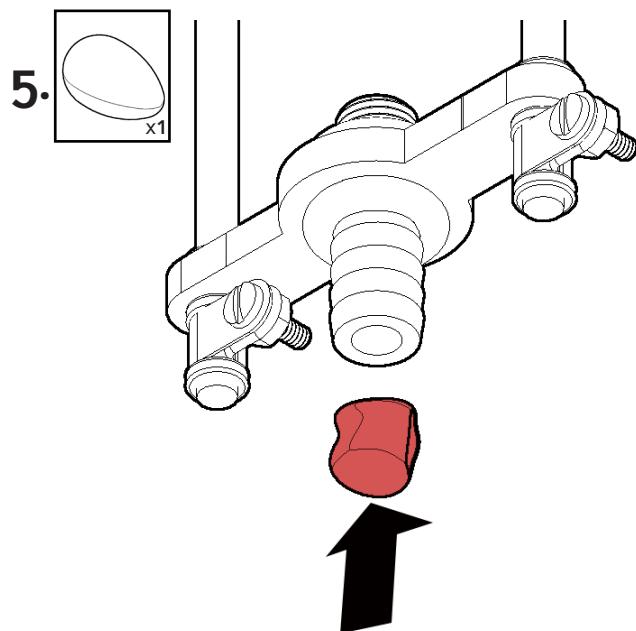
Silly Putty Pan Mechanism Assembly



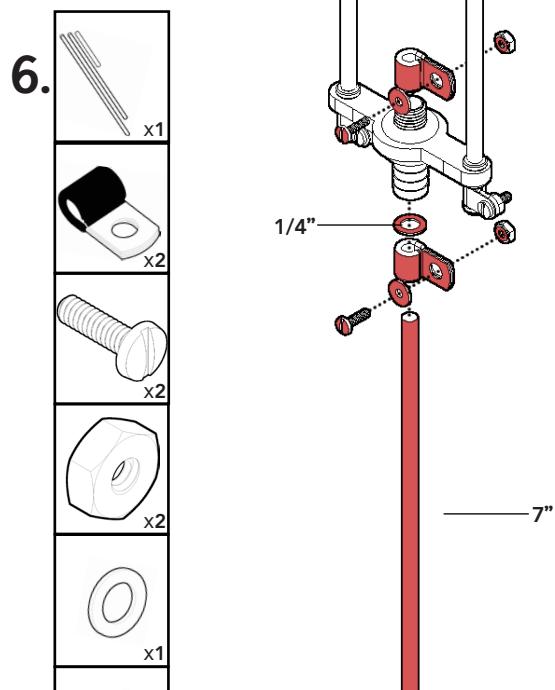
Note: Plywood plate should be pushed down about 2" through dowels.



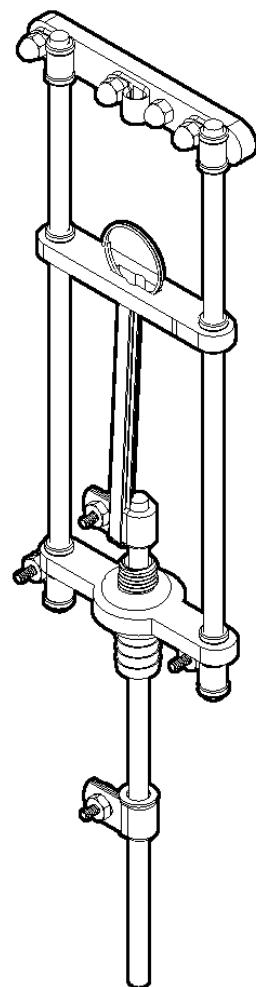
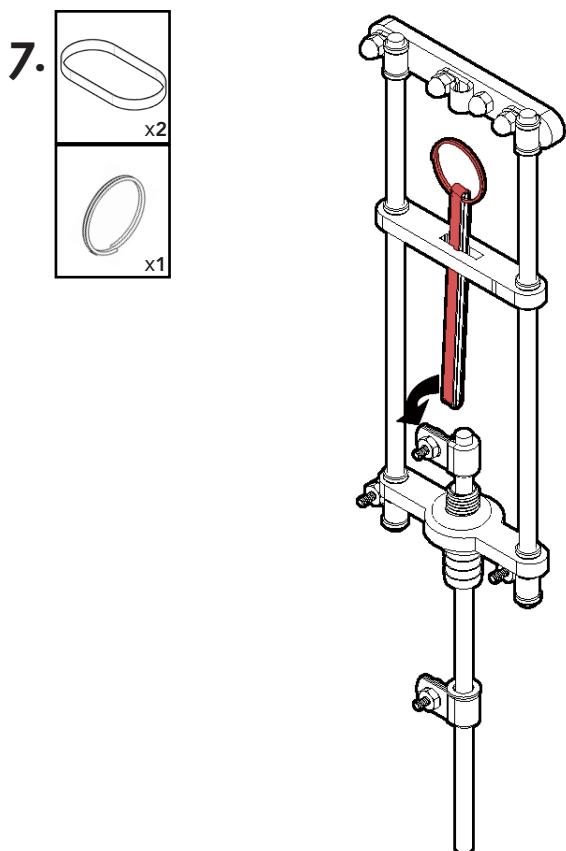
Silly Putty Pan Mechanism Assembly



Note: Use 3/4" diameter ball of Silly Putty

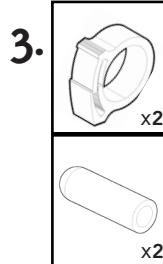
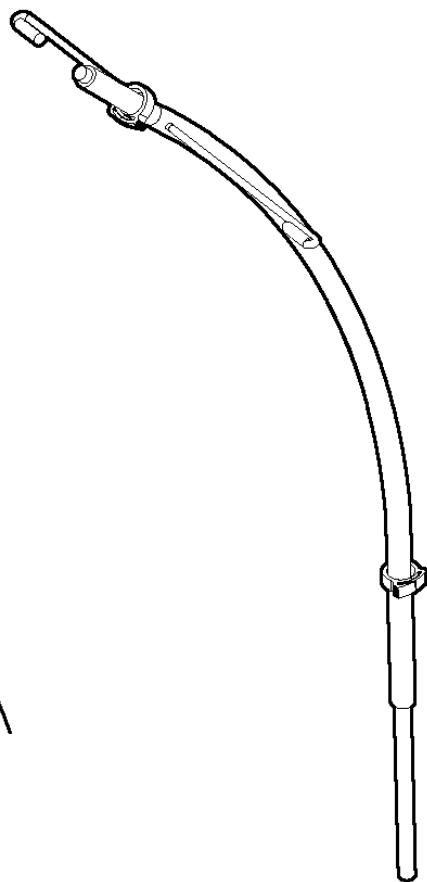
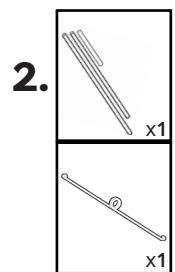
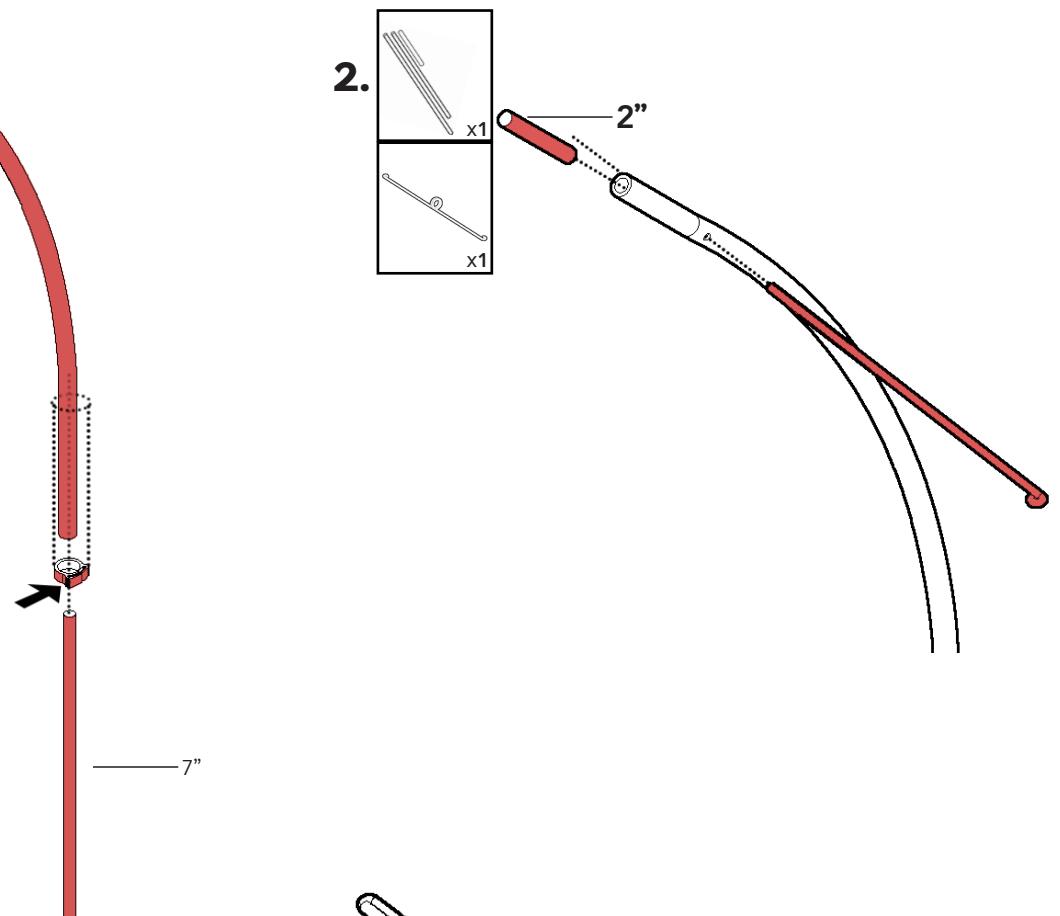
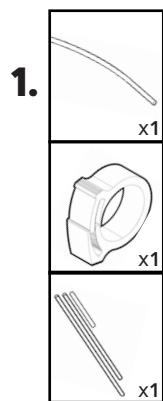


Note: When pushing dowel through silly putty, push against the top hole of the tube-to-pipe fitting to prevent silly putty from pushing out



Complete

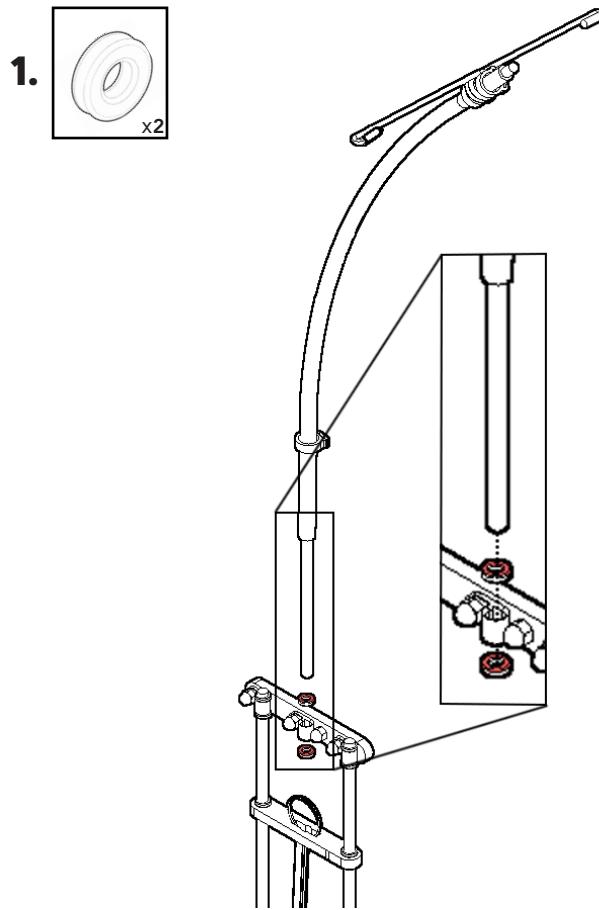
Pendulum Assembly



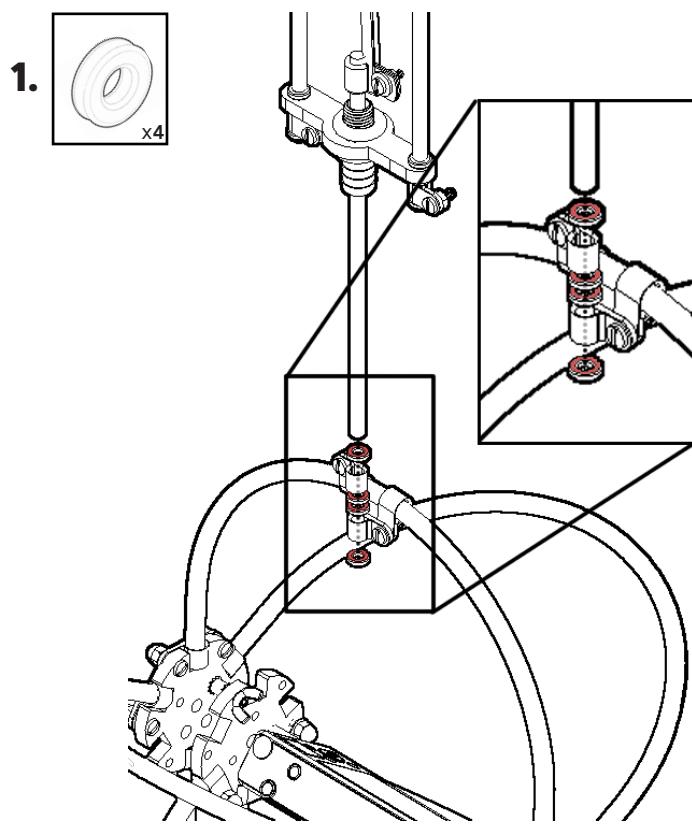
Complete

Note: Be sure zip clamps hold wire tightly on either side

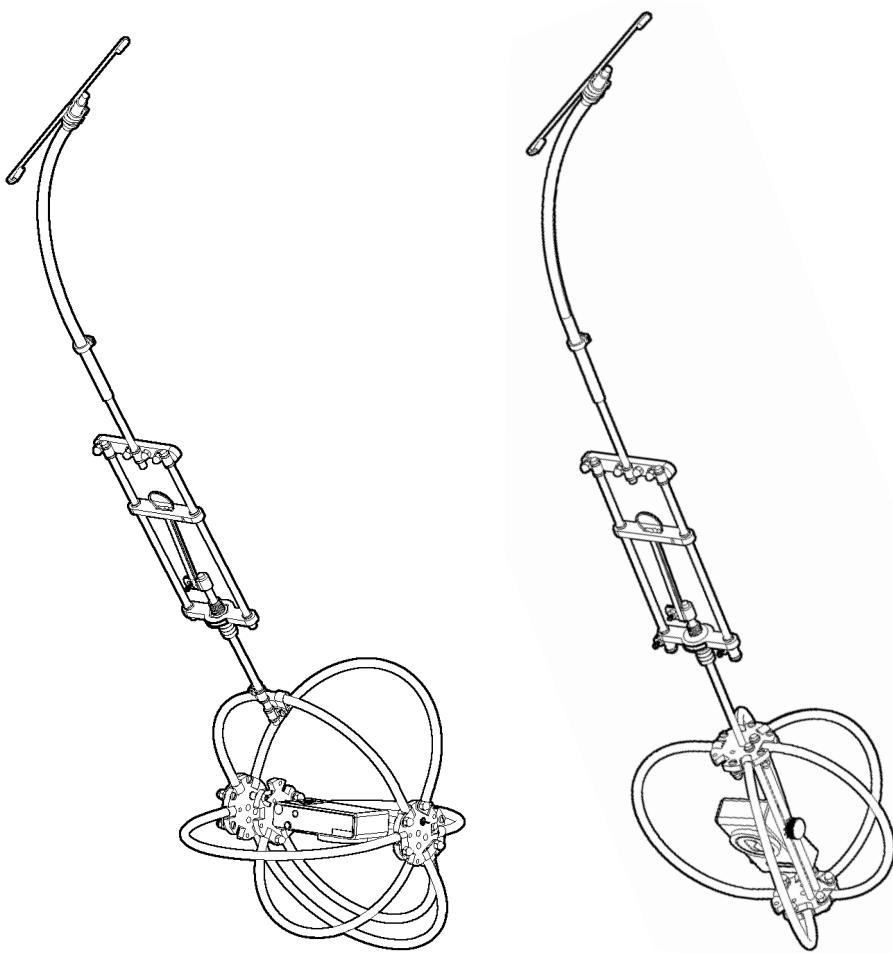
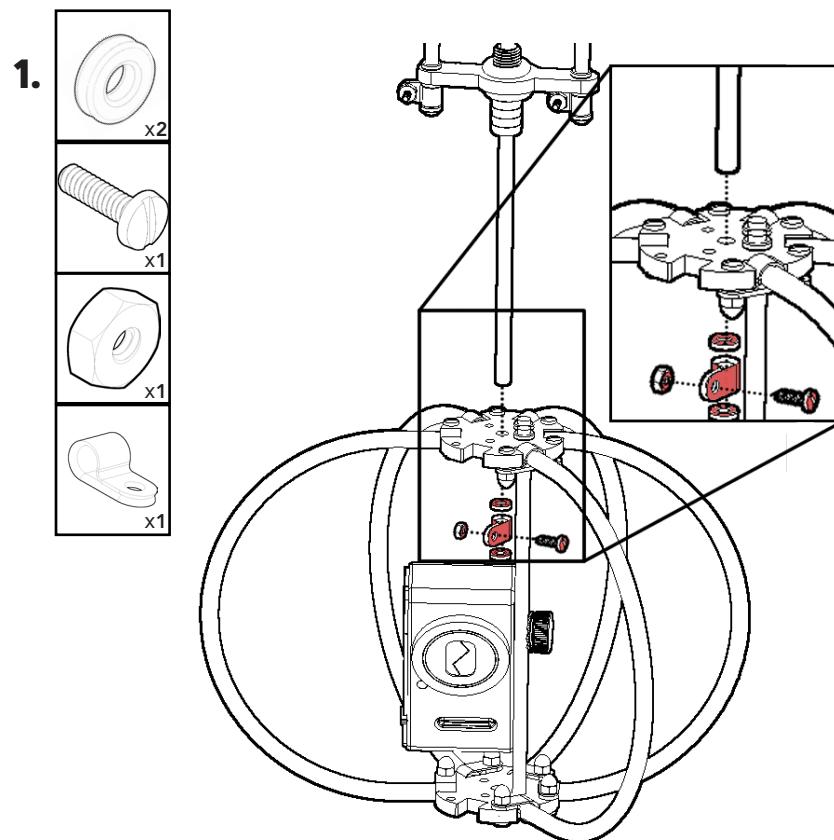
Pendulum to Silly Putty Pan Mechanism



Silly Putty Pan Mechanism to Landscape Rig



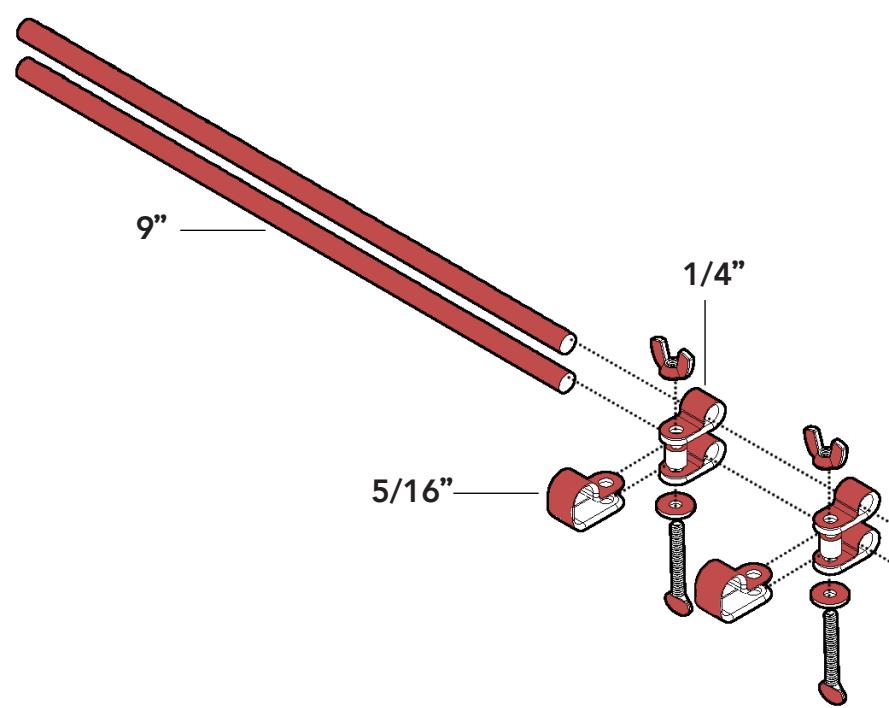
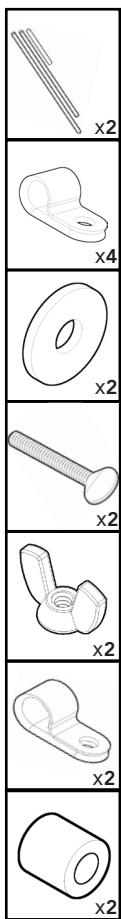
Silly Putty Pan Mechanism to Portrait Rig



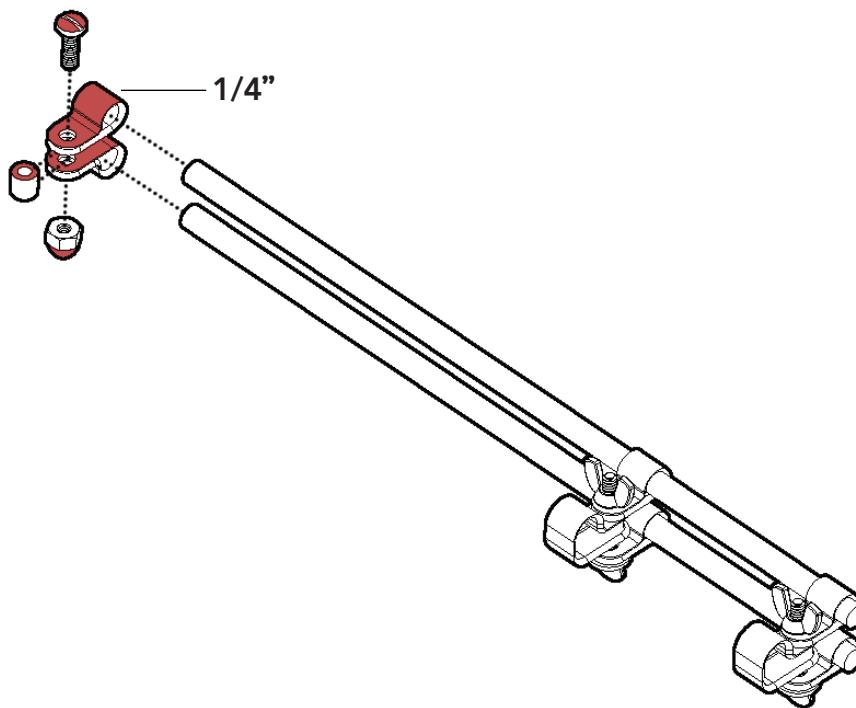
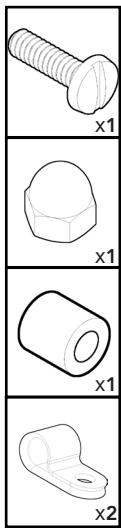
Complete

Pole Rig

1.

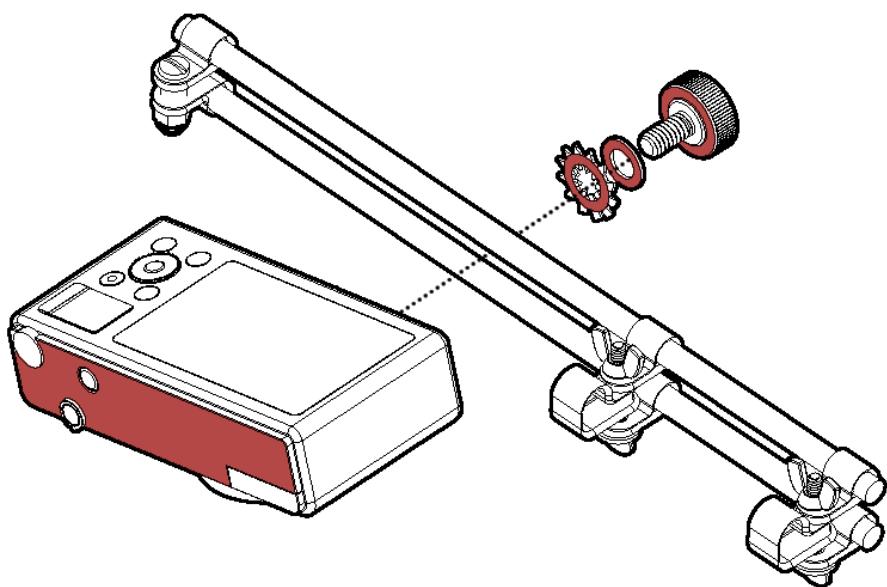
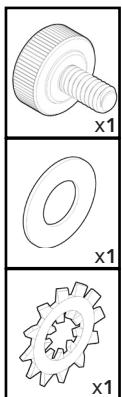


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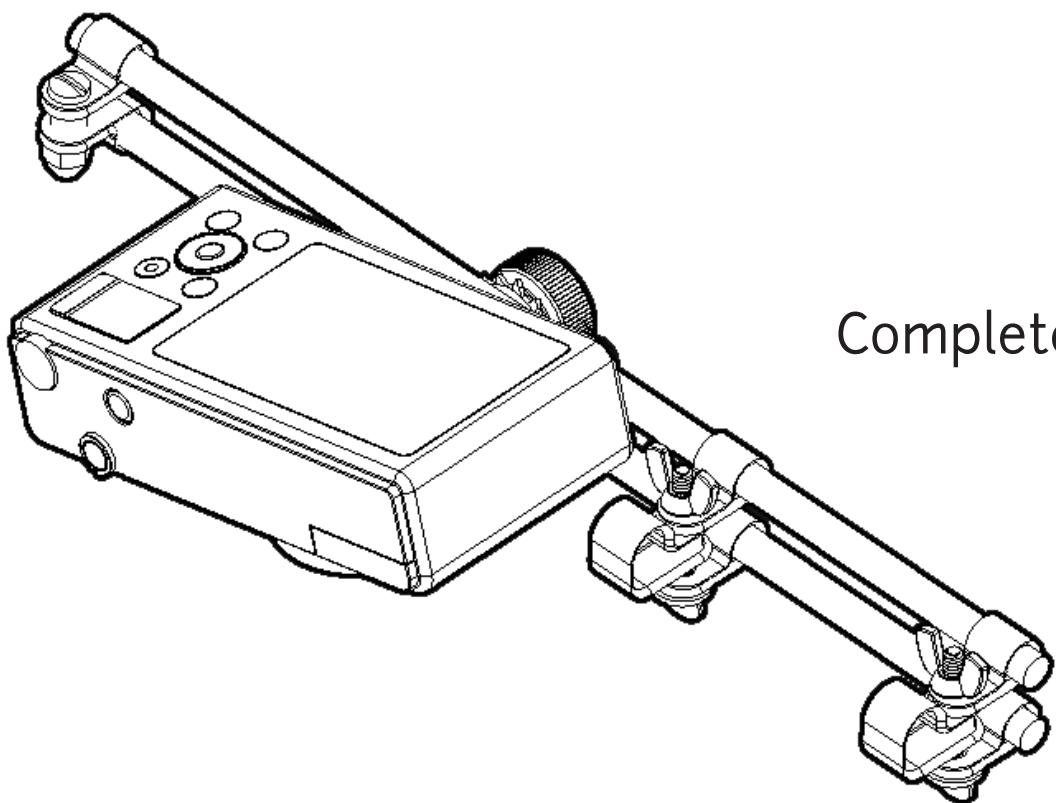


Pole Rig

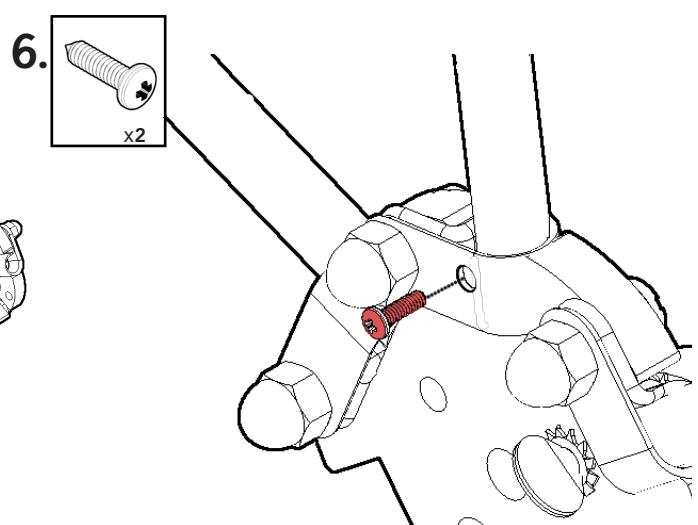
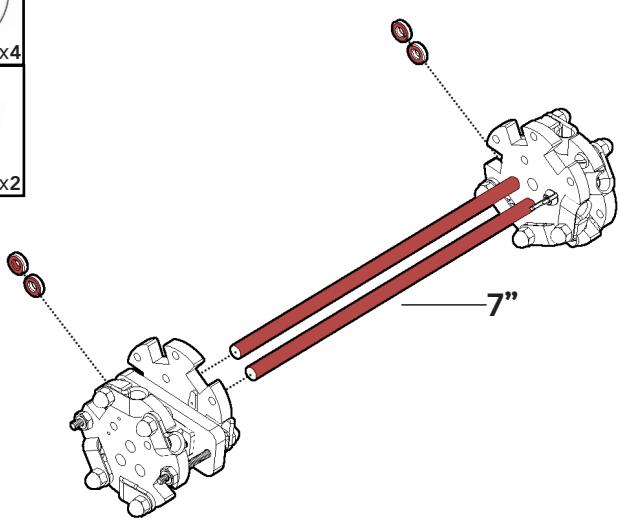
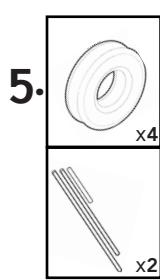
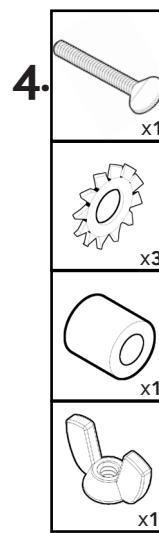
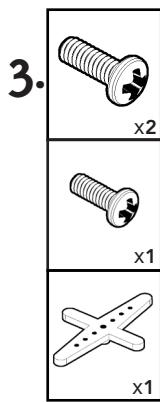
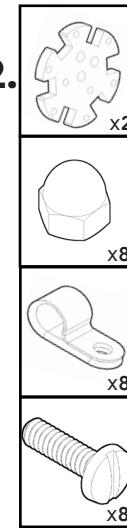
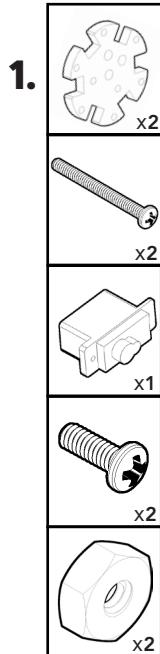
3.



Complete



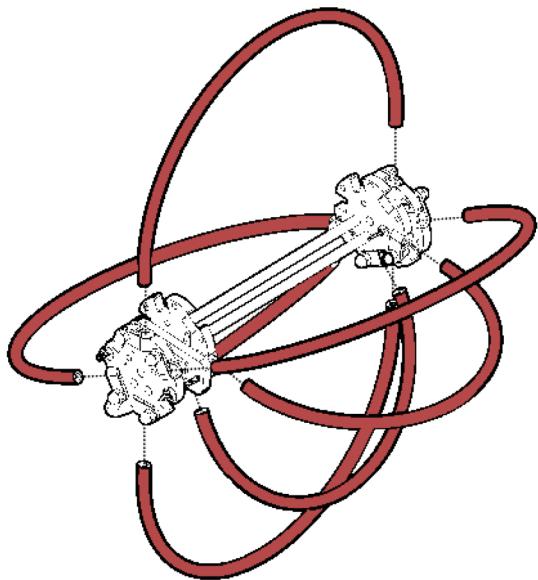
Servo Powered Landscape Rig



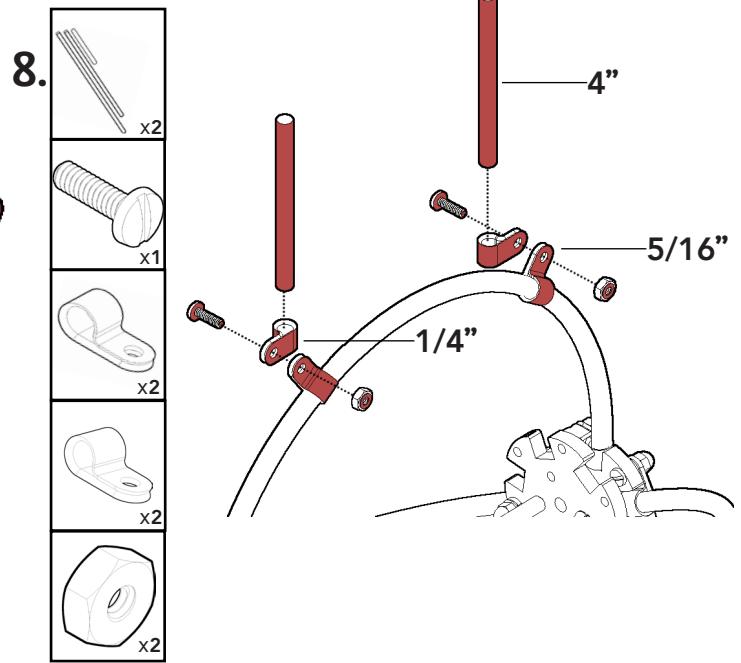
Note: Bore hole through top clamp using thumb tack before inserting screw

Servo Powered Landscape Rig

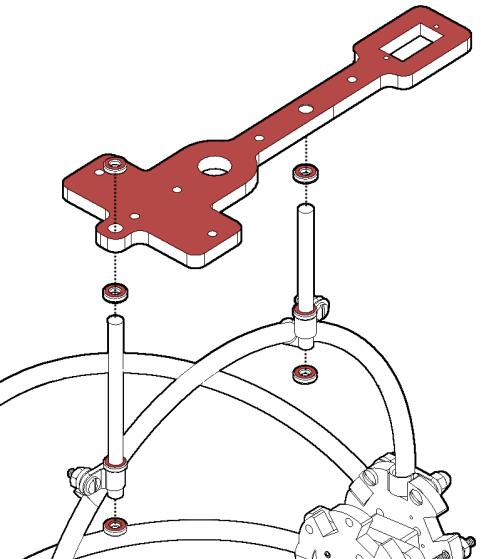
7.



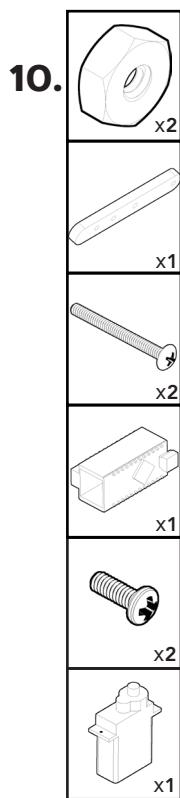
14" x4
12" x3



9.

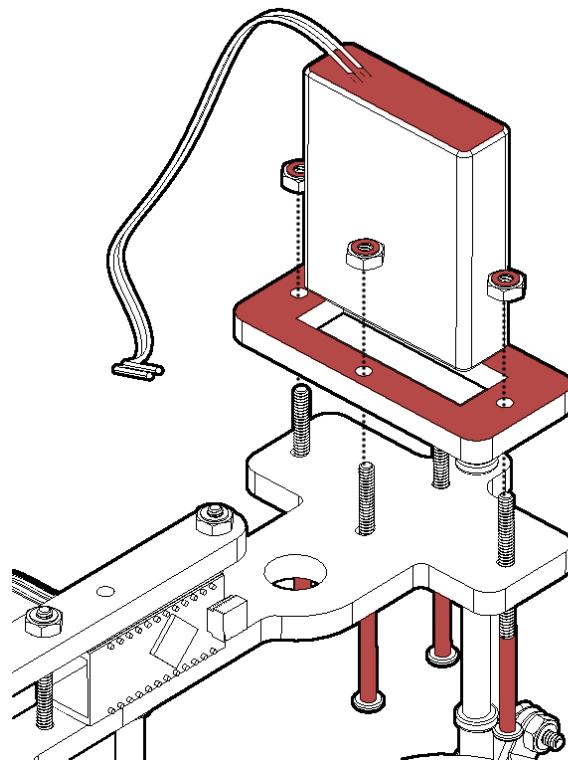
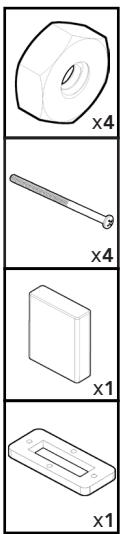


x5
x1

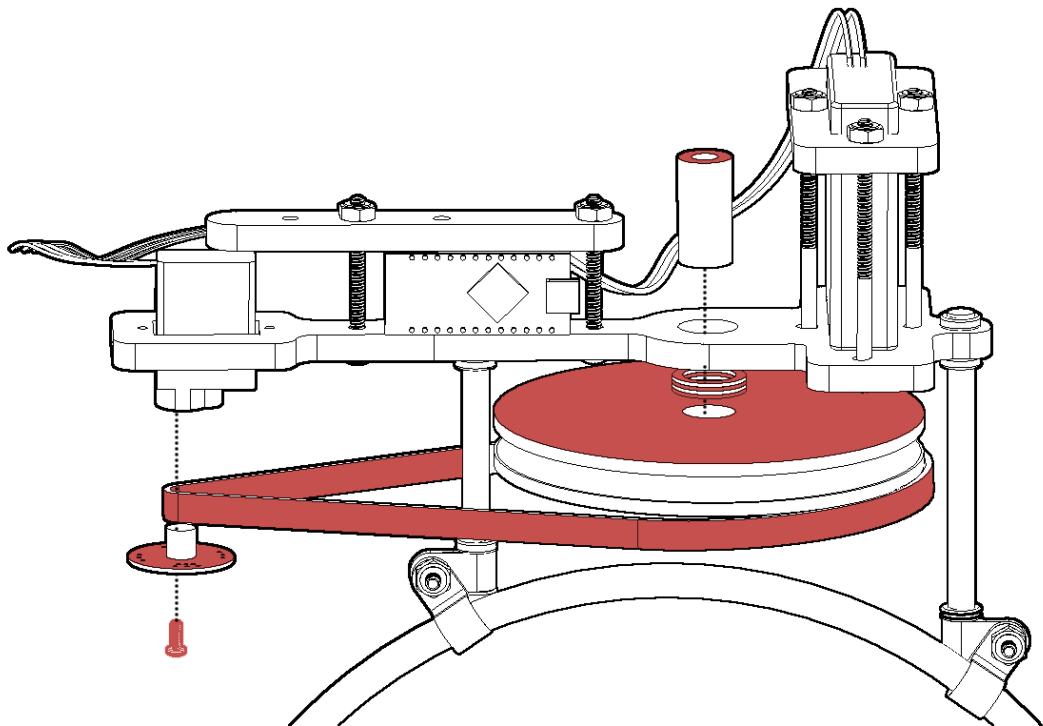
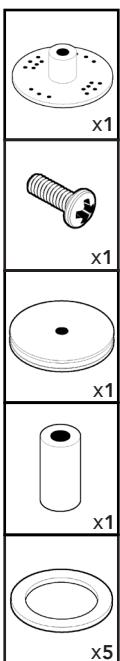


Servo Powered Landscape Rig

11.

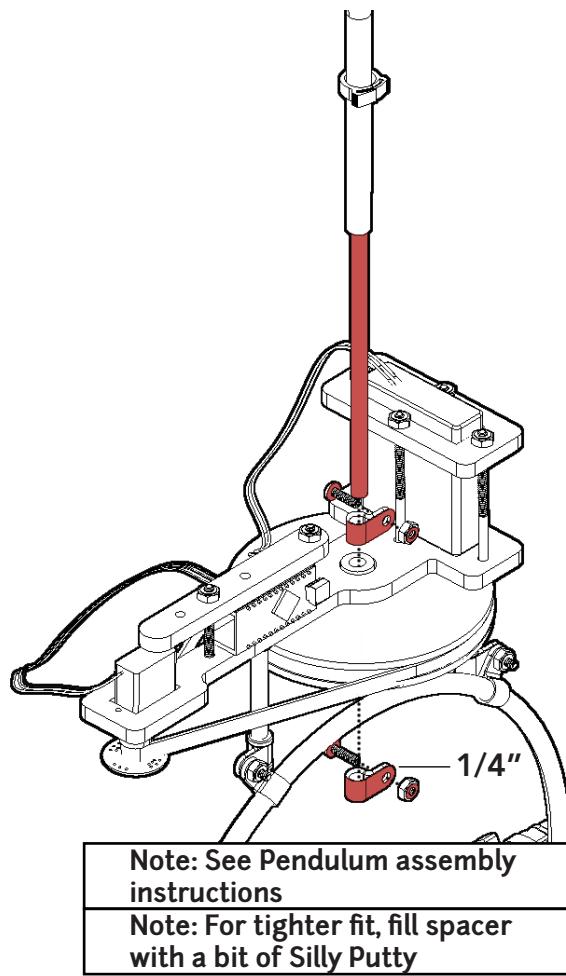


12.

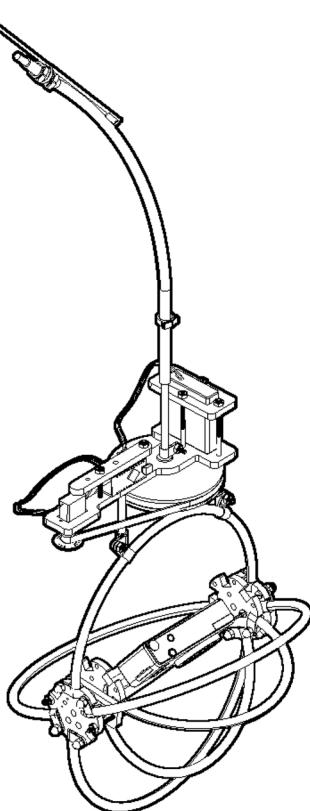


Servo Powered Landscape Rig

13.



Complete



Usage: Silly Putty Pan Mechanism

When winding the silly putty pan mechanism, pull up on the key ring and turn until the rubber bands are wound to the point that they are “double” wound all the way down, as shown.



Usage: Pendulum

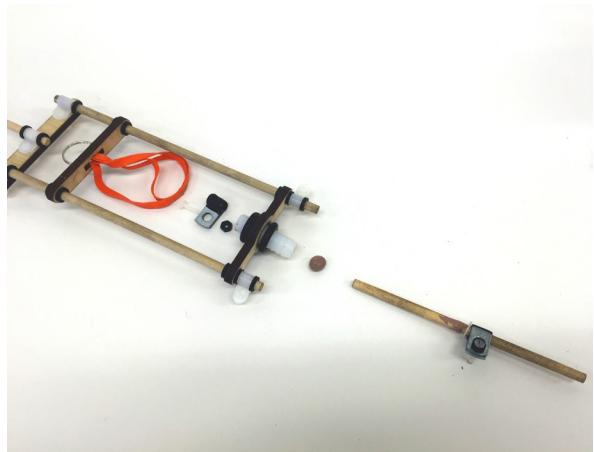
On one end of the pendulum wire, loop the tip a couple of times around the closed (smaller) side of the carabiner. When attaching the kite line to the pendulum, wrap the line around the inside of the carabiner before wrapping it around the remainder of the pendulum. This will act as a safety in the situation of the line unwrapping from the pendulum.



Pre-Flight Checklist

The following checklist, though not necessary for successful use, includes recommendations for optimizing the safety and function of your rig.

- 1. Repack silly putty into pan mechanism:** We recommend repacking the silly putty into the pan mechanism before every flight, to ensure that it doesn't loosen from the last flight when in the air.



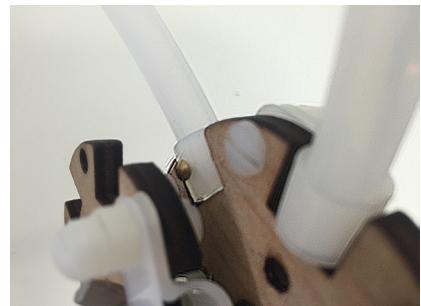
- 2. Set camera angle and tighten thumb screws (landscape orientation):** Before letting the rig go up the line, set your preferred camera angle and tighten the wing nuts very tight to ensure the camera will stay set in flight.
- 3. Attach camera lanyard to pole (pole rig):** Tying or taping the camera lanyard to the shaft of the pole provides an extra failsafe.

Design Notes on Parts

- 6-32x1" Spade Head Thumb Screw: I like the fit of this part.



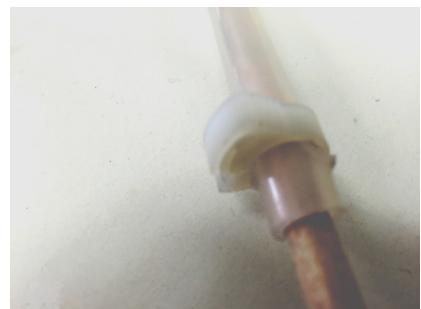
- Nylon screws and nuts: They are lightweight, provide more friction than metal hardware, and are less sharp



- Nylon tube clamps: The tube clamps we've ordered from McMaster Carr and from our local hardware store fit the tubing very tightly when used with the nylon screws, although the tightness can vary depending on where they come from.



- 15/32" ID nylon hose clamp: These can provide a tight clamp on the tubing if locked down with a pair of pliers, but we decided to run the wire through the top of the tubing rather than use them to hold the wire in place, as they can be prone to slipping.



- 1/4" Wooden dowels: These dowels are easily accessible and are very flexible in this system of parts. One drawback is that the type of wood may not be consistent depending on where you get it from, so the density and width can vary.



Design Notes on Parts

- X-Profile 1/4" ID O ring: These x-profile o rings provide a good deal of friction to prevent the dowels from slipping out of the plywood pieces, is there a better method to do this?



- 1/2" ID Rubber O ring: these o rings act as extra insurance to hold in the tube fitting from slipping out of the plywood, which should be a very tight fit.



- Polyethylene Tubing: This tubing works great in these rigs, dowels can fit tightly inside the 3/8" OD tubing, and the 5/8" OD tubing is very flexible and provides enough rigidity to cushion a fall.



- 1/4"-1/2" ID Pipe-to-tube fitting: This part may vary quite a bit from the ones I've looked at in the hardware catalogue, so the one from our local hardware store may have a different fit than those from somewhere else. It does fit the wooden dowel very tightly and prevents the silly putty from spilling out, which makes it the best option we've found for the silly putty pan mechanism.



- Vinyl covered tube clamp: These clamps provide a solid lock against the wooden dowels, making them great for holding back the rubber bands. The vinyl provides a better grip than the rubber lined clamps, and is also cheaper.



Design Notes on Parts

- 14 gauge coated wire: I like this gauge of wire, it is easy to bend while still providing rigidity. Would it be better to sacrifice a bit of flexibility for better stability by switching to a heavier gauge?



- Tooth washers: These seem to function well, the int/ext tooth washer for the camera mount bites into the wood very well.



- #1 Wood Screw: they only come with a slotted head, which makes it difficult to screw in through the tube clamp, could it be a bit bigger to allow for a Philips head?

