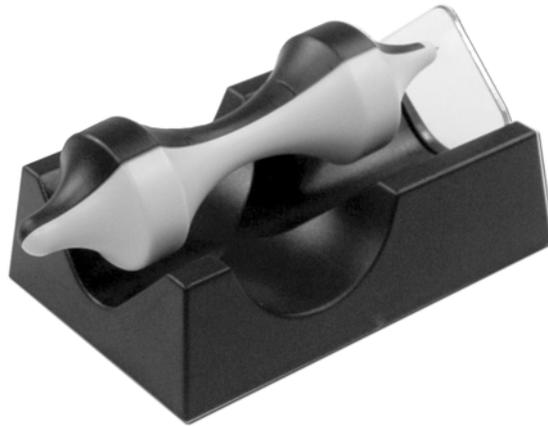


## 615-0025 (20-130) Levitating Vortex



### **Warranty and Parts:**

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

### **How to Teach with Levitating Vortex:**

**Concepts Taught:** Magnetic Repulsion; Levitation; Negative Acceleration

**Curriculum Fit:** Magnetic Field and Magnetism.

### **Additional Materials Needed:**

- Stroboscope

### **Demonstration: Levitation of a Magnet**

**Kit Components Needed:** Levitating Vortex

**Additional Items Needed:** Stroboscope

### **Procedure:**

1. Put the black base of the perpetual spinning magnet on a flat surface such as a laboratory bench.
2. Insert the plastic disk into the open end of the base, so that the triangular portion is pointing upward.
3. Prepare a stroboscope for use in counting revolutions.
4. Stick the tip of the black and white magnet to the plastic disk and give it a quick turn to start the “perpetual motion”.
5. Use the stroboscope to measure the rotational speed for a predetermined amount of time.

### **Theory:**

Magnetic repulsion is responsible for the operation and the device demonstrates that opposing permanent magnets can produce levitation. The stability of the black and white magnet in mid-air is due to the fixed stop that exerts a force on one end of the rotating axel.

Negative acceleration is a decrease in velocity. As the levitating vortex spins, the magnets are exerting a force that takes away velocity from the object that was once moving in a positive direction, thus the object comes to a stop.

The force with which you start the levitating vortex spinning will determine how long the object spins before it comes to a complete stop.

### **Other Science First Items you may enjoy:**

**615-0270 Magnetic Field Demo 2D:** Perform experiments that everyone can see. Visualize magnetic lines of force in two dimensions. Our transparent case contains iron filing in transformer oil. When near a magnet, iron filings line up along magnetic lines of force. 6-1/4 x 3-1/2 x 3/8" in size with reusable styrofoam pack. Magnet not included.

**653-9015 Magnetic Earth Model:** Now visualize the earth's magnetic field in 3D. Our 100mm (4") x 50mm (2") liquid filled model has a magnetic earth to place on it. As the Earth is a magnet, the iron filings in the liquid get pulled to the poles, just like on our Earth.

**611-1705 Gaussian Gun:** A fun and intriguing demonstration of Newtonian physics. When properly arranged, a slow moving steel ball will be accelerated to 3-4 times its original speed by the pull of magnets and Newton's Third Law of Motion. How is this possible? As a ball approaches the powerful magnet, it is accelerated into that magnet, but on the other side of the magnet there are two balls in a row. The impact of that ball kicks off the farthest ball on the other side just like Newton's Cradle. The released ball however has the energy of the magnetic acceleration propelling it faster than the original ball. This is possible because it begins its journey already a ball away from the original magnet. When this motion happens four times in a row, there is enough velocity built up to shoot a ball across a room!

This unit comes with 4 neodymium magnets, 4 magnet holders which allow the user to move the magnets and reverse their polarity towards one another. Ten 3/4" steel balls, and a low friction track with an open end for launching the balls. This device can be used to teach magnetism, motion, Newton's Laws, and can be used as a fun ball launcher for other experiments and demonstrations.