UNIT: CATAPULT

LAUNCH ANGLE & FLIGHT

Your Mission:

You’re on a mission to unlock the secret of the perfect launch! Your job is to test how changing the launch angle affects how far your projectile flies. Use your catapult, adjust the angles, and find out which one gives the best flight path. Ready, aim, launch!

Focus: Motion, Angles & Projectile Patterns

Materials:

* Slinky
* Rope
* Graph paper
* Ruler

STUDENT DIRECTIONS:

**1. Set Up Your Launch Angle**

* Use a protractor or angle guide to tilt your catapult arm to each target angle.
* You can also mark pull-back positions if that helps keep your angles consistent.

**2. Test at 30°**

* Launch your projectile at a 30° angle.
* Measure from the front of your catapult to where the projectile lands.
* Record your measurement in the table.

**3. Repeat for 45° and 60°**

* Adjust the angle carefully each time.
* Keep everything else (pull-back amount, projectile type) the same.
* Launch and measure for both 45° and 60° angles.

**Data Table:**

| Launch Angle | Distance Traveled (cm) |
| --- | --- |
| 30° | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 45° | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 60° | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Analysis Question:**

Which angle gave the longest launch distance? Why do you think that angle worked best?  
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
→ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Analysis Question:**

* Make sure to launch from the same surface and height.
* Keep the rubber band tension and projectile consistent.
* Record any observations—Did the projectile go higher, shorter, or straighter?

Standards Alignment

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