

Target Practice

Build a catapult using a lever, and power it with a rubber band. Then, use what you've learned to build your own design, and send a marshmallow flying through the air!



1 Get what You need.

- plastic spoons • rubber bands • duct tape
- craft sticks • brass fasteners • scissors
- mini marshmallows • pen • toilet paper or paper towel tubes • cardboard base (chipboard, shoebox, tissue box, cereal box, milk carton, etc.) • target (trash bin, for example) • meter stick (optional—for Dig Deeper activity on back of sheet)

2 Construct a catapult.

- Attach a toilet paper tube to a cardboard base. This is your *fulcrum*.
- Tape the handle of a plastic spoon to the end of a craft stick. This is your *lever*.
- Use a pen to make a hole in the top of the tube and insert the lever. Secure with tape.
- Punch a hole in the base in front of the tube (using the pen), and attach a brass fastener.
- Wrap a rubber band around the brass fastener, then around the middle of the lever (so that there is tension as you pull it back). Tape in place.

3 Launch it!

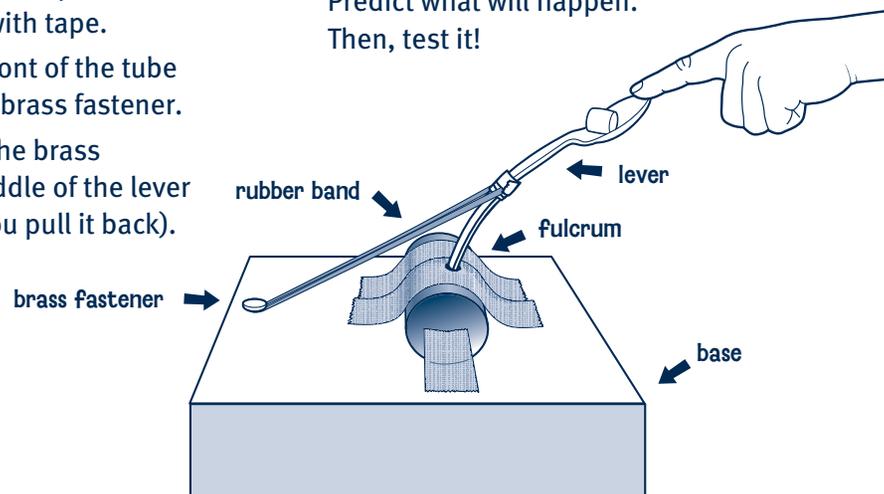
Pull back on the lever and put a marshmallow on the spoon. Then, let go! What happened?

4 Design Your Own.

Now that you know how to build one kind of catapult, brainstorm your own design. Try a different base or fulcrum, build a different type of lever, or use the rubber band in a different way.

5 Test it!

Can your marshmallow hit a target? How can you make it go farther? Or higher? Change one thing (a *variable*), like the length of the rubber band or the position of the lever. Predict what will happen. Then, test it!



Chew on This!

A catapult is a device used to hurl an object. It uses a simple machine called a *lever* (the spoon and craft stick), which is attached to a stationary point called a *fulcrum* (the cardboard tube), to help move a *load* (the marshmallow).

Your catapult is powered by the rubber band. When you pull back on the lever, *potential energy* is stored in the rubber band. When you let go, the potential energy is transferred to the lever and turned into the energy of motion (or *kinetic energy*), and the marshmallow is flung forward.



Dig Deeper

catapult contest! See whose catapult can send the marshmallow the farthest. Use a meter stick to measure the distance, and then record the results.

POP FLY. Make a lever and send a ping-pong ball flying high! Check it out at *Design Squad*: pbskids.org/designsquad/projects/pop_fly.html.

Did You Know?

The catapult was used in ancient and medieval warfare to hurl stones and other projectiles at the enemy. Today, catapults are used for other purposes: like launching airplanes into the air! Ships that carry aircraft don't have space for long runways, so planes need help getting airborne. An aircraft catapult slings a plane forward, helping create enough lift for a safe takeoff.



Watch **FETCH!** on PBS KIDS GO! (check local listings) and visit the **FETCH!** Web site at pbskidsgo.org/fetch.



FETCH! is produced by WGBH Boston. Major funding for *Fetch!* is provided by the National Science Foundation and public television viewers. This *Fetch!* material is based upon work supported by the National Science Foundation under Grant No. 0813513. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. © 2009 WGBH Educational Foundation. All rights reserved. FETCH!, the characters and related indicia are trademarks of the WGBH Educational Foundation. All third party trademarks are the property of their respective owners. Used with permission.

Fold

Fetch!

Target Practice

My sweet Charlene has banned me from her back yard—she refuses to see me! I wrote her a love note and need a way to deliver it. I know: Build a catapult for me! I'll fling the love note over the . . . WAIT! Are you thinking what I'm thinking? CAT-a-pult?! I'll fling BLOSSOM over the fence, WITH the love note! I say, there never was a smarter dog . . .

GOOO FETCH!

