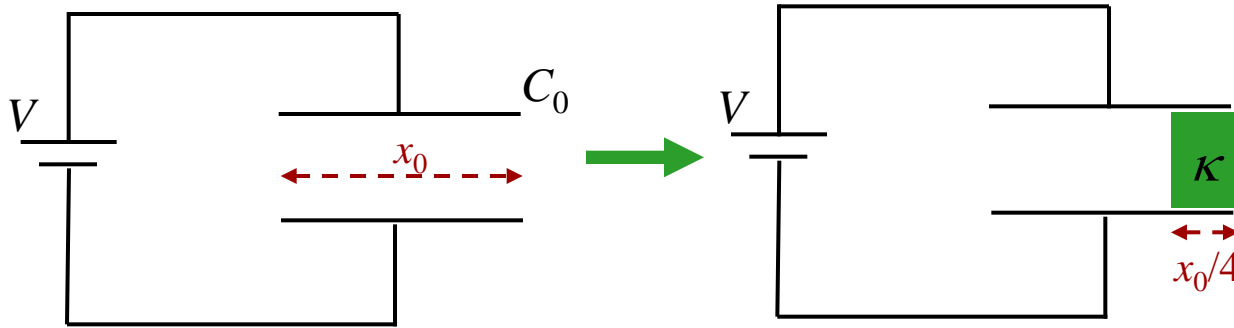


# Calculation



An air-gap capacitor, having capacitance  $C_0$  and width  $x_0$  is connected to a battery of voltage  $V$ .

A dielectric ( $\kappa$ ) of width  $x_0/4$  is inserted into the gap as shown.

What is  $Q_f$ , the final charge on the capacitor?

Conceptual Analysis:

$$C \equiv \frac{Q}{V}$$

What changes when the dielectric added?

- A) Only  $C$     B) only  $Q$     C) only  $V$     **D)  $C$  and  $Q$**     E)  $V$  and  $Q$

Adding dielectric changes the physical capacitor



$C$  changes

$V$  does not change and  $C$  changes



$Q$  changes