

# SEEK

Student Engineers Educating Kids

**Activity Name:** Popsicle Stick Catapults

**For Groups of:** 1 Mentor and 1 Student = 2

**Location:** Day 1: Classroom || Day 2: Outside

**Time Estimated:** Day 1:1.5hrs || Day 2:1.5hrs

**Engineering Relation:** Mechanical Engineering

**Materials adequate for:** All Students

**Description:** *(enter in a short, concise description)*

Students will build a catapult that really works. The student will be given Popsicle sticks, hot glue, a dowel rod, and a bottle top. After building the catapult the student will have competitions against each other for distance and accuracy. The student will be able to take their creation home with them.

**Purpose of Activity:** *(similar to a description, focus on concepts and goals, mention any design processes)*

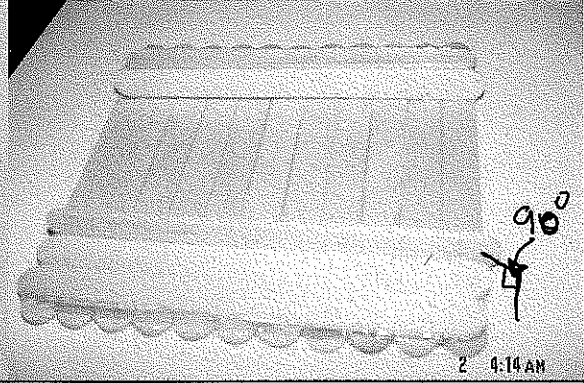
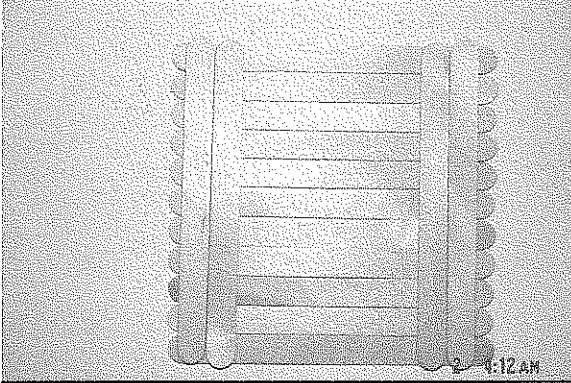
The student does not have to design the catapult, unless they want to. After completing the activity the student should better understand the effect that different angles of launch and different amount of rubber bands. The student should also understand the effect of wear on the catapult. (i.e. What will happen to the catapult after many launches?)

**Target:** *(who is this for? what grade level?)*

For mentees grades 6-10 with mentors' help

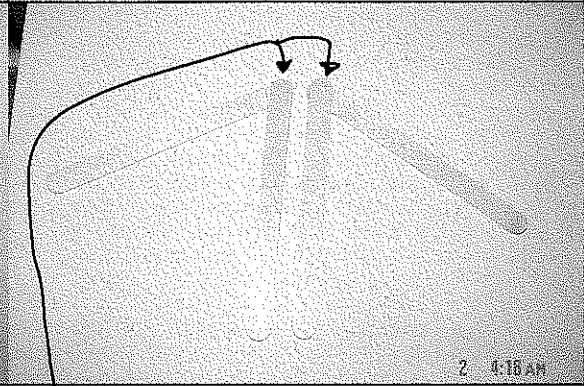
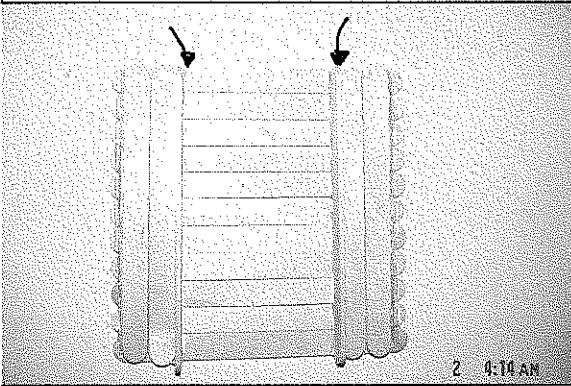
**Materials Required:** *(list the item and the actual or approximate amount needed)*

<u>quantity</u>	<u>item</u>
1	Bottle Cap
≈38	Popsicle Sticks
1-2	Rubber Bands
≈2"	¼" Dowel Rod
1	Hot Glue Gun
1 or more	Marble(s) (kids loose Marbles)
**A lot of Glue sticks**	



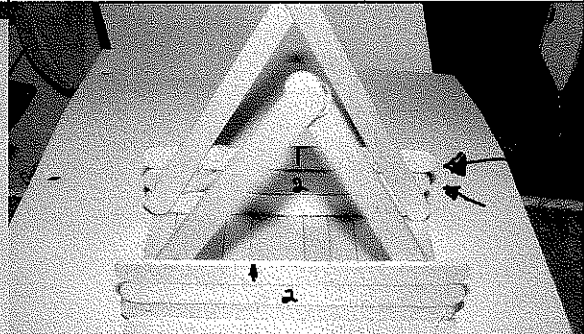
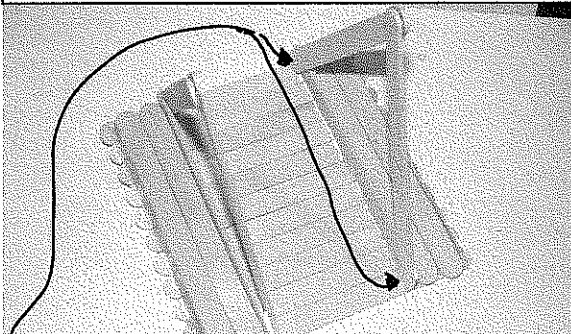
1. Lay down 11 sticks as shown above.  
2. Glue 2 sticks, in the opposite direction, on the outer edge of each side.

3. Glue 2 sticks perpendicular to the base that you just created as shown above.



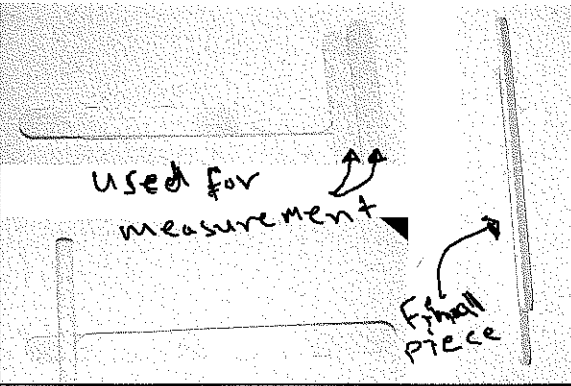
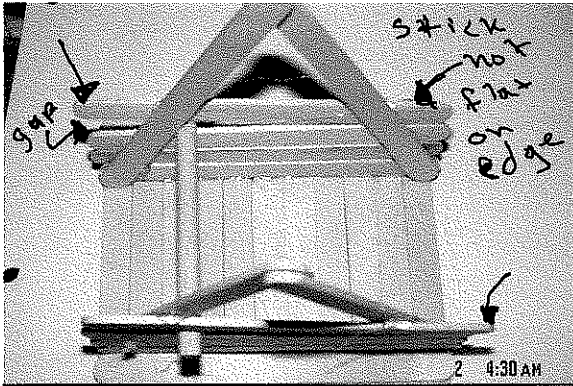
It should now look like this.

4. Glue 2 pairs of sticks (A sticks) to be fit on the base, as shown in the next picture.



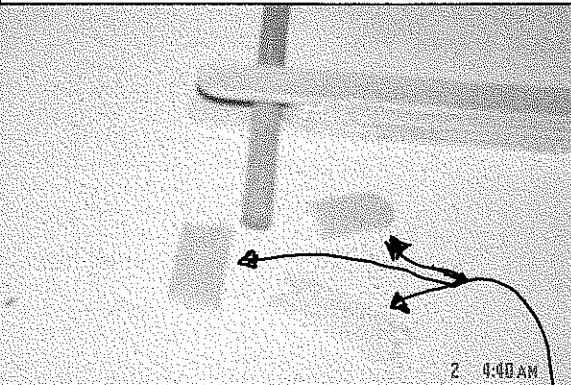
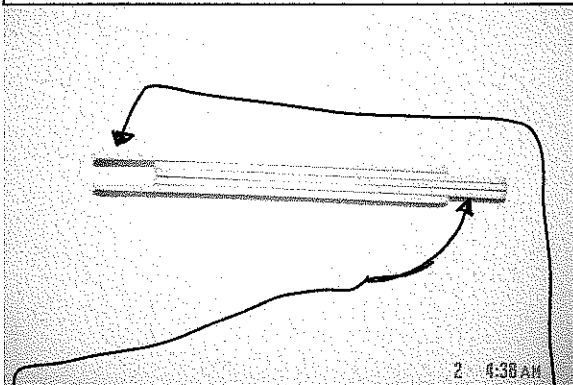
5. Glue the piece from step 4 as shown.

6. Glue 2 sticks on the outer side of each of the A sticks.



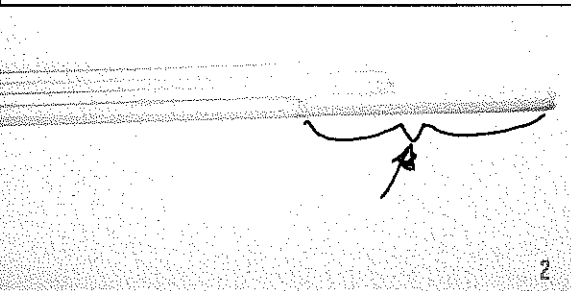
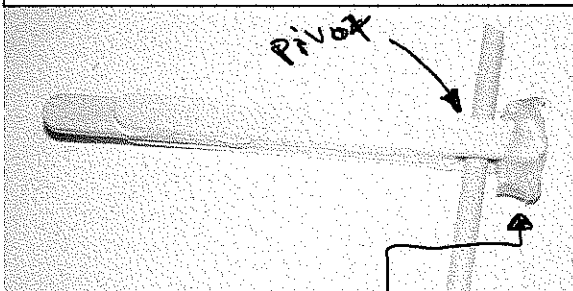
7. Place about a 2 inch piece of dowel as shown on the above picture.  
 8. Glue a stick above the dowel. The dowel should fit snugly. **\*\*DO NOT GLUE THE DOWEL\*\***

9. To construct the "Arm" of the catapult you need to glue 2 sticks together so that the sticks hang over about the width of 2 sticks side by side.



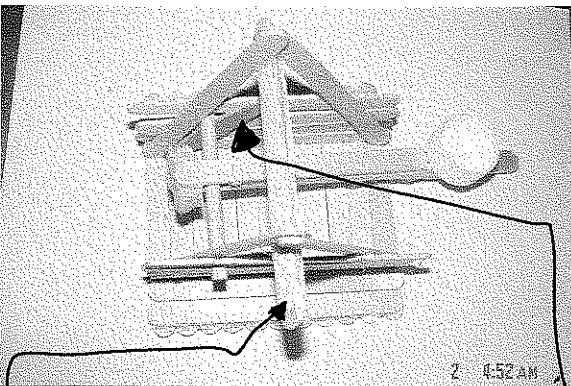
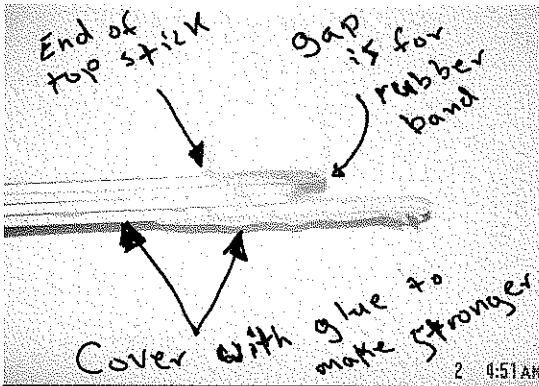
10. Now glue 2 more sticks like a pancake. The last stick sticks out like in step 9 (this last stick can be estimated). The resulting piece should look like the picture above.

11. Cut 3 small pieces of a stick.



12. Glue the three pieces together and attach it to the Arm as shown above. **\*\*Make sure to leave room for the dowel to move freely\*\***

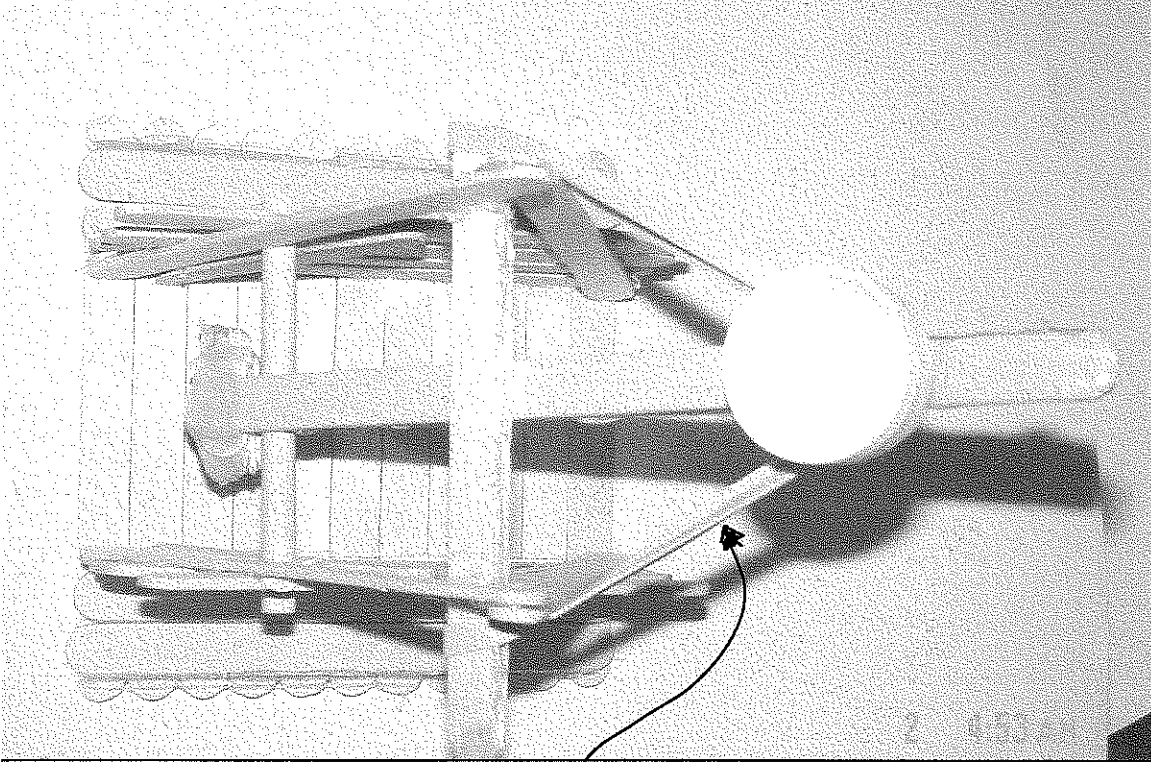
13. Cut a stick in half and glue it on the end that does not pivot as shown.



14. Glue the bottle cap at the same end as in step 13 as shown.

15. The stop bar is made of about 3 sticks that are glued together. You may glue the stop wherever you think would give the greater distance.

16. If you want more stability for the dowel you may choose to add a half of a stick as shown above, or gluing it.



17. The final step is to add the rubber band and have fun. There are a couple of different places to put the rubber band, so experiment a little to find out the best position to have it in.