

Source: [KBhPHYS201CircuitsIndex](#)

## 1 | Capacitors

### 1.1 | Capacitors vs. Batteries

**Batteries** => Converting  $PE_{chem}$  => Electrical energy

**Capacitors** => Converting  $PE_{elec}$  => Electrical energy

When you are discharging a battery, they remain at constant voltage until they are used up, at which point the voltage drops 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:  $E = \frac{V_c \cdot Q}{2}$ .

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...

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

$Q_{cap} \propto V$ . 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.

As you fix the Resistance, the capacitor of a higher capacitance would charge quicker.