Capacitors

Learning Goals:
Calculate the energy stored on a capacitor
Describe how placing capacitors in parallel and series effects the total capacitance of a circuit.

Starter (recap):

Define Capacitance

If a 500uF capacitor was charged with a constant current of 3A for 15s, what would the potential difference stored across it be?

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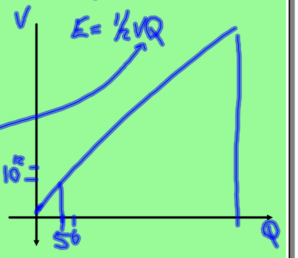
Energy stored = VQ

$E = \frac{1}{2}VQ$

Energy stored across a capacitor

$Q = CV$

$Wd = \frac{1}{2}CV^2$



Energy stored = area under the line

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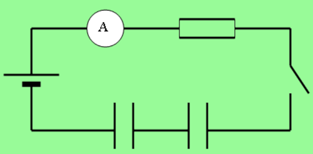

Set up capacitors in series and in parallel.
Colect measurements and use these to determine the total capacitance of the circuit in each case.

Use first principles to derive and equation that agrees with your observations

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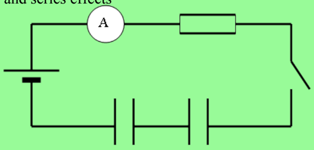

T/F?

The capacitors are initially uncharged. The switch is then closed.

Statements:

1. The current at ALL points around the circuit, at any instant, is the same.
2. The charge stored on the two capacitors is the same.
3. The voltage across the two capacitors, at any instant, is the same.
4. The voltage across both capacitors in total is less than the emf of the cell.
5. The voltage across the resistor increases with time.
6. Changing the cell for one with a higher emf will increase the time it takes for the capacitors to charge up.
7. The energy stored on each capacitor is the same.
8. The total energy stored on the capacitors is half the work done by the cell.

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Plenary

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