



Inquiring Minds Want to Know

Science Activities for Young Minds

Launching Cotton Ball Catapults

WHAT YOU'LL NEED

- Plastic spoons
- Cotton balls
- Rubber bands
- Masking tape
- Craft sticks (such as popsicle sticks)
- Tape measure

WHAT TO DO

Remember: The purpose is NOT to teach a specific topic but to help children experience the excitement of **science exploration!**

GETTING READY

Have a variety of launching photos to share during the wrap-up at the end. A few examples: rocket launch, catapult, baseball pitch, football toss, diving board.

LET'S GO

1. Explain to the children that their job is to **experiment** with a rubber band to find a way to use it to launch a cotton ball.

*Were you able to launch your cotton ball using the rubber band?
Did your first idea work? Did you try different ways? Do you think the first time always works for scientists?*

2. Explain to the children that their next job is to experiment with a variety of items to design something that will launch a cotton ball. Distribute the rubber bands, plastic spoons, masking tape, craft sticks and cotton balls. Measure how far each cotton ball flies.

Were you able to launch your cotton ball? What did you use to launch your cotton ball? Did you make changes to the first design that launched your cotton ball?

TALK IT OVER

Observe and discuss the launching photos and/or videos.

What are some other examples of ways that things can be launched?

*Have you ever used something to launch something else or yourself?
For instance, a ball thrower, sling shot or a diving board?*

Do you think the first time always works for scientists or engineers?

How many times do you think scientists or engineers test their designs?

What worked? What did not work and why?



What was different about the catapult designs that launched the cotton balls farther?

What other items could you use to launch your cotton ball?

If you launched something heavier than a cotton ball, would the extra weight make a difference in how far the object travelled?

GOOD TO KNOW

9- 12-year-olds:

This activity is a great way to introduce older children to the engineering design process. The process asks children to identify the problem or challenge, brainstorm possible design ideas, select a design and build it, test the design, improve the design and finally communicate their process. Children may document the design ideas tried throughout the process and the results through a journal.

Challenge older children to discover more real-life launchers and why they are important.

You may wish to create challenges for accuracy, height and distance with older children.

THE SCIENCE BEHIND IT

Catapults are simple or compound machines that propel an object.

A catapult stores potential energy and releases it. The physics concept that a catapult is based on is that stored potential energy can be converted into moving (kinetic) energy.

When the object is released from the catapult, it faces air resistance before getting to its target.

The science behind the fun is called transferring energy. When you pull the rubber band back, you are applying force over distance and doing work on the rubber band. How much work you do depends on how hard you pull on the rubber band (force) and how far back (distance) you pull the rubber band. $Work = force \times distance$.

The work you do is stored as elastic energy in the rubber band. When you release the rubber band, the rubber band then does work on the object being launched, and the elastic energy is transformed into what is called kinetic energy (the energy of motion) in the flying object.

When the object hits something and stops, the kinetic energy is then transformed into another form of energy and/or transferred to that object. In other words, the energy you produce by pulling back on the rubber bands can be transformed from one kind of energy to another or transferred from one object to another.

Scientists and engineers use their understanding of simple machines, their knowledge of how science works and observations of the world around them to design many items that we use every day.

RESOURCES

- ▶ Your local university Extension office
– <http://msue.anr.msu.edu/county>
or the MSU Extension Science and Technology website – http://4h.msue.msu.edu/programs/science_technology.
- ▶ Science Blast website – http://4h.msue.msu.edu/programs/science_technology/science_blast.

(Launcher was modified from the Engineering Challenges section of *Family Engineering: An activity and event planning guide* available at <http://www.familyengineering.org/store/>.)

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