A capacitor is a way to store electric potential energy in an electric field. The simplest form of a capacitor is a parallel plate capacitor.

Capacitance, C, is defined as the magnitude of the charge stored on one plate divided by the electric potential difference between the two plates: $C \equiv \dfrac{Q}{\Delta V}$
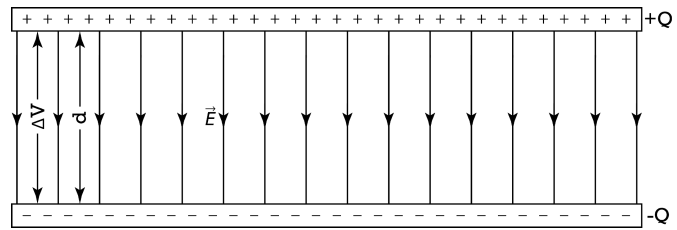
- Capacitance is always positive.
    o Q, is the charge on the positive plate.
    o ΔV is the positive electric potential difference between the two plates.
- The net charge on a capacitor is zero.
    o $Q_{total} = +Q + (-Q) = 0$
- $C \equiv \dfrac{Q}{\Delta V} \Rightarrow$ Capacitance in $\dfrac{\text{coulombs}}{\text{volts}} = F$, farads
    o charge, $Q \Rightarrow$ coulombs, C & capacitance, $C \Rightarrow$ farads, F
    o It is not my fault the symbol for capacitance is C and capacitance is charge per electric potential difference and the units for charge are coulombs for which the symbol is C.
- The three-line equal sign, $\equiv$, means "is defined as". This is not a derivation. We made it up. We have simply decided to define the charge on a capacitor divided by the electric potential difference of the capacitor as "capacitance".
- Energy is stored in the electric field of the capacitor.
- The capacitance of a capacitor depends only on the capacitor's physical characteristics. For example, the capacitor's shape and material used to separate the plates of the capacitor.

The basic idea is:
- Start with an uncharged capacitor.
    o No charge on either plate.
    o No electric field between the plates.
- Attach the terminals of a battery to the two plates of the capacitor.
- Charges flow from one plate to the other plate of the capacitor.
- We now have a charged capacitor.
    o Both plates have equal magnitude charge.
    o There is an electric field and an electric potential difference between the plates.
    o Energy is stored in the electric field of the capacitor.