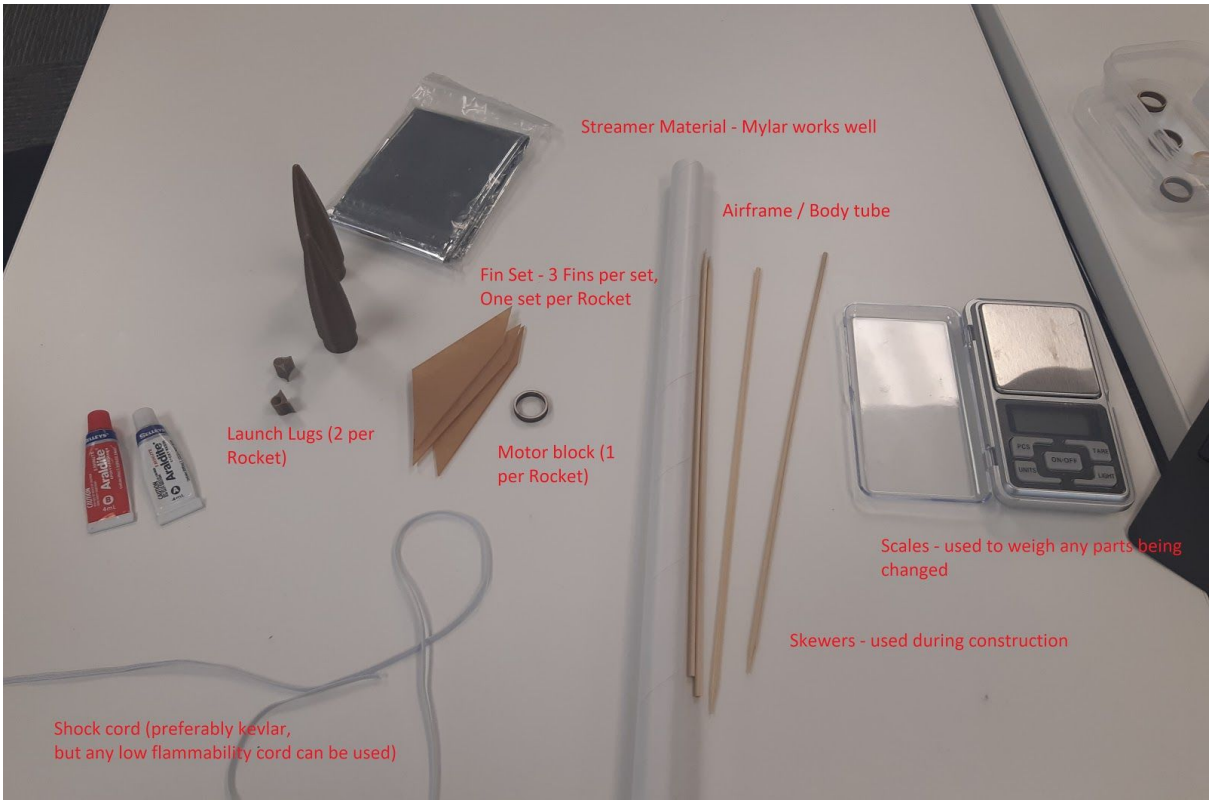
Stage 1: Preparation

What do I need?
1x Body Tube - for this rocket we are using a 45cm long BT20 diameter tube
1x Nose Cone
1x Streamer
1x Motor Block
1x Fin Set
1x Shock Cord
2x Launch Lug
Miscellaneous: Skewers, Strong Tape, Weak Tape (Masking Tape), Glue

The most important question is, are you using the standard array of parts?

1. Yes:
   Excellent. Prepare for initial construction. Check you have all the parts you require against the below photo.



2. No:
   This will make it more interesting! First, you must qualify your design.
   Download OpenRocket - available from http://openrocket.info/
   Download the .ORK file for this rocket design from
   https://github.com/wholerabbitNZ/MyFirstRocket/raw/master/Rocket.ork

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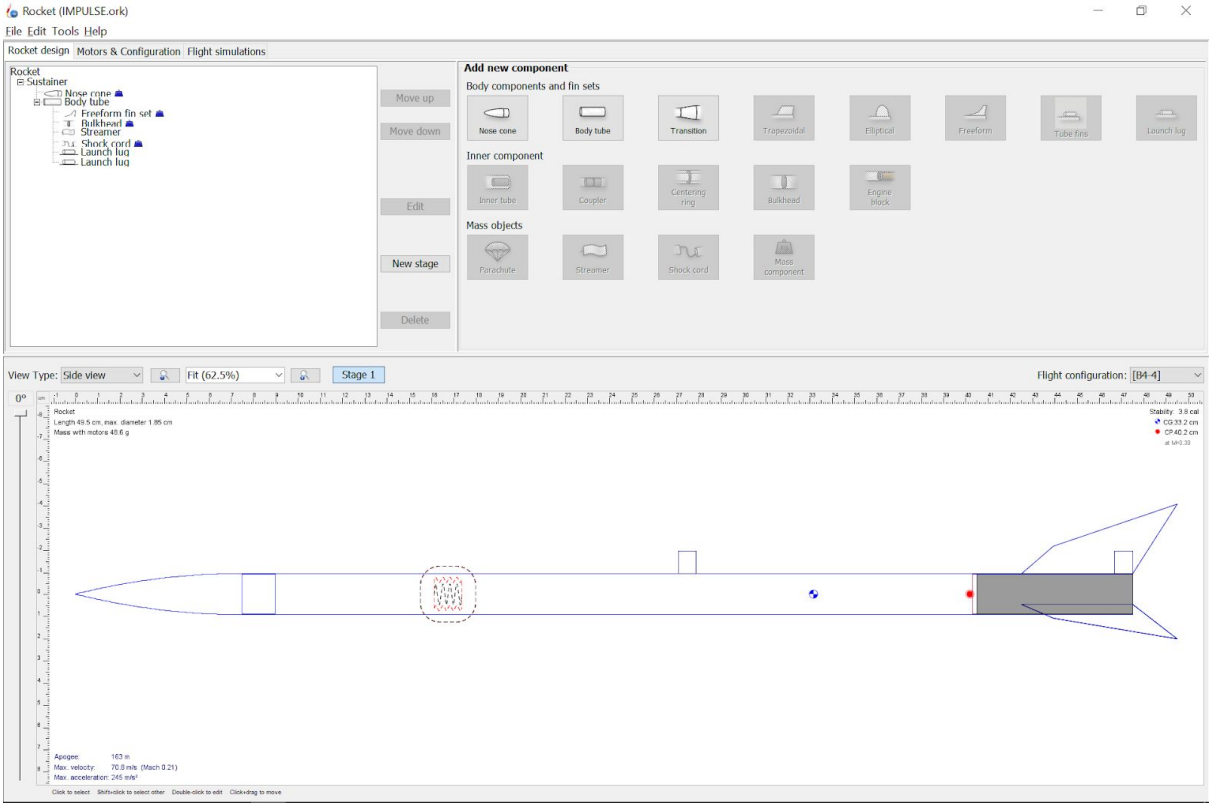
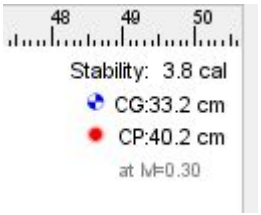


Modify as you wish. Note that the existing rocket already has the weights provided, so you will need to weigh any parts that you change and input their weights into the override field (see below example)

For this event, we have a maximum altitude of 199m, and one thing to note is that when simulating the rocket in OpenRocket, it is important to verify that the Centre of Pressure remains behind the Center of Gravity. This determines the stability of the rocket which is measured in calibre (in ratio to the diameter of the bodytube).

You want this to be greater than 1 calibre, otherwise, it can cause instability in the flight of the rocket.



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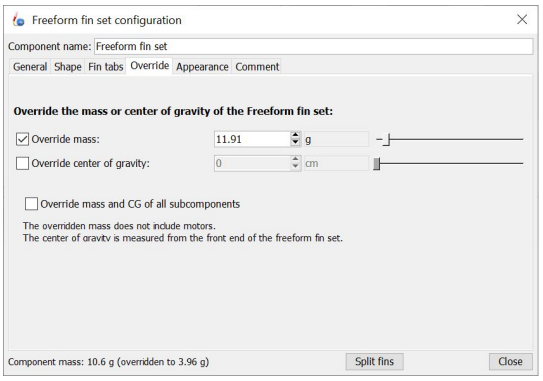
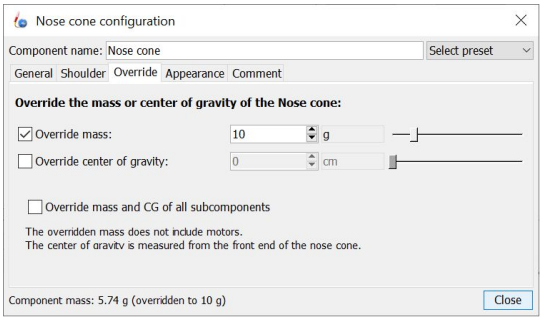
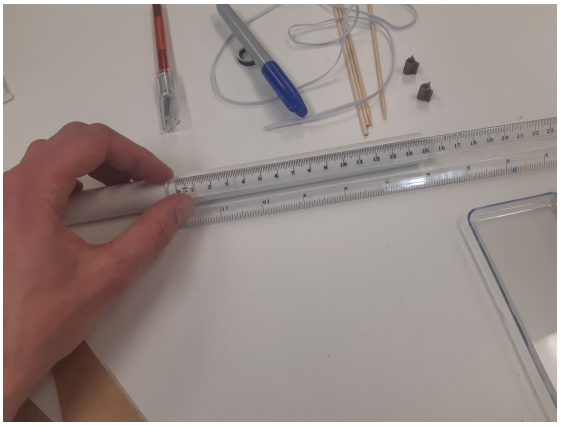
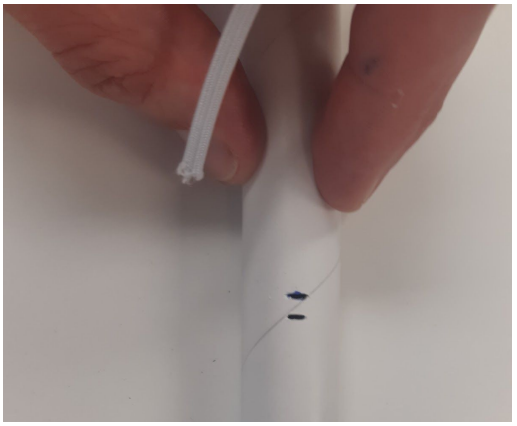




Stage 2: Initial Construction:

1. Take your (highly advanced) airframe, and prepare it for action. We want to cut two small slots around the width of the shock cord (the long piece of elastic or kevlar thread) included with the parts. These should be about 1/3rd of the way down the rockets airframe.





2. Once you have the airframe ready to go, take one of the meat skewers (supplied) and carefully (pointy end away from your face) use it to feed the shock cord through the bottom slot which you made

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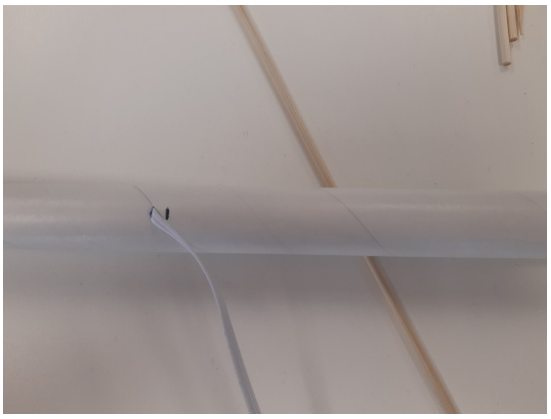

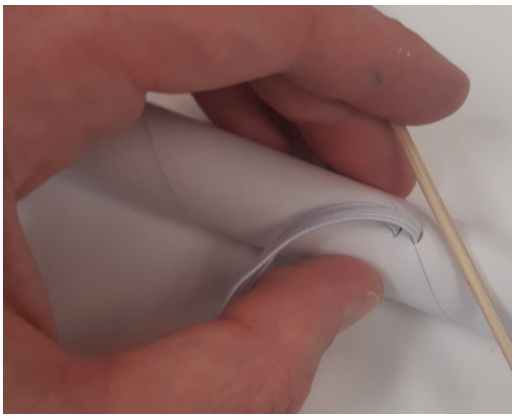

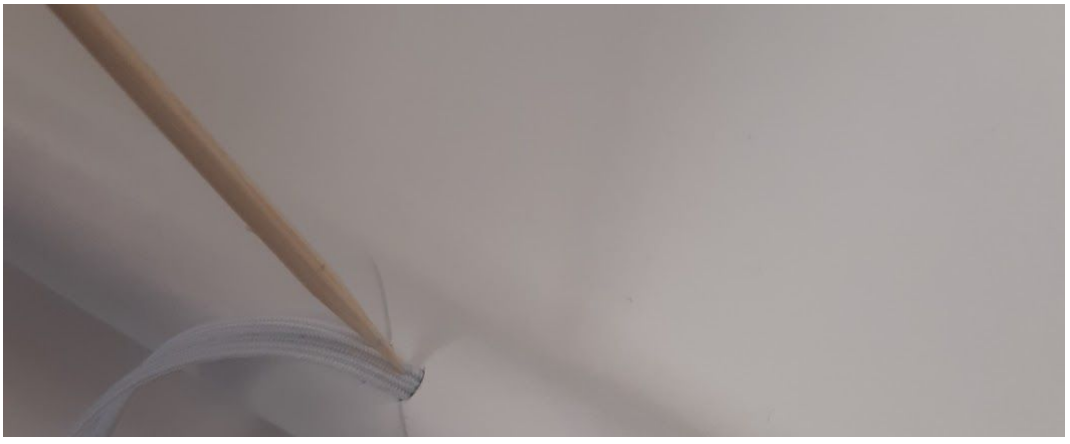

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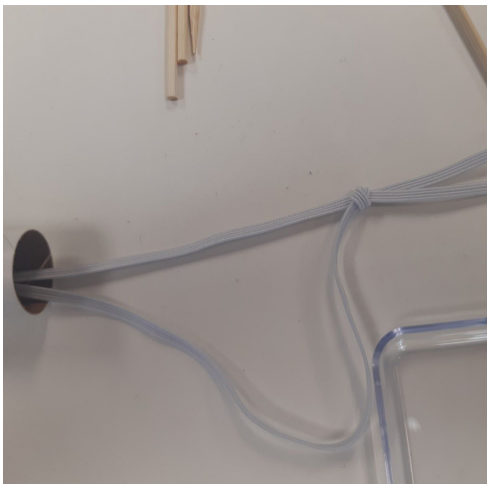
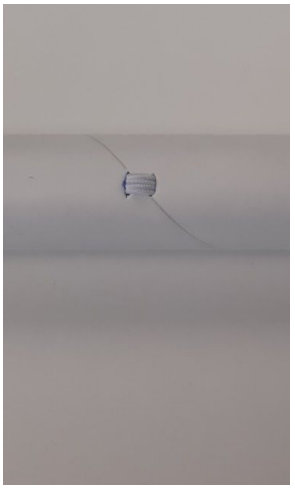
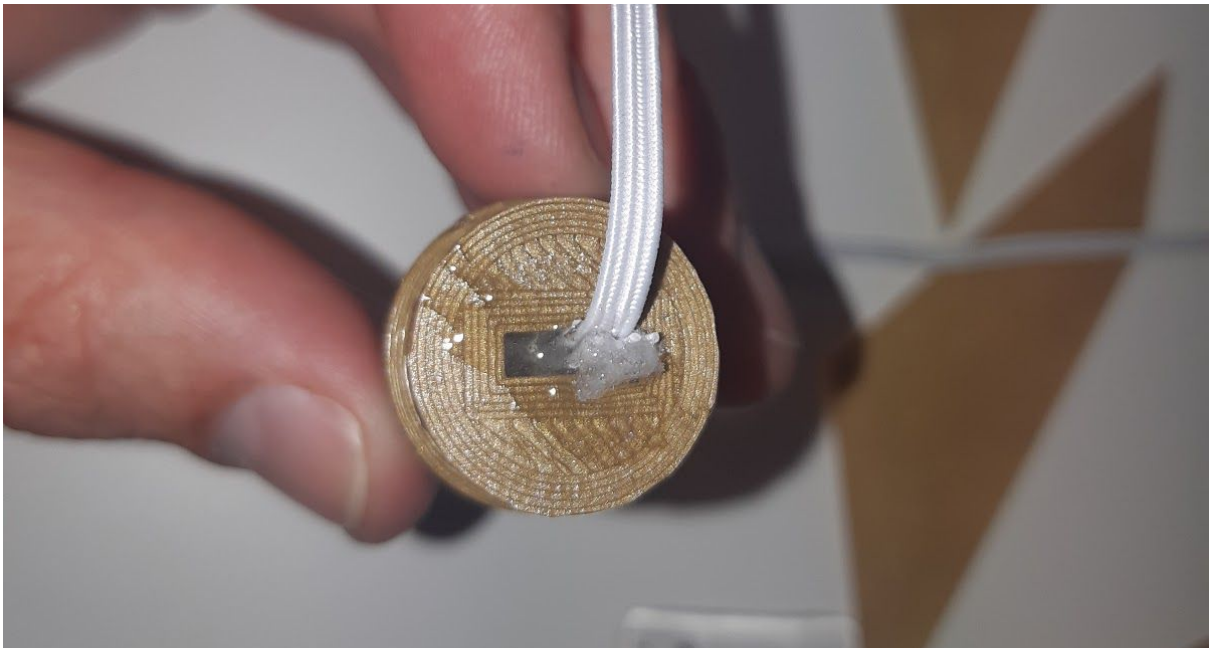
3. Taking care to make sure that the shock cord is not at all twisted, take its other end, and feed it through the top slot. Feed it equally through so that both ends exit the top of the body of the rocket.

4. Now that you have both ends protruding from the rocket, you can pick an end, and tie a loose knot but don't tighten it all the way. Take the other free end of the shock cord and feed it through this knot, sliding the knot down the length so it is resting inside against the airframe.
5. Take the nose cone, either the one which has been provided, or 3D print one with the STL file provided here, and attach the shock cord to it using glue or tying it to the eyelet



6. Now with the hardest part done, you can proceed to the business end of the rocket. Find your motor block (the circle of wood) and prepare a meat skewer for gluing this into the inside of the rocket, by marking it at around the six-centimeter mark from the

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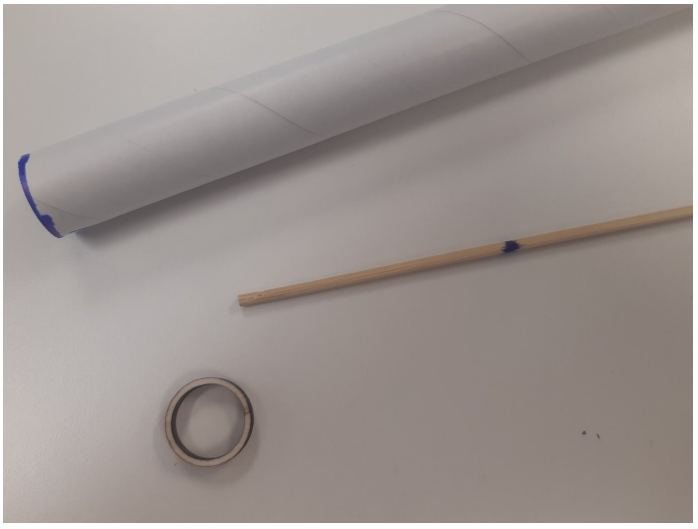
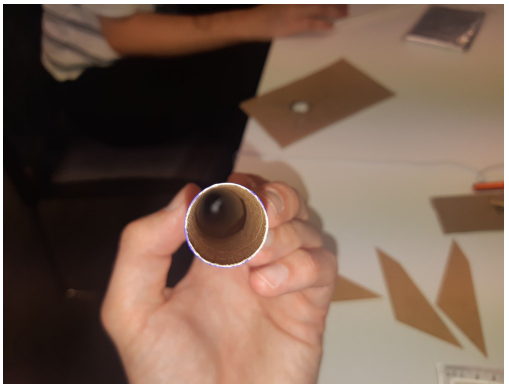
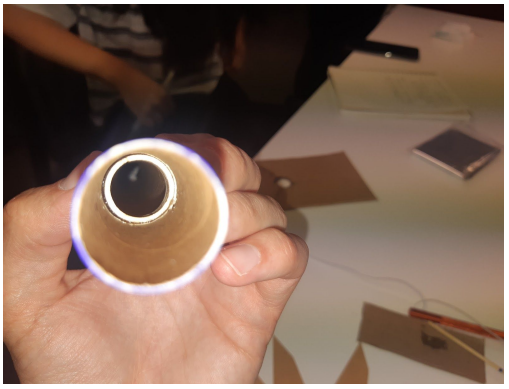
end. This will ensure that when we place the motor into the rocket it will still protrude far enough for us to use some tape to hold it in



7. This next step is a little tricky, but you can do it! Take your pre marked skewer, and coat the end which is closest to the mark you made with your glue of choice. Insert it into your tube taking care not to touch the sides with it, until the mark that you made is flush with the end of the tube. Evenly spread the glue the whole way around the inside making sure there's a good amount. Take your motor block, and carefully slide it into the rocket tube, making sure it stays in the orientation shown below, until it reaches the glue.





8. Now for nearly the final step! We get to the part where it really starts to look like a rocket - attaching the fins! Let's start by printing the template at the end of this document, and tracing it onto cardboard.

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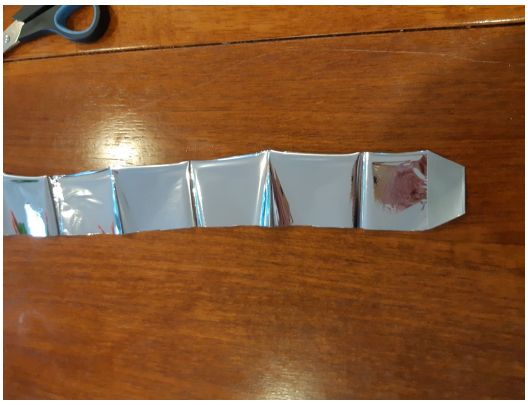
9. With a little bit of trial and error, we can get the fins to fit. Sometimes it is easier to glue one on first and then glue the others on individually, rather than gluing them all at once!
10. Attach your streamer or parachute. Whether you choose a streamer or chute is up to you, but it is recommended that if you change from the simulated design that you simulate your ground hit velocity.
    Below you can find an example of a good way to construct a streamer which can then be tied to the shock cord on the rocket.
    You want to have a strip of streamer material around 5 cm in width, and fold tape over the end to strength it. Once this has been done, you can punch a hole in it with a regular hole punch, and tie it to the shock cord.
    Optionally, you can add a smaller piece of tape folded over the other end of the streamer too.



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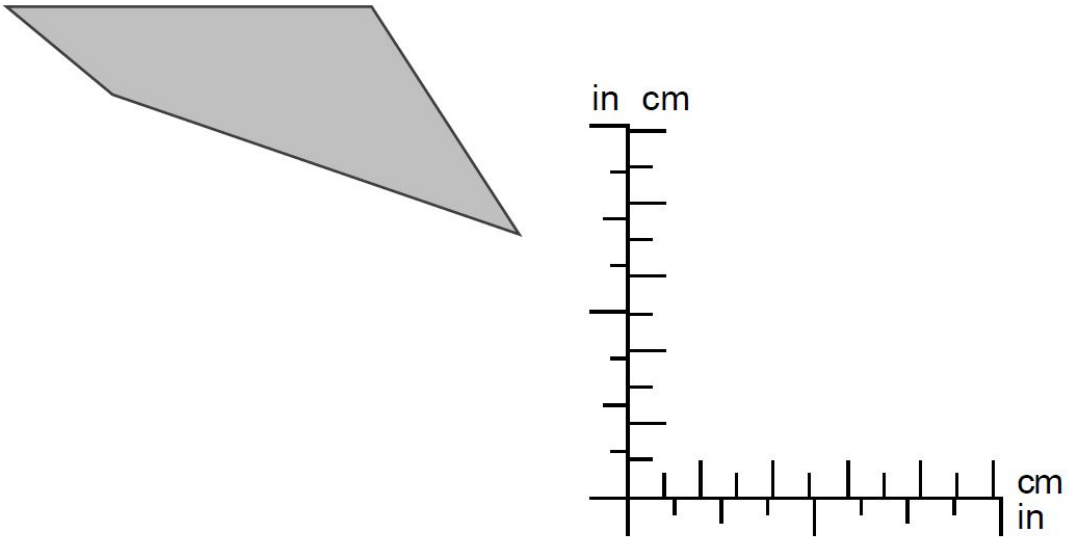
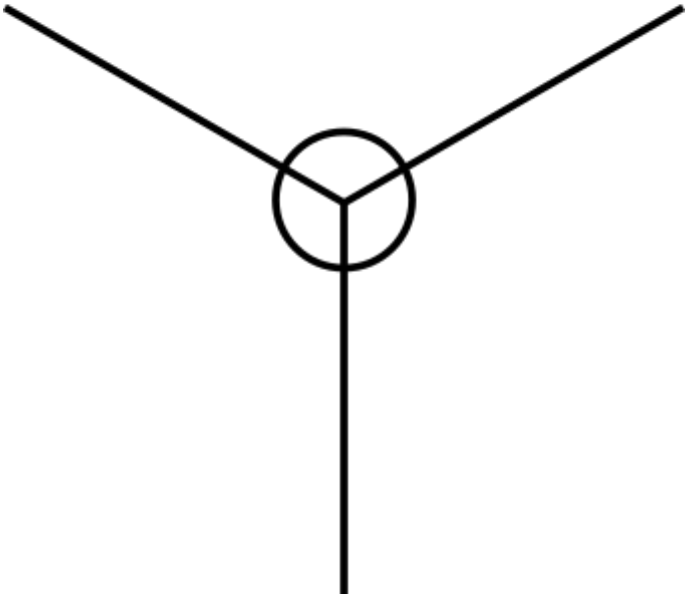
Fin Cutting Template



Fin Alignment Guide



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