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CATAPULT

THE STEAM BEHIND THE EXPERIMENT:

This activity demonstrates Newton's Three Laws of Motion:

1. An object at rest will stay at rest, and an object in motion will stay in motion, until an unbalanced force acts upon it. (For this experiment, the pom pom is not going to move by itself. We have to apply a force. In this case, we use the catapult and pull back/release the catapult. The pom pom also does not stay in motion forever because of gravity and drag from air molecules).
2. Force = Mass x Acceleration. (For this experiment, the pom pom does not have a lot of mass, so it does not take lot of force to move it. The harder we pull back on the catapult, the more force is applied, and the higher or further the pom pom will fly).
3. For every action, there is an equal and opposite reaction. In this experiment, we pull back on the catapult and then release it, making the pom pom move forward.

MATERIALS:

- 9 Craft Sticks
- 6 Rubber Bands
- 1 Plastic Spoon
- 2 Pom Poms

VOCABULARY:

- | | | | |
|---------------|------------------|----------------|--------------|
| Catapult | Force | Gravity | Motion |
| Energy | Potential Energy | Kinetic Energy | Inertia |
| Drag | Mass | Weight | Acceleration |
| Newton's Laws | | | |

DIRECTIONS:

STEP 1:



Gather Your Supplies.

STEP 2:



Stack 2 sticks. Wrap 1 Rubber Band around one end of both sticks.

STEP 3:



Stack the other 7 sticks and wrap rubber bands around both ends.

STEP 4:



Slide the stack of 7 sticks in between the stacked 2 sticks at a perpendicular angle like the picture



STEP 5:

Connect the perpendicular formation using 2 rubber bands. Cross one rubber band over the left side like the picture. Repeat for the right side. You will end up with an X formation over the middle.

STEP 6:



Lay a spoon on top of your catapult. Tuck the end under your rubber band X To hold it in place and use your last rubber Band to secure it to the catapult like the Picture shows.

STEP 7:



Lay the pom pom on the spoon. Hold the catapult in place by placing your finger over the end of the catapult and pull the spoon back with one finger to hold it in place and use your last rubber from your other hand. Release the spoon (but not the other end of the catapult) and watch your pom pom fly.

MAKE IT AWESOME:

Try getting the pom poms in a basket or to hit a target!

WEBSITES AND VIDEO LINKS:

1. Newton's Laws Explained in a Video: <https://youtu.be/mn34mnnDnKU>

EXTENSIONS:

1. What happens when you change how hard you pull back on the catapult?
2. What happens if you change the size of the pom pom?
3. What happens when you change the amount of craft sticks used?
4. What other changes can you come up with for this experiment?

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