Series Capacitor Circuit

$$Q = VC_{total}$$
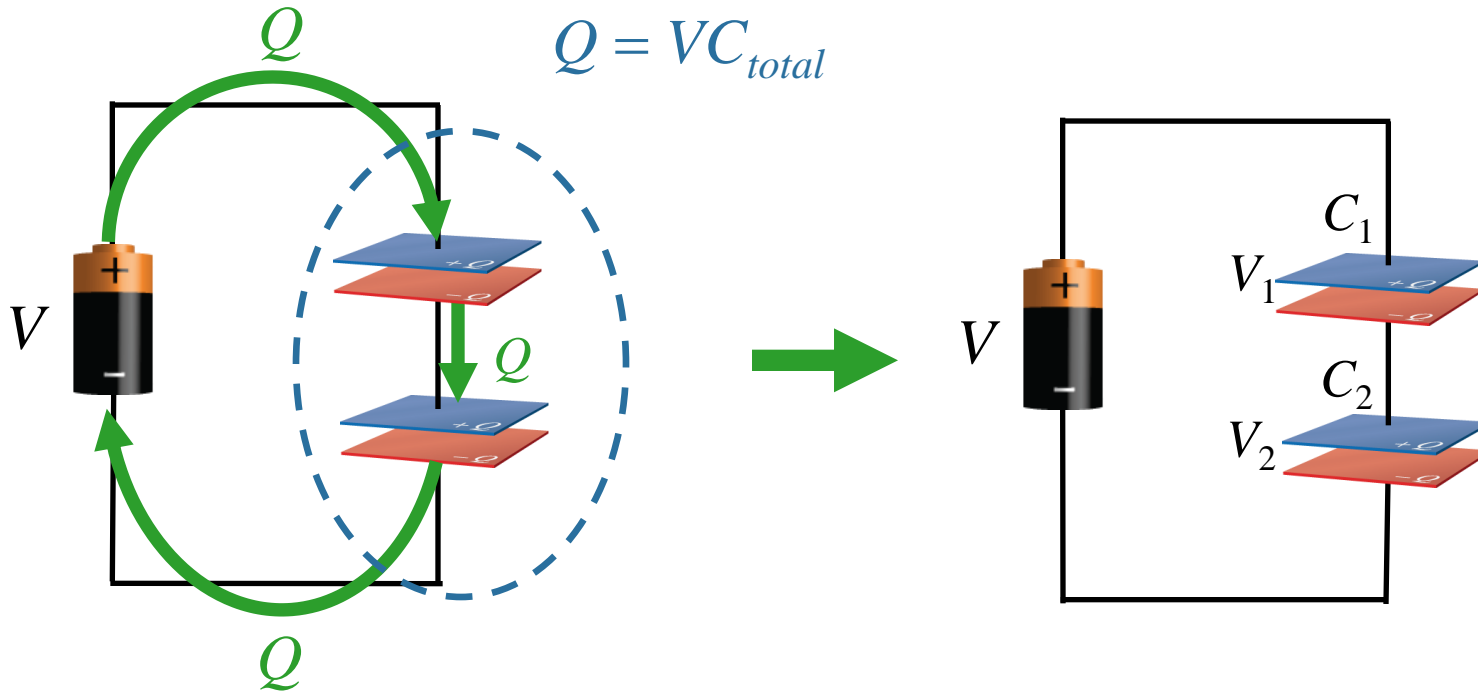
Key point: Q is the same for both capacitors

Key point: $Q = VC_{total} = V_1 C_1 = V_2 C_2$

Also: $V = V_1 + V_2$ $\longrightarrow$ $Q/C_{total} = Q/C_1 + Q/C_2$

$$\frac{1}{C_{total}} = \frac{1}{C_1} + \frac{1}{C_2}$$