

Catapults

Background information: There are many forms of energy, but they can all be put into two categories: **kinetic** and **potential**. Kinetic energy is motion—of waves, electrons, atoms, molecules, substances, and objects. Potential energy is stored energy and the energy of position—gravitational energy. A catapult works because potential energy can be converted into kinetic energy and it transfers that energy from the catapult to the object being launched. When you prepare the catapult to launch, you add energy to it. This energy is stored in the launching device as potential, or stored, energy until it is transferred into kinetic energy.

Challenge: Using the Inquiry Design process, build a catapult which can launch marshmallows.

Possible Criteria for Success: marshmallow will be launched 6 feet or more, marshmallow will hit the target 3 out of 5 tries, catapult will launch one marshmallow at a time



What you will need:

- Craft sticks
- Rubber bands
- String
- Plastic spoons
- Large marshmallows
- Lids from plastic bottles or small bottles which will hold the marshmallow before the launch
- Kinetic and potential energy video https://www.youtube.com/watch?v=zCKenikIH_c
- Access to videos:
Marshmallow Catapults <https://www.youtube.com/watch?v=AIPdmrXLCw0>
Popsicle Stick Catapult <https://www.youtube.com/watch?v=lwWMyyIXj70>

What you will do:

Prepare a KWL chart BEFORE bringing youth together

K: What do you know about kinetic and potential energy?	W: What would you like to know about transferring potential energy into kinetic energy?	L: When building your catapult, what did you learn about potential and kinetic energy.

K: What do you know about catapults?	W: What do you want to learn about catapults and how they transfer energy?	L: What did you learn about catapults and energy transfer?
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This KWL chart will have two parts. The first will ask the youth about kinetic and potential energy. The second part of the chart will ask the youth about catapults.

1. Bring youth together.
2. Share the KWL Chart. Ask the question about what they know about kinetic and potential energy. List under the “K” column.
3. Ask what they would like to learn about these two types of energy. List under the “W” column
4. Show the video on Potential and Kinetic energy
5. Ask what they learned about potential and kinetic energy. Write under the “L” column.
6. Repeat the process asking and recording responses to the questions about catapults. Complete the “K” and “W” columns.
7. Show two videos about catapults
8. Explain that today, they will make a catapult which will transfer potential energy into kinetic energy and launch a marshmallow
9. Divide youth into groups of 3-4. Review the process (selected from the beginning) and have them begin.
10. When youth have completed the process (be sure they have a drawing and Criteria for Success), have them get the supplies and build the catapult
11. When catapults are completed have teams share with their peers
12. Complete the “L” portion of the KWL chart.

Debriefing

- What strategies did you use to build an effective catapult?
- How might the strategy you ultimately used be helpful for you when you are facing other challenges?
- What was the biggest challenge to this task?