TREBUCHET ACTiViTY KiT

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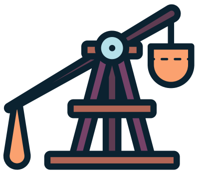
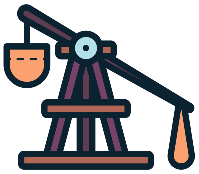


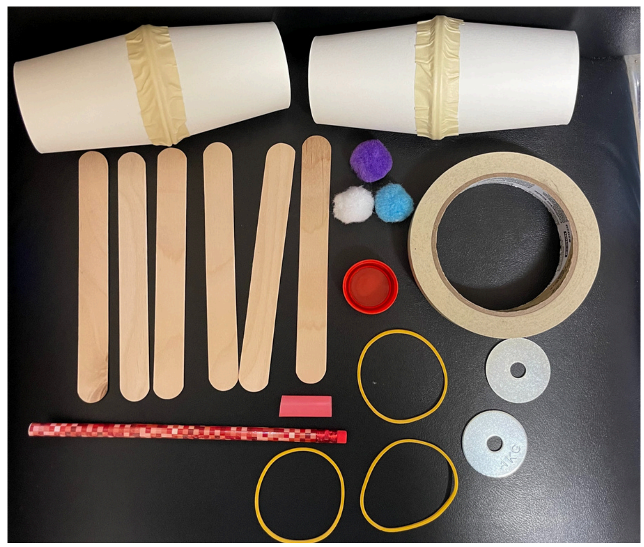
What is a Trebuchet?



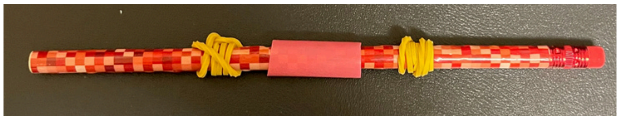
Like catapults, trebuchets were used to throw large rocks (and other projectiles) at an enemy. Trebuchets work by dropping a heavy weight, which makes a long arm swing and launch the projectile. Like catapults, trebuchets also make use of potential energy. When the heavy weight is lifted off of the ground, we can say it has **potential energy** (stored energy). When the heavy weight is cut loose, then the potential energy is converted into **kinetic energy** (energy of motion) and the weight moves; this movement also causes the trebuchet's arm to swing.

Materials Needed:

- 4 cups
  - Two with holes at the top. Two with 4 slits at the bottoms, 2 on each side.
- 6 tough depressors
  - One with 2 Washers taped. One with a bottle cap super glued/taped
- 3 rubber bands
- 2 washers
- 1 bottle cap
- 1 cut boba straw
- 3 Pompoms
- Tape

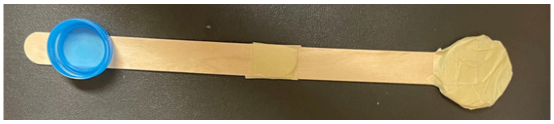


Step 1: The Pencil & The Arm



The Pencil

Insert the pencil into the boba straw and use two rubber bands to make sure it does not move across the whole pencil.



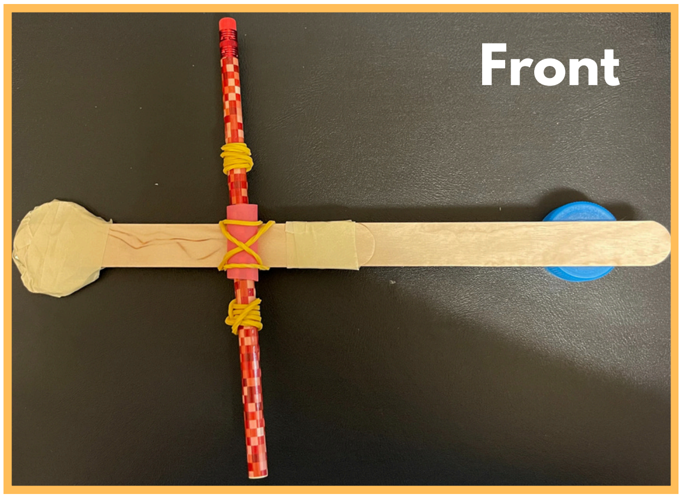
The Arm

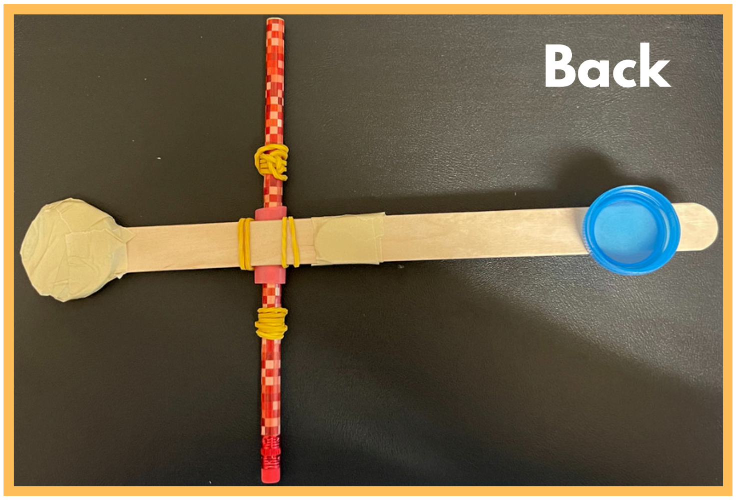
Tape the prepped popsicle sticks with the washers and bottle caps together.

Choking hazard, small parts. This activity is intended for use by adults and children who can read and follow directions and warnings. Adult supervision advised. Use for intended purposes only. Always aim flying objects away from people and other living creatures.

<u>Connecting the Two</u>

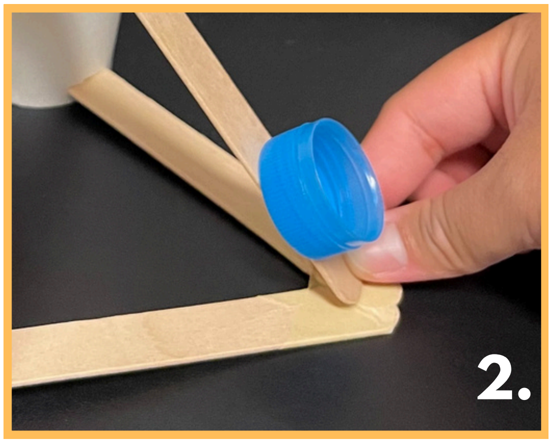
Wrap the final rubber band around the arm and the pencil to connect the two.

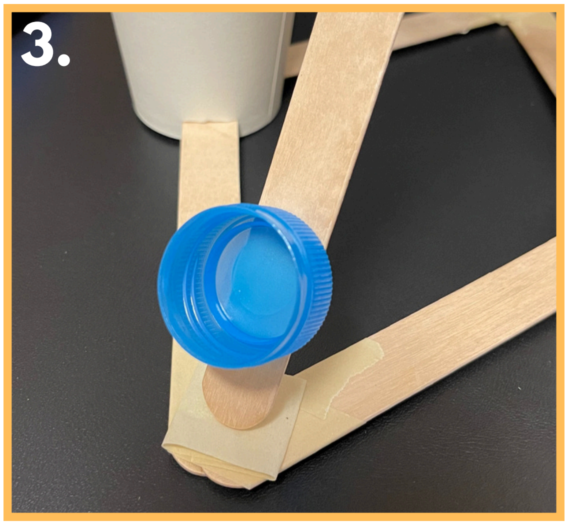




Step 2: Building the base

- Insert the completed arm into the cups in the circular holes making sure the holes are at the top of your trebuchet (**Picture 1**).
- Insert the remaining popsicle sticks into the slits at the bottom of your prepped cups.
- Pull down the top of your trebuchet and line up the popsicle sticks so that the top touches the tips of the base (**Picture 2**). Tape the bases together.
- Add a piece of tape at the end of the base that the arm will touch (**Picture 3**). This will secure the arm until you are ready to launch.





Step 4: Testing Your Trebuchet

- Secure your arm onto the piece of tape.
- Place a small object, like the provided pompom, onto the bottle cap.
- Once ready, lightly nudge the end of the bottle cap to launch your object.

How far did your object launch?

Does the counterweight of the washers affect the distance it travels?

How could you tweak the design to make your object launch farther?

HISTORICAL FUN FACTS

- A trebuchet was used during the Middle Ages to launch projectiles during battle.
- Trebuchets are different from catapults because trebuchets take advantage can be well known from other types of catapults in that they do not use stored tension (such as in twisted ropes or flexed wood) to launch objects.
- Trebuchets were effective during battle because they could be set up a safe distance away from a castle, and the archers guarding it, while still causing significant amounts of damage.

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