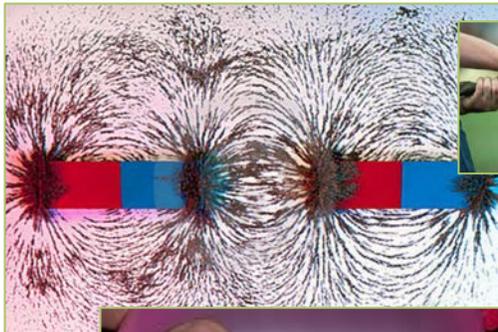


Name:

# Weird Whirlers

Can you match up these pictures with the types of forces involved?



## Everyday Forces

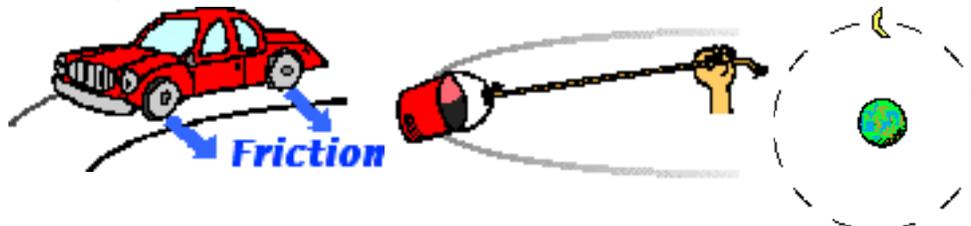


Gravitational    Air Resistance    Applied    Magnetic    Tension    Electrical

## A Force to be Reckoned With...

Ever noticed that as you're driving around a curve, you hit the door of your car? Same with many spinning rides at an amusement park? Your body obviously wants to move away from the turn, so what keeps you from going that way? This is when the **centripetal force** steps in and keeps you moving in a circular motion!

Here are a few examples:



Can you name which forces are acting as the centripetal force (the force preventing the car, bucket, and moon from flinging off and out of circular motion)?

- A)
- B)
- C)

Name: \_\_\_\_\_

## Let's Build a Weird Whirler!

### Materials:

- Plastic container
- Cord
- Water



### Instructions:

1. Poke three holes, evenly spaced, around the top of the plastic container. Thread about 25 cm of cord through each hole, tying each strand to the cup.

2. After the cup is secured, knot the three loose cord ends together. Then attach a 1m long piece of cord to the knot where all three cords meet. Be sure all your knots are tight!

3. Fill the container half full with water. Go outside and swing your widget in a circle by the long cord. When you feel confident, try over your head! Are you still dry? Try spinning faster and slower and feel the difference in your hand.

**Questions:** 1. What happened to the water?  
2. What force acted as the centripetal force in this experiment?  
3. How is this similar to what fluids undergo in a centrifuge?



## Science & The Centrifuge

A centrifuge is a spinning scientific machine that separates liquid mixtures according to their densities. An example is separating milk into cream and skim milk.

What do you know about density?

Are the more-dense objects on top or bottom?



## Spin Lifter

Predict: What object would win in a tug of war, a big or a small eraser?



Tie 1m of string to the big eraser. Slip the other end through a roll of sturdy paper and tie to the small eraser. Move the roll in a circle, and try to get the small eraser spinning. What happens to the big eraser?

## Humans in Space

1. Why do you think astronauts have to train with a centrifuge before going into space?



2. How sturdy do you think the human body is against centripetal motion?