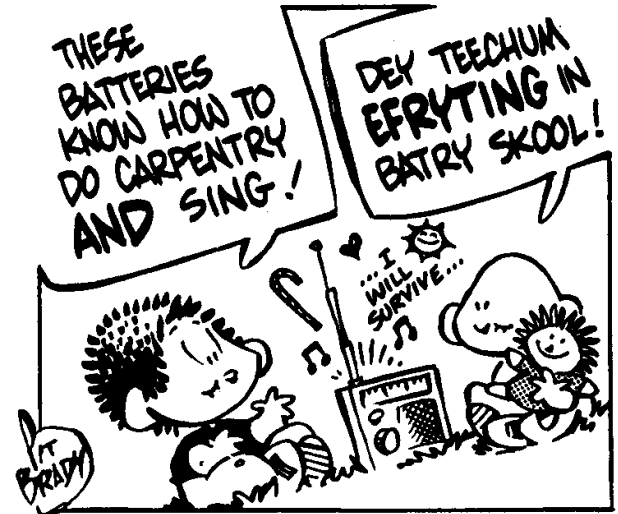
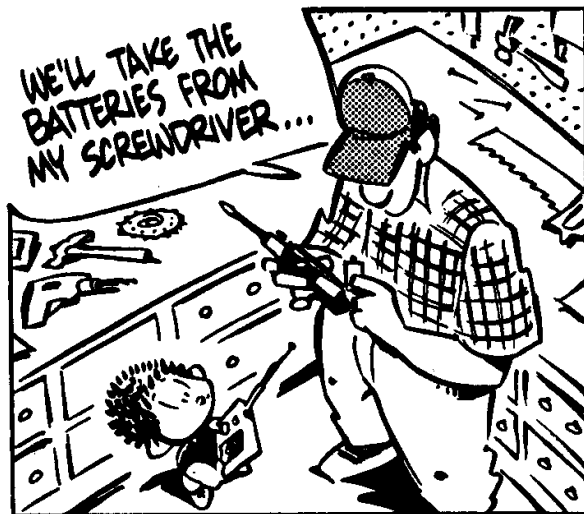


■ Theme Music: The Black-Eyed Peas

Electric City

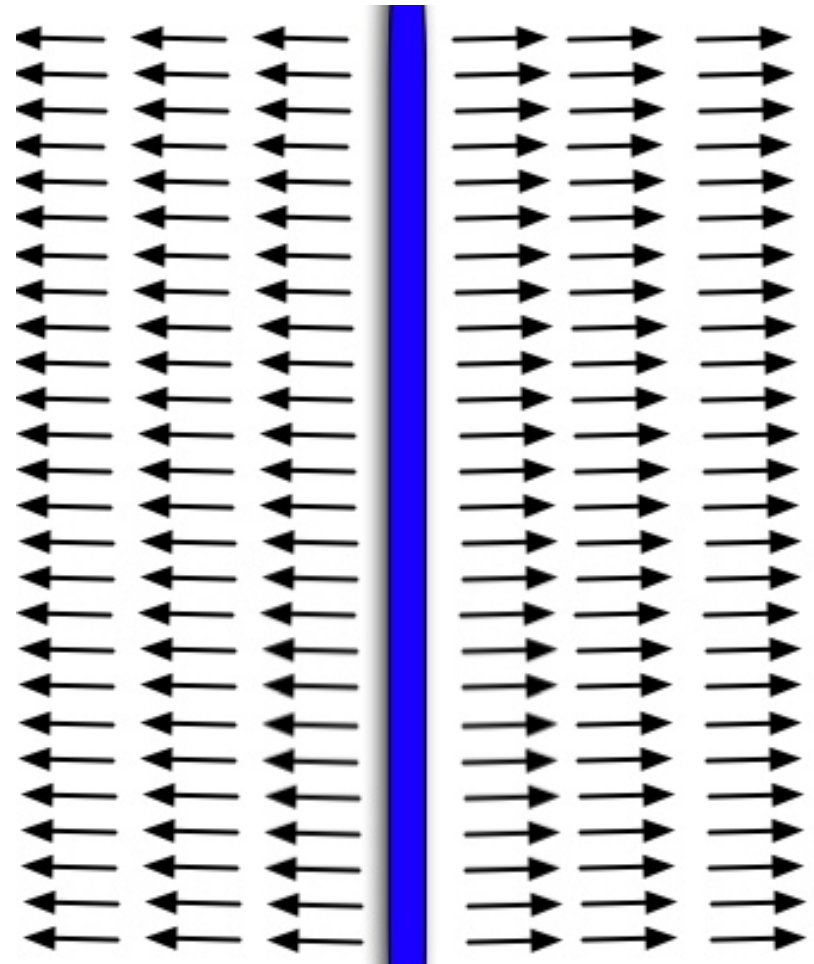
■ Cartoon: Pat Brady

Rose is Rose

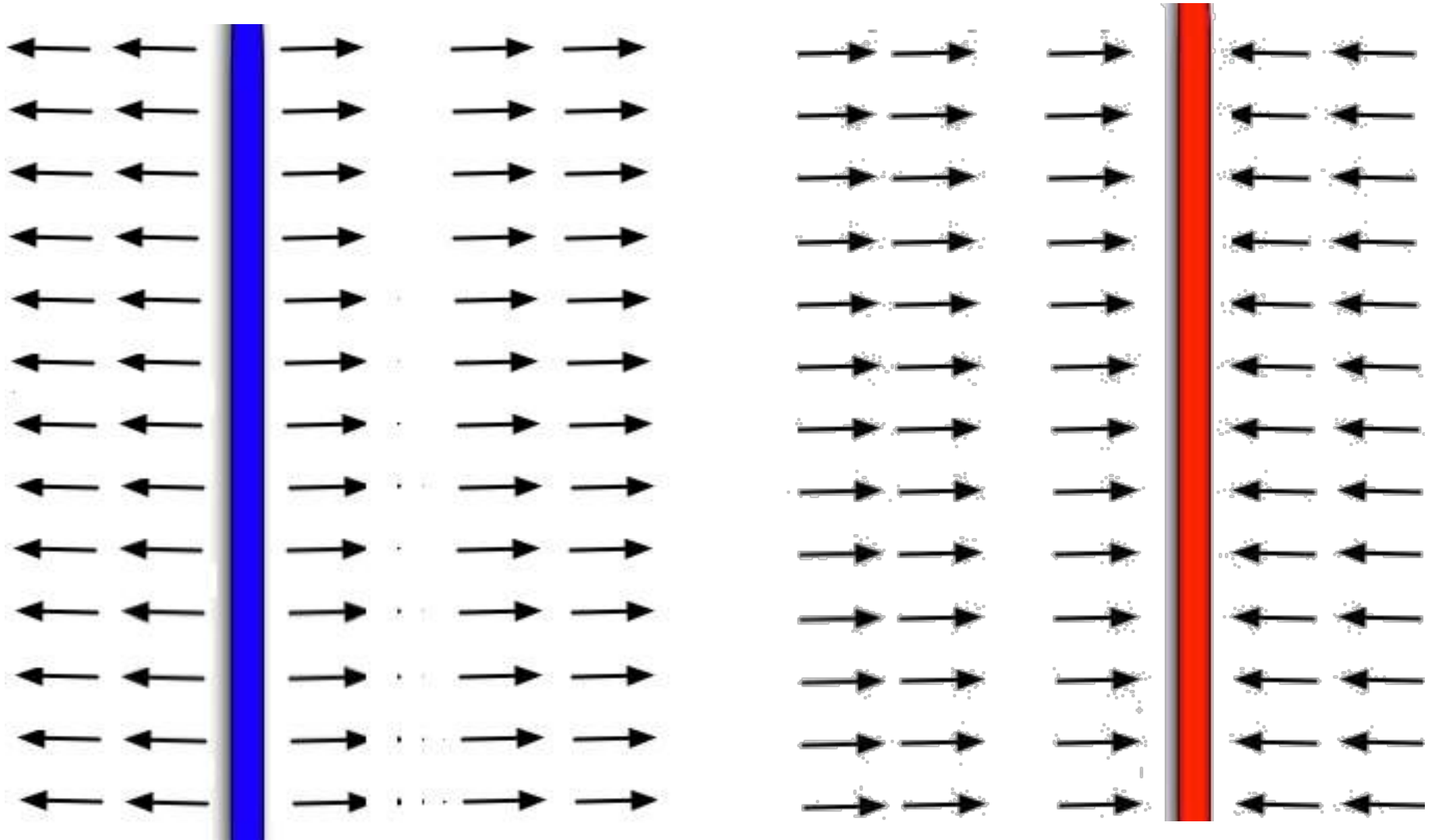


The sheet of charge

- Field is constant, pointing away from positive sheet, towards negative sheet.
- Constant!!?
How can that be?



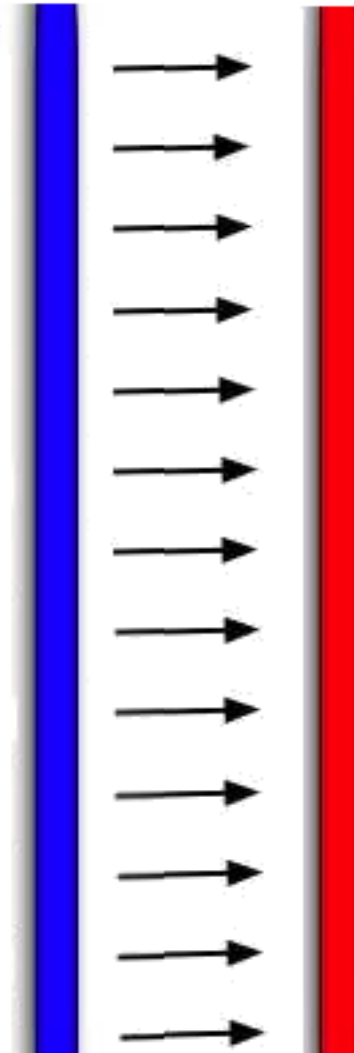
Two sheets of charge



Result

The fields of the two plates cancel each other on the outside.

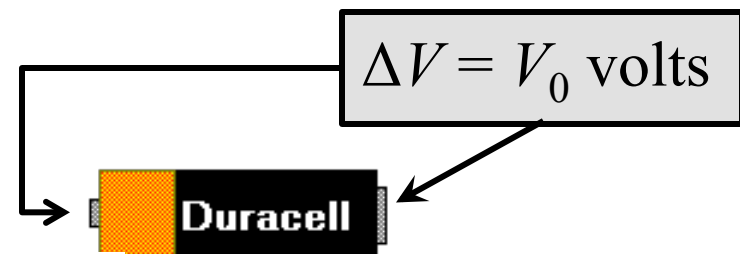
The fields of the two plates add on the inside, producing double the field of a single plate.



The fields of the two plates cancel each other on the outside.

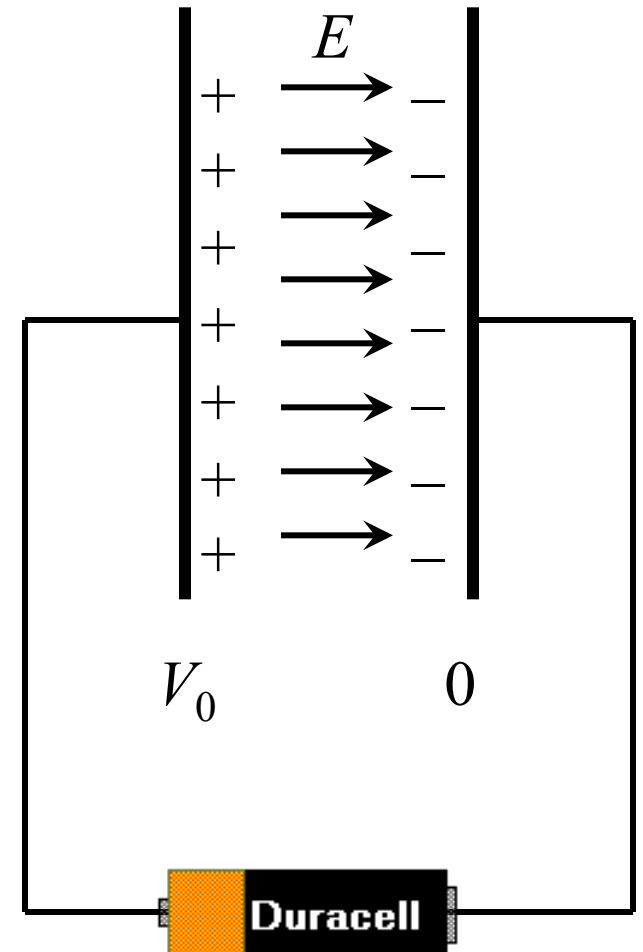
Some basic electrical ideas

- ***Conductor*** – a material that permits some of its charges to move freely within it.
- ***Insulator*** – a material that permits some of its charges to move a little, but not freely.
- ***Battery*** – a device that creates and maintains a constant potential difference across its terminals.



Charging a capacitor

- What is the potential difference between the plates?
- What is the field around the plates?
- How much charge is on each plate?



Capacitor Equations

$$\Delta V = E\Delta x = Ed$$

$$E = 4\pi k_c \sigma = 4\pi k_c \frac{Q}{A} \Rightarrow Q = \left(\frac{A}{4\pi k_c} \right) E$$

$$Q = \left(\frac{A}{4\pi k_c d} \right) \Delta V$$

4πk_c is often written as "1/ε₀"

$$Q = C\Delta V$$

What does this "Q" stand for?