



Try This at Home Science: Popsicle Stick Catapult

Activity Overview:

Create a mini lever catapult.

Materials:

- Seven jumbo popsicle sticks
- Seven rubber bands
- Bottle cap or plastic spoon
- Hot glue or regular glue
- Mini marshmallows, cereal, or other small projectile objects
- Tape
- Ruler

Try this!

1. Place a piece of tape on the floor, then use the ruler to measure 6 inches and place another piece of tape to mark the spot. Continue marking 6-inch increments on the floor until you have reached a length of 6 feet.
2. Stack 5 jumbo popsicle sticks on top of each other and wrap each end of the stack with a rubber band. This stack will act as your fulcrum.
3. Stack 2 jumbo popsicle sticks on top of each other and secure with a rubber band, approximately one inch from the end. Now you have a launcher.
4. Take the fulcrum and wedge it between the two sticks of the launcher.
5. Use another rubber band to secure the launcher to the fulcrum by wrapping the rubber band back and forth around the fulcrum, as in the pictures.
6. Secure a plastic spoon to one side of the launcher using a rubber band. If you do not have a plastic spoon, have an adult help you to glue a bottle cap to the end of the launcher, opposite of the fulcrum.
7. Place a projectile in the spoon or bottle cap, pull the launcher arm down, and release!
8. Observe and record the distance launched.

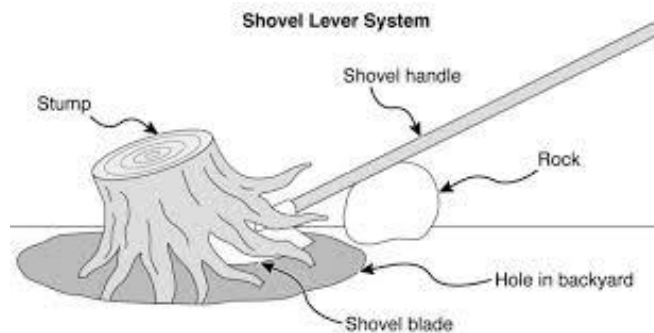


What's happening?

We have created a simple lever that we can use to launch objects across the kitchen! Each time you pull the projectile holder we are storing potential energy in the form of tension in the launcher arm. Potential energy is stored energy that has the potential to move. As we release the launching arm the potential energy is transformed to kinetic energy which flings the launcher arm launching your projectile! Kinetic energy is the energy of motion, and since energy cannot be created or destroyed, it can only change states. This is why the projectile stays in place when pulled back, and flies through the air when released!

How else do we use levers?

A great example of a lever is a shovel. Place a shovel in the dirt and as soon as you pull on the handle you are increasing the potential energy stored through the handle. The top of the ground on the shovel blade is the fulcrum, and the resistance comes from the dirt or as in the picture to the right, a stump. As soon as the resistance gives way the potential energy is converted into kinetic energy moving whatever is on the end of the shovel up and out of the way. Now if we add a rock under the shovel we can increase the potential energy to be converted into kinetic energy by increasing the size of the fulcrum.



Now try...

- Reposition the fulcrum on your catapult to see if that changes the distance your projectile travels. What did you notice? Did the projectile fly further or shorter than the original experiment?
- Try with several different types of projectiles and record the distance they travel. What did you notice? Which projectile flew the furthest distance? Which projectile flew the least distance? Why?
- Replace the fulcrum with a smaller fulcrum of only three popsicle sticks. What did you notice? Did the projectiles fly as far as the original experiment? If not why?

Additional Information

<https://www.youtube.com/watch?v=dbQ0xSmivWQ>

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