

PHYSICS

Lab: RC Circuit Lab

name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

Group Number: \_\_\_\_\_ Important, look at the # on the plastic bag)

Purpose: To investigate the charging and discharging of a capacitor.

Procedure: Set up the capacitor circuit and carry out all instructions. If you are unfamiliar with the symbols, use your notes.

(Safety Note: make sure the positive and negative terminals of the power supply are connected to the positive and negative leads to the electrolytic capacitors. If not, you may damage the capacitor or yourself. You will be using the Logger Pro software on the computers to measure voltage loss and graphing the results.

1. Set up the capacitor circuit as shown on the circuit diagram. The switch can be two alligator clips if you want.
2. Connect the GoLink to the USB port of the computer. Connect the Volt Probe to the GoLink. Your computer is now a voltmeter.
3. Open Logger Pro on the desktop. Under the file menu, click Open. When the Dialog box appears "Look in:" Click on Experiments. Open "Physics with Computers" file. Open "27 – Capacitors". You are now fired up and ready to go.
4. Set the power supply to 10 volts. The capacity of the probe is only 6 volts but it will be quicker to charge. Press control – T to increase the time of collection until the "150" seconds show.
5. With the switch open (very important), charge the capacitor by touching the + and the – of the power supply to the correct poles of the capacitor for 10 seconds. DO NOT LEAVE THE POWER SUPPLY CONNECTED.
6. Close the switch and push "Collect" on the screen. Record the time it takes for the current to drop to 1/2 of its original value. \_\_\_\_\_ seconds.
7. Let the graphing program run for the complete 3 minutes. (Each table has a different resistor-capacitor combination)
8. Use the key in your tray to record the resistance of the resistor that you used.
9. Read the capacitor and record its capacitance.  
\_\_\_\_\_ Ohms                      \_\_\_\_\_ Farads
10. make a copy of the graph for the instructed number of members and staple it to the back of this lab sheet.

CONCLUSION:

1. Where did the energy that charged the capacitor come from?
2. As the current flows, where does the energy stored in the electric field of the capacitor go (as the capacitor discharges and loses its energy)?
3. Explain the shape of the graph in terms of the charge stored in the capacitor, the potential (voltage) across the capacitor, and the resistance of the resistor.
4. Did the volts reach "0" in the 180 seconds or so? Why or why not?

