FLINN SCIENTIFIC

Name_____

What Is a Capacitor? Worksheet

Data Table and Observations

Draw and label the circuit setup (step 6).

Battery voltage: _____

	Measured Resistance	Time Constant (RC)
Resistor, 220 Ω		
Resistor, 620 Ω		
Resistor, 1.1 k Ω		

Qualitative Observations: Discharging a capacitor

Record your observations of the circuit and LED for each resistor.

Resistor, 220 Ω.

LED "On" time_____ Average _____

Resistor, 620 Ω

LED "On" time_____ Average _____

Resistor, 1.1 k Ω

LED "On" time_____ Average _____

Quantitative Analysis (optional)

Record the equation for best-fit line for the voltage vs. time graph for each resistor.

	Charging	Discharging	Average RC
220 Ω Resistor			
620 Ω Resistor			
1.1 k Ω Resistor			

Post-Lab Questions and Calculations

1. Compare the RC constant for each resistor with your observations. Was there a correlation between the amount of time the LED was lit and the RC value? What about the brightness of the LED?

2. *Quantitative:* Identify the constants in your best-fit lines, and compare them to Equations 2 and 3. Calculate the average time constant using the charging and discharging data. Does the time constant in your best fit lines match the expected values?

3. You've come upon a lab where most of the components are not properly labeled. You find a capacitor and wish to know its capacitance. You happen to have a 9-V battery and find a resistor whose color code indicates that it's a 780 Ω resistor. You also have a 1.6-V LED. Based on this information, is it possible to calculate the approximate capacitance of the capacitor? If so, explain how and calculate the capacitance. If not, explain what other information is needed, and how you would calculate it.