

Catapults are Way Cool

A **catapults** is a device used to launch an object a great distance without the aid of an explosive bang. Catapults have been used effectively for centuries especially for hunting and as weapons during times of war.



Catapults work by storing **force** either in twisted ropes, stretched bands, or flexed pieces of an object. The force stored in these bent items is used to push other objects of choice into the air and toward a target. In other words, the potential energy in the flexed object is converted into kinetic energy in the projectile. These projectiles might include an arrow shot from a bow, a pebble shot from a slingshot, or a boulder shot from an ancient army catapult. The navy even uses high-tech catapults to launch fighter jets off of aircraft carriers.



While the fluffy object is catapulted momentarily into space, the force of **gravity** (attraction) between the marshmallow and the earth quickly pulls it back to the ground. The amount of this gravitational force depends on the mass of the objects involved and the distance between them. Since the earth is by far the most massive object in our vicinity, it exerts the strongest attractive forces on the objects around it – including the marshmallow. Hence, the marshmallow is quickly pulled back to the floor.

In this STEM Challenge, your task is to build a catapult that can shoot a marshmallow over a protective wall. The wall protects the fortress of the evil king and queen inside who cruelly rule over their suffering people. If you can bombard the fortress with deadly marshmallows from your catapult, the evil rulers will certainly be overcome and the people can be freed.

Your catapult should include a:

1. Strong base
2. Flexible arm to store the force
3. Cup or device to hold your ammo.

Materials you can use:

6 craft sticks, 6 popsicle sticks, 10 tiny bands, 2 regular rubber bands, 1 binder clip, 10 inches of masking tape, 1 plastic spoon, 1 dixie cup, 1 marshmallow