

## The Big Idea

We'll show you how to make a catapult out of a plastic spoon, pencils and rubber bands. Then we'll see how the size of the fulcrum can make your flying object the winner!

#### You Will Need:

#### To play the game:

- Masking tape or another way to mark a starting line
- ★ Measuring tape
- ★ Objects to fling: Anything that's safe to fly, like dry pasta, marshmallows, craft pompom balls, a few cotton balls taped together or crumpled-up paper
- ★ Scrap paper and sharpened pencil, pen or marker to record your flying distances

### To make the catapult:

- ★ Pencil: 1
- ★ Plastic spoon: 1
- ★ Popsicle stick: 1 (You can use another pencil, preferably unsharpened, if you don't have a popsicle stick)
- Rubber bands: 2, small or medium size
- ★ Thick marker (optional): 1

### The Math Behind the Scenes:

Catapults are a great way to practice measuring distance while exploring a bit of physics. So, if you're ever looking to become an engineer and build your own roller coaster or rocket, you'll have the right skills to take off!

# Make the Catapult:

- Hold a spoon and a popsicle stick or one of your pencils back to back with the scoop pointing up. The scoop should extend past the stick, as shown.
- 2. Wrap a rubber band around the spoon and stick near the lower tip.
- 3. Wrap a 2<sup>nd</sup> band around only the popsicle stick at the top.
- 4. Create a fulcrum by sliding a pencil between the center of the spoon and stick. The 2<sup>nd</sup> rubber band keeps the fulcrum in place!



# How to Play:

- 1. Assemble your catapult and gather the objects to fling.
- 2. Find a space long enough to safely fling your objects. Mark one end of your space with masking tape or other item to create a starting line.
- 3. Fling your first object from the starting line and measure the distance! Record that distance on your paper.
- 4. Keep flinging and measuring. Try different objects and compare the distances to see which object flies farther!
- 5. You can change the fulcrum of your catapult by sliding out the pencil or inserting a thick marker. If you don't have a thick marker, just take out the pencil to see how that changes the flying distance of your objects.

## **Riddles and Questions**

**Kindergarteners:** One of our balls flew 20 feet! What numbers do you say to count up to 20?

**1**<sup>st</sup>-graders: If a pompom flew 5 feet and a marshmallow flew 2 feet further than that, how far did the marshmallow fly?

**2**<sup>nd</sup>-graders: If a piece of dry pasta flew 15 feet and a ball of paper flew only 5 feet, how much farther did the pasta fly?

**3**<sup>rd</sup>-graders: A cotton ball flew 7 feet and a piece of cereal flew twice as far. How far did the cereal fly?

**4**<sup>th</sup>-graders: If a cotton ball flew 7 feet and a piece of cereal flew twice as far. What is the total distance the items flew in all?

**5**<sup>th</sup>-graders: Dry pasta flew 195 inches! How many feet did the pasta fly?

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Answers: K: 1, 2, 3, 4, 5, and so on. \mathbf{1}^{st}: The marshmallow flew \mathbb{7} feet! \mathbf{2}^{nd}: The piece of dry pasta flew 10 feet further than the ball of paper. \mathbf{3}^{rd}: The piece of cereal flew 14 feet. \mathbf{4}^{th}: \mathbb{7} + 14 = 21 feet in all! \mathbf{5}^{th}: There are 12 inches in every foot and 12 goes into 195 16 times with 3 inches left over. So the pasta flew 16 feet and 3 inches!
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