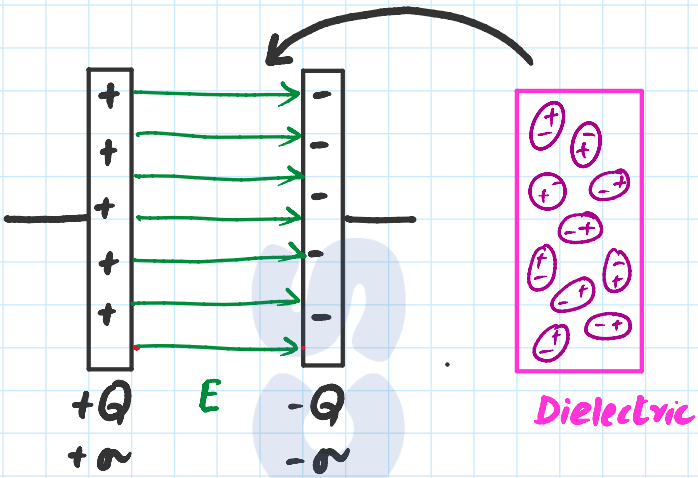
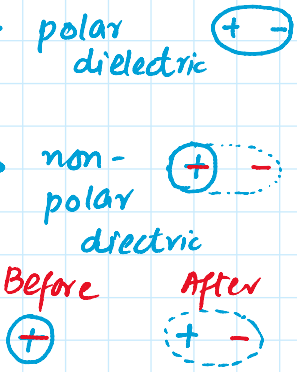
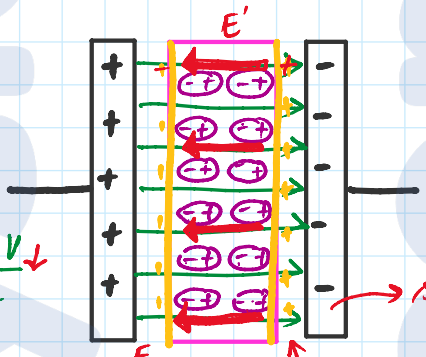
Electric Polarization → effect of dielectric on capacitance → C_{inc}



Dielectric
- polar dielectric
- non-polar dielectric

Before / After





"Rearrangement of dipoles of a dielectric in the presence of an external electric field"

$Q_{net} = Q - Q'$

$E_{net\ (dec)} = E - E'$

$\because E = \frac{\Delta V}{d}$ ↓

$C_{inc} = \frac{Q}{V_{dec}}$

$Q > Q'$

$Q_{net} = Q - Q'$

Battery Connected

- $V = const.$

dielectric → V_{dec}

$Q_{inc} \Rightarrow C_{inc}$

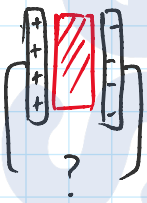
$C_{inc} = \frac{Q_{inc}}{V = const}$

- $Q = inc.$
- $C = inc.$
- $E = const$
- $\sigma = const$
- $U = inc.$ (energy stored)

$E = \frac{\sigma}{\varepsilon_0}$

$U = \frac{1}{2} Q V$ ↑

Battery Removed



$Q = const$

dielectric → V_{dec}

$C_{inc} = \frac{Q_{const}}{V_{dec}}$

- $V = dec$
- $C = inc$
- $E = dec$
- $\sigma = dec.$
- $U = dec.$

$U = \frac{1}{2} Q V$ ↓