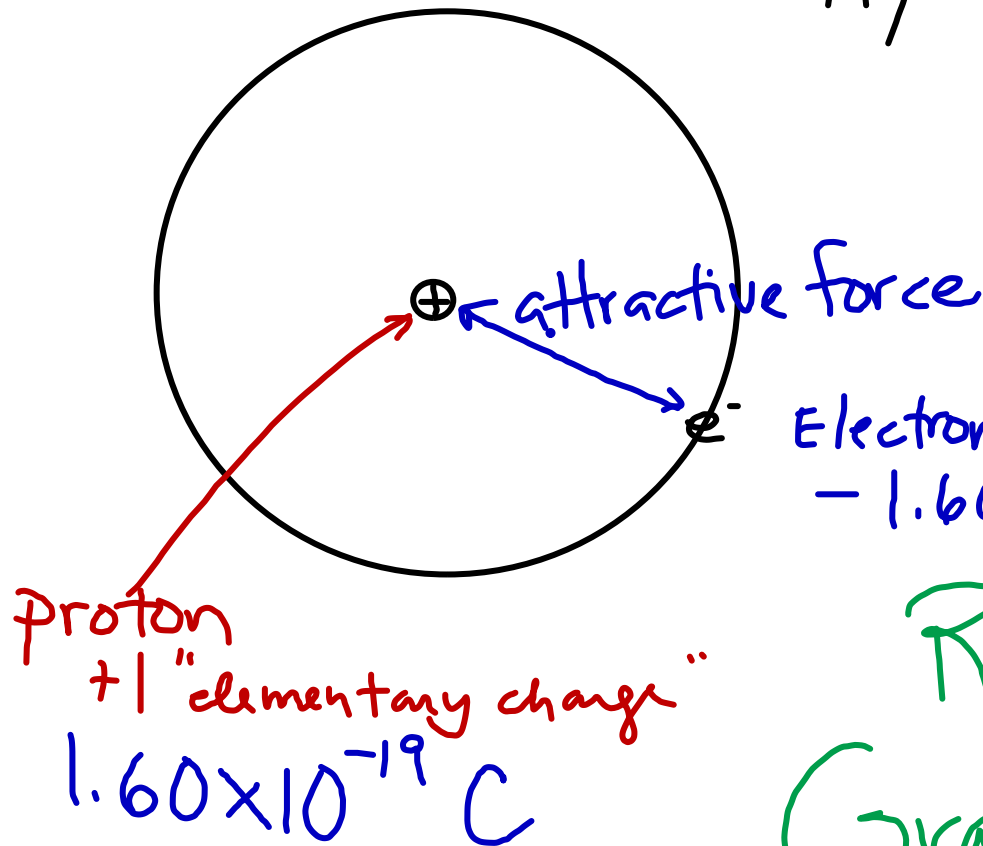


# Castle kits ?

All kits in classroom  
by Friday 1/5

↑ All parts + pieces

# Hydrogen Atom

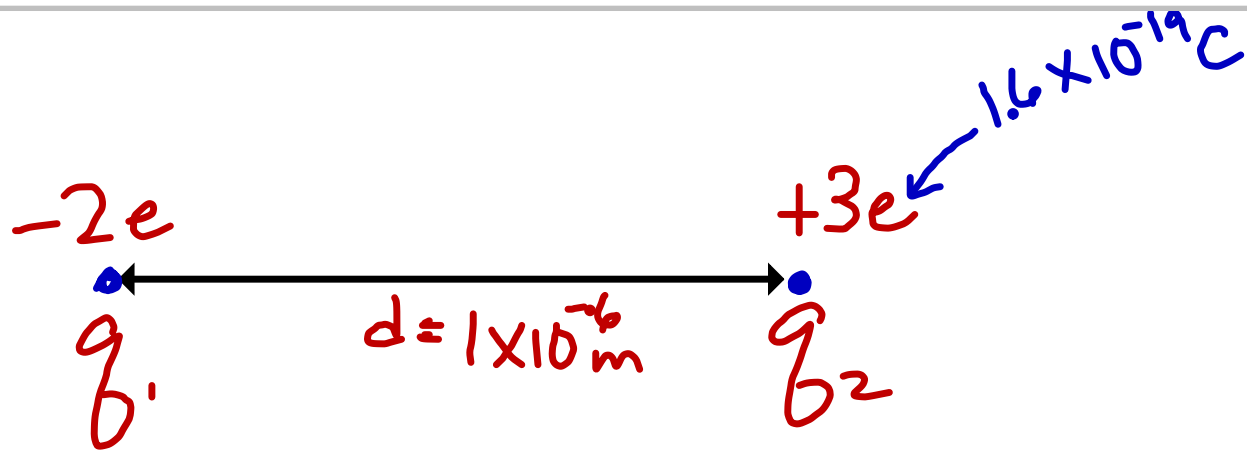


$$F_e = \frac{k q_1 q_2}{r^2}$$

Electron  
 $-1.60 \times 10^{-19}$  C

Remember  
Gravity...

$$F_g = G \frac{m_1 m_2}{r^2}$$

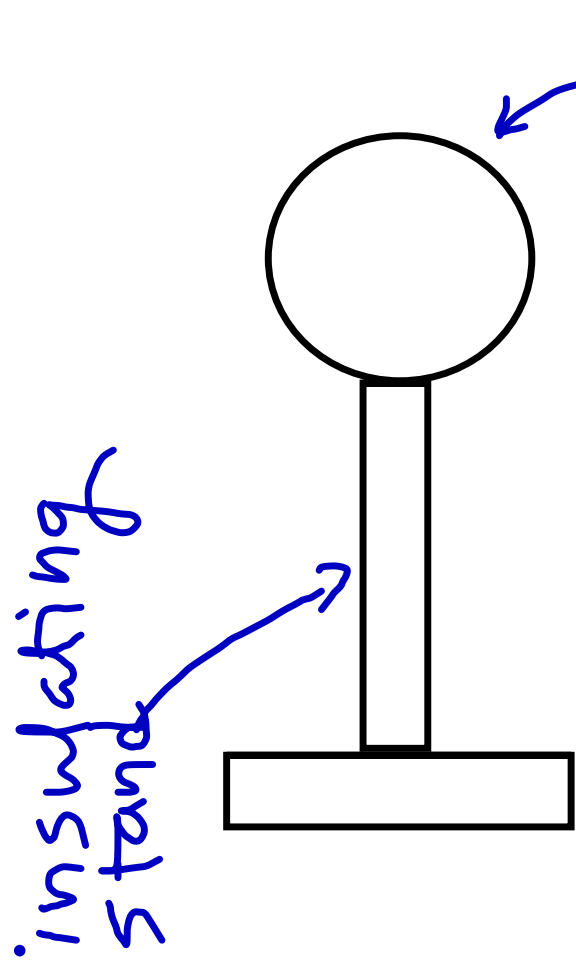


$$F_e = k \frac{q_1 q_2}{r^2} = 8.99 \times 10^9 \frac{\text{m}^2 \text{N}}{\text{C}^2} \frac{-2(1.6 \times 10^{-19} \text{ C})(3(1.6 \times 10^{-19} \text{ C}))}{(1 \times 10^{-6} \text{ m})^2}$$

$$F_e = -1.38 \times 10^{-15} \text{ N}$$

Exponent Estimate

$$9 - 19 - 19 + 12 = -17 \text{ approx}$$

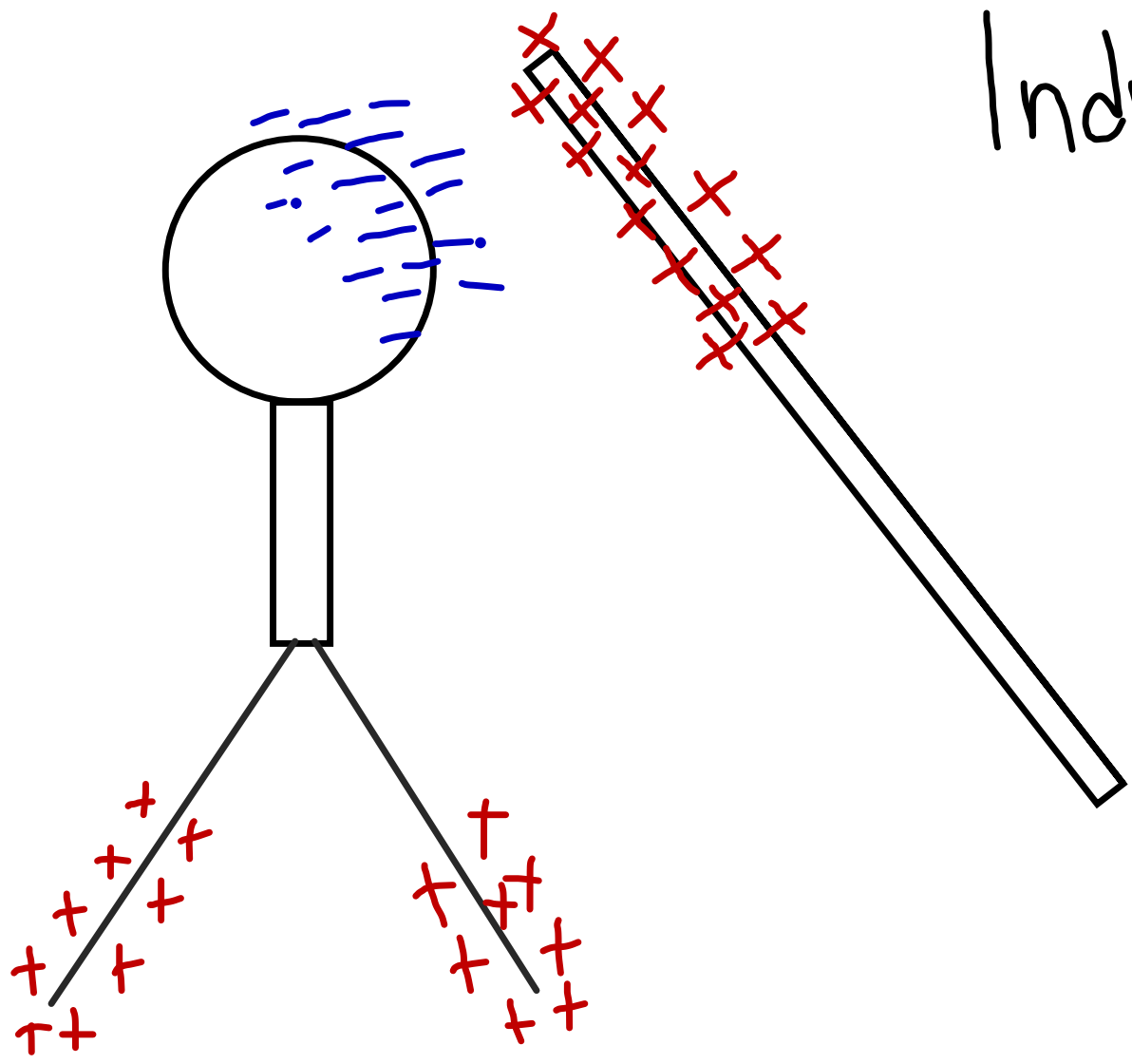


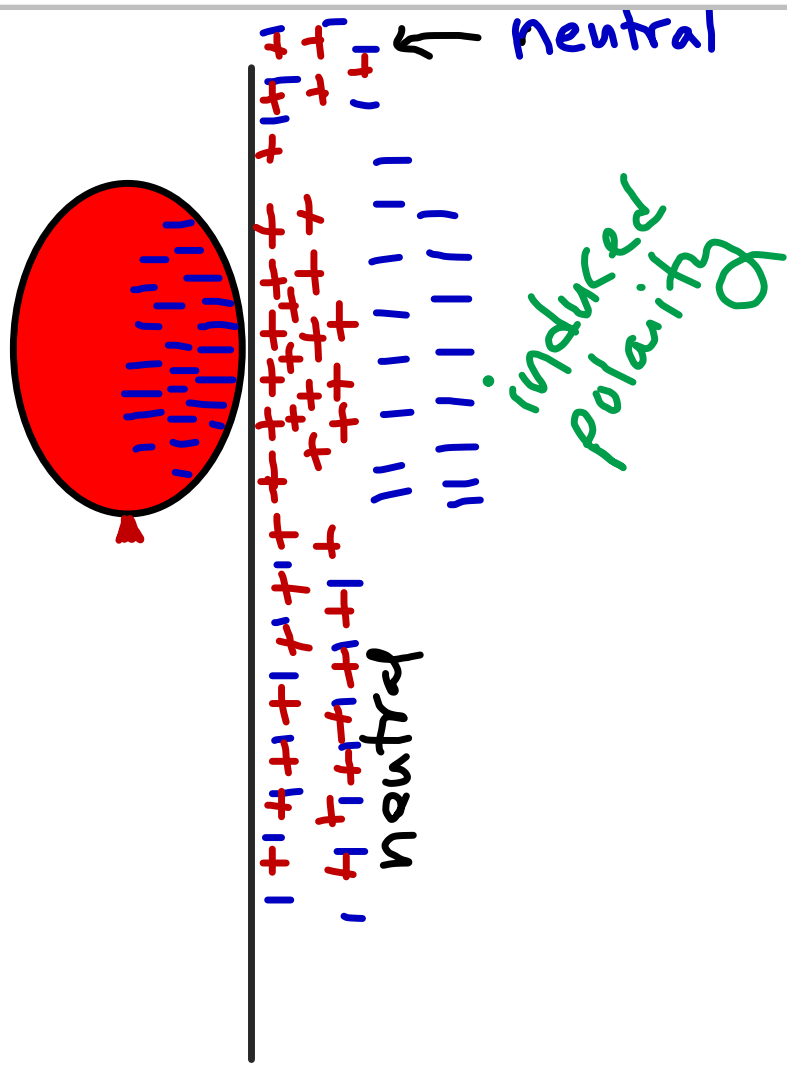
metallic sphere

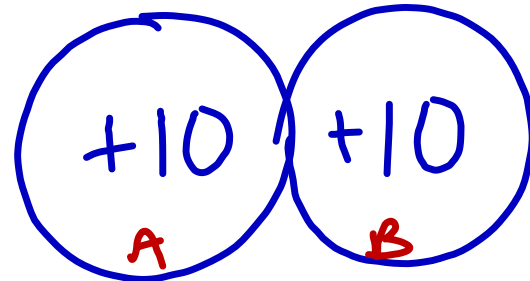
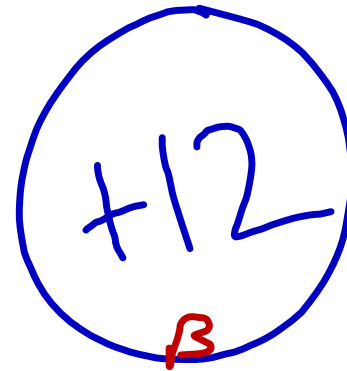
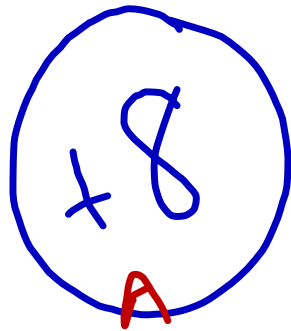
Can put charge on sphere by:

\* touching directly  
→ conduction

Induction





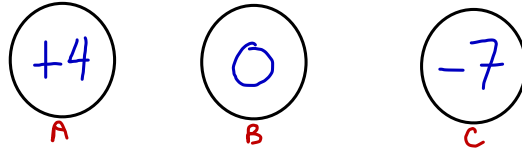


$$\begin{array}{r} +12 \\ +8 \\ \hline +20 \div 2 \end{array}$$

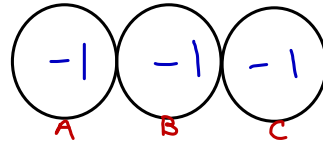
$$= +10 \text{ each}$$

What happened?

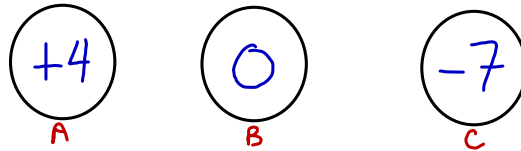
2  $e^-$ 's flowed from A to B



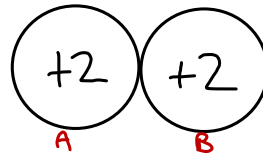
All 3 spheres touch simultaneously



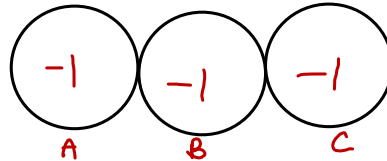
$$\begin{array}{r} +4 \\ 0 \\ -7 \\ \hline -3 \div 3 \\ = -1 \text{ each} \end{array}$$



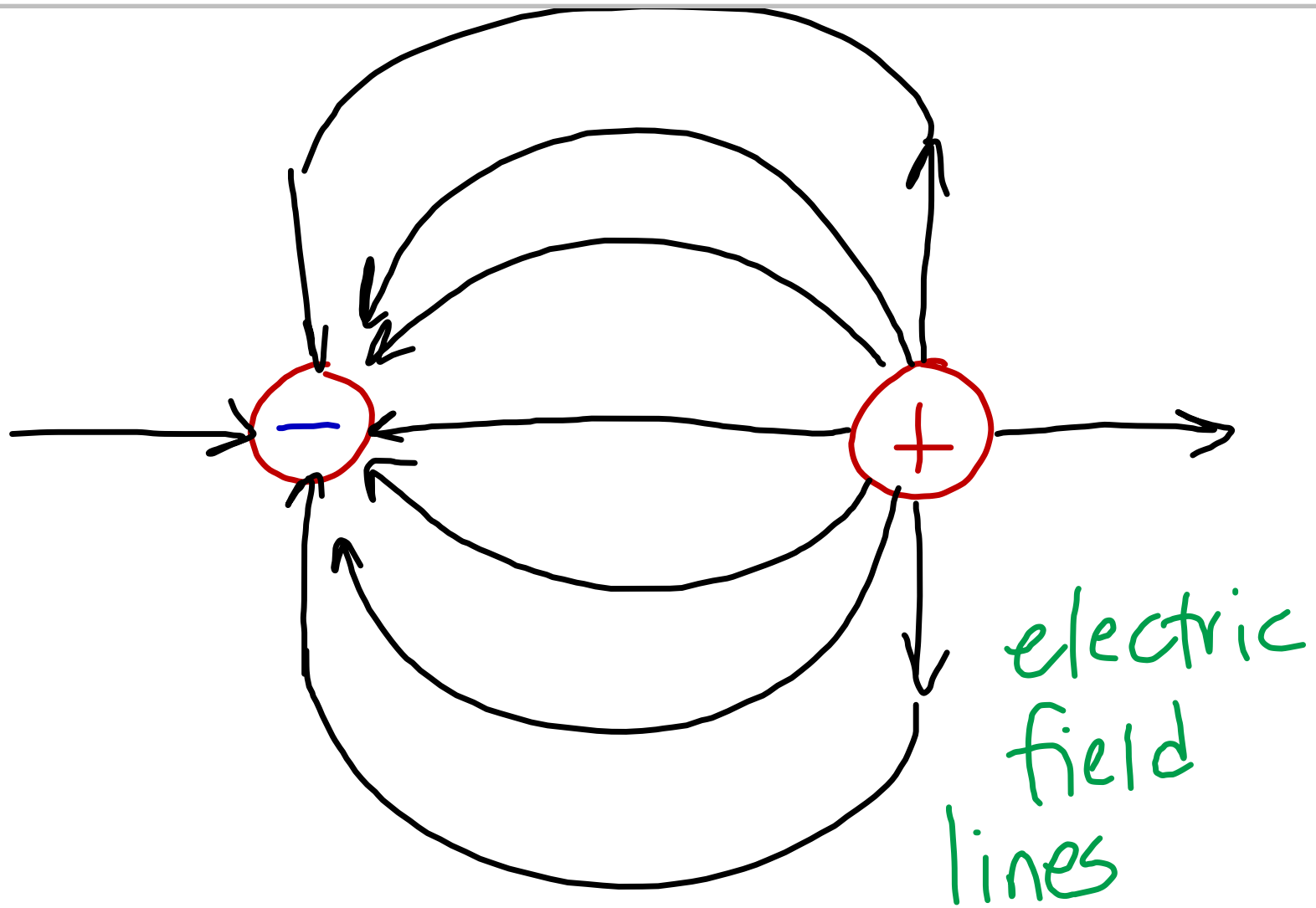
A touches B

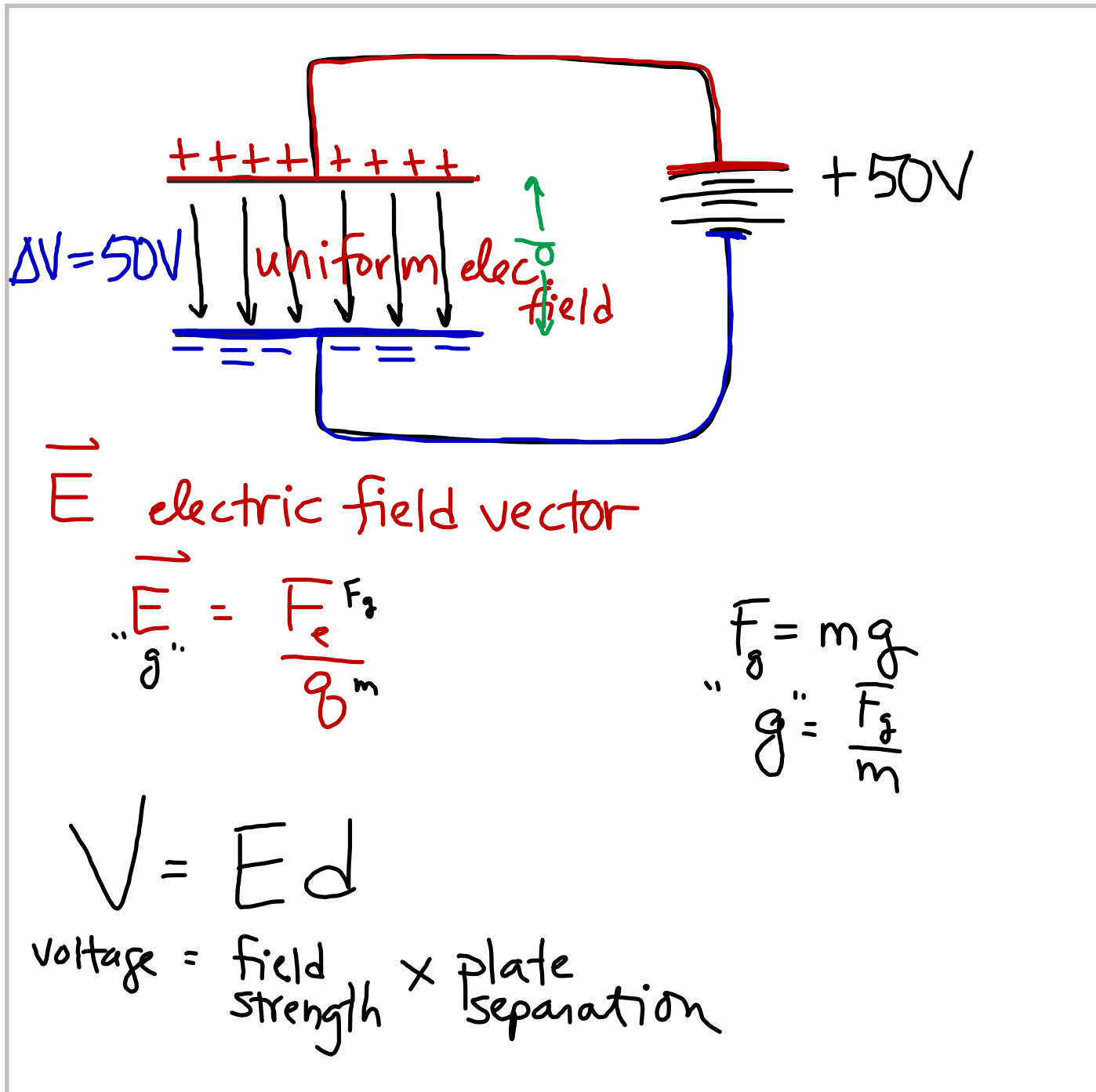


B gives electrons to A



$$\begin{array}{r} +2 \\ +2 \\ -7 \\ \hline -3 \div 3 = -1 \text{ each} \end{array}$$





$\Phi V$   
 $e^-$   
gun

