9. Set the magnetic field sensor to read zero.
   a. Select SETUP from the main screen of DataMate®.
   b. Select ZERO from the setup screen.
   c. Select CH2-MAGNET F(MT) from the SELECT CHANNEL menu.
   d. Monitor the reading displayed on the calculator screen. When the reading appears to be stable, press ENTER to zero the sensor.
   e. Keep the magnetic field sensor in this same position for the remainder of the experiment.
10. Make sure the dial on the power supply is turned completely counterclockwise. When your teacher has approved your circuit, turn the dial on the power supply about halfway to its full value.
11. Close the switch briefly. Read the potential difference across the resistor and the strength of the magnetic field. Open the switch as soon as you have made your observations. Record ΔV_R *(V)* and $B_{Measured}$ *(T)* for *Trial 1* in your data table. Determine and record the *Current Direction* (*A* to *B* or *B* to *A*).
12. Reverse the direction of the current by closing the switch in the opposite direction. Read and record the potential difference and the strength of the magnetic field for *Trial 2*. Open the switch as soon as you have made your observations. Determine and record the *Current Direction* (*A* to *B* or *B* to *A*).
13. Increase the setting on the power supply to about two-thirds of the maximum setting on the dial. Repeat the procedure in steps 11 through 12. Record all data in your data table as *Trials 3* and *4*.
14. Repeat step 13 with the power supply set to one-third of the maximum setting. Record all data in your data table as *Trials 5* and *6*.
15. Clean up your work area. Put equipment away safely so that it is ready to be used again.

ANALYSIS

1. **Organizing Data** For each trial, use the equation $\Delta V = IR$ to find the current.
2. **Constructing Graphs** Use the data from *Trials 1, 3,* and *5* to plot a graph of B_{wire} in teslas against the current in amperes in the circuit. Also, plot graphs for *Trials 2, 4,* and *6*. Use a computer, graphing calculator, or graph paper.

CONCLUSIONS

3. **Drawing Conclusions** For each position, what is the relationship between the current in the wire loop and the magnetic field strength?
4. **Drawing Conclusions** What is the relationship between the direction of current in the wire and the direction of the magnetic field? Explain.

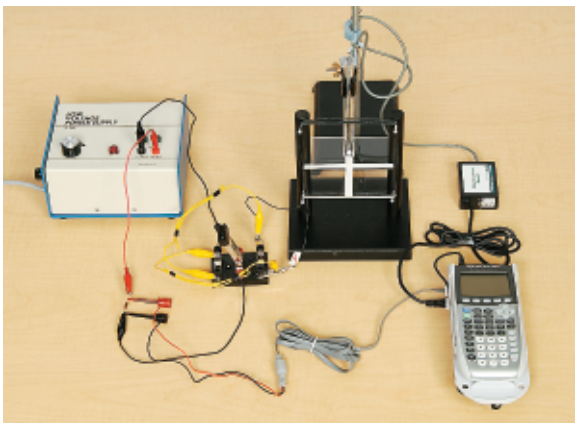

Figure 1

Step 3: Loop the copper wire around the support pins, and attach alligator clips to the ends. Place the galvanometer with one support pin on the left and one on the right.

Step 4: Use two pieces of tape to mark perpendicular lines, and mark a circle to use as a reference for placing the sensor.

Step 5: Place the switch in front of you so that it moves from left to right. Check all connections carefully.