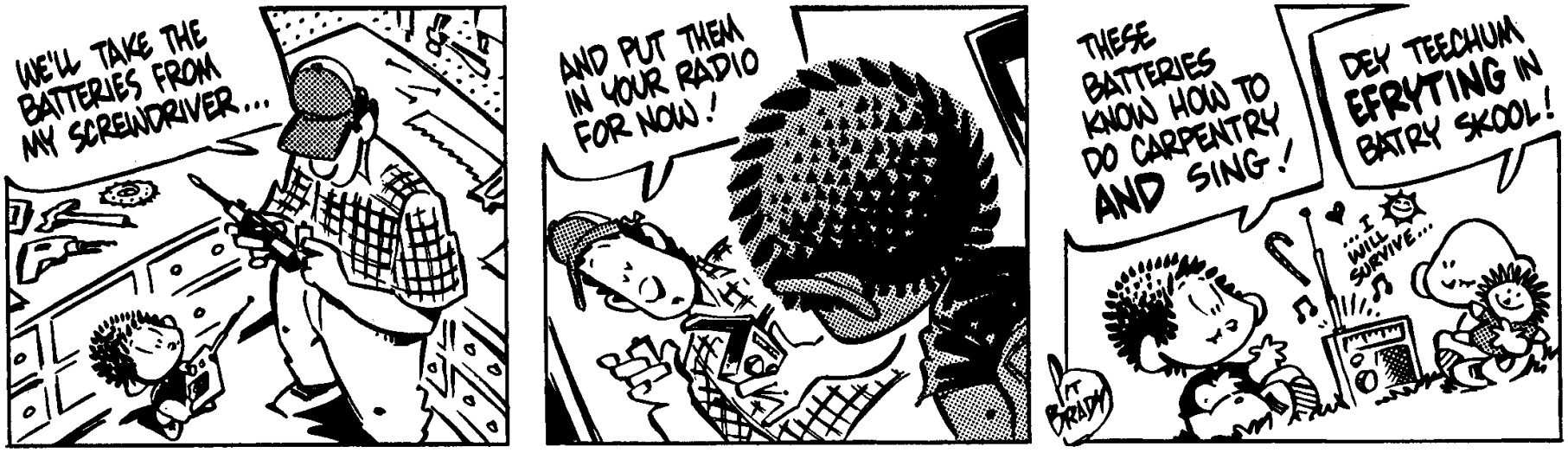
- **Theme Music: The Black-Eyed Peas**
  Electric City
- **Cartoon: Pat Brady**
  Rose is Rose

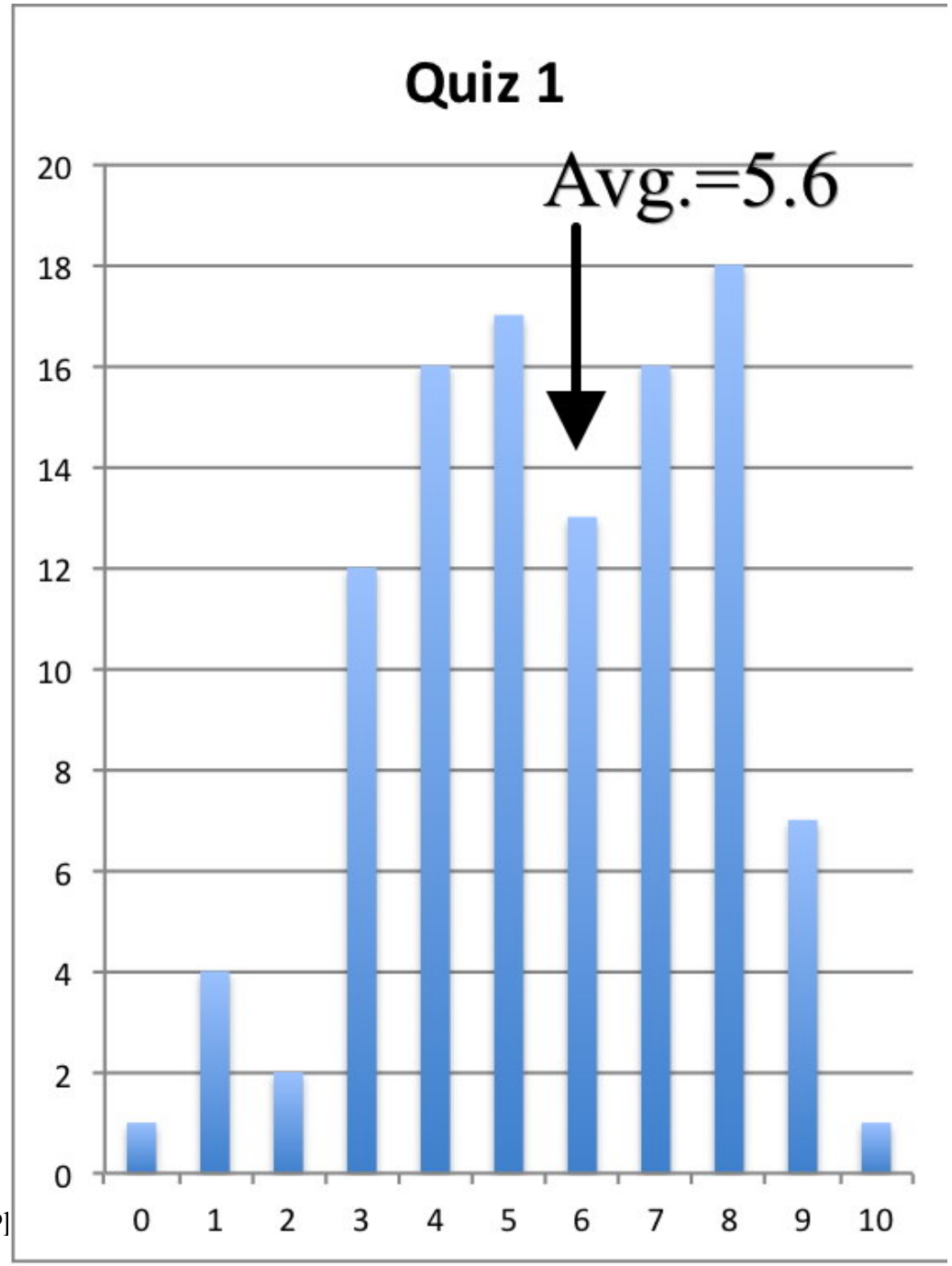


Outline

- Go over Quiz 5
- The field and potential in a capacitor

Quiz 5

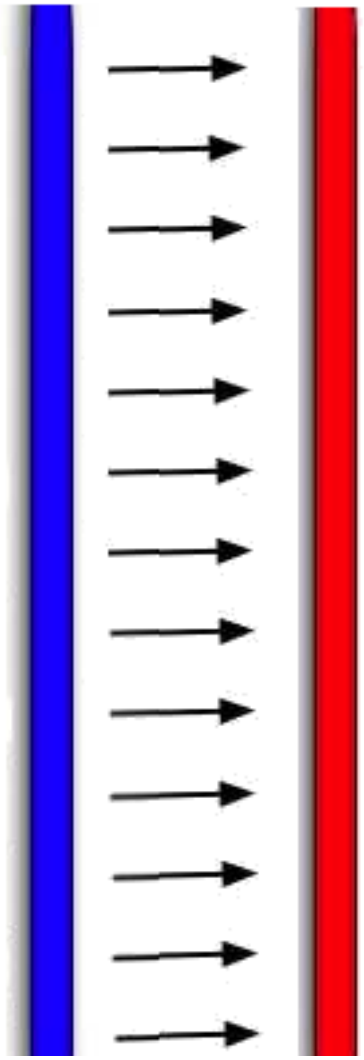
	1	2	3.1	3.2
a	7%	2%	5%	6%
b	12%	7%	6%	5%
c	**59%**	**29%**	**40%**	13%
d	20%	30%	27%	3%
e	2%	10%	5%	6%
f		16%	18%	29%
g		5%		0%
1				**23%**
2				4%
3				12%



Result

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

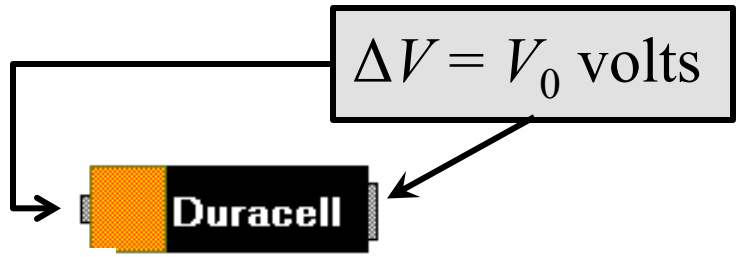
The fields of the two plates add on the inside, producing double the field of a single plate.



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

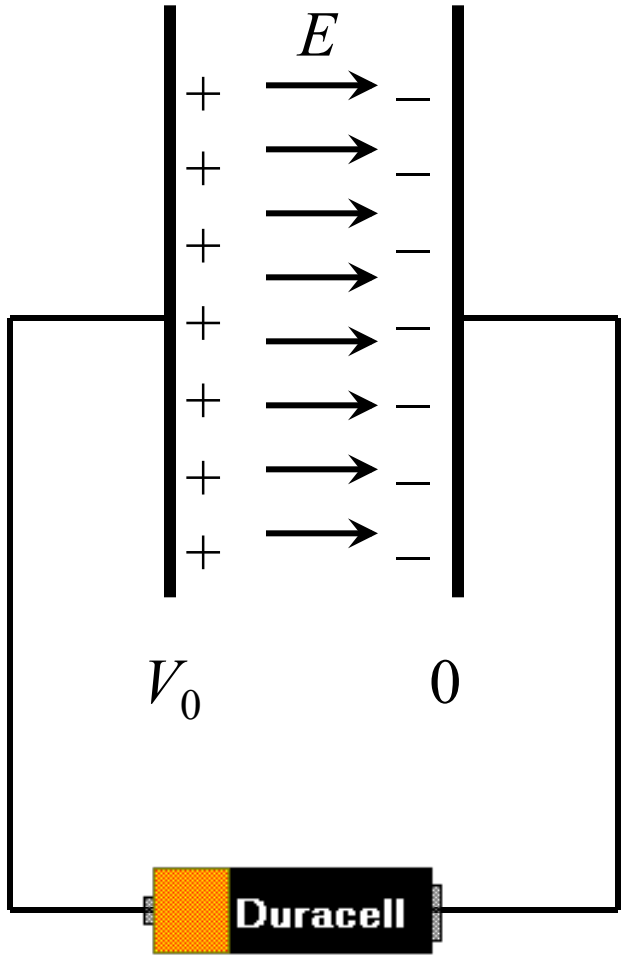
Some basic electrical ideas

- ***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

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

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

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

$4\pi k_c$ is often written as "$1/\varepsilon_0$"

$$Q = C\Delta V$$

What does this "Q" stand for?