DC Motor Lab

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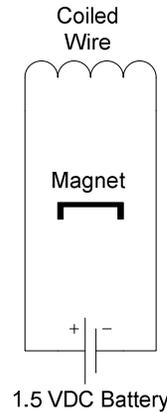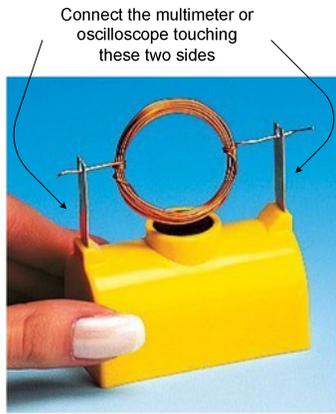**Follow the instructions to build both DC motors.**

Fig 1: Small Electric Motor   Fig 2: Circuit Model of Small Electric Motor

1. For the DC motors, after you connect the power, sometimes you need to kick start it to get the motor spinning. Why? From an engineering point of view, what would you do to resolve? If you connect the multimeter to the ends where the wires are held in place and measure the AC current for the small electric motor, there will be some current going through the multimeter. Record this value. If you keep the coiled wire from spinning, the current will drop until it reaches zero. If you keep the multimeter and let the DC motor keep spinning, the current will approximately stay the same.

2. If the oscilloscope is connected at the ends, there should always be around 1.5V measured. It will try to drop to zero. Find the frequency of the voltage and peak-to-peak voltage across the motor. The frequency will change depending on how fast the motor spins. Do a screen capture of the voltage from the oscilloscope. Find the voltage of the motor when it is in steady state (i.e. not moving). Calculate the power consumption when moving and when steady (not moving). What happens when there is a higher load on the motor (use your fingers to load the motor). Does the frequency change? Does the voltage change?
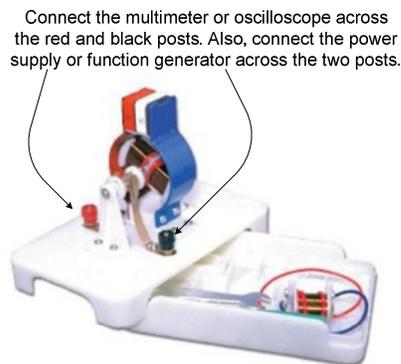

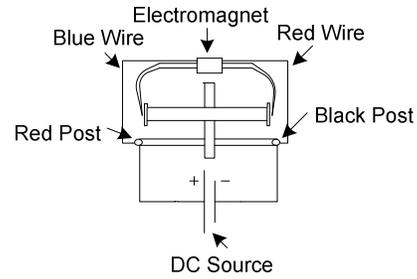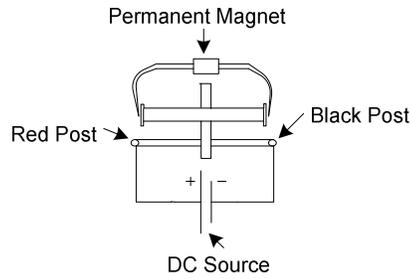*Fig 3: Large Electric Motor*

Fig 4: Large Motor with Permanent Magnet   *Fig 5: Large Motor with Electromagnet*

3. Repeat the above procedure using the large electric motor. Use a DC motor. Report how much current is needed. Use less than 2.5A. The voltage should be from 3 to 6 volts. Instead of using a power supply, try spinning the motor yourself. Connect the oscilloscope across black and red posts. Also, find the frequency and peak-to-peak voltage. Try to add more load by putting your fingers on the end. How does changing the direction of the motor affect movement? Report on it and why. How does a DC motor work? Replace the permanent magnet with the electromagnet. An AC source can also be used, but it will not be done in this lab.