

Stay at Home Science



Catapults

What You Need

Masking tape
Rubber bands
1-oz portion cups
Paper

Craft sticks of various sizes
Paper clips
Mini marshmallows
Pencil

What You Do

1. Tell children that you have a problem: You need to get a mini marshmallow as far away from you as possible. Have them brainstorm some ways you could achieve this goal. Crazy ideas are great!
2. Encourage children to focus on an idea for a catapult, which can be made using the materials you have available. Have them draw out a plan for their catapult before attempting to build.
3. Have children build and test their catapults, using the mini marshmallows as ballast. You may wish to test outside. **SAFETY TIP:** Never aim a catapult where a person might be!
4. Challenge children to adjust/improve their design to allow their marshmallow to fly further.

Questions to ask

- Where is the energy being stored in your design?
- What changes did you make to your design? What effect did they have on your catapult?

What's The Science?

This activity is designed as a way to practice the Engineering Design Process, by having children **Ask** a question to solve a problem, **Imagine** solutions, **Plan** their solution, **Create** and test their solution and then **Improve** it.

Catapults work a combination of potential energy (stored energy), kinetic energy (the energy of movement), and inertia (the tendency for an object at rest to stay at rest, or an object in motion to stay in motion, until acted upon by an outside force). As the arm of the catapult is pulled down towards the ground by an outside force acting upon it, it is building potential energy. As soon as the arm is released, that potential energy is transformed into kinetic energy, flinging it forward. Many catapults have a brace that will stop the arm from going any further forward, which allows the ballast to keep moving, due to inertia, as no other force has acted upon it. Without the brace, the ballast would never leave the arm, and both would continue moving forward in an arc until they hit the ground.

Try This

Use science vocabulary: Use related science words such as potential and kinetic energy, inertia, and engineering.

Extend the Activity: Try using other objects (large marshmallows, puff balls, cotton balls, grapes, etc.) as ballast to see what effect that has on the catapult's range.

Keep In Mind

- Children are natural scientists; let them lead the way in their experimentation!
Encourage them to ask questions and make suggestions only when they are stuck/discouraged.

Additional Resources

The Marshmallow Incident by Judi Barrett

Catapult Facts for Kids by Kiddle: <https://kids.kiddle.co/Catapult>

Catapult entry in the Encyclopaedia Britannica:

<https://www.britannica.com/technology/catapult-military-weaponry>

Pumpkin Catapult video by National Geographic:

https://video.nationalgeographic.com/video/00000144_0a40_d2eb_e06a_7b4d462e0000?source=researchguides

