

Screaming Balloon

Experiment Materials

- Clear latex balloons (9" to 11" balloons from a party store work great)
 - Some 1/4" hex nuts from the hardware store
 - ****Get everything you need in the "Screaming Balloon" kit****
- 1) Squeeze the hex nut through the mouth of the balloon. Make sure that the hex nut goes all the way into the balloon so that there is no danger of it being sucked out while blowing up the balloon.
 - 2) Blow up the balloon, but be careful not to overinflate the balloon, as it will easily burst. Tie the end of the balloon and you're ready to go.
 - 3) Grip the balloon at the stem end as you would a bowling ball. The neck of the balloon will be in your palm and your fingers and thumb will extend down the sides of the balloon.
 - 4) Once the hex nut begins to spin, use your other hand to stabilize the balloon. Your hex nut should continue to spin for 10 seconds or more.

How Does It Work

This is actually a 2-for-1 experiment—you're learning about the science of motion and sound. To understand how and why it works, you have to look at the forces that are acting on the hex nut. The shape of the balloon makes the hex nut move in a circular path. Otherwise, the hex nut would want to continue to move in a straight line. Another force to consider is friction. There's very little friction between the edge of the hex nut and the balloon. More friction would cause the hex nut to slow down and stop.

The real force in action here is a centripetal, or center-seeking, force. **Centripetal force** is the inward force on a body that causes it to move in a circular path. The old concept of "centrifugal force," an outward or center-fleeing force, has been largely replaced by a more modernistic understanding of centripetal force.

A hex nut has six sides, and these flat edges cause the hex nut to bounce or vibrate inside the balloon. The screaming sound is made by the sides of the hex nut vibrating against the inside wall of the balloon.

Take It Further

What happens when you change the size of the balloon or the size of the hex nut? Try using a marble in place of a hex nut. Does the marble make the balloon "scream?" Experiment with other objects whose edges may vibrate against the balloon.

Take a trip to the moon in order to try the experiment in an environment with less gravity. How does this affect the outcome of the experiment? Does the hex nut spin for a longer period of time? Come back to Earth and hold a press conference.