# BUILDING A CATAPULT

The catapult that is described here will throw a water balloon several hundred feet. Obviously, if you reduce the dimensions of the components, the distances you can throw will change accordingly.

Equipment List

| Qty	Item	Comments
3	2.4m (8ft) spars (front face)	All spars must be good quality. DO NOT use dowelling.
3	4.5m (15ft) spars (back brace)	
1	4.5m (15ft) spar (throwing arm)	Best results will come from a good but relatively thin spar.
1	1m (3.5ft) spar (throwing arm cross piece)	Must be strong
15 m (50 ft.)	.6cm (1/4in) or thicker rope	Launching rope
7x3.5m (12 ft)	.6cm (1/4in) rope	These are for lashing. I prefer braided nylon or better still, braided polyester.
1	double pulley or 2 single pulleys	Must fit the launching rope above
1	throwing tin	See diagram below
2x1/2m (20in)	.6cm (1/4in) rope	Attach pulley(s) and throwing tin
1 supply	water balloons	

Step 1: Build front face triangle
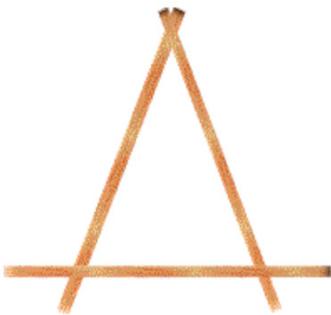
Lay out the 2.4m spars as shown in the diagram and lash the spars together with a square lashing where they cross.
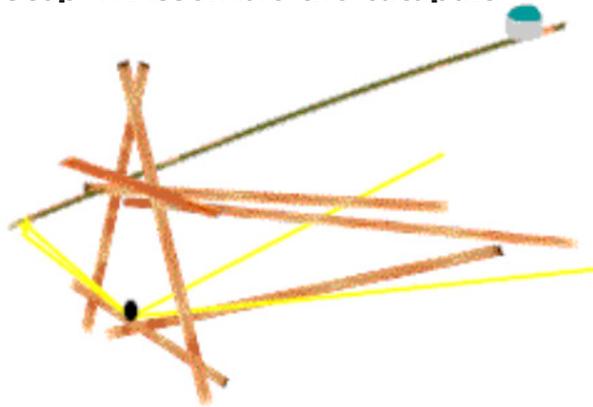
Step 2: Attach the back supports
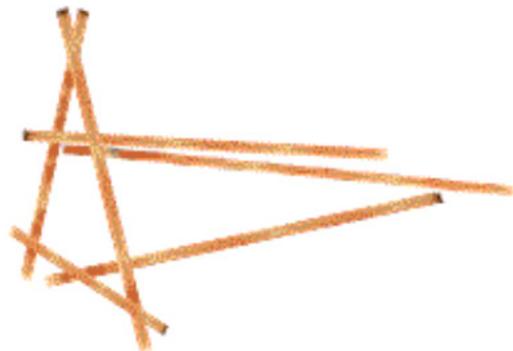
Lash the back brace spars to the front face triangle as shown in the diagram. Note: The two side spars should be lashed to the inside of the triangle about 2/3 of the way up from the bottom. The bottom spar should be attached on the outside.
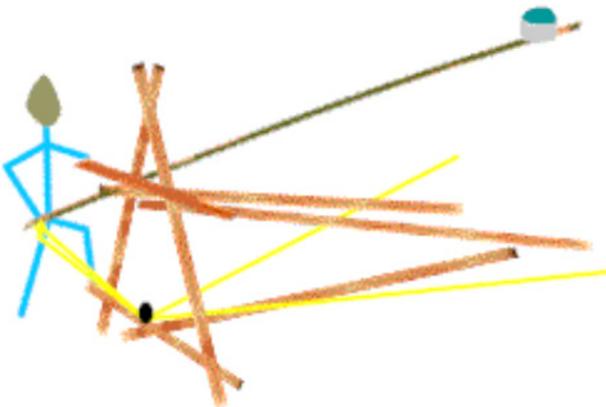
Step 3: Build the throwing arm

Apex up
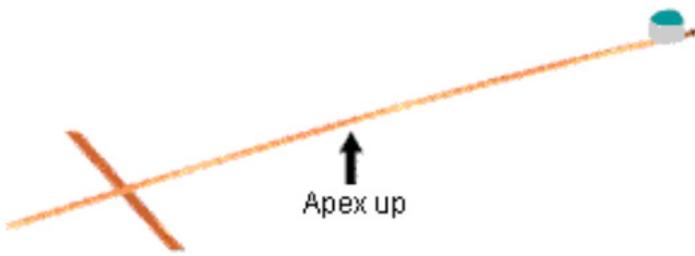
Lash the throwing arm cross piece to the bottom side of the throwing arm about 1m (3.5Ft) back from the thickest end. If the throwing arm has a curve in it make sure the apex of the curve is up (see diagram). Attach the throwing tin to the tip of the throwing arm.

Step 4: Assemble the catapult

1. Set the completed throwing arm into the catapult as shown.
2. Attach the pulley(s) to the end of the lower back support.
3. Attach the middle of the launching rope with a clove hitch to the large end of the throwing arm.
4. Run the two ends of the launching rope through the pulley(s) and lay them back beside the two back supports.

Step 5: Safety Considerations

The excitement of watching the water balloon sail out and hit its mark is the fun of building a catapult. However, what goes up will also come down and the throwing arm is no exception. Once the balloon is launched all eyes will follow the balloon and unfortunately not the decent of the arm. One person MUST act as safety control and control the decent of the arm. (see the diagram). This means that they must stand just in front of the catapult and keep their hand on the short end of the throwing arm. The same person can check the path of the throwing arm before they call "fire" to ensure everyone is clear.

Step 6: Operation

Assign youth to pull the launching ropes. Depending on their strength and size, you can assign several on each rope. When the water balloon is in the tin and everyone is clear of the arm, the safety control person should yell "fire" and both ropes pulled. If the throwing arm is heavy then the safety control person may want to assist the throw by pushing down on the throwing arm extension. (Remember to control the descent of the arm after the water balloon has been thrown.)

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Step 7: Have Fun

As with all games a set of rules will help keep the excitement under control. If you are building several catapults to throw balloons at each other, then here are some simple rules that have worked for me.

1. No balloons will be thrown until all the catapults are built and operational. (This keeps the focus of the teams on the building process.)
2. No balloons will be thrown by hand.
3. Only water balloons can be thrown.

Throwing Tin
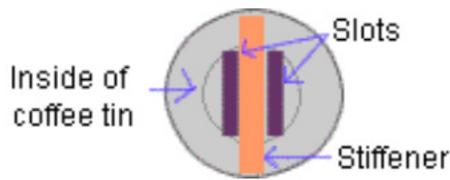
The throwing tin is made from a large coffee tin. The side is cut down to a 8cm (3in) height and the edge is turned over. Two slots 1.25cm (.5in)wide X 10cm (4in)long, about 2.5cm (1in) apart. (see diagram). Tape the edges with duct tape. (Note: If the tin is to be used on several occasions then add a stiffener that fits inside the tin between the two slots and extends out to the sides. Hold it in place with more tape!)

Special Note:
The distance that this catapult can throw a water balloon is related to the square of the length of the throwing arm i.e. an arm ½ the length will only through a water balloon ½ X ½ or ¼ of the distance. In addition the weight of catapult itself is too light.

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