Applications of the Motor Principle: The MINI-MOTOR

Task

In this activity you will construct a simple motor from simple materials.

Materials

- copper wire (shielded)
- 1 battery
- 2 paper clips
- Tape
- 2 rare earth magnets
- sand paper

Procedure

Constructing the commutator and assembly:

1. Unfold the two paperclips.
2. Attach 1 paper clip to each side of the battery with a small piece of tape.
3. Make a small loop at the end of each paperclip to hold the ends of the coil. (see diagram)

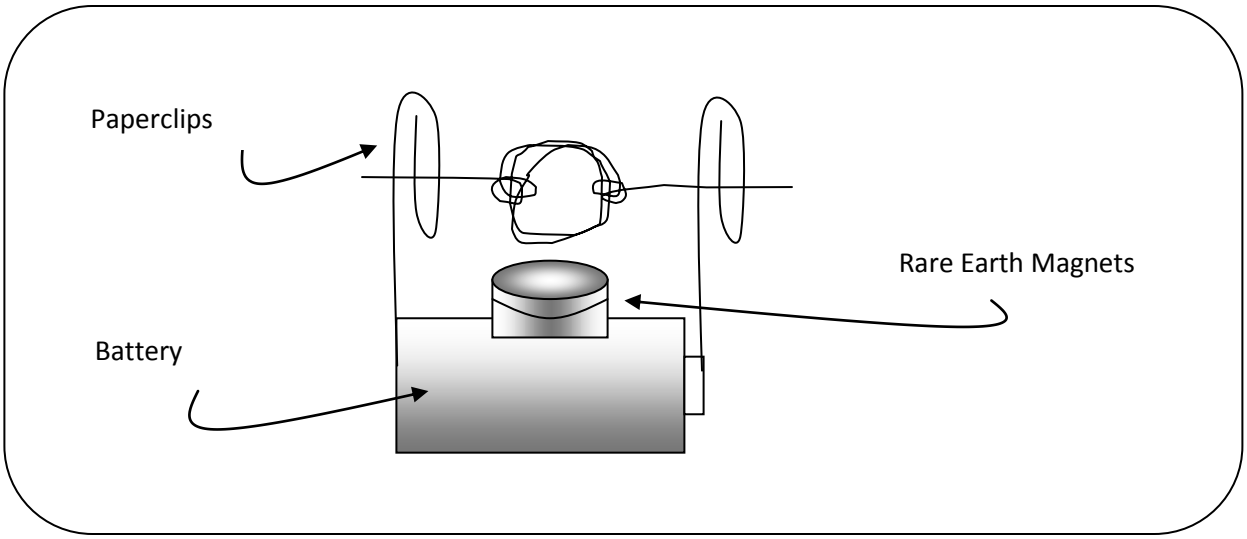
Constructing the coil and brushes:

1. Wrap the conducting wire around a cylindrical object (battery) several times to form a loop. Leave about 20 cm of wire on each end.
2. Remove the coil of wire from the cylindrical object, keeping the coils together.
3. Weave the ends of the wire around the coil (evenly) to hold the coils in place.
4. Using the sandpaper, completely remove the insulation on **one lead only**. Note: The insulation is a dark coppery color while the conducting wire on the inside has the color of a shiny, new penny.
5. On the other lead, use the sandpaper to remove the insulation, **along the top side of the wire only**.
6. Make sure your coil is balanced and that the ends are straight.
7. Insert the ends of the coil into the loops of the paperclip. Eventually, the battery and wiring will get hot as you are creating a short circuit. Do not leave the coil in for too long. Do not leave the assembly unattended.

Questions:

Answer the following questions on the back of this sheet.

- Explain how your mini-motor works (why is it a two stage motor? Why was it necessary to sand only one half of the one side of the copper coiled wire?
- Discuss in detail, several changes you could make in the construction or design of your motor (at least three) in order to increase its performance.



Explanation/Improvements: