

# Making A Simple Motor

## Materials:

"D" sized Dry Cell  
#20 gauge Enamel Coated Copper Wire (about 2-3 feet)  
2 Paper clips  
Sand Paper  
1 Strong Mini Magnet  
1 Rubberband

## Directions:

### Step 1:

Start by wrapping the wire around the dry cell, leaving about 2 inches of wire on both ends after wrapping.



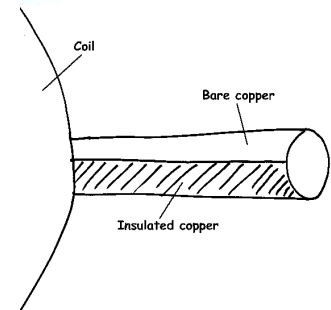
### Step 2:

Take one end of the wire and wrap it around the new coil of wire that you made to hold the coil together and do the same on the other side as well. This is called the *armature or rotor*.



### Step 3:

**READ CAREFULLY:** Now you are going to SAND only *one half of one side* of the armature wire that is sticking out to the side. Be very careful and ONLY sand one half of one side.

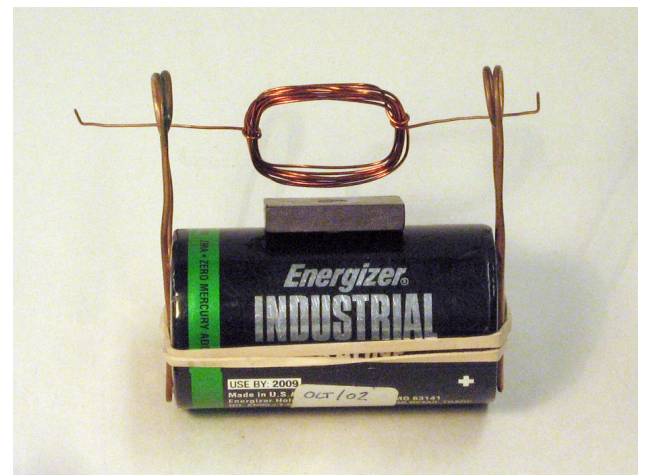


### Step 4:

Take the rubber band to and place the 2 bent paperclips on each end of the dry cell. Then place the ROTOR on the paper clips and the magnet directly underneath the rotor. Your set up should be similar as what you see in the picture.

NOTE: You will need to make slight adjustments and different positioning in order to get your motor to work....EXPERIMENT and TRY to get it to work!

The reason to entirely remove the insulation from one side of



## WHY SAND ONLY ONE HALF OF ONE SIDE of the wire?

The reason to remove 1/2 the insulation from the other side of the wire is so the coil (electromagnet) is only on, or active, 1/2 the time. This way you can get the coil-magnet and ceramic-magnet to "push" against each other without them "pulling" each other 1/2 the time, which would keep the coil from spinning.

Remember if a north-pole end of a magnet is near a north-pole end, it will repel, but if a north-pole end is near a south-pole end it will attract. If we have equal "pulling" and "pushing", the forces will cancel each other out. If we only do one or the other, there is no other force to cancel.

**In SHORT.....by sanding only one side of the wire, we are turning ON and OFF the electromagnet causing attracting and repelling forces by pushing and pulling the coil wire.**