

## Major Project Part Ia - Building from Plans

**Due:** May 10, 2019

In the spirit of our study of design history from the Greeks to the modern era, I have provided plans in the following pages, for 4 versions of a mini catapult. This project will require some materials that can be easily found at an office supply store or an arts and crafts store (like Staples or the A.C. Moore across the street),

Either, individually or in groups (of 2), select one of the catapults to build and include the following:

1. Implement One (1) simple design modification.

Did it improve the original plan?

**Prove it!\***

2. Document your process in pictures AND video.

3. Present your Revised Catapult with supporting process documentation.

On Fri May 10,, 2019 you will present your version of the mini catapult, and test fire it in class.

**\* This part of the project is supported by #2 above.** Document your process with photos and/or video. You MUST build the original version as close to the instructions as possible. Test it. Choose 1 element you want to improve with a design innovation or modification. Is it more power, travel, accuracy, rate of fire, etc.

**DOCUMENT AND PROVIDE DATA**

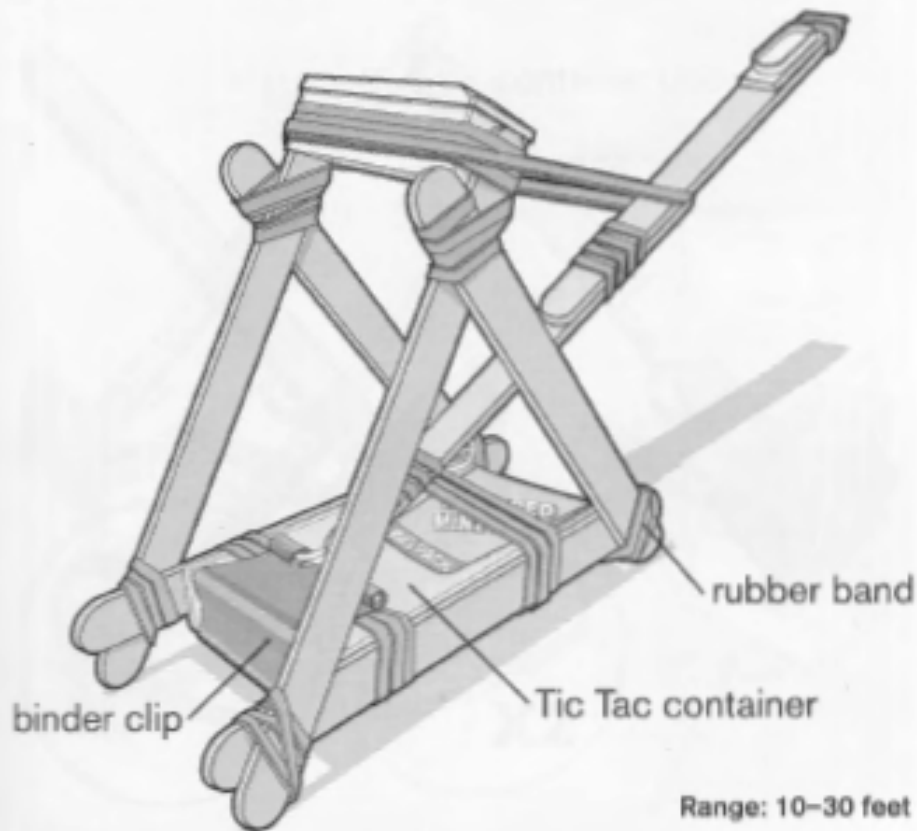
### **CATAPULT OPTIONS**

There are elastic, spring powered, and trebuchet options:

1. Tic Tac Catapult - Instructions start on the next page.
2. Ruler Catapult - Instructions here
3. Mouse Trap Catapult - Instructions here
4. Trebuchet - Instructions here

## A. Build the “Tic Tac Catapult”

# TIC TAC CATAPULT



As war drums sound in the distance and resources run scarce, this ingenious catapult design could be the kingdom's only salvation. It's the Tic Tac Catapult, and it's awesome! Despite its small size, it has an impressive range and has proven to be very effective during warfare. Plus, it can be quickly constructed without the aid of tools. All the materials needed for assembly can be purchased in bulk, making it easy to mass produce these little siege engines—and doing so won't cost you the royal treasury!

### Supplies

- 1 medium binder clip (32 mm)
- 1 Tic Tac container
- 13 rubber bands
- 8 craft sticks
- Duct tape (optional)

### Tools

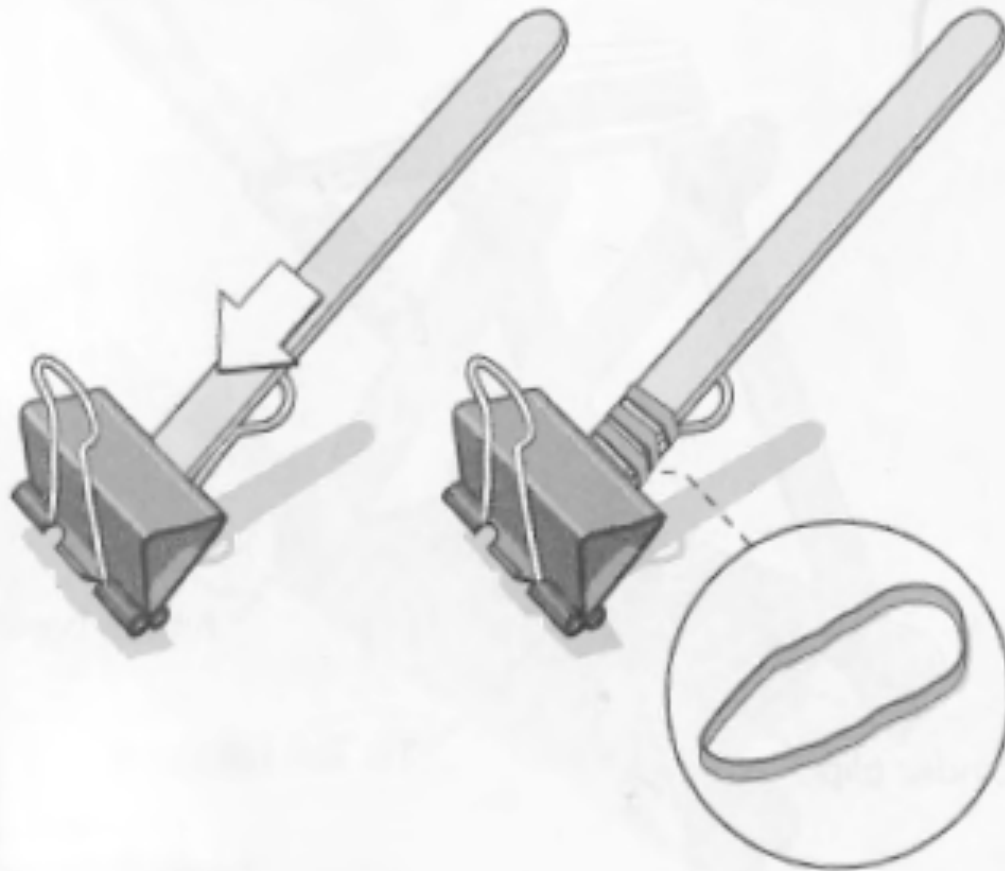
- Safety glasses

### Ammo

- 1+ soft candies or small, hard candies

## Step 1

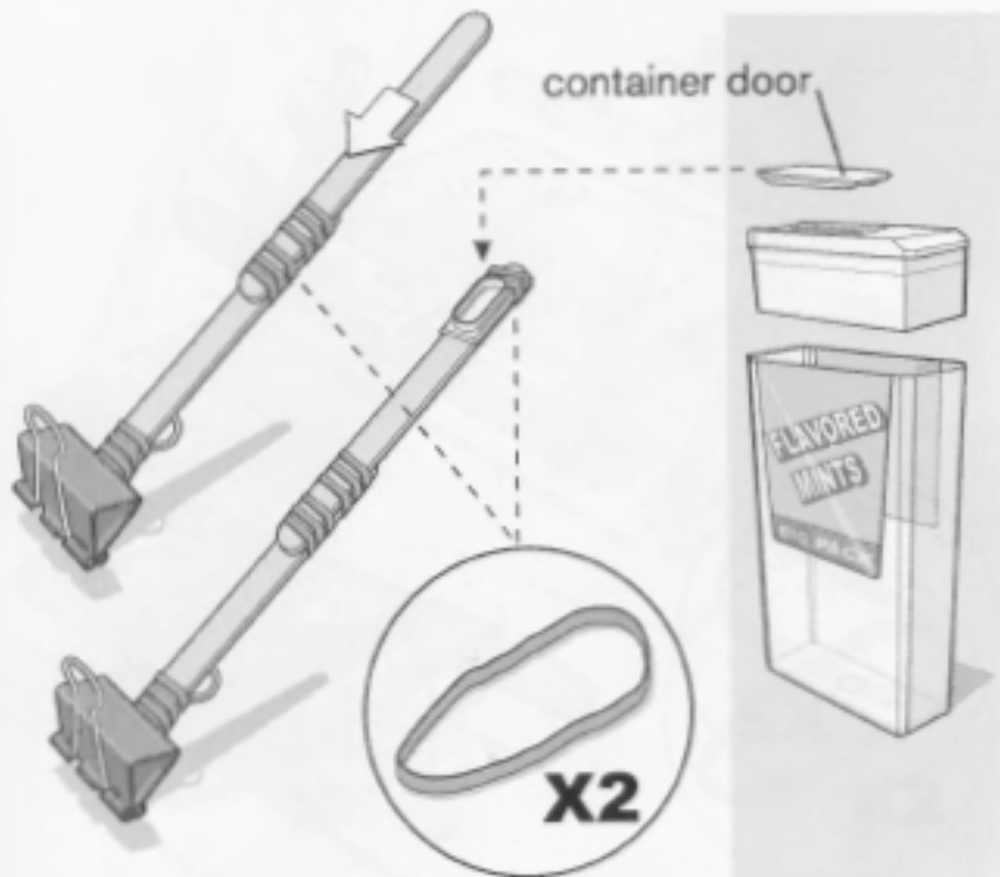
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Begin construction with the catapult arm or beam. Locate one medium (32 mm) or similar sized binder clip that can clamp onto a Tic Tac container—test fit it now. Use one rubber band to fasten one craft stick onto the inside of the metal handle attached to the binder clip. Duct tape can be substituted or added for additional strength.

## Step 2

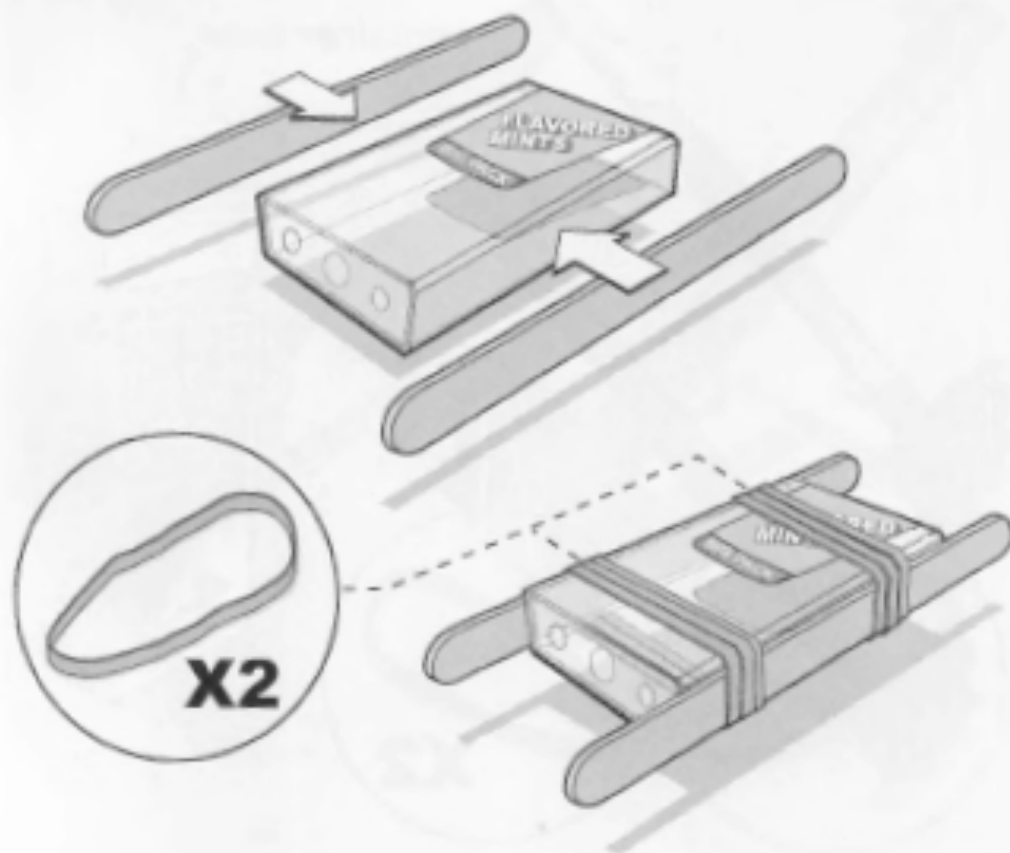


To lengthen the arm, add an additional craft stick to the far end of the fixed stick using one rubber band to secure it into place.

At the end of a catapult arm is the projectile basket, which is fashioned out of a Tic Tac container door. Carefully snap the small door off the lid as illustrated above. Place the door smooth side down at the end of the second craft stick and secure it with a rubber band. The throwing arm is now complete.

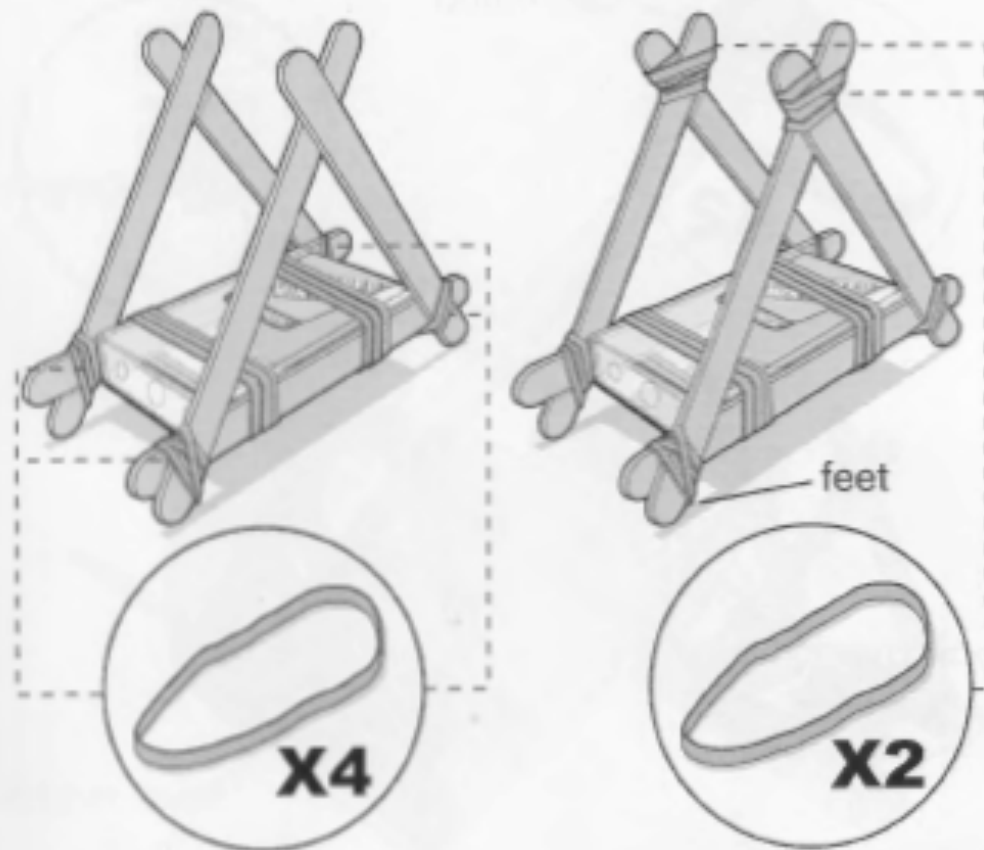
### Step 3

5 minutes



It's time to build the frame out of the Tic Tacs' main container. Fasten two craft sticks to the opposite sides of the container using two rubber bands. The elastic pressure from the two rubber bands may cause some warping at the open end of the container, but minimal warping won't affect the catapult's performance.

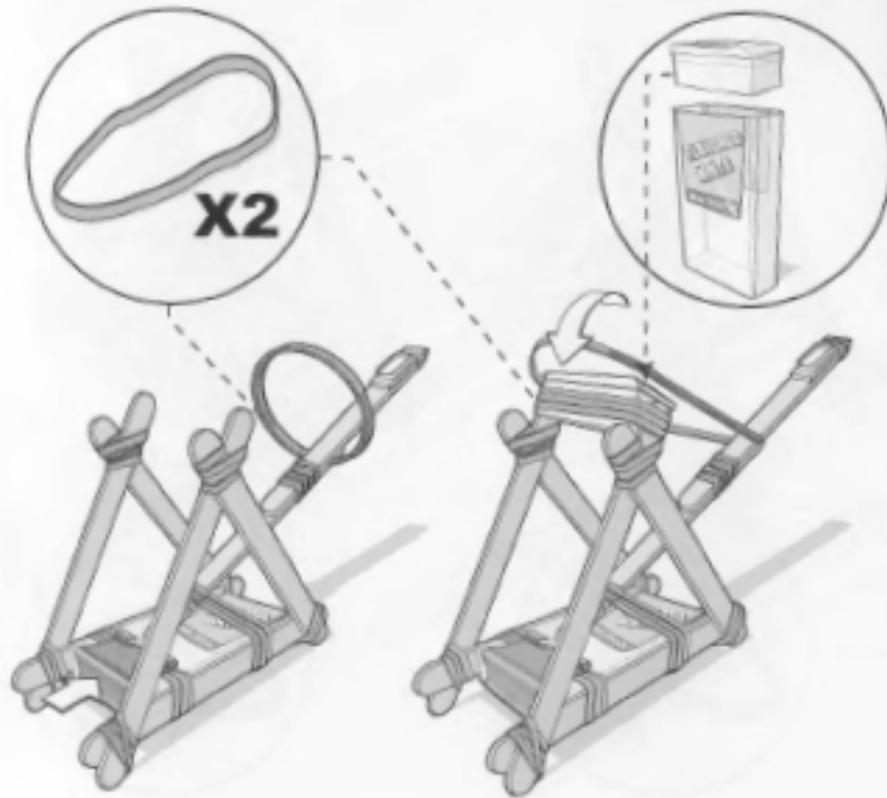
## Step 4



This step requires four craft sticks and six rubber bands. With the foundation of the frame complete, fasten each of the four craft sticks to the endpoints of the container assembly as shown. Once fastened, rotate the sticks to form a triangular frame, then fasten each pair together with one rubber band each. The round ends of these craft sticks should extend slightly at the bottom to create four feet.

## Step 5

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It's time to combine both assemblies. Clamp the arm assembly onto the end of the Tic Tac container frame. Once fastened, the swing arm assembly should move back and forth between the two triangular wooden supports.

This catapult will be powered with one rubber band. Place the rubber band around the swing arm and then slide one end between the two attached craft sticks.

Finally, place the remaining part of the Tic Tac container lid between the two triangular frames to create what is called the padded beam or bed. Fasten the lid to the frame using one rubber band. Then wrap the rubber band fixed to the arm around the cap.

The catapult is complete! When firing, place your hand on the frame for support. **Remember to use eye protection! Never aim this catapult at a living target and use only safe ammunition.** Soft mints, hard candies, and mini marshmallows work nicely.