Balloon Gyroscope: a powerfully simple tool

What you will need:

- Transparent or lightly colored rubber balloon
- Metal washer and/or coin

How to perform the demo:

Insert a penny into an un-inflated balloon. Inflate the balloon until it comfortably fits in the palm of your hand and tie its neck shut. Bigger is not better. Over-inflation will cause you to make deep finger indentations as you attempt to grip the balloon. Gently hold the balloon in one hand. With a swirling action, make the penny roll on its edge around the inner surface of the balloon. Try to keep the penny traveling a distinct planar (consistent) path. Once you have the penny moving consistently in the balloon, try rotating the balloon and note how the penny will continue orbiting in approximately the same plane while the balloon rotates around it: you’ve just created a gyroscope!

Caution:

The balloon may pop and send your orbiting coin flying: wear eye protection!

The Science:

One of the basic laws of physics as described by Newton states that an object in straight line motion tends to stay in motion until acted upon by some outside force. You might comment that the coin is not traveling in a straight line, rather a circle. At any given moment, the coin is attempting to travel in a straight line. Popping the balloon with a pin at any time the coin is revolving will prove that point.

Note:

The above science does not cover all relevant science regarding this demonstration – do some of your own research to provide interesting information during your demonstration!