Source: [[KBhPHYS201CircuitsIndex]]

1 | Capacitors

1.1 | Capacitors vs. Batteries

Batteries => Converting PE_{chem} => Eletrical energy

Capacitors => Converting PE_{elec} => Eletrical energy

When you are discharging a battery, they remain at constant voltage until they are used up, at which point the voltage drop like a plate.

When you are discharging a capacitor, there is a linear fall in voltage that is constant.

Charge remaining: capacitance times voltage

1.2 | Energy on a Capacitor

A little bit #disorganized

Energy stored on a capacitor: $E = \frac{V_c * Q}{2}$.

Charge on a capacitor: $Q = C \times V_c$

Farads: $F = \frac{C}{V}$

So, putting this together, the energy stored on a capacitor would be...

Definition 1 · **Energy stored in a capacitor** $E = \frac{V \times Q}{2} = \frac{CV^2}{2}$
as $Q = C \times V_c$

$Q_{cap} \propto V$. In fact $Q_{cap} = C \times V_c$.

1.3 | Capacitors interacting with Resistance

As you increase the [[KBhPHYS201Resistance]], the a capacitor of the same capacitance would charge slower. (*"Less charge flows in"*)

As you fix the Resistance, the capacitor of a higher capacitance would charge slower. (*"Need more change to fill"*)

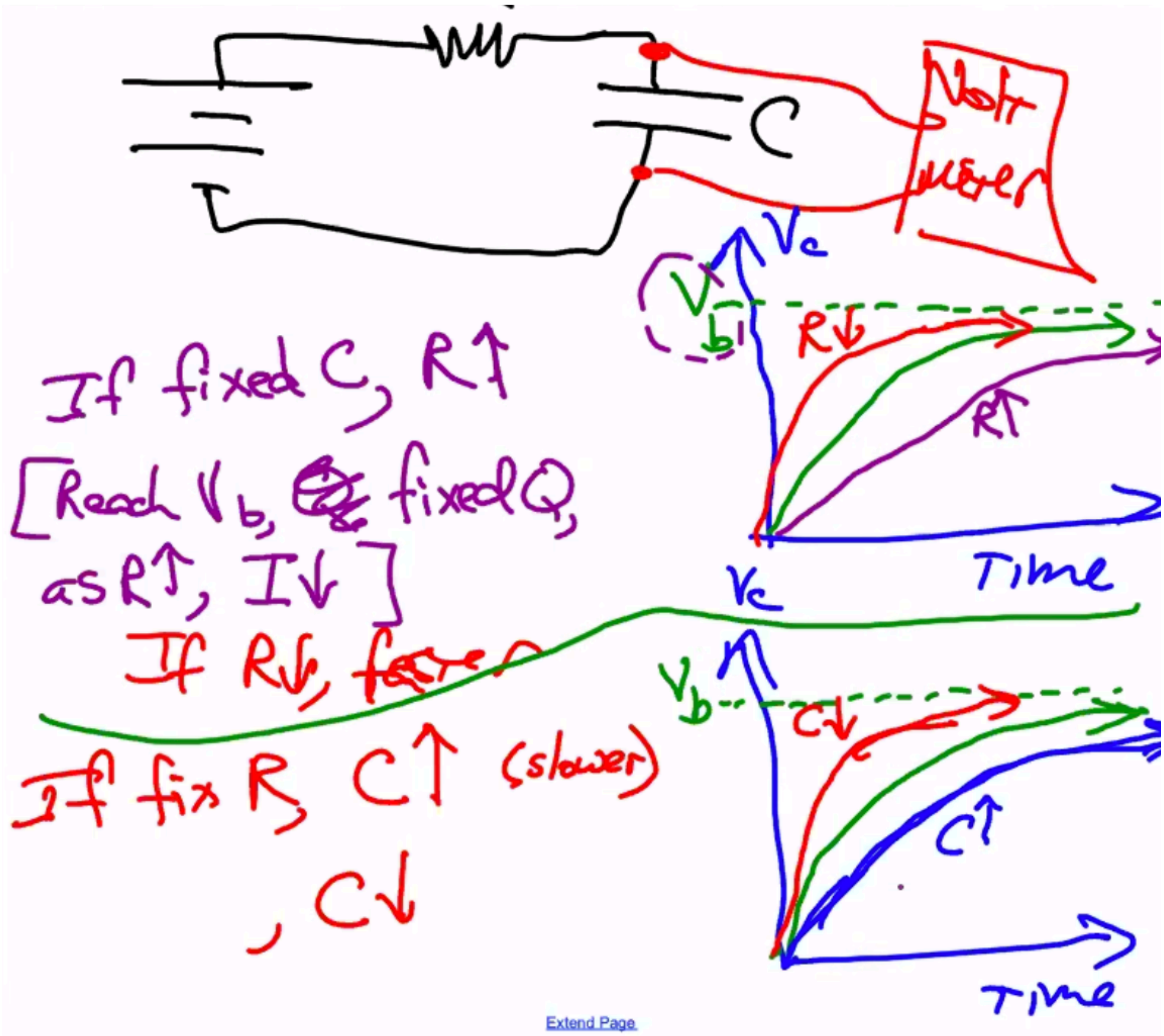

Figure 1: Screen Shot 2020-09-30 at 10.42.44 AM.png

Charging time is in fairly good agreement with *resistance* * *capacitance*.

So… #disorganized

Experimentally, “Charging time”, $\tau \approx R \times C$.

Let’s check the units!

- $V = IR$
- $R = \frac{V}{I}$
- So… R =