



Electrostatics

Electrostatic Generators:

- [Van der Graaf Generator \(\\$150\)](#)
- [Fun Fly Sticks \(\\$28\)](#)
- [ElectroCatic Generator](#) (Low Cost)

Hands-on Activities:

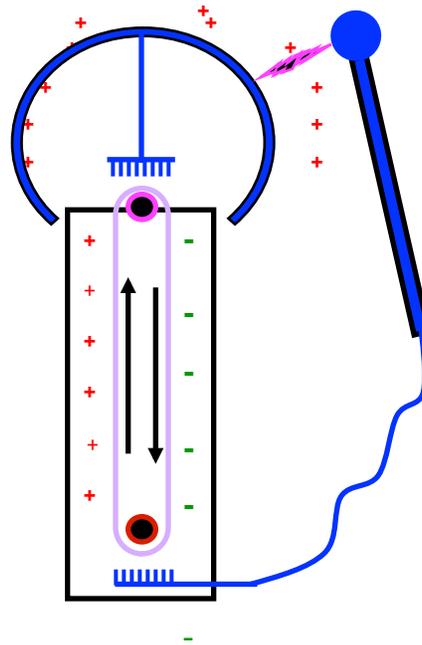
- [Can Racing](#) (\$0.25 Generator)
- [Leaf Electroscopes](#)
- [Electronic Electroscopes](#)
- [ElectroSoda Motas](#)
- [ElectroPong Gongs](#)



Van der Graaf: Serious Charges (\$150+)



Become part of the circuit !



Charge separation



Play with one of the forces that hold the universe together !



Fun Fly Sticks: Static Magic! (\$28)



The Fun Fly Stick© low-cost and fun alternative to a Van der Graaf generator



ELECTROSTATICS - ElectroCatic* Generator (\$0 plus 1 cat?)



Hand-crank electrostatic generator

MATERIALS

1. Kitty litter bucket
2. 3" PVC pipe (3.5" OD), 15" long
3. ½" PVC pipe, 8" long
4. ¾" CPVC pipe, 5" long
5. ½" PVC end cap
6. (2) tin cans, 3.5" dia., 5.75" tall
7. Real wool (mitten, hat, scarf)
8. (4) 8-32 bolts, ¾" long
9. (8) 8-32 lock washers and nuts
10. (2) 10-32 bolts 1.5" long
11. (2) 10-32 lock washers and nuts
12. (1) Cat (optional ;)

* No animals were harmed in the construction and use of this device



ELECTROSTATICS - Can Racers



Race electrostatically powered soda cans!

- $\frac{3}{4}$ " PVC pipe, 16" long
- Soda can, 12 oz.
- Real wool mitten, hat or scarf



High-tech scientific equipment



ELECTROSTATICS - Leaf Electroscope



MATERIALS

1. Clear, flat-sided plastic jar
2. Medium binder clip
3. 1/4-20 Bolt, 3" long
4. (2) 1/4-20 Flat washers and nuts
5. 1/4-20 Lock washer
6. (2) Aluminum foil strips, $\frac{3}{4}$ " x 2.25"
7. Transparency w/ protractor image

Assemble and insert into hole in jar lid



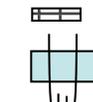
Bolt (1/4-20)
Nut
Washer

Place washer and nut on bolt and hand tighten



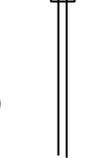
Jar lid

Attach binder clip to end of bolt and remove handles



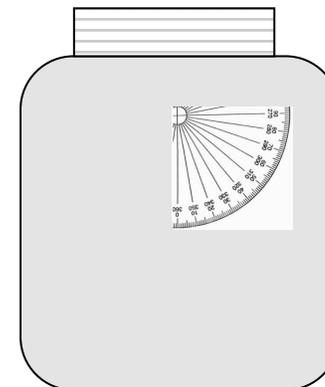
Washer
Nut
Binder Clip
Paper Clip section

Thread leaves onto paper clip sections and snap sections onto outside of binder clips



Aluminum foil leaves

Screw lid onto jar



Align protractor section with foil leaves and tape in place



ELECTROSTATICS - Electronic Electroscope



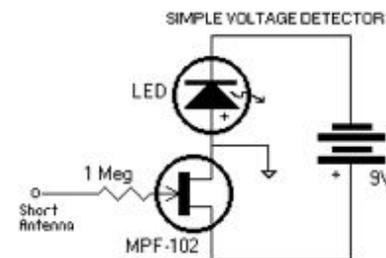
Electroscope mounted 9V battery



Empowerment through soldering

MATERIALS

1. 9V battery
2. 9V battery top cap (recycled)
3. N-JFET Transistor (MPF102)
4. Red LED (e.g., Radio Shack #2)



Electrostatic Charge sensor, <http://www.eskimo.com/~billb/emotor/chargdet.html>



ELECTROSTATICS - Soda Mota



Construction of the Soda Mota (electrostatic motor)

NOTE: The aluminum foil stripes on the bottle should be separated by ~ 1cm



Low-cost electrostatic fun !

MATERIALS

- Bottled-water bottle (8 oz.)
- 3 ballpoint pens (e.g., Staples, med)
- 2 X 4 Wood block , 8 $\frac{3}{4}$ " long
- 2 Very large paper clips
- Aluminum foil (2 $\frac{1}{2}$ " x 8" inches)
- Transparency (1 $\frac{7}{8}$ " x 8 $\frac{1}{2}$ ")
- Glue stick
- Double-sided tape



ELECTROSTATICS - Pong Gong



Pong Gong III

MATERIALS

1. Plastic milk carton (1 gallon)
2. Dental floss, 16" long (or equivalent)
3. Ping pong ball
4. No. 2 pencil (for coloring)
5. (2 - 4) Brass fasteners



Constructing Pong Gong II

MATERIALS

1. Two tuna cans, half opened & lid folded under
2. Plastic support cut from 5-gallon bucket
3. Dental floss, 16" long (or equivalent)
4. Ping pong ball
5. No. 2 pencil for coloring
6. 2 x 4 Wooden block, 4 3/4" long
7. (4) Wood screws, 1" long
8. (4) 8-32 Flat washers and nuts
9. (2) 8-32 Bolts with lock washers and star washers



Pong Gong Electrostatic motor