Join Aim Academy science teacher, Dr. Karen Joseph, each week for science experiments you can watch with your kids or try at home.

Fun with Balloons

Roll a nut in a balloon

SUPPLIES:

- **a round balloon**
- **a hex nut**

TO DO:

1. Put the hex nut in the round balloon.
2. Blow up the balloon so that it makes a nice big round shape.
3. Holding the balloon with both hands, begin to swirl the balloon around in a circular motion to get the hex nut moving in a circle inside the balloon.

EXPLANATION:

Things at rest want to stay at rest, so I must add energy to make the hex nut move. Once something is moving, that thing wants to stay in motion. And, things want to move in a straight line unless something prevents that. The shape of the balloon makes the hex nut move in a circular path.

Because the inside of the balloon is very smooth, there is very little friction between the balloon and the hex nut. Friction would slow the hex nut's movement inside the balloon.

There is a force at work that you may not have heard of: It's called centripetal force, and it's the force that acts on an object to keep it moving along a circular path. Centripetal force keeps objects moving in a circle because the objects are being pulled toward the center of the circle—in this case, the center of the balloon. If objects weren't being pulled toward the center, they would fly off in a straight line.

Can you think of other objects that move in a circular path? If you said the planets around the sun, you are correct. The same centripetal force that keeps the hex nut moving inside the balloon keeps the planets revolving around the sun. Centripetal force also keeps roller coasters on a track when they go through a loop.

But why does the hex nut scream inside the balloon? A hex nut has six sides and the flat sides make the hex nut bounce a tiny bit as each side hits the balloon. This bouncing causes the balloon to vibrate, causing the sound.

Extend this a bit further by experimenting with different-sized balloons, different-sized hex nuts, and other objects. Do you think a smaller hex nut will make a higher pitched sound or a lower pitched sound? Will a smaller balloon cause a different sound? Will a smooth object such as a marble cause the balloon to vibrate and scream? Be sure to form a hypothesis before testing it.

DebraBell AIM ACADEMY

PUBLISHED BY DEBRA BELL PUBLISHING, DEBRABELL.COM |

Water in a balloon with flame

SUPPLIES:

- **at least 2 balloons**
- **water**
- **a taper candle**
- **matches**
- **safety goggles**
- **an adult helper**

TO DO:

1. Blow up a balloon and tie it shut.
2. Have the adult helper light the taper candle and put it in the middle of the table or countertop.
3. Put on safety goggles!
4. Hold the balloon a foot above the top of the flame and slowly lower the balloon closer and closer to the flame. Notice the point at which the balloon pops.
5. Fill another balloon with water, and then blow it up with air and tie it shut.
6. Hold the balloon 12 inches above the top of the flame and slowly lower the balloon, getting it as close to the flame as possible. You should be able to let the flame touch the balloon.
7. Remove the balloon, blow out the candle, and examine the bottom of the balloon.

EXPLANATION:

The first balloon popped because the heat from the candle flame melted the balloon. But adding water changed all that. Water is an amazing substance that has a lot of cool properties. One of water's properties is that it can absorb a LOT of heat energy. The thin balloon allows the heat from the candle flame to pass through and the water inside the balloon absorbs the heat energy so that the heat doesn't melt the balloon. The water near the flame warms and rises inside the balloon. The warm water is then replaced by cooler water, which then absorbs more heat energy. You can't see this happening because the water is clear, but it is happening! If you keep the flame in contact with the water-filled balloon for long enough, eventually the heat of the flame will become too much for the water to absorb and the balloon will pop.

When you look at the bottom of the balloon, you see a black spot. This is soot, which is made of carbon. The carbon was deposited on the balloon by the flame, but the balloon doesn't pop, thanks to the amazing, heat absorbing property of water!