

Catapults

Curriculum Connection

Science: forces & motion, potential (stored) energy

Criteria for Product

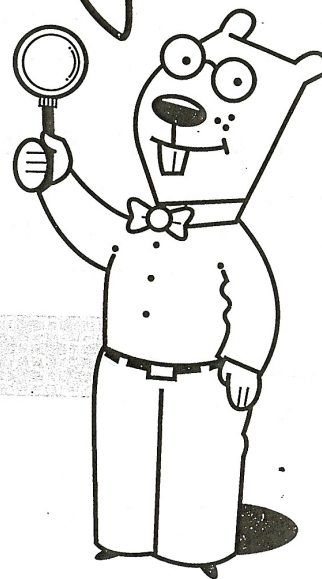
- Lighter, easier-to-carry catapults score higher than awkward, heavier ones
- Freestanding catapults score higher than catapults that must be held down
- Catapults should send the marshmallow at least 6 feet, with a higher score for longer distances

Constraints for Challenge

- Must use only the materials provided
- Must complete each stage in the time allowed
- Only three attempts are allowed, with the longest distance used for scoring

Challenge

From ancient times through current day, humans have launched objects through the air. Students design and build catapults to launch safe projectiles—marshmallows.



Materials

Catapult Materials (for the class)

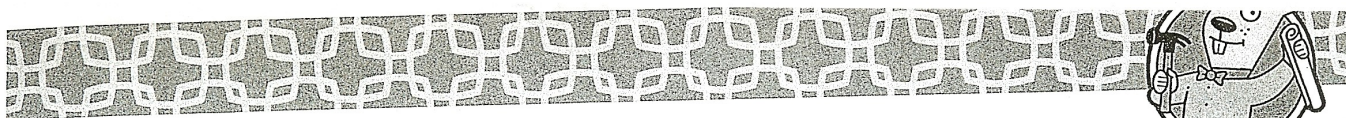
- 25 plastic spoons
- 100 jumbo-size craft sticks
- 100 regular-size craft sticks
- 100 assorted rubber bands
- 25 assorted sizes of binder clips
- 50 paper plates
- Several sticks, either dowels or from outdoors (assorted sizes and lengths)
- 12+ egg cartons
- 50 straws
- 100 clothespins (with springs)
- 100 unsharpened pencils
- 30 bottle caps, any size or style
- 50 small paper cups, 6-oz. size
- 100 paper clips, any style or size
- 2 rolls of clear tape
- 2 rolls of masking tape
- Assorted shapes and sizes of cardboard boxes

Tools

- Scissors
- Hole punches

Additional Materials

- Chart paper
- Markers
- Plain paper
- Pencils
- Digital timer
- Wood block
- Rock, large enough for class to see
- Metal spoon
- Yardstick or tape measure
- Sidewalk chalk, cones, or other means of marking distance
- 5 bags of regular-size marshmallows
- Digital video camera (optional)



Names _____

Catapult Test Results

Criterion

Score

1. Portability

Easy to carry and lightweight, score = 4

Easy to carry but heavy, score = 3

Awkward to carry but lightweight, score = 2

Awkward to carry and heavy, score = 1

2. Ability to stand alone

Stands on its own, score = 3

Must be attached to something else to stand up, score = 2

Falls down when nothing is holding it, score = 1

3. Longest distance marshmallow traveled

Distance on attempts 1, 2, and 3; use the longest distance for scoring.

1. _____ feet

2. _____ feet

3. _____ feet

Score 1 point for every 2 feet traveled up to 6 feet

(round to the nearest 2 feet)

Score 1 additional point for each foot over 6 feet traveled

Total Score

Display Board: STEM Challenge Catapult

1. Big Question! Describe the challenge, include criteria and constraints (paper attached to this lists the criteria and constraints)
2. Brainstorming: What did you do to start designing your catapult? What lead you to use certain materials?
3. Materials: List of materials you used.
4. Research: Did you do any research to help you design your catapult?
5. Plan: Show us the picture or notes of your plan.
6. Pictures: Photo or drawing of your finished catapult. Include how you launch the marshmallow.
7. Changes: IF you changed your plan, describe why. Describe any insights (Ah-Ha! Moments) you had while experimenting with the materials. Such as, why did you use the materials you did to launch the marshmallow. How did you decide to build the catapult out of the materials you had to choose from?
8. What I learned: What did you learn while building the catapult or completing the Science Fair project?

SCIENCE FAIR PROJECT BOARD

Science Fair Display Layout

Project Title		Plan
Student's name		
Research	Pictures	Changes
Big Question		What I learned
Brainstorming		
Materials		