26 Loop the Loop

Rat's Rating

Ever wondered how satellites stay in orbit? Or why laundry in a washing machine is pushed against the sides during the spin cycle? Two forces—that of *gravity* and *centrifugal* force—are the reason. Try these experiments to see how these forces work.

You will need:

rope 24 inches (60 cm) long, bucket, soft rubber ball ☆

Rat's Helpful Hint

Test forces at a fair or theme park. Go on one of those rides where you stand up while spinning around and the floor drops out from underneath you. It's another fun way to test forces.

What to do in your forces experiment

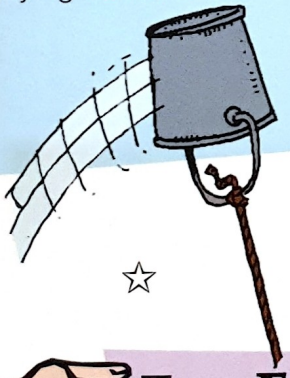
1. Tie the rope tightly to the handle of the bucket.

2. Put the ball in the bucket.

3. Go outside where there is no risk of you hitting anything.
4. Hold the bucket by the rope.
5. Whirl the bucket in the air as fast as you can.

What Happens

If you haven't hit anything, or anyone, the ball will stay in the bucket even when it turns upside down. For a satellite, it's the gravity of Earth, and not a string, that stops it flying out of orbit.

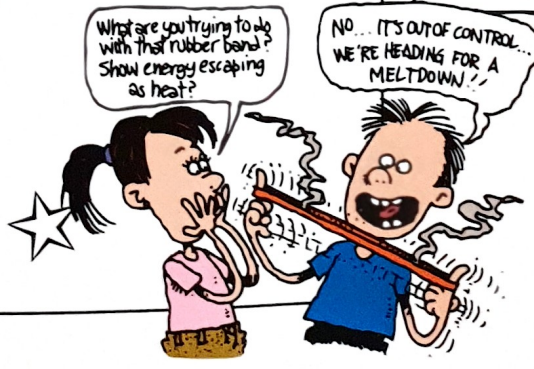


Why

- Centrifugal force – the force made by the whirling action – equals the force of gravity.
- This keeps the ball from falling out of the bucket.
- It pulls the ball against the sides of the bucket rather than down and out of it.
- Centrifugal force is directed away from the center by the rotating bucket. It is a "fleeing from the center" force.

Fun Fact

Want to feel the force of energy? Stretch a rubber band out suddenly. Then place it against your cheek. Feel the warmth? That is the stored energy trying to escape as heat!



Mini Quiz

What is the difference between *centripetal* force and *centrifugal* force?

Mini Answer

Tie a ball to a long piece of string. Spin it around over your head. Centripetal force tries to pull the ball inward towards the center of the spin. Centrifugal force tries to throw the ball off in a straight line.