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Period: 2

Class: Physics II AP

Lab #: 6

Capacitance Lab (Parallel vs. Series)

Purpose:

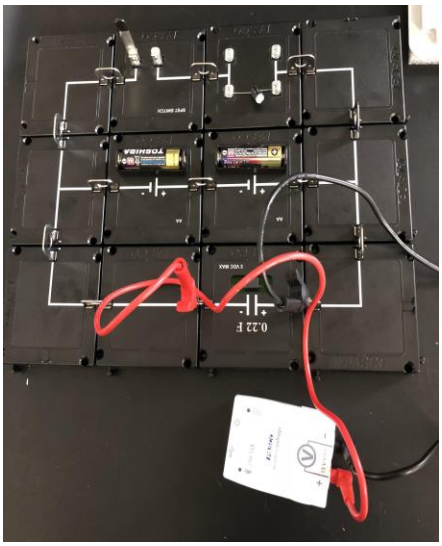
The purpose of this lab is to determine whether a parallel or series circuit will charge a capacitor faster. We are measuring the amount of time it takes to reach a specific voltage.

Materials:

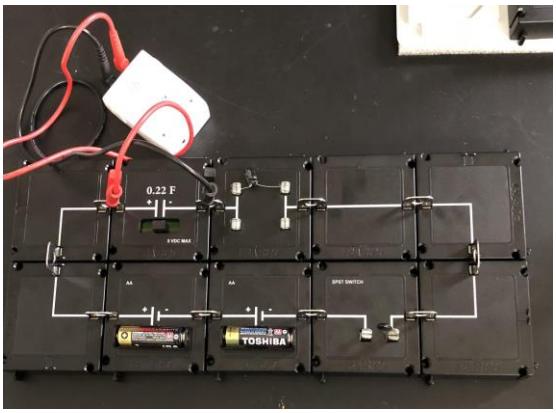
2 Capacitors, 2 Batteries, 1 Voltmeter, Alligator Cables, 4 Corner Modules, 2 Tee Modules, 1 Straight Module.

Procedures:

1) Make circuit as shown.



2) Connect the Voltmeter to Sparkvue.
3) Turn switch on.
4) For every 5 second interval, measure the voltage until 25 seconds and record the data in the data chart.
5) Then remake circuit as shown.



6) Connect the Voltmeter to Sparkvue.
7) Turn switch on.
8) For every 5 second interval, measure the voltage until 25 seconds and record the data in the data chart.

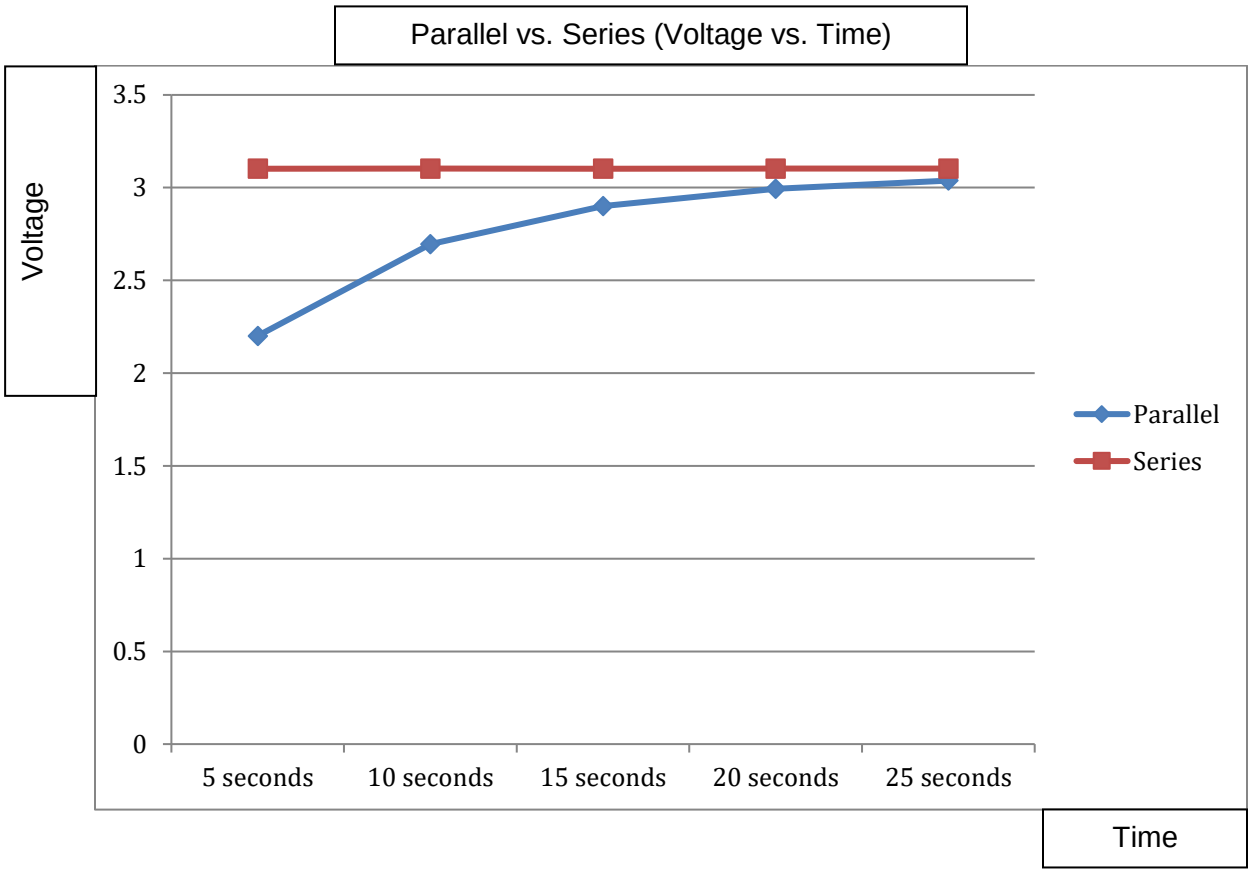
Data:

Parallel

Time (s)	Voltage (V)
5	2.201
10	2.695
15	2.901
20	2.994
25	3.038

Series

Time (s)	Voltage (V)
5	3.102
10	3.103
15	3.102
20	3.103
25	3.103



Analysis Questions:

1) How did the rate of change differ between the parallel and series circuits?

The capacitors in series charge much more quickly than in parallel.

2) Why do you think the rate of change occurred like this?

When put in parallel, the current is split between the two branches, so the capacitor charges more slowly.

3) What would happen if the switch remained open?

If the switch remained open, there would be no resistance in the circuit, and no charge would flow through the capacitor.

4) How would the information learned from this lab be used in the real world?

If you are wiring a circuit and only want a capacitor to charge in some situations, you could introduce a resistor in parallel only when you want it charged.