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## Lab 10--Building an Electric Motor + Building a Speaker

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### Supplies Required:

One 'C' or 'D' Cell Alkaline Battery  
One Wide Rubber Band  
Two Large Paper Clips  
One Ceramic Magnet  
Heavy Gauge Magnet Wire, Insulated  
Fine Sandpaper  
Small Block of Wood for Base

### Instructions:

1. Starting about 5 cm from the end of the wire, wrap it 5-12 times around a cylindrical object. The goal is to produce a nice coil of wire. Cut the wire, leaving a 5 cm tail opposite the original starting point. Wrap the two tails around the coil so that the coil is held together and the two tails extend perpendicular to the coil.

Be sure to center the two tails on either side of the coil. Balance is important.

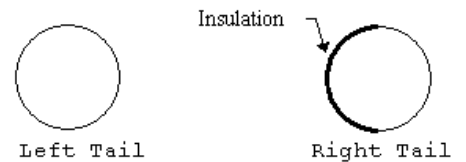
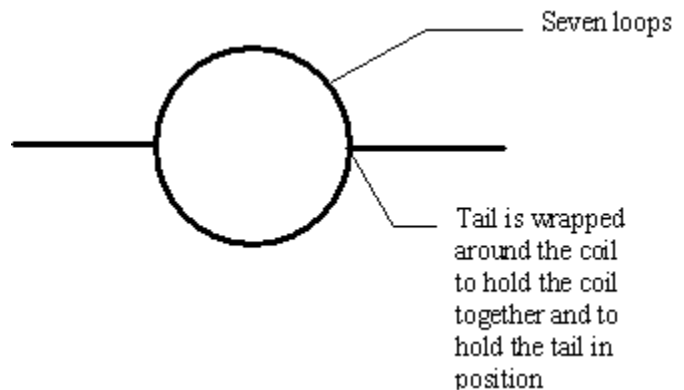
2. On one tail, use fine sandpaper to completely remove the insulation from the wire. Leave ~0.5 cm of insulation on the end and where the wire meets to coil. On the other tail, lay the coil down flat and lightly sand off the insulation from the top half of the wire only. Again, leave about 0.5cm of full insulation on the end and where the wire meets the coil.

3. Use the paper clips to mount the hoop. Again, the hoop needs to be well balanced so that it spin easily and freely.

4. Attach each pole of the battery to one paperclip.

5. Place the magnet under the coil.

6. Give the coil a little nudge to start it spinning.

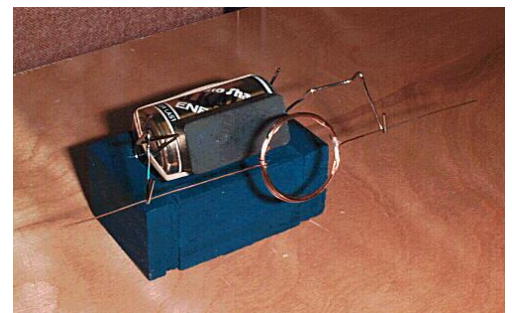


### Troubleshooting:

Be sure that the paper clips are in tight contact with the ends of the battery.

Be sure that the sanded areas of the wire are shiny clean.

Try changing the position of the magnet.



### Building a Speaker:

Once you have built the motor, the next thing you can do is build a speaker. Try constructing a speaker using the coil of wire you just made, a magnet, and a paper or Styrofoam cup.