615-4755 (10-330) Ring Launcher

Introduction:
When your students think of projectiles, they will likely first think of bullets, which are propelled by rapidly expanding gases. However, this is not theonly mechanism that can be used. Springs,rubber bands, and centripetal force are other common methods. One method that has attracted significant attention and research lately is firing projectiles using electricity.
Your students will surely wonder:
how can electricity, which is immaterial, affect heavy projectiles? They should be familiar with pith balls and aluminum leaves being deflected by a charge, but these objects are extremely light. How can a mass of tens of grams be moved by electricity? The secret has to do with induction. Induction occurs when one conductor is placed adjacent to another, and a current is passed through the first. A current will be generated in the second conductor. Between the two currents an electromotive force forms; this forces the two currents to repel each other. This is because each circuit has an overabundance of electrons, giving them both a negative charge. Normally, such as in a transformer, the two conductors are fixed in position. However, if one of them is free to move, it will travel away from the first conductor as long as a current is being induced.

In the ring launcher, a coil of copper wire is used to create an initial current. A steel core has been added to intensify the magnetic field around the coil. When an aluminum ring is slid around the coil and the unit is energized, a current is induced in the ring, causing it to repel the coil. Since the ring is prevented from moving downwards and sideways, it has no choice but to travel upwards.

Operation:
Using your ring launcher is extremely easy. First, place the two extender columns on top of the base. They are beveled to fit neatly into each other. This forms a three piece column that, when placed on a lab bench, is over 2 meters tall. This prevents students from leaning over the device and inviting injury.

Next, slip the solid aluminum ring around the column and rest it on the base. It will sit at the perfect height relative to the coil for launching. To fire, simply depress the red button. You will hear a buzz, and the ring will launch three to four meters into the air. Wait a few seconds before launching again.

Some ideas for other experiments:
Place the launcher horizontal or at an angle. Use it for studies of projectile motion. For more advanced classes, have your students take into account the different aerodynamics of a ring versus a traditional sphere.
Place the split aluminum ring on the launcher and fire. What happens? Why? Hint: does the split ring conduct electricity?
You can try with other rings you provide: rubber, steel, plastic, and other materials. Have your students form hypotheses about which rings will fire, and why.

Safety Considerations:
Always wear safety glasses when operating this unit! The device can throw a ring with considerable velocity.
The firing button has a built in microprocessor. It can fire once every five seconds. Repeatedly pressing the button will have no effect. This is to prevent excessive heat buildup.
The ring has rubber rims to help prevent damage. Even so, prepare the area before using. Move fragile objects at least three meters away. Have your students take two steps back.

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.