



Try This at Home Science: Windmill Cam Automata

Activity Overview:

Create your own automaton driven by a cam mechanism.

Materials:

- Skewers
- Glue gun
- Small box
- Thick cardboard
- A straw
- Scissors



Try this!

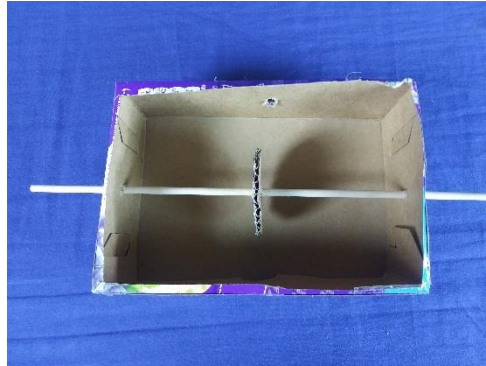
1. Using your cardboard, cut 5 circles of similar size (about 3 inches is fine). Punch a hole in the center of all circles. These are your cams. Cut 3 thin rectangles with the remaining cardboard. These are your windmill blades.



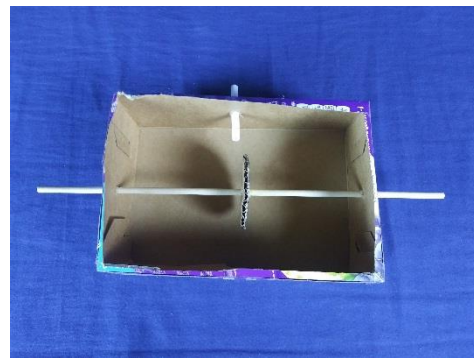
2. Punch a hole on the top of your box and on the sides of your box.



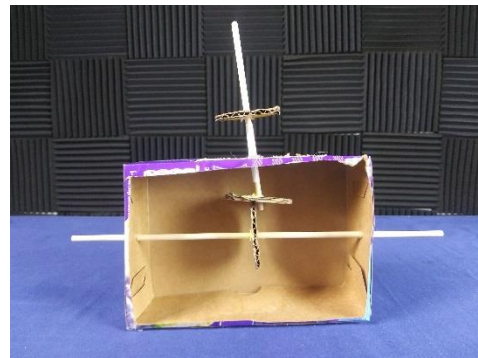
3. Insert a skewer into one hole, slide a cam in, and insert the skewer into the other hole. Make sure your cam is in the middle as shown.



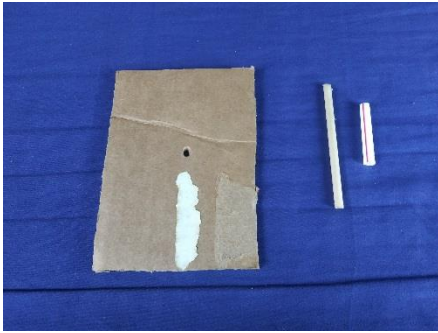
4. Cut out two 1-inch pieces of straw. Insert one of the straws through the top hole and glue it so it stays in place.



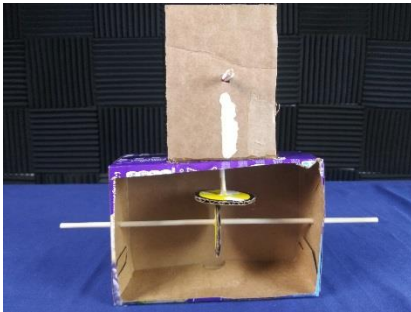
5. Slide half of a skewer in and glue a cam to the bottom. Add a cam to the top of that same skewer as shown.



6. Cut out a 3 inch by 5 inch piece of cardboard and punch a hole in it. Insert the second straw and 1/4th of a skewer through the straw.



7. Glue the cardboard to the top of the box. Add a cam to the back side of the skewer piece.



8. Glue the windmill blades to the final cam and glue that cam to the front side of the skewer piece.



9. Your windmill automaton is complete!



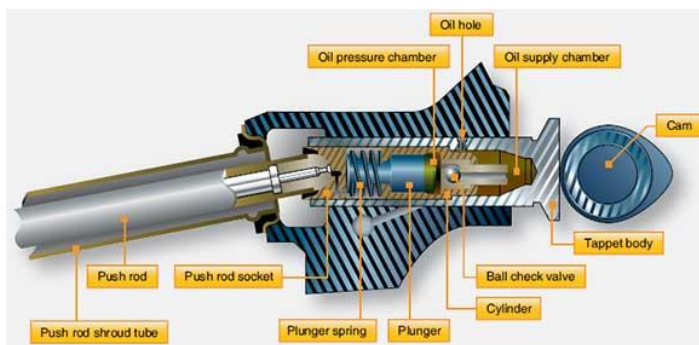
What's happening?

When you spin the horizontal skewer, the bottom cam you are driving forces the horizontal cam to move. This happens with both cam/driver mechanisms in your windmill.

How does this relate to real life?

Many modern-day engines, pumps, and valves use cam mechanisms to function. You can also find similar mechanisms in ancient automatons made to replicate movement exhibited by humans, animals, and nature - these are the predecessors to modern-day robots!

Windmills are currently used to convert the kinetic energy in the wind to electricity which we can use to power our homes- it's a great green energy source!



Now try this

By changing cam shapes and positions, the movement of the mechanism can be drastically changed. Try punching other holes in your cams, cutting out different shaped cams, or adding more cams and observe how your changes affected your automaton.

Additional Information

To learn more about the history of automata and invention, check out the [NISE Network Frankenstein200](#) kit.

Check out [MiSci ECHO Live!](#) "Episode 41: Tinkering with Toys" for a how-to instructional video for this activity!