



# Magnetism & Electricity

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Hands-on Activities:

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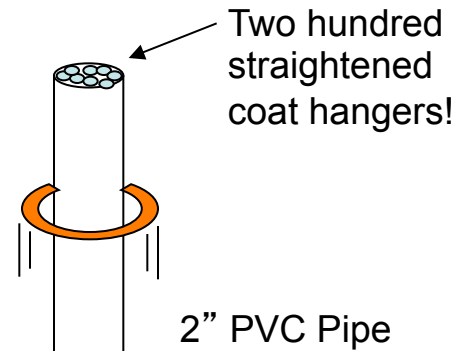
## Magnetism & Electricity: Ring Flinger



Levitate or Fling Rings!



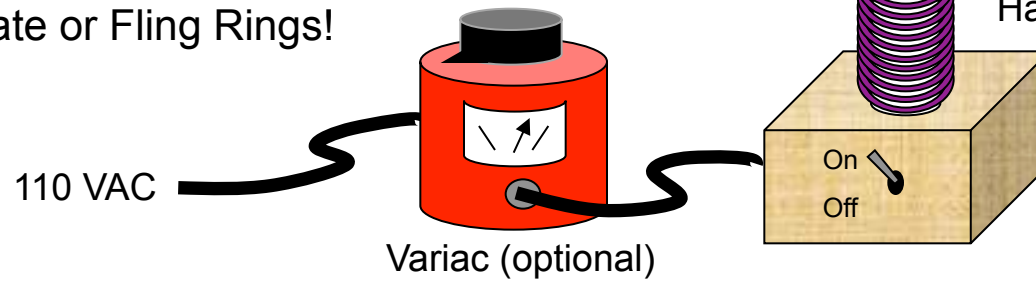
Metal Ring



Two hundred straightened coat hangers!

2" PVC Pipe

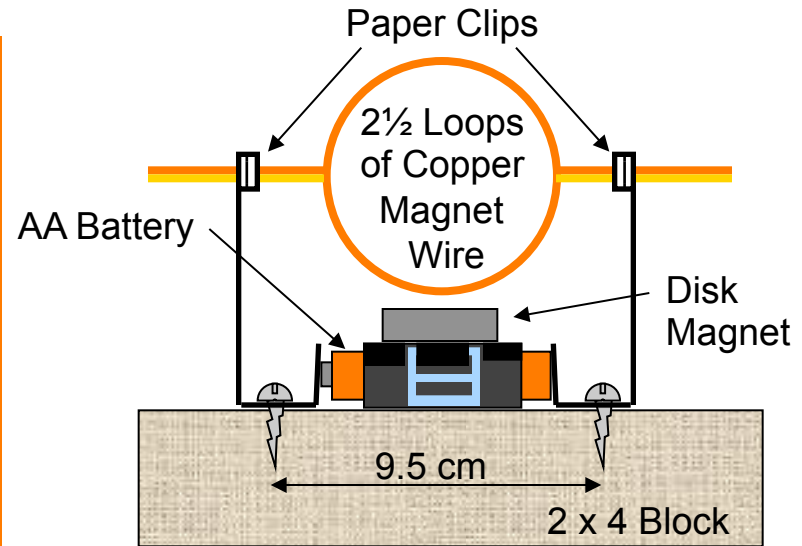
Hand-wound coil



Split ring for comparison



## Magnetism & Electricity: Loop Motors



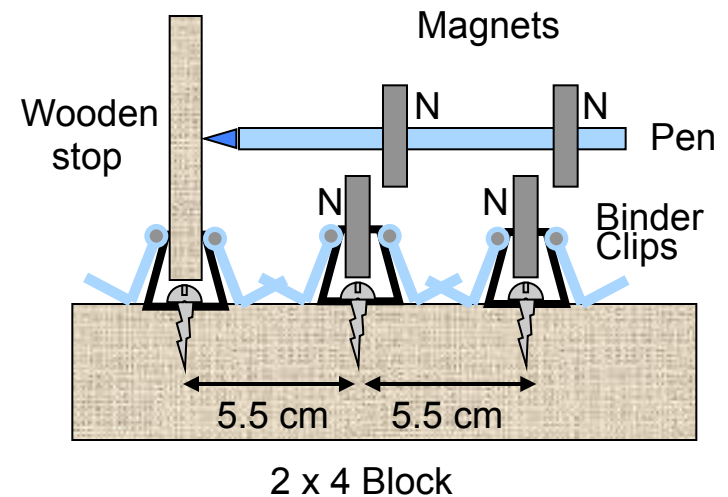
**NOTE:** On each side where the copper wire can contact the paper clips, scrape the insulation off just the bottom edge of the wire with the loop vertical

### MATERIALS

1. (1) 2x4 wooden block, 20 cm long
2. (1) medium binder clips
3. (1) Disk magnets
4. (2) small wood screws
5. (2) large paper clips
6. Copper magnet wire, ~24 gauge (65 cm with ~ 7 cm diameter loops)
7. (1) AA battery (rechargeable!)



## Magnetism: Mag Spinners



Magnetic levitation with a twist!

### MATERIALS

1. (1) 2x4 wooden block, 20 cm long
2. (1) wooden stop, ~0.5 cm thick, ~8 cm tall
3. (5) medium binder clips
4. (6) Disk magnets
5. (1) ballpoint pen (e.g. bic, staples)
6. (5) small wood screws



## Magnetism & Electricity Mag Sensor



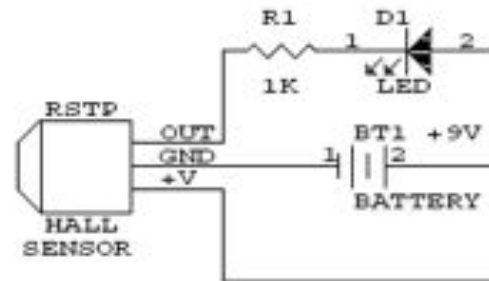
Mag sensor mounted on a 9V battery



Assembly of the magnetic sensor

### MATERIALS

1. 9V battery
2. 9V battery top cap (recycled)
3. Hall Sensor (e.g., UTC U18)
4. Red LED (e.g., Radio Shack #2 )
5. Resistor, 1 KOhms

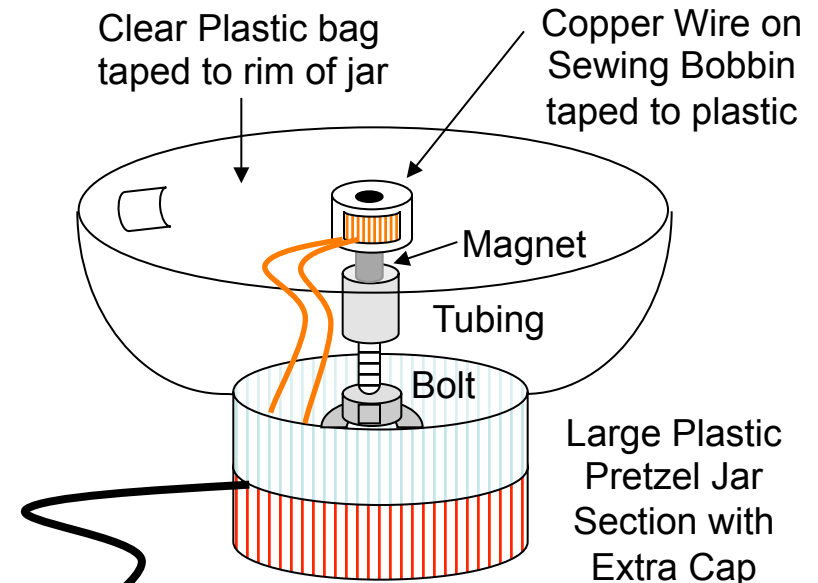




## Magnetism & Electricity: Speakers



Speaker with mini amp circuit and CD player



### MATERIALS

1. Plastic sewing bobbin
2. Copper magnet wire, 30 gauge, 40'
3. Large-mouth plastic jar
4. Bolt, flat washers & nuts (14-20)
5. Rare-earth cylindrical magnet, (e.g., 0.25" dia, 0.5" long)
6. Plastic tubing, 0.25" ID, 1" long
7. Clear plastic sheet



## Magnetism & Electricity: Electric Guitar



Jammin' with the 1-string EM-Guitar

### MATERIALS

1. Plastic sewing bobbin
2. Copper magnet wire, 42 gauge
3. Scrap floor board
4. Piano tuning pins (recycled)
5. Rare-earth cylindrical magnet, (e.g., 0.25" dia, 0.5" long)
6. (2) Wooden triangle blocks (bridges)
7. Piano wire (or guitar string)
8. Frozen orange juice lid
9. Output jack (e.g., 1/4" )
10. Connecting wire

