

Planning & Carrying Out Investigations Activity #2: Marshmallow Catapult

Student Goal: Design and build a Popsicle stick catapult to launch mini-marshmallows across the room into a paper cup with accuracy.

Teacher Goal: Give students goal, materials, parameters, and opportunities to plan and carry out investigations without assistance.

Once students understand the parameters of the phenomenon, have them write a PLAN, which includes, but is not limited to the following:

- Introduction
- Necessary materials
- Step-by-step plan for catapult design
- Description of the data collection method
- Timeline of the investigation
- Example of data collection strategy (tables, graphs, etc.)
- How the results will be reported

Students then carry out the investigation.

Possible Materials:

- Plastic spoons
- Popsicle sticks
- Rubber bands
- Masking tape
- Paper cups
- Mini-marshmallows

Optional materials for differentiation:

- Measuring tapes
- Tablet to video-record launches
- Calculator
- Bulls-eye

Resources for Teachers:

Show the “Punkin Chunkin’” video included below from ScienceChannel.com to give students an idea of what catapults looks like and to discuss failures, challenges, and perseverance:

Differentiating for Different Grade Bands:

- Differentiating for Primary: no limitations on supplies (teacher discretion)
 - Possible focus: measurement; cause/effect
- Differentiating for Intermediate: limit amount of rubber bands, tape, and Popsicle sticks
 - Possible focus: measurement; forces; percents; simple machines
- Differentiating for Middle: supplies have prices; students have limitations on how much they can “spend” on materials
 - Possible focus: measurement; velocity; force; angles; potential and kinetic energy
- Differentiating for High: supplies have prices; students have limitations on how much they can “spend” on materials; aesthetics; set distance
 - Possible focus: force; energy; physics; angles of trajectory

Related Crosscutting Concepts:

- [Cause & Effect](#)
- [Scale, Proportion & Quantity](#)
- [Structure & Function](#)

Related Disciplinary Core Ideas:

- [Core Idea PS2: Motion and Stability: Forces and Interactions](#)
 - [PS2.A: Forces and Motion](#)
 - [PS2.B: Types of Interactions](#)
 - [PS2.C: Stability and Instability in Physical Systems](#)
- [Core Idea ETS1: Engineering Design](#)
 - [ETS1.A: Defining and Delimiting an Engineering Problem](#)
 - [ETS1.B: Developing Possible Solutions](#)
 - [ETS1.C: Optimizing the Design Solution](#)