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Designed by:
Ritchie Kinmont

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Mousetrap Catapult



Mousetrap Catapult

About this project:

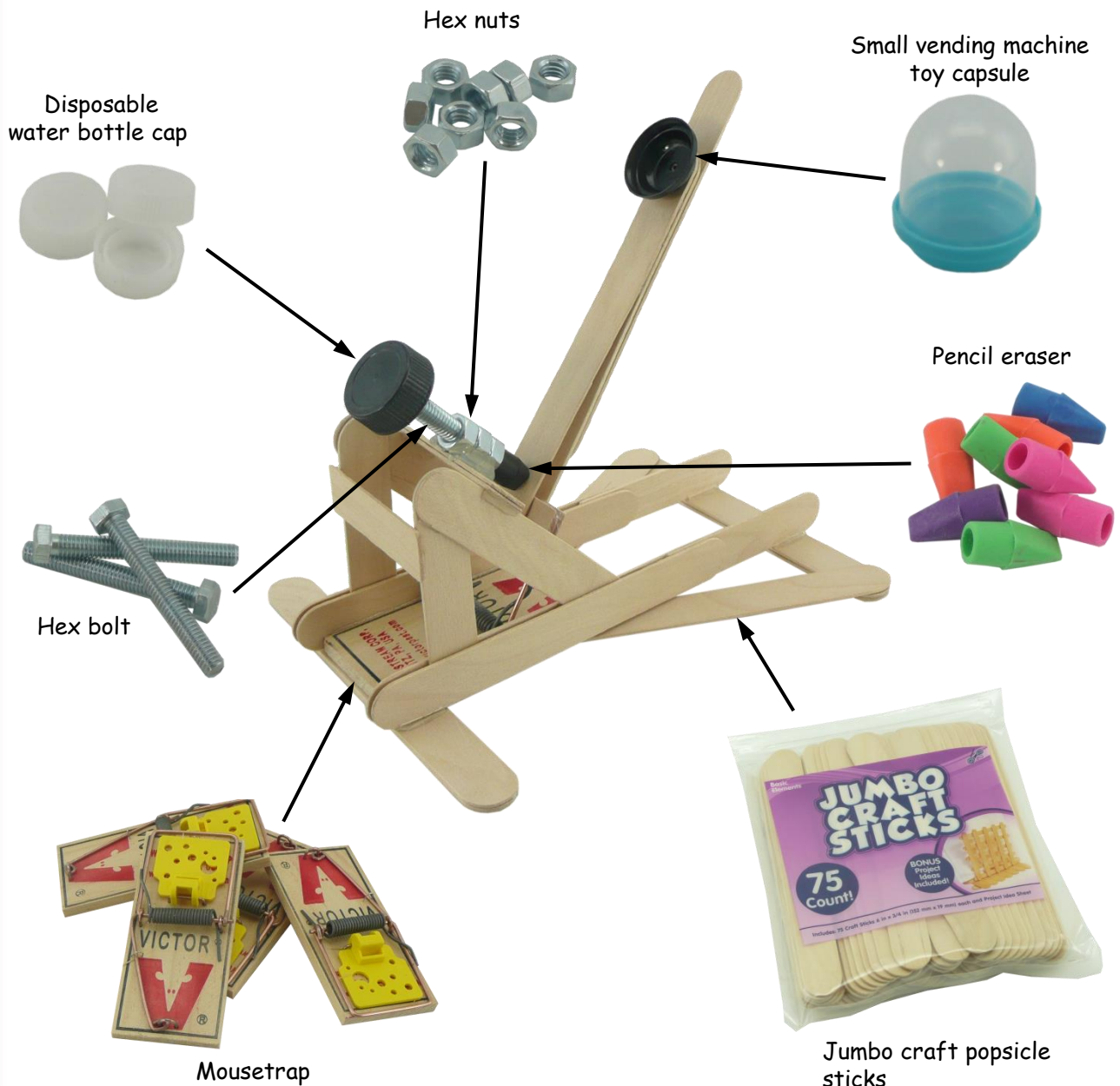
The Mousetrap Catapult is fun for ages four and up. Using a mousetrap for the spring, this catapult is designed to throw objects such as practice golf balls, paper balls, or marshmallows. These kinds of objects can be thrown 20 feet or more. The adjustable arm-stop knob allows you to dial in the target for some precision catapult strikes.

All catapults are fun, but this design combines fun with a precision strike capability. Dial it in and let the projectiles fly . . . Cool!



What's it made of?

The Mousetrap Catapult frame is made from a mousetrap and jumbo popsicle sticks. The adjustable stop is made from hex nuts, a bolt, a pencil eraser, and a water bottle cap. The projectile cup is made from the lid of a small vending machine toy capsule.



Project Construction



Check out my way cool Sonic Dad gauges for project difficulty, time, and cost. Cost of this project depends on how many items you have on hand. If you purchase all items new, cost will be higher than the approximate cost shown.

SHOPPING LIST

Quantity	Item needed	Where to find it	See Figure
1 pkg	Jumbo popsicle sticks	Wal-Mart, craft store	Page 2, A, B
1	Wood mousetrap (this project is designed around the Victor brand mousetrap)	Wal-Mart, grocery store	Page 2, C, D
1	5/16" hex bolt x 2 3/4" long	Home Depot, hardware store	Page 2, Y, Z
3	5/16" hex nuts	Home Depot, hardware store	Page 2, Y, Z
1	Small vending machine toy capsule (about 1 1/8" diameter)	Discount retail store, grocery store	Page 2, FF
1	Pencil topper eraser	Discount retail store, office supply store	Page 2, BB, EE
1	Disposable water bottle cap	On hand	Page 2, CC, DD

SUPPLIES AND TOOLS NEEDED

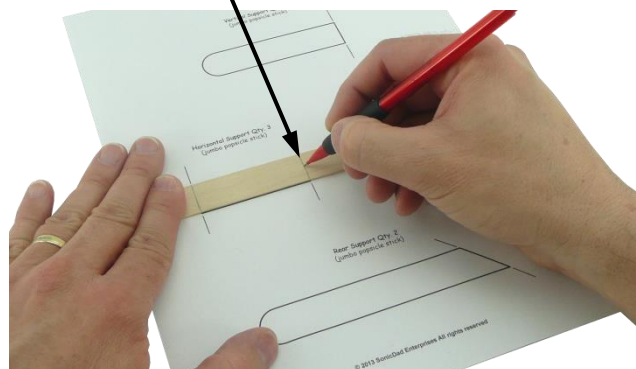
Item needed	Where to find it
High temp hot glue gun and glue sticks	Discount retail store, home improvement store, craft store
Ball point pen or pencil for marking	Discount retail store
150 grit sandpaper	Discount retail store, home improvement store
Heavy duty shears (for cutting popsicle sticks)	Discount retail store, home improvement store
Pair of pliers	Discount retail store, home improvement store
X-acto knife with sharp blade	Discount retail store, home improvement store
Masking tape (see Step 20)	Discount retail store, home improvement store
Krylon Fusion spray paint for plastics, gloss black	Discount retail store, home improvement store

Step 1

Print the cutting template from page 16 on regular printer paper. Lay the template sheet on your work surface, then lay the popsicle sticks on top. Use a pen or pencil to mark the cut lines on each piece to be cut. (fig. A)

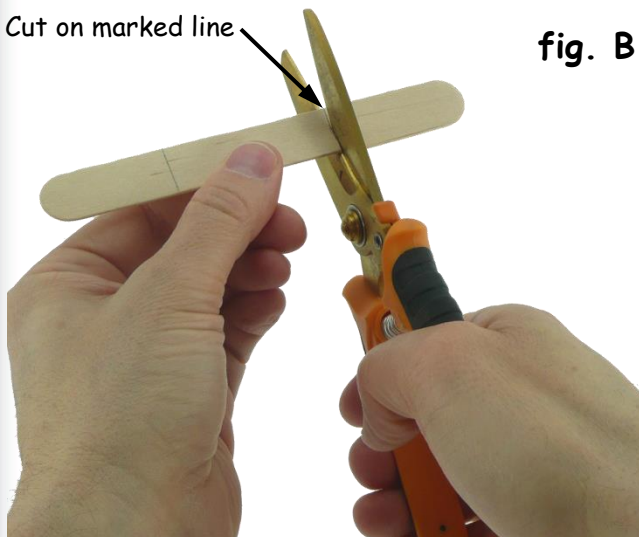
Use template to mark cut lines

fig. A



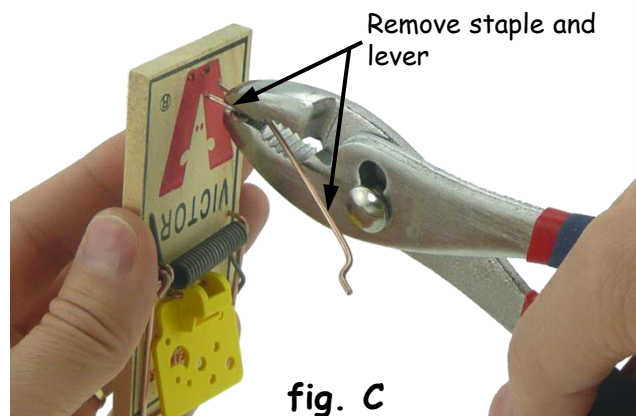
Cut on marked line

fig. B



Step 2

Use heavy duty shears to cut the popsicle sticks on the marked cut lines. Use 150 grit sandpaper to sand the cut edges smooth. (fig. B)



Remove staple and lever

fig. C

Step 3

Use a pair of pliers to remove the staple and trap lever as shown. (fig. C)

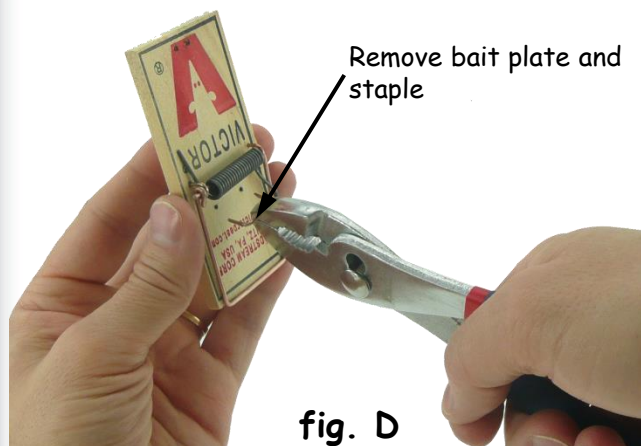


fig. D

Step 4

Snap off the plastic bait plate from the mounting staple. Use a pair of pliers to remove the staple as shown. (fig. D)

Attach jumbo
popsicle stick to arm
mount

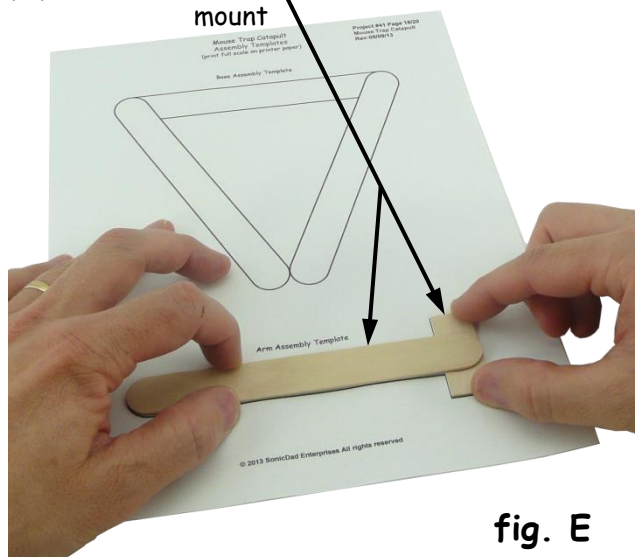


fig. E

Step 5

Print the base and arm assembly template from page 17 on plain printer paper and lay it on your work surface. Lay one of the arm mount pieces on the template and apply high-temp hot glue in the area where the popsicle stick will mount. Attach a jumbo popsicle stick using the template for alignment and position as shown. (fig. E)

Be sure the popsicle stick arm assembly is centered under the mousetrap arm. If it's not centered, it may rub on the frame when it's attached in a later step, which would be a real bummer!



Step 6

Lift up the metal trap arm and slide the arm assembly under as shown. Let the spring-loaded trap arm clamp the arm assembly in place as shown. Adjust the arm assembly position until it is centered and lined up straight with the mouse trap base as shown. (fig. F)

Position arm
assembly under
trap arm

fig. F



Apply glue on arm mount

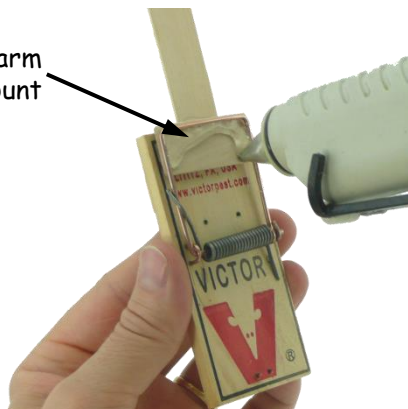


fig. G

Step 7

Once you have the arm assembly in position, apply a large bead of glue on the arm mount as shown. (fig. G)

Attach second arm mount aligned with the first

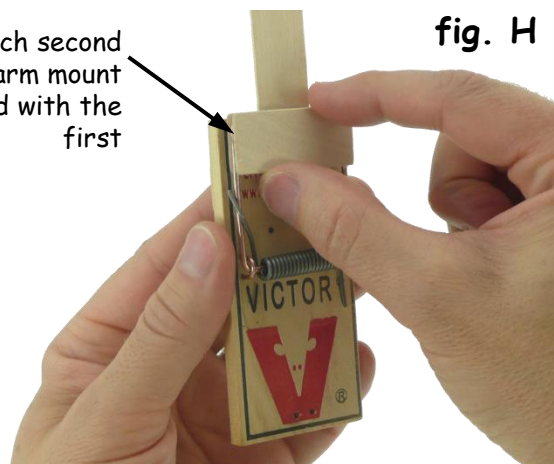


fig. H

Step 8

Working quickly while the glue is still hot, attach the second arm mount piece as shown. Be sure the edges are lined up with the arm mount below. (fig. H)

Fill gap with glue

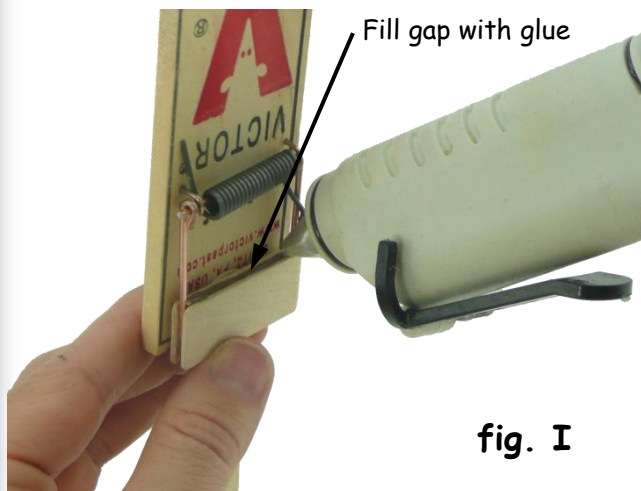


fig. I

Step 9

Hold the assembly upright and fill the gap between the arm mounts with glue to strengthen the joint. (fig. I)

Attach second popsicle stick aligned with the first

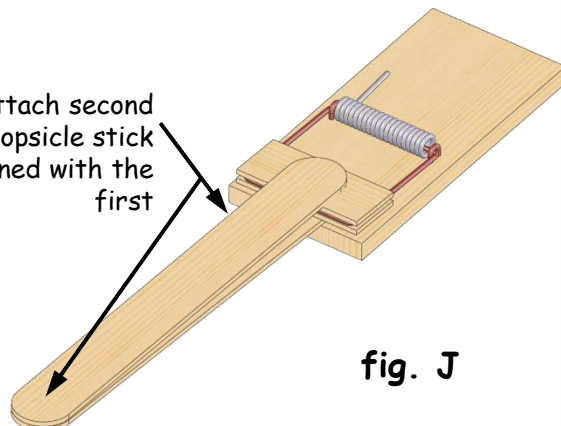


fig. J

Step 10

Attach a second jumbo popsicle stick on top of the arm mount as shown, aligned with the lower popsicle stick. Be sure the sticks are glued together where they touch at the end. (fig. J)

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Step 11

Attach a popsicle stick to the arm assembly with the end about 1 1/4" from the lower arm as shown. (fig. K)

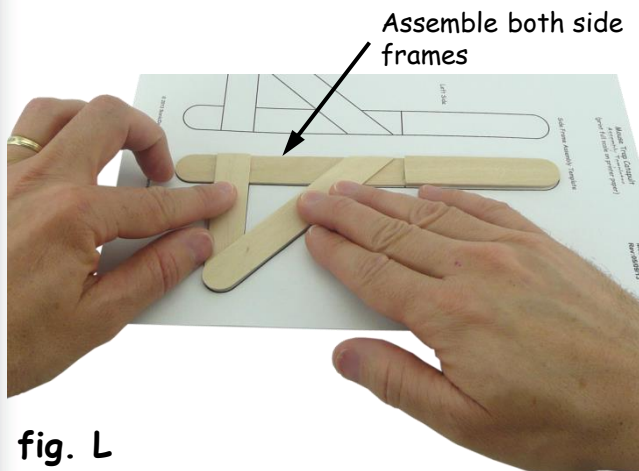


fig. L

Step 13

Attach the right side frame assembly to the arm assembly flush with the bottom of the base. Align the front of the side frame with the base as shown. (fig. M)

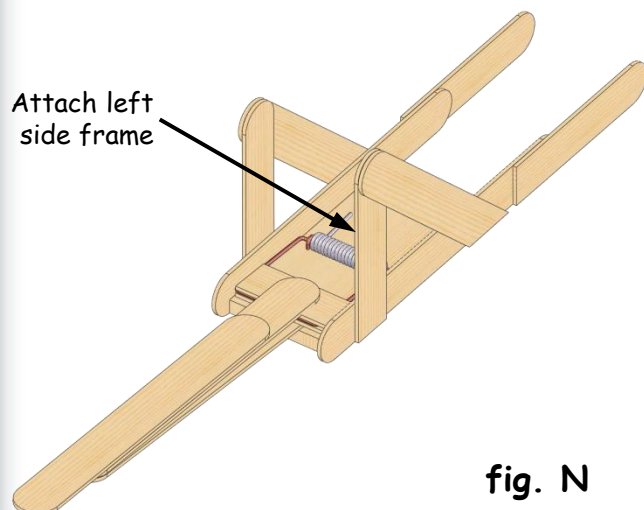
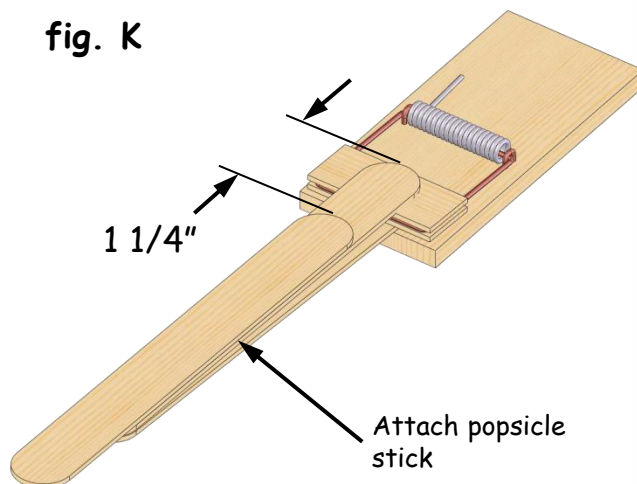


fig. N

fig. K



Step 12

Print side frame assembly template from page 19 on plain printer paper and lay it on your work surface. Lay a jumbo popsicle stick on the template, then attach the vertical, rear, and base supports as shown. Assemble the right and left side frames using the template as a guide. (fig. L)

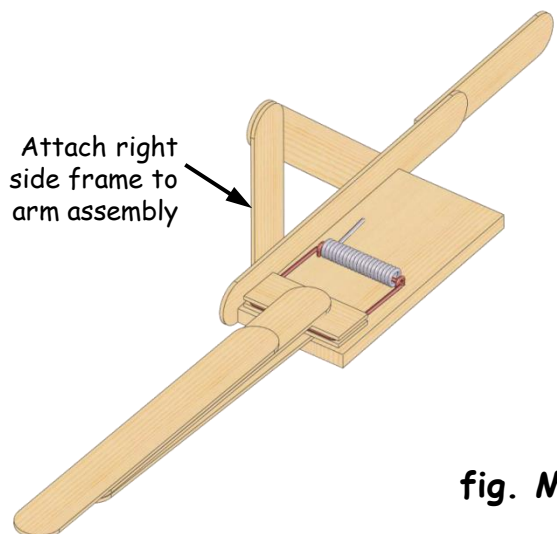


fig. M

Step 14

Attach the left side frame flush with the bottom of the base and aligned with the right side as shown. (fig. N)

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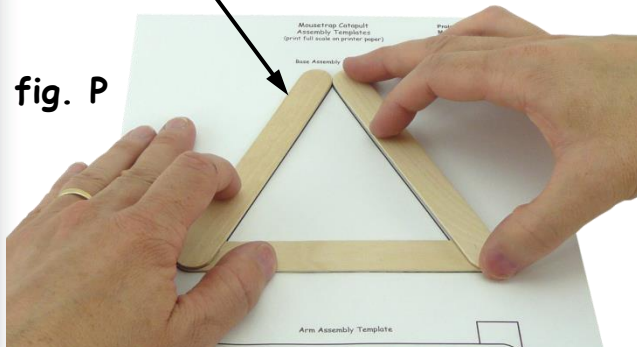
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Step 15

Attach a popsicle stick on the outside of each side frame in the location shown. (fig. O)

Assemble base using template

fig. P



Attach popsicle stick on each side

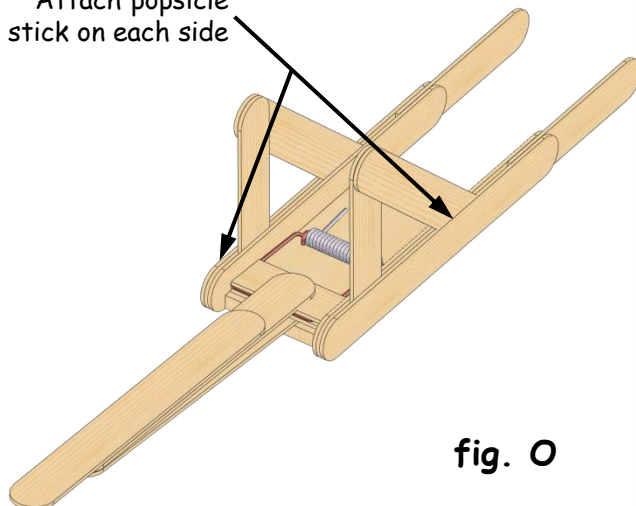


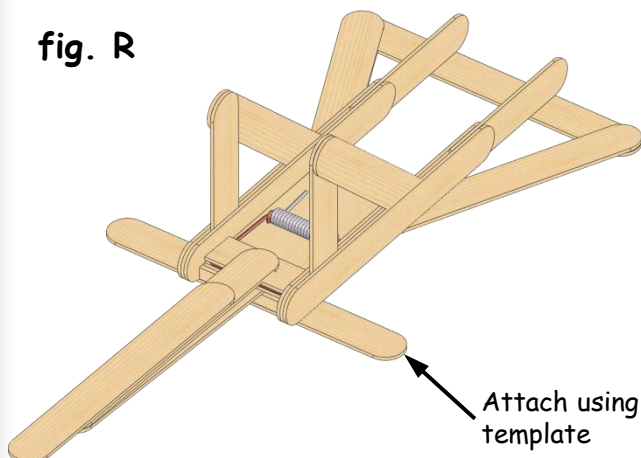
fig. O

Step 16

Use the base assembly template to assemble the base using three popsicle sticks as shown. (fig. P)

Print frame assembly template from page 18 on plain printer paper and lay it on your work surface. Lay the base assembly on the template. Apply glue where the arm and side frames attach to the base. Working quickly while the glue is still hot attach the arm and side frame assembly to the base using the template for alignment and location as shown. (fig. Q)

fig. R



Use template to attach base

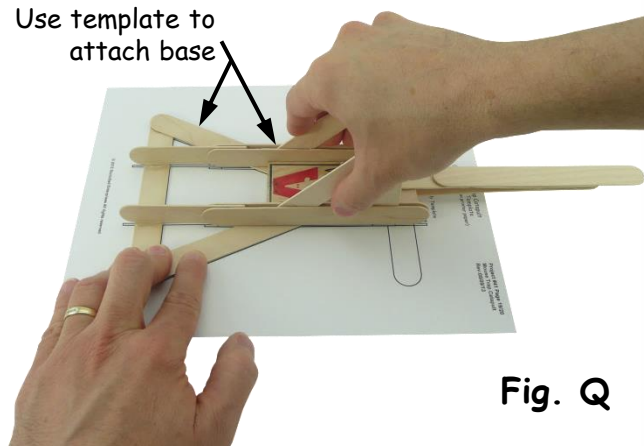


Fig. Q

Step 18

Attach a popsicle stick to the frame as shown using the template for location. (fig. R)

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Step 19

Attach a second popsicle stick to stiffen the base on the front and back as shown. (fig. S)

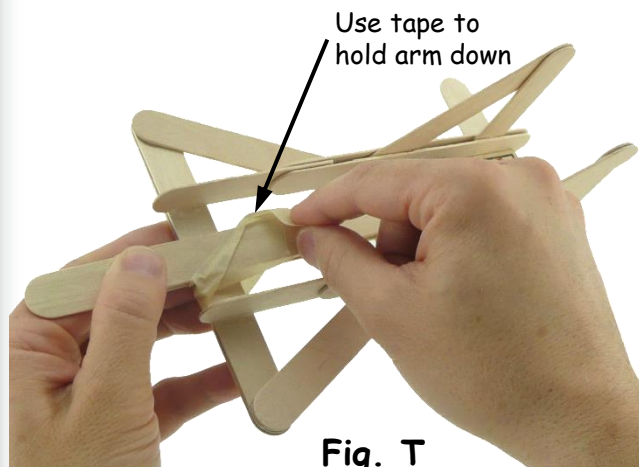
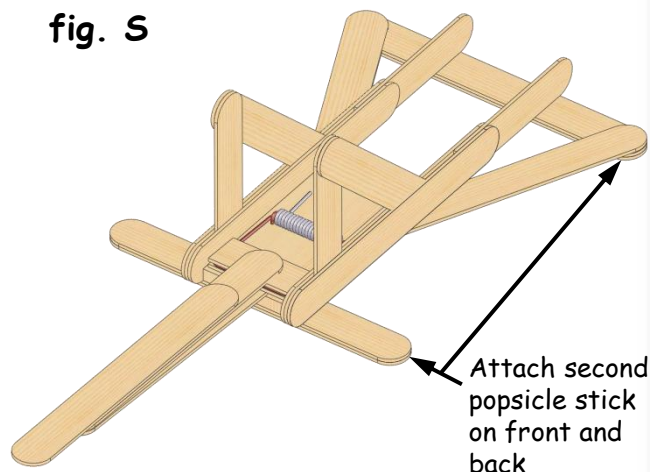


Fig. T

fig. S



Step 20

Pull the arm all the way back against the back of the base. Use a piece of masking tape to secure it in place as shown. (fig. T)

Attach one of the horizontal support pieces on the rear supports as show. Locate the support about 1/2" down from the radius on the rear support as shown. Be sure the side frames are parallel and the horizontal support is centered. (fig. U)

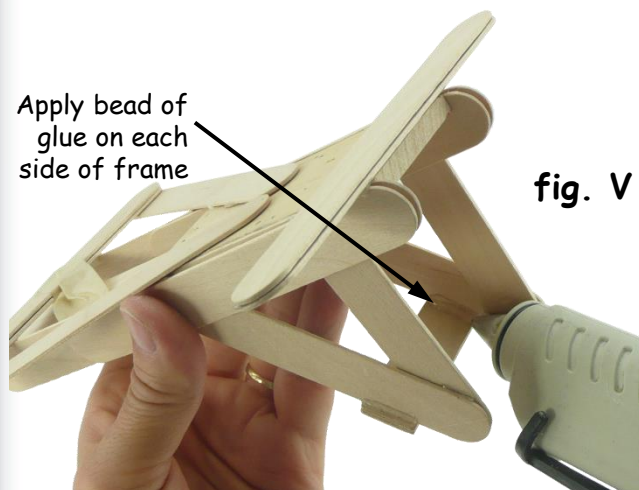


fig. V

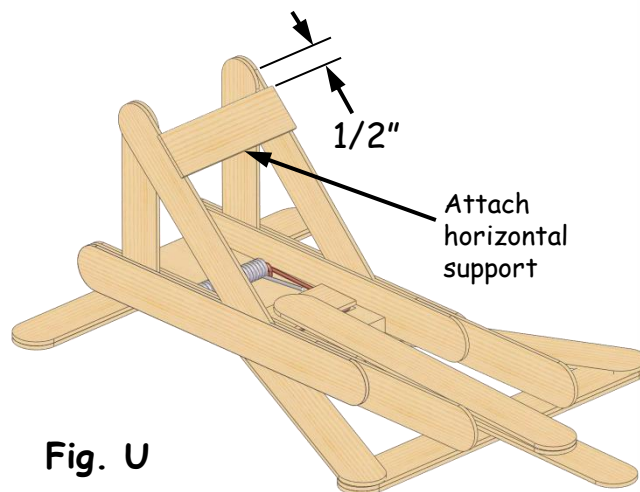


Fig. U

Step 22

Apply a large bead of glue on each side of the side frames to reinforce the horizontal support as shown. (fig. V)

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Step 23

Attach a second horizontal support on top of the first support. Align the edges flush as shown. (fig. W)

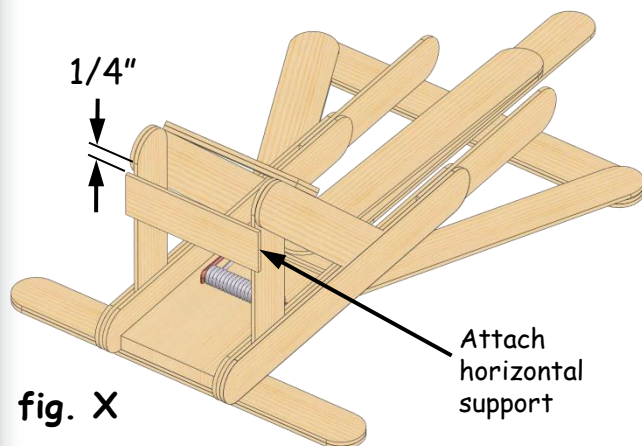


fig. X

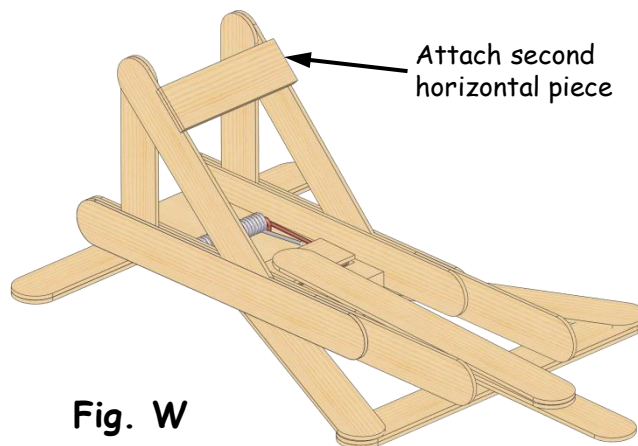


Fig. W

Step 24

Attach the third horizontal support on the front of the frame. Locate the support about 1/4" down from the radius on the vertical support as shown. Be sure to center the support on the side frames. (fig. X)



The trick in this step is to find the perfect alignment for the three nuts on the bolt. You want the nuts to be close together but not tight. The bolt must turn freely while you hold the nuts with your fingers! Keep adjusting the position of each nut until they are close together with the flats aligned and the bolt is able to turn freely.

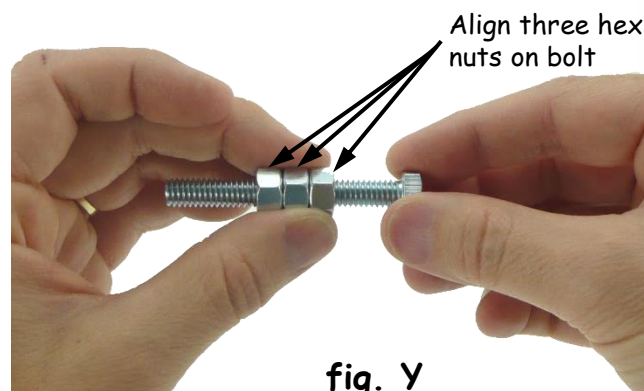


fig. Y

Step 25

Thread three 5/16" hex nuts on a 5/16" x 2 3/4" long hex bolt as shown. Align the three nuts so they are close together with the flats lined up, but still loose so that the bolt can turn freely. (fig. Y)

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Step 26

Apply a vertical bead of glue in the center of the doubled horizontal support. Working quickly while the glue is still hot attach the three nuts with the bolt inserted, while maintaining the nut alignment from the previous step. Be sure the nuts are positioned in the center of the support and straight up and down as shown. (fig. Z)

Apply glue on both sides of nuts

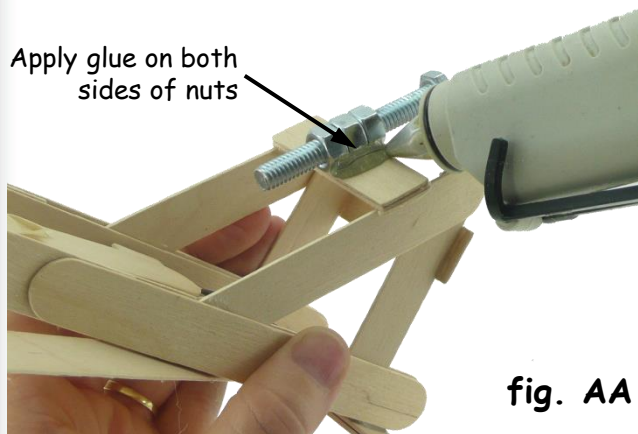


fig. AA

Attach on center of support

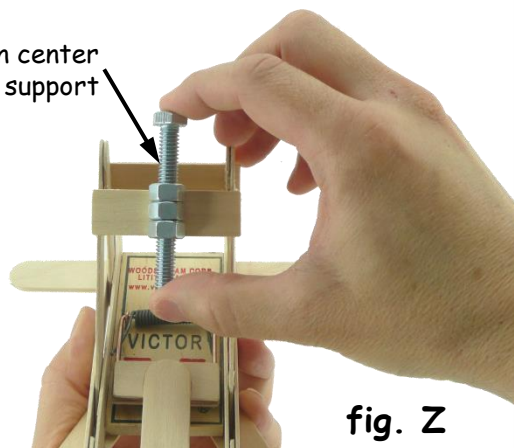


fig. Z

Step 27

After the glue has cooled from the previous step, rotate the bolt to be sure it turns freely. If it does not turn freely, carefully remove the hex nuts and re-attach. Apply a large bead of glue on each side of the nuts to secure them to the support as shown. (fig. AA)

Step 28

Use heavy duty shears or an X-acto knife to cut the tip of a pencil topper eraser as shown. Cut in about the middle of the tapered portion of the eraser. (fig. BB)

fig. CC



Paint gloss black

Remove tip of eraser

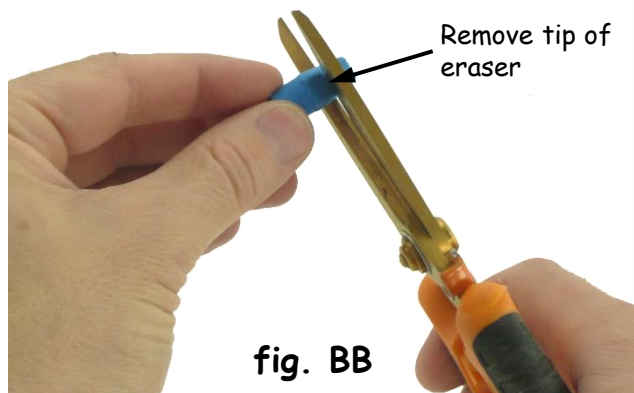


fig. BB

Step 29

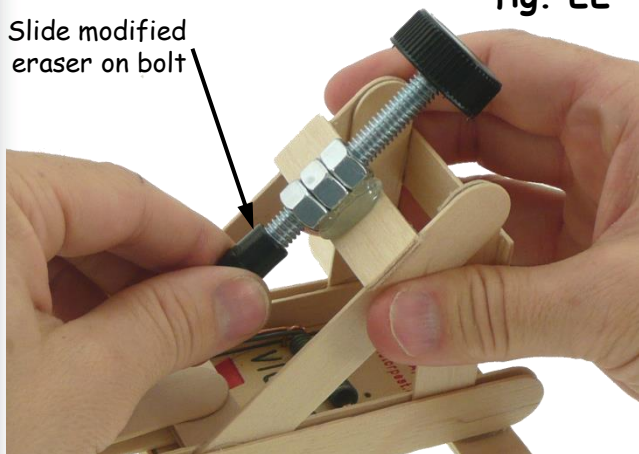
Apply two light coats of Krylon Fusion spray paint for plastics, gloss black or the color of your choice, on a water bottle cap, and the lid from a vending machine toy capsule. You may also want to paint the modified pencil eraser to improve the appearance. (fig. CC)

Step 30

Remove the hex bolt from the horizontal support. Apply a bead of hot glue in the inside center of the painted water bottle cap and attach the bolt centered inside the cap as shown. (fig. DD)

fig. EE

Slide modified eraser on bolt



Attach bolt to cap

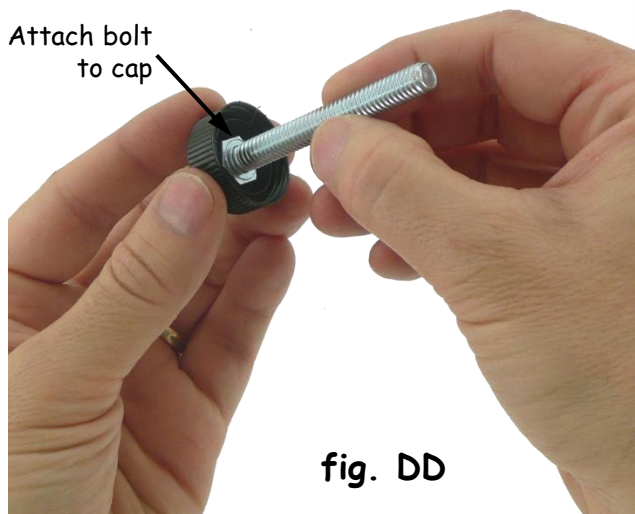


fig. DD

Step 31

Re-install the hex bolt assembly and press on the modified eraser. Push the eraser all the way on the bolt. (fig. EE)

Step 32

Remove the masking tape holding the arm down to the frame, allowing it to rest on the arm stop. Use an X-acto knife to scrape off the paint and rough up the plastic on the back side of the painted toy capsule cap, an area about 1/2" diameter. Apply a bead of glue on the end of the arm and attach the projectile cup in the location shown. (fig. FF)

fig. FF

Attach projectile cup to arm



Operating Your Catapult



You can use many different items as projectiles for your catapult. Here are a few that I like to use:

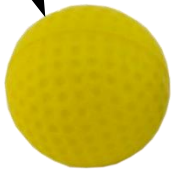
Foam or plastic Practice Golf Balls - buy them at Wal-Mart or sporting goods stores.

Paper Balls - make them from brown paper bags, magazine pages, or printer paper. Get the paper wet and form into a ball. Let them dry overnight, and you're ready for action!

Masking Tape Ball - make them from wide masking tape. Keep wrapping pieces of tape until the ball is about the size of a golf ball.

Jumbo Marshmallow - jumbo marshmallows are also fun to launch in your catapult.

Foam practice golf ball



Plastic practice golf ball



Brown paper sack ball



Magazine page paper ball



White printer paper ball



Masking tape ball



Jumbo marshmallow



Adjusting the stop position of the catapult arm will change the trajectory of your projectile . . . Cool! That means you can zero right in on your target! To adjust the stop position, just hold the arm down with one hand, then turn the knob right or left to move the stop up or down. That's all there is to it!



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Here is how I like to load and shoot my catapult.

Step 1:

I place my left hand on the base of the catapult and pull the arm back with my right index finger.



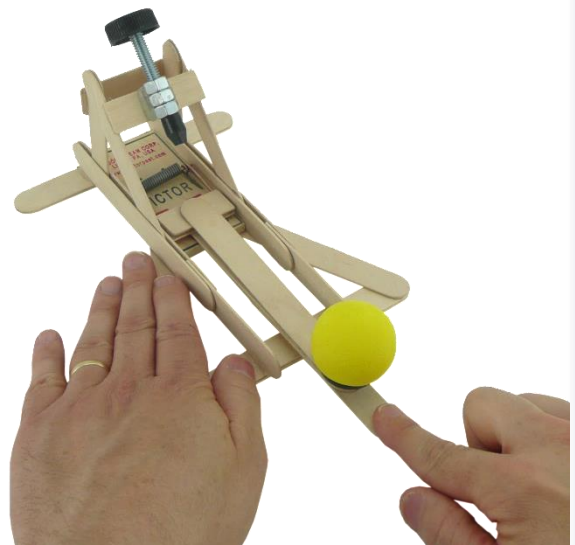
Step 2:

I use my left thumb to hold the arm down, and my right hand to load the catapult.



Step 3:

Then I do a tricky SonicDad finger swap with my left thumb and my right index finger.



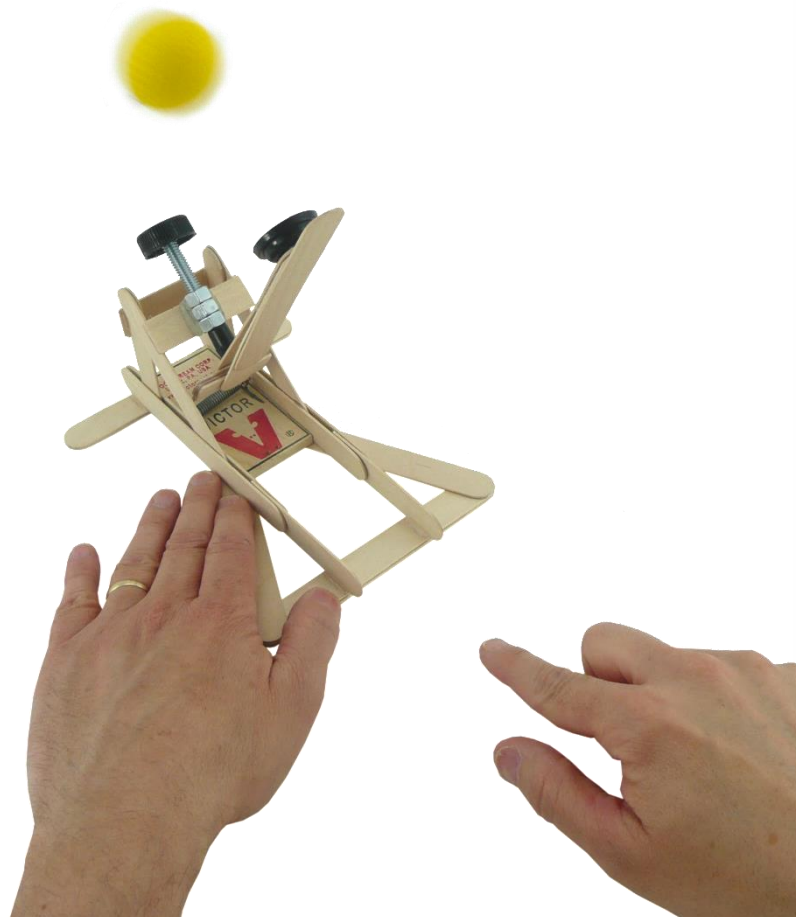
Step 4:

To fire my catapult I just slide my index finger back until it slides off the end of the catapult arm, and BAMMO . . . I'm accelerating mass . . . cool! That's all there is to it!



Try this:

Try target shooting at an object on the floor. Adjust your catapult arm-stop until you can hit the target exactly! Or, how about setting up toy soldiers and having a battle in your front room. See how many cool ideas you can come up with!



Notice to Airmen:

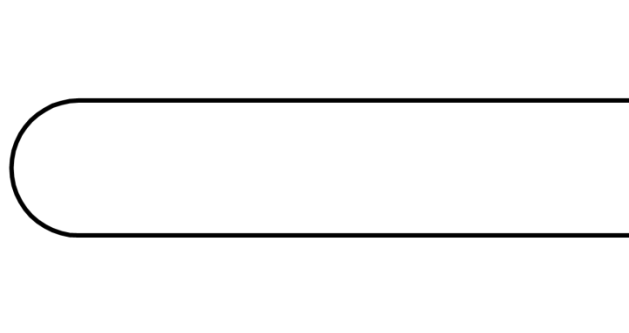
The Mousetrap Catapult is a lot of fun to use, but if misused it can also cause serious injury. **Never** point or launch the catapult at people or animals. **Always** point the catapult away from your face when loading the projectiles. Always launch at inanimate targets. Please use the Mousetrap Catapult safely and have fun!



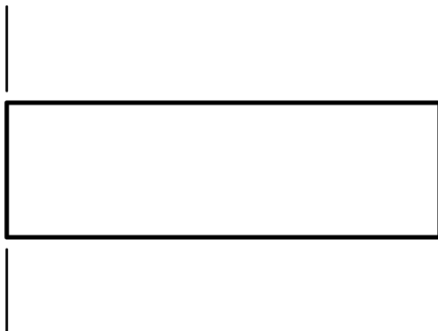
Mousetrap Catapult
Cutting Templates
(print full scale on printer paper)

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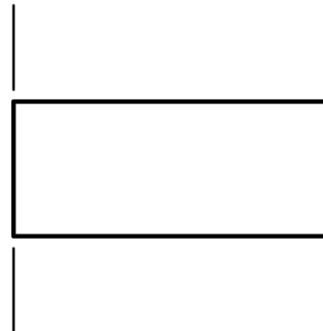
Vertical and Base Support Qty. 4
(jumbo popsicle stick)



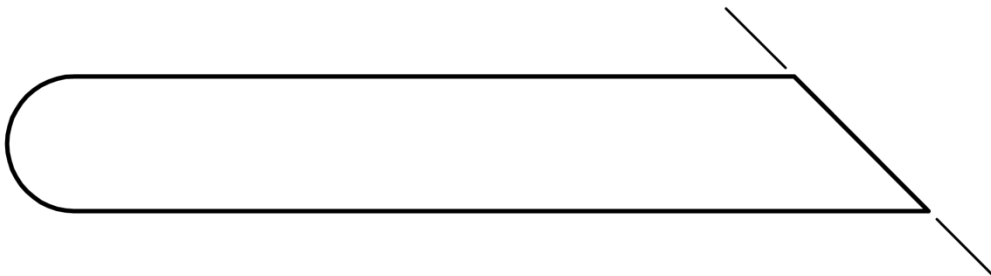
Horizontal Support Qty. 3
(jumbo popsicle stick)



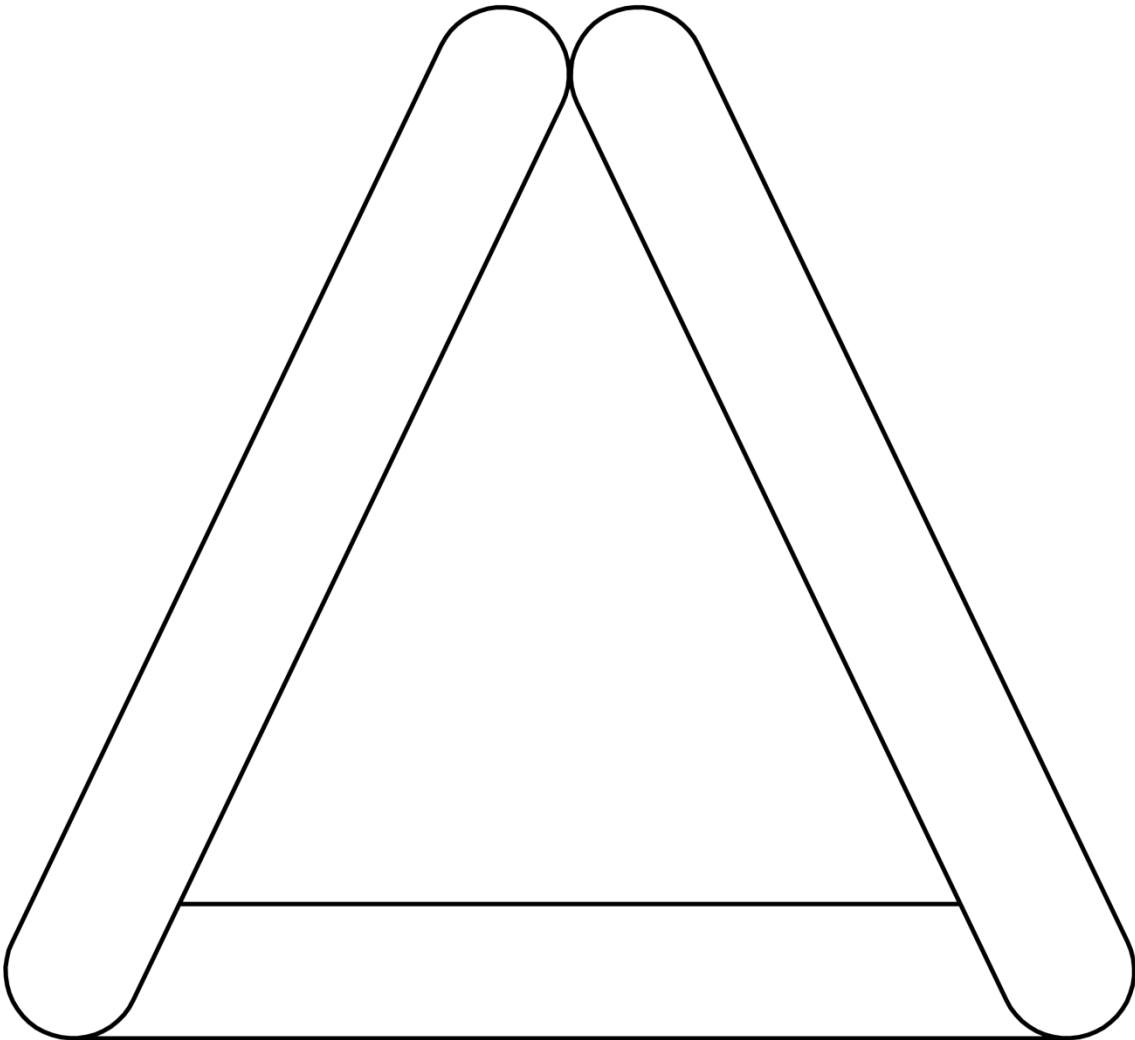
Arm Mount Qty. 2
(jumbo popsicle stick)



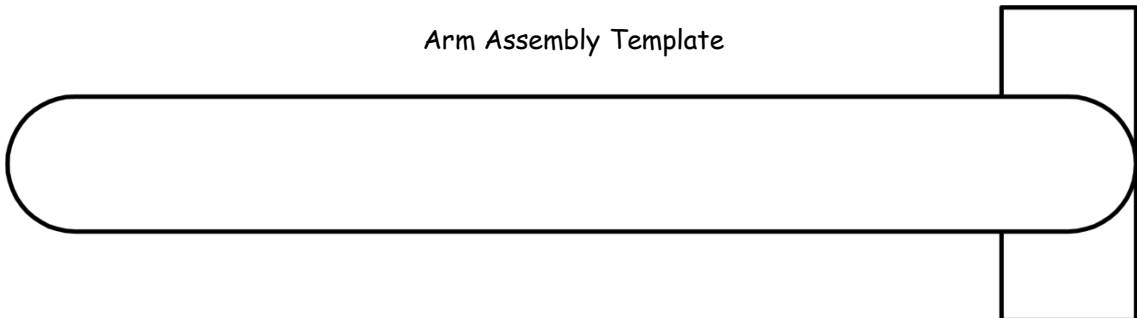
Rear Support Qty. 2
(jumbo popsicle stick)



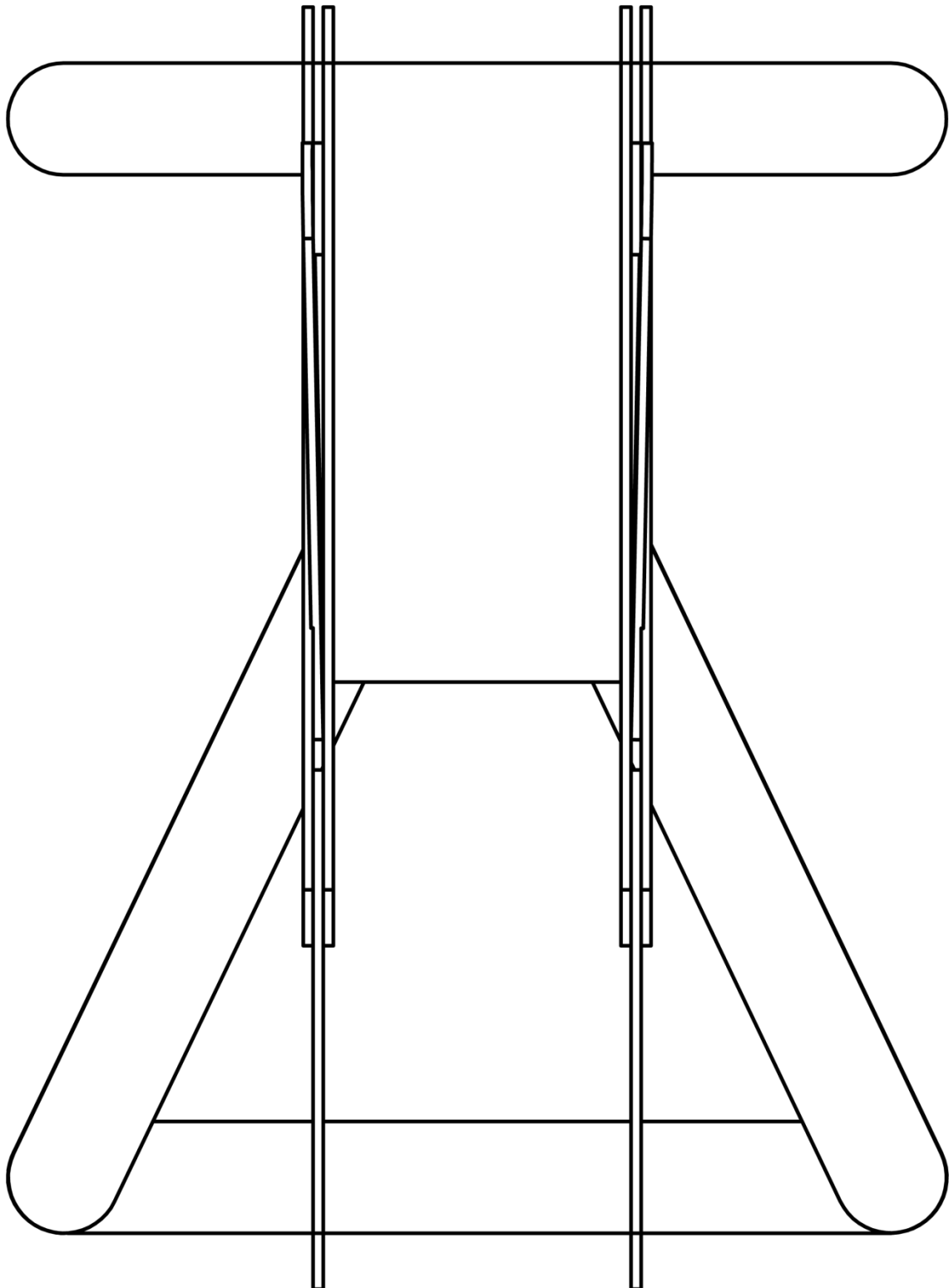
Base Assembly Template



Arm Assembly Template



Frame Assembly Template



Side Frame Assembly Template

