UNIT: CATAPULT

force vs. distance

Your Mission:

You’re testing how power affects performance! Your challenge is to launch a cotton ball using different amounts of force (by adding rubber bands) and measure how far it travels. Keep everything else the same—your goal is to find out how force changes motion!

Focus: Force, Motion & Distance Traveled

Materials:

* Catapult
* Rubber bands (vary amount)
* Cotton ball or pom-pom
* Ruler or measuring tape

STUDENT DIRECTIONS:

**1. Prepare Your Catapult**

* Attach 1 rubber band to your catapult arm.
* Place your cotton ball or pom-pom in the spoon/cap.

**2. Test the Launch**

* Pull back to the same angle or position each time (use a consistent launch angle like 45° if possible).
* Launch the cotton ball and measure the distance it travels using the ruler or tape.
* Record your measurement in the table.

**3. Repeat with 2 and 3 Rubber Bands**

* Add a second rubber band and repeat the same launch setup.
* Then try with 3 rubber bands.
* Measure and record the distance each time.

**Data Table:**

| Rubber Bands | Distance Traveled (cm) |
| --- | --- |
| 1 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 2 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 3 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Analysis Question:**

What pattern do you notice between the number of rubber bands and the distance traveled?  
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Hints for Success:**

* Keep your **launch angle and technique the same** each time so the only variable is the number of rubber bands.
* Use the **same projectile** and **measure from the same starting point**.

Standards Alignment

NGSS:MS-PS2-2 STEL: STEL 1F, STEL 2E, STEL 3F, STEL 4F, STEL 5D CCSS: CCSS.MATH.CONTENT.6.SP.B.5, CCSS.MATH.CONTENT.8.F6.EE.C.9, CCSS.MATH.CONTENT. 7.EE.B.4, CCSS.MATH.CONTENT. 7.SP.C.7, CCSS.MATH.CONTENT. 8.F.A.3