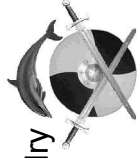
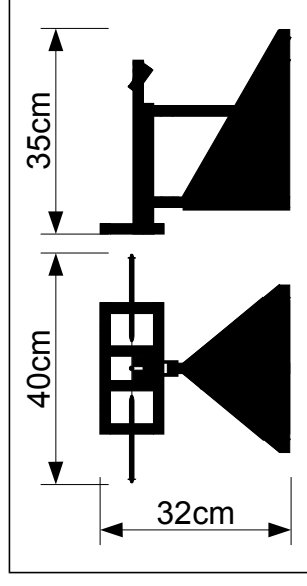


Table Top Ballista Project

Plans & Instructions for making a functional catapult



22AD Plans & Kits are produced by Dolphin Foundry
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Introduction

Before beginning this project you should read these instructions thoroughly and become familiar with the plans.

Take your time and where it says to allow something to dry take it seriously. If you try to rush you will make mistakes and have to go back and do it again.

Some parts require the use of power tools and adult supervision is required. However there is nothing too complicated here and with careful work you'll be able to complete a working model in a short time.

All parts are designed to use stock wood;

18mm square for all frame parts

20mm X 40mm for the launch tray base

8mm dowel for the throwing arms

4.75mm sheet for the braces, some small parts & trigger

Kabab sticks are used for the axles and pins

The arrows can be made from the full sized patterns included

Ordinary string for the string

You will also need some rubber bands and a brass ring.

White glue is used for all assembly except for a couple of places where an epoxy glue is used for strength.

The plans are drawn at a scale of 1:2 to get the full size measure from the plan and double. Templates for full sized parts are provided on the last page. Glue these parts to the sheet for cutting.

Arrows

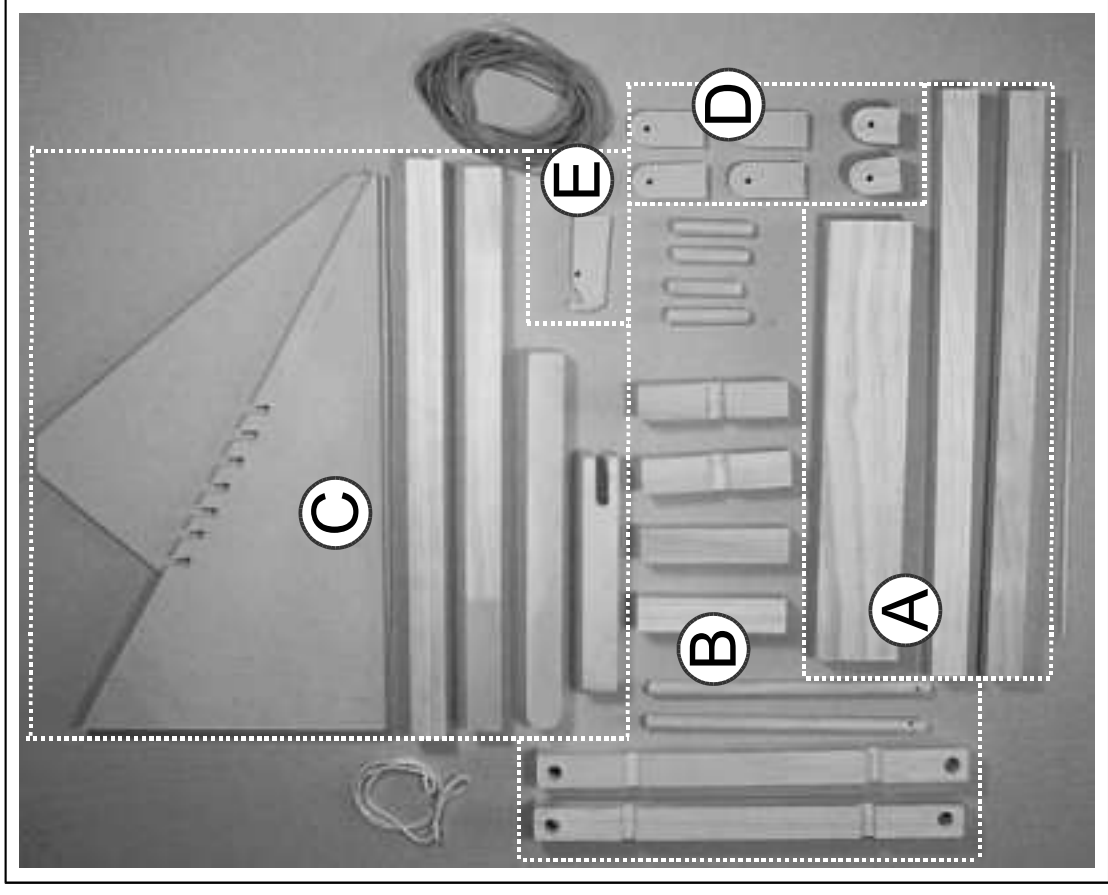
1. Cut out the arrow flights from the sheet provided. Fold in half and turn back the outer flap. Glue the inner part only
2. Cut out the shaft parts and roll into tubes gluing the last edge down.
3. Glue the flaps of the flights and attach to the shaft. Make sure that they are placed evenly and are slightly forward of the back of the shaft so that they are clear of the strings when loaded.
4. Use modeling clay to make a short sausage and fit into the tip end of the arrow then squash down to make a rounded tip.

Final Assembly

1. Remove the outside frames of the torsion frame and place an even number rubber bands on the torsion frame in bundles over the slots.
2. Place a throwing arm into the middle one of the bundles from the front and rotate the arm to the back.
3. Slide the arm through the bundle so that you can rotate the arm to the rear again. Repeat until tight enough. Ensure that the arm is oriented with the string retaining pin vertical.
6. Replace the out frame and secure with its retaining pins.
7. Repeat for the second arm making sure it gets the same number of turns.
8. Tie a loop in one end of the string and place it over one of the throwing arms with the string passing back through the slot.
9. Measure the string to other throwing arm and tie a loop with the right length to have the string tight with the arms touching the outside frames of the torsion frame.
10. Attach the trigger ring to the arrow string with a small loop of string and test the firing mechanism.
11. Secure the launching tray to the stand at the pivot points.
12. Test with an arrow.

Parts

- A Launching tray
- B Torsion frame and throwing arms.
- C Stand
- D Pivot parts
- E Trigger



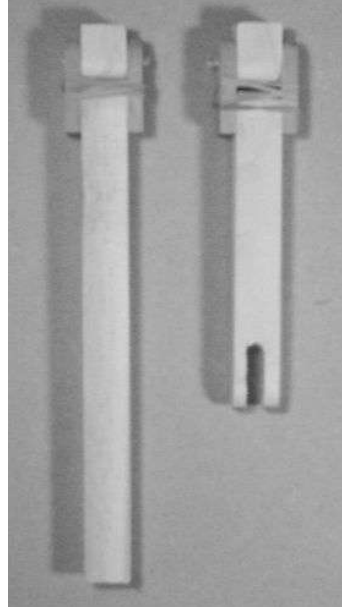
Parts preparation

1. Cut all the parts to size as shown on the plans. Use the full size templates for the pivot assembly parts and the stand back brace. The ranging slots can be made by first drilling holes then cutting the slots with a saw.
2. Drill all required holes. The half holes are made by clamping opposite parts together and drilling through with the join line as the center.

The holes for the throwing arms on the outer uprights of the torsion frame are 3/8 all others need to be the size of your kebab sticks which can vary a bit.

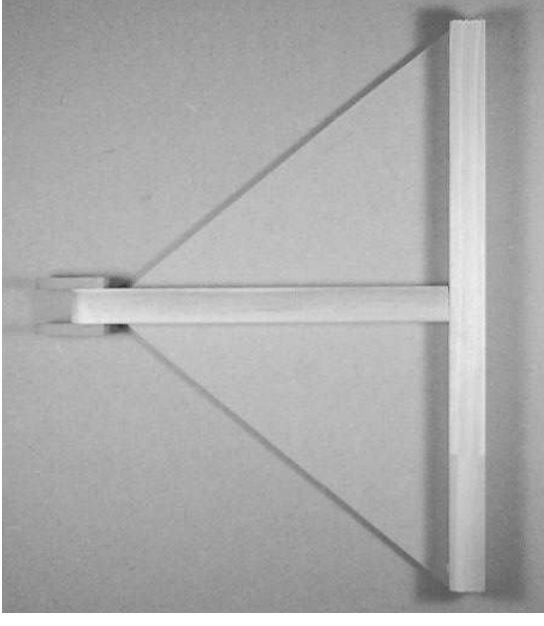
4. Cut slots into the ends of the throwing arms at right angles for the hole you made for the retaining peg and then glue in the pegs. Cut a slot into the bottom of the ranging brace wide enough for it to fit over the back brace of the stand. Round off both ends of the ranging brace and the top of the stand upright spar.

5. Assemble the two pivot assembly's ensuring the pivot holes line up.

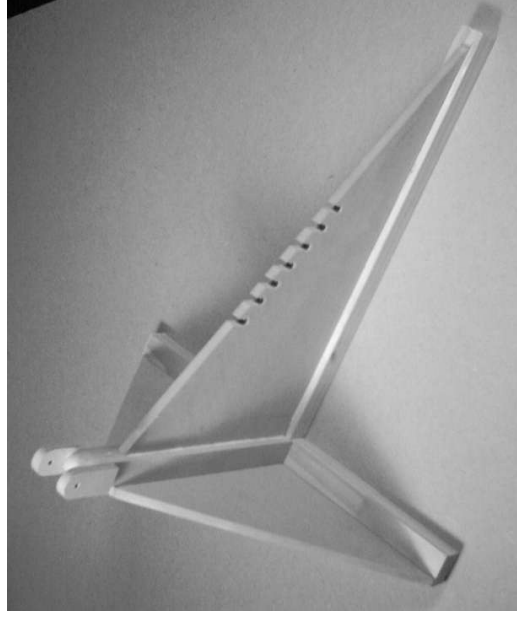


Stand assembly

14. Glue the front brace to the front spar and the upright spar. Allow to dry.

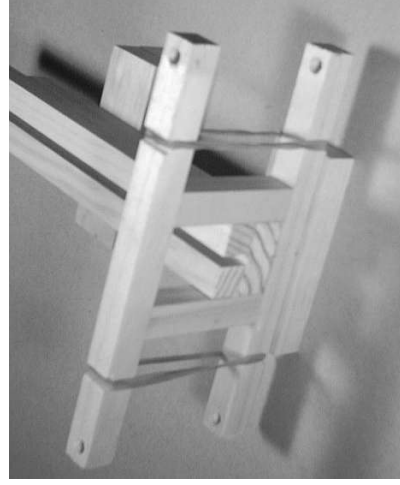


15. Glue the stand rear spar to the front assembly. Epoxy the back brace in place in the center of the upright and bottom spars.



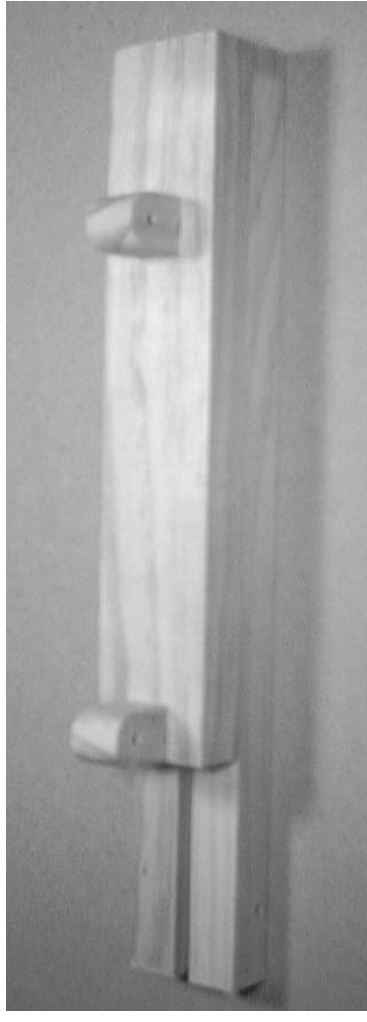
Torsion frame assembly

10. Glue the launching tray to the bottom horizontal frame of the torsion frame ensuring it is in the middle and square. You can use one on the frames as a square for this.
11. Glue the two inside upright frames to the bottom frame and the launch tray. Allow to dry.
12. Glue the top frame to the two inside uprights and secure with rubber bands
13. Insert the outer frames and their retaining pins to ensure that everything lines up. Allow to dry. The outer frames are not to be glued. They are just retained by the dowel pins and are there to stop either of the arms going forward of the frame.

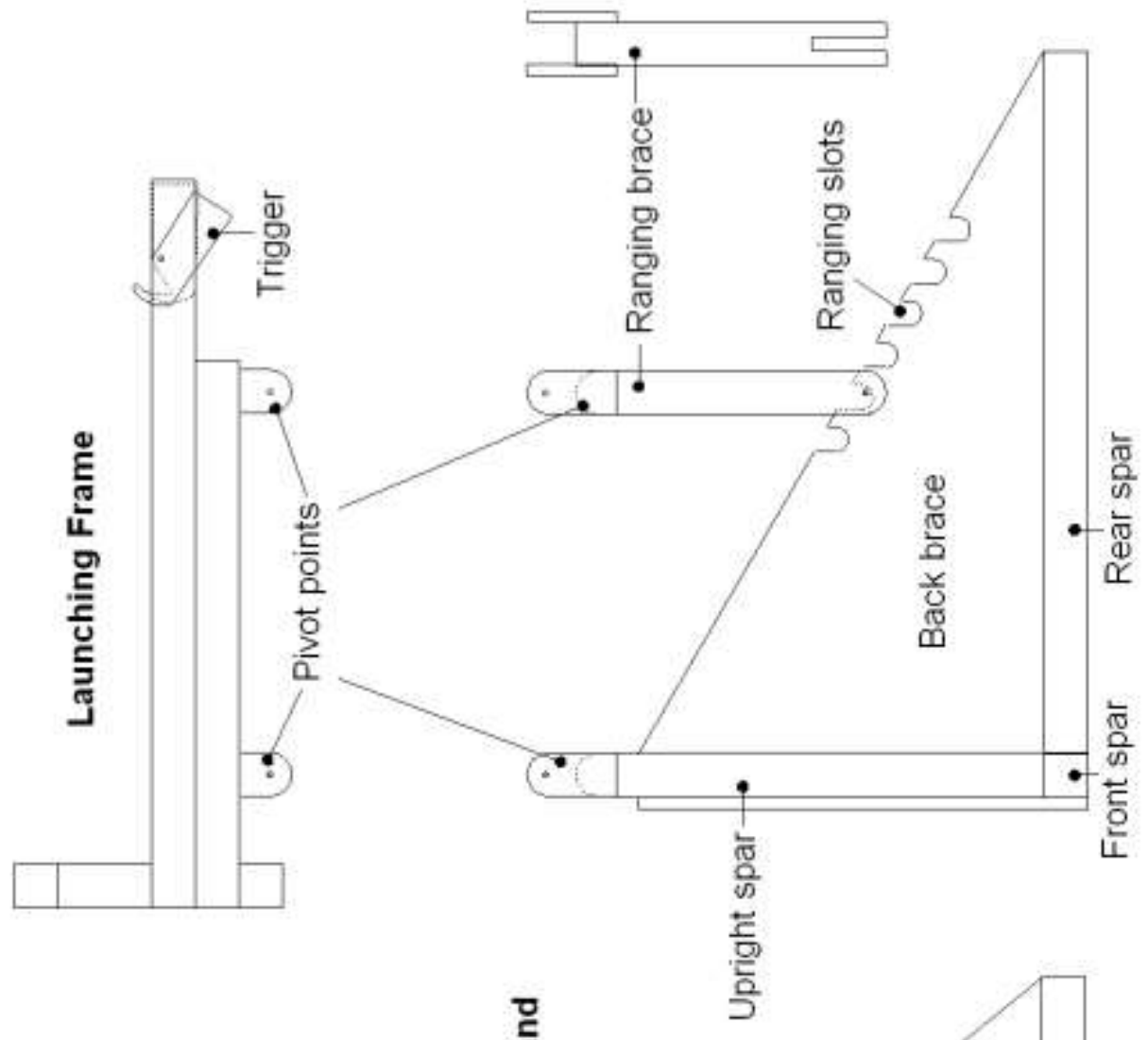
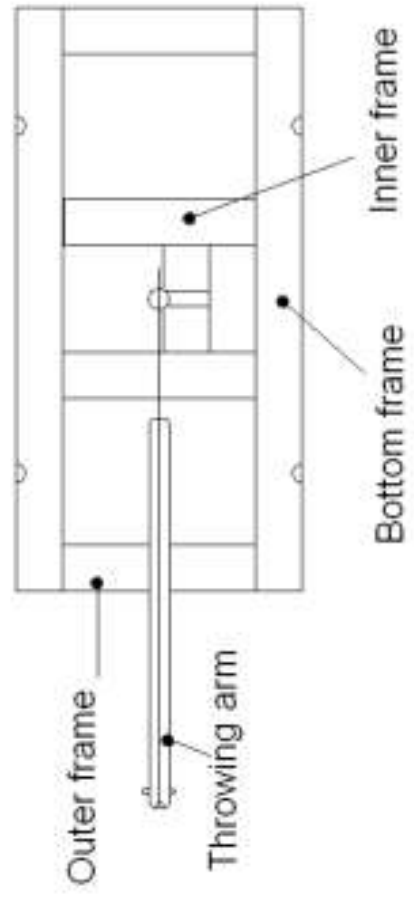


Launching tray assembly

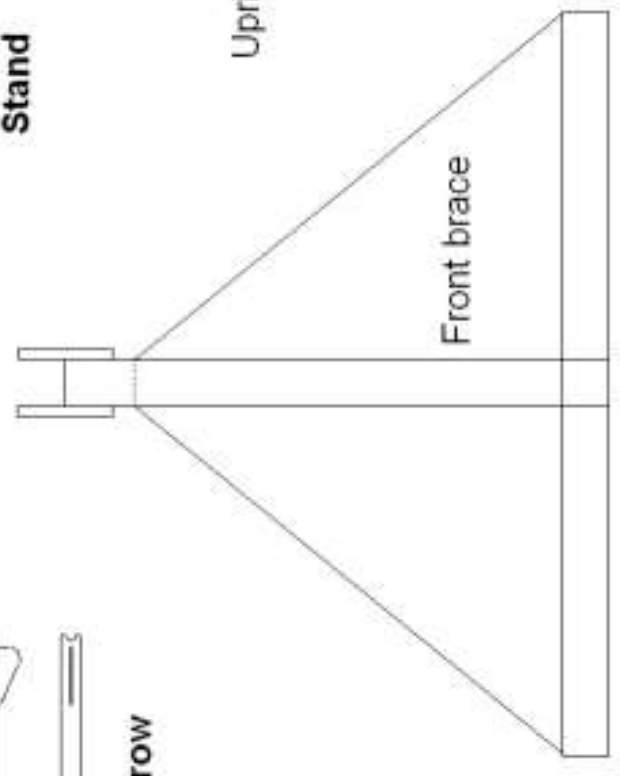
6. With a sanding block sand down the top inside end of the two tray blocks from the front to just in front of the trigger position. This to help the arrow site in the tray.
7. Glue the two square runners to the tray base with all the front edges flush. Ensure the trigger holes line up.
8. Insert the trigger and glue in the trigger pin and ensure the trigger is moving freely.
9. Epoxy the two pivot assemblies into position on the underside of the paunch tray.

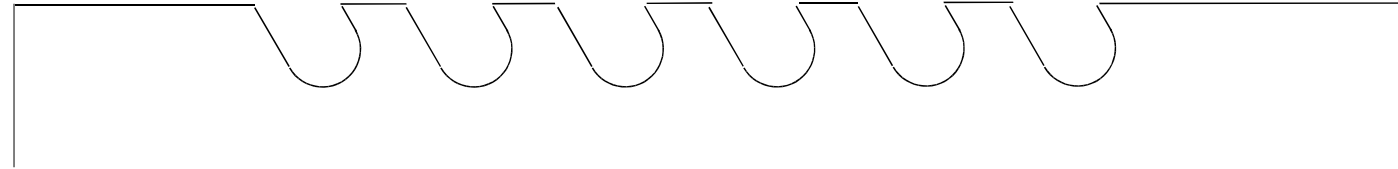


Torsion Frame Top frame



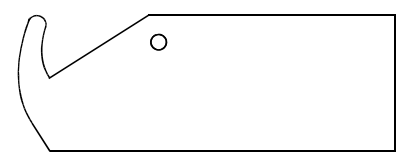
Stand



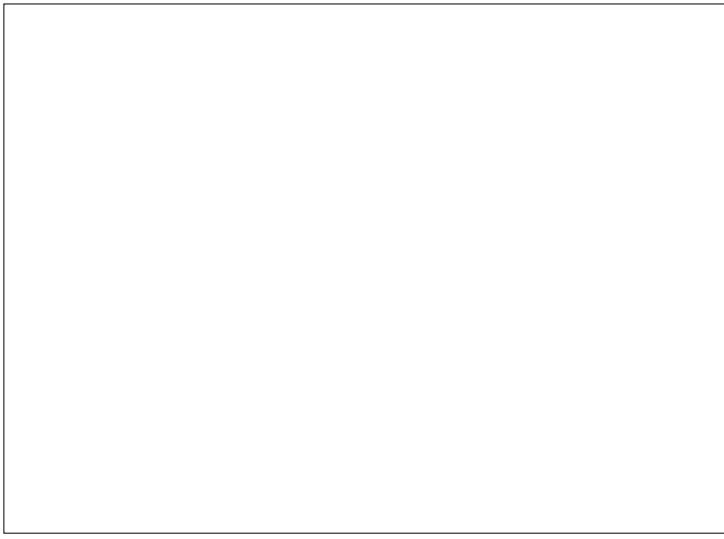
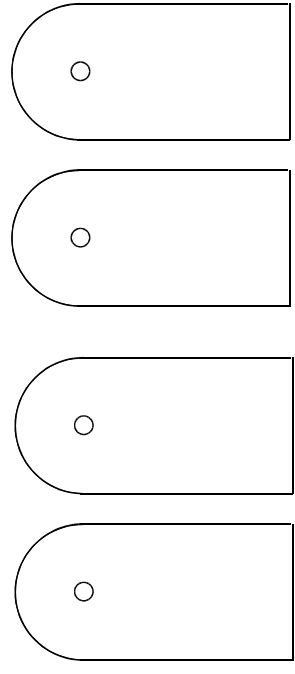


Pull out this page and copy to make extra arrows

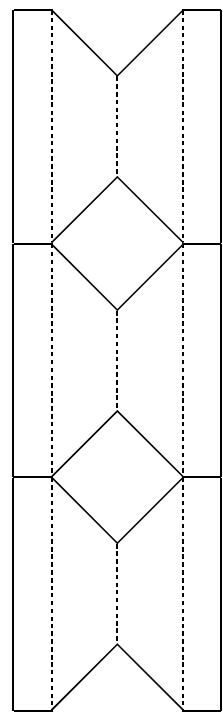
Ranging slot template
Glue directly to back brace to cut slots



Full Size pivot points and trigger
Glue directly to board for cutting



Arrows
Follow the instructions in the booklet to assemble



Arrow flights

