Name(s)_____Per#_____

Catapult Design Challenge

Each student or group and build a marshmallow catapult using the following materials to achieve the goal:

- wood block
- clothespin
- glue
- masking tape *(tape materials first, then glue when sure)*
- spoon, woodcraft sticks, plastic bottle caps
- marshmallows for launching

You may add to these materials to achieve your goal but not change the basic design of a clothespin attached to a block. Feel free to decorate your final design.

Engineering Design Process

Step 1: Identify the need or problem

Build a catapult using the above resources and basic plan provided. The catapult must be able to shoot a marshmallow a distance of 1 meter minimum forward from the base. This is about the same ratio as a "springtail" can jump!. ***The team that can shoot their marshmallow the farthest wins!***

Step 2: Research the need or problem

- What is a catapult? Complete the research form provided.

Step 3: Brainstorm

1. Think of three different possible solutions. Draw detailed pictures of them in the *Research and Development section.*

Step 4 Test & evaluate design solutions

1. Report on your results beneath each drawing.

Step 5: Identify Improvements

1. Record the solution that worked the best. Solution # _____
2. Describe **at least 2 design changes** that would improve or exceed your goal.

_____

_____

_____

Step 6: Redesign solution

Draw and label detailed pictures of your redesigned solutions in the R & D section

Step 7: Test & evaluate your redesigned solutions

Report on your results beneath each drawing.

Step 8: Communicate results

1. Describe the strengths and weakness of your **best** performing design.

   Strengths:

   Weaknesses:

2. Describe why this design was more successful ***in terms of kinetic and potential energy.***

3. How would you plan to redesign your catapult to make it even better? Discuss other materials that might make your catapult even better.

***Be prepared to demonstrate your catapult and present your findings in front of the class during the "Catapult Symposium"*

RESEARCH & DEVELOPMENT SECTION (PROTOTYPES)

Design 1 sketch *(include labels and important measurements)*

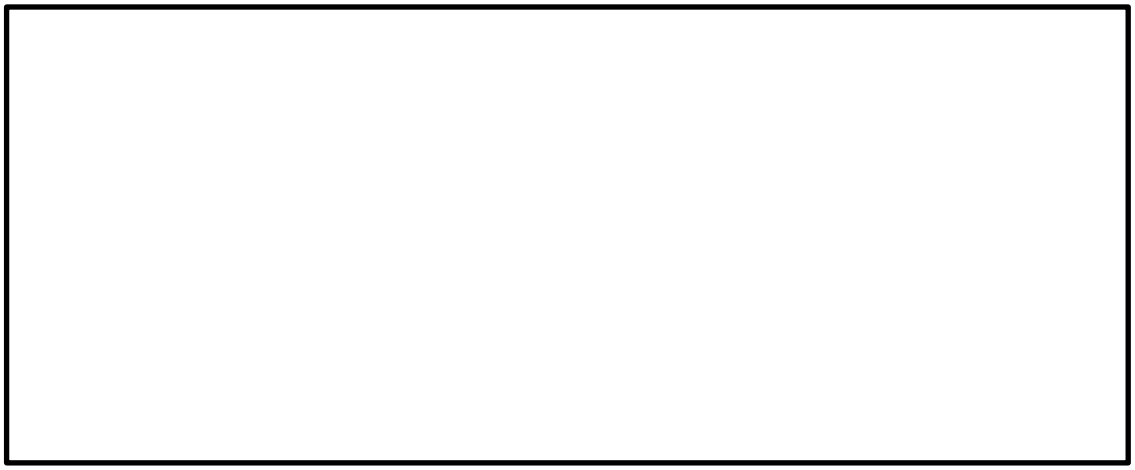
Average distance of launched marshmallow in 4 (or more) trials

Trial 1_____ Trial 2_____ Trial 3_____ Trial 4 _____ Average distance_____cm.

What went well during your tests?

What didn't go well?

Design 2 sketch *(include labels and important measurements)*



Average distance of launched marshmallow in 4 (or more) trials
Trial 1_____ Trial 2_____ Trial 3_____ Trial 4 _____ Average distance_____cm.

What went well during your tests?

What didn't go well?

Design 3 sketch *(include labels and important measurements)*

Average distance of launched marshmallow in 4 (or more) trials
Trial 1_____ Trial 2_____ Trial 3_____ Trial 4 _____ Average distance_____cm.

What went well during your tests?

What didn't go well?

REDESIGN

Redesign sketch 1 *(include labels and important measurements)*

Average distance of launched marshmallow in 4 (or more) trials
Trial 1_____ Trial 2_____ Trial 3_____ Trial 4 _____ Average distance_____cm.

What went well during your tests?

What didn't go well?

Redesign sketch 2 *(include labels and important measurements)*

Average distance of launched marshmallow in 4 (or more) trials
Trial 1_____ Trial 2_____ Trial 3_____ Trial 4 _____ Average distance_____cm.

What went well during your tests?

What didn't go well?