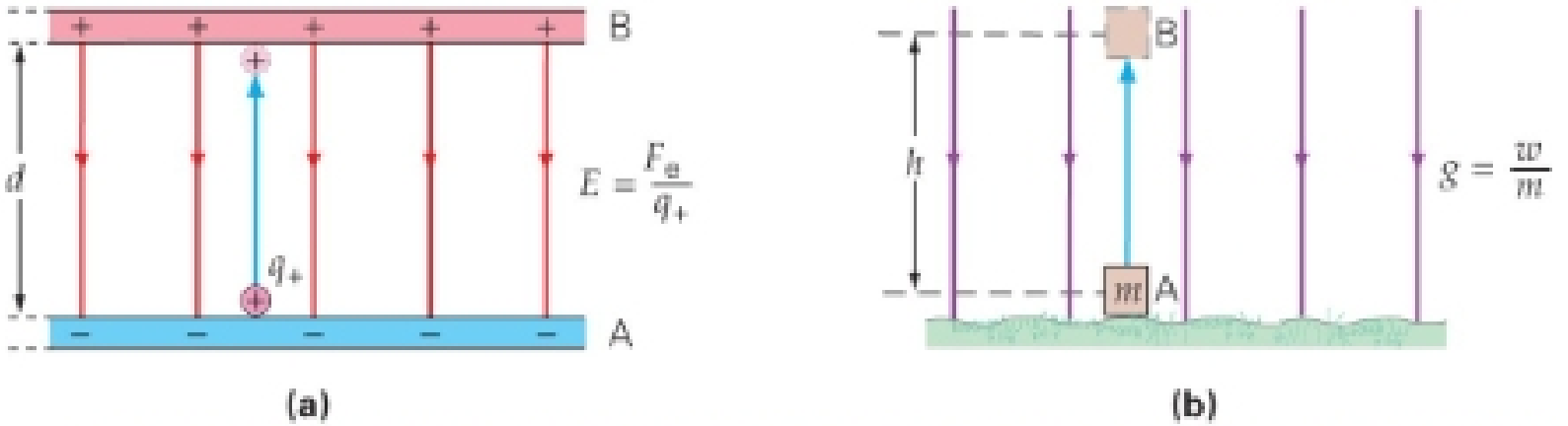
Chapter 15 Videos Quiz Wednesday 6/25/14 June 24, 2014

- Capacitor → device to store charge
  - 2 reasons for the ball to move → attraction and repulsion
  - Positive plate = higher voltage
- Piezoelectric sparker → bone – under pressure distributes a charge
  - Ex. Outer and inner portion of vertebrae

Chapter 16 Electric Potential, Energy, and Capacitance
16.1- 16.5 ish in the book but 16.1-16.2 in the powerpoint he gave in class

16.1

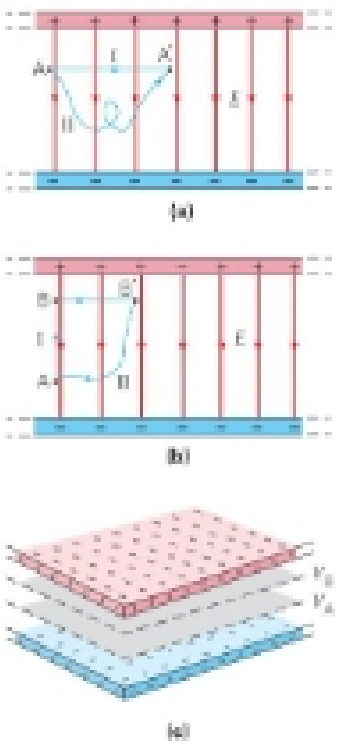



- In the picture above, in part B as you move from the ground to the air, there is an increase in gravitational potential energy = you did work to increase the potential energy of the charge
- In the picture above, in part A, you start with a positive test charge and because its positive it doesn't want to be near the positive plate because it is getting repelled and it is attracted to the negative plate = you do work to move the test charge toward the positive plate
- $\Delta U_e = U_B - U_A = q_+ E d$ : change in potential energy
- $\Delta V = \frac{\Delta U_e}{q_+}$ : electric potential difference → Unit of electric potential difference Volt, V
- In the equation above, when being applied to parallel plate capacitors, the electric potential difference is really just Ed
- An electric field is uniform and electric field lines always come out of the positive plate or charge
- Electric potential difference of a point charge:

$$\Delta V = \frac{kq}{r_B} - \frac{kq}{r_A}$$

note "r" isn't squared

16.2 Equipotential Surfaces and the Electric Field



- In this figure to the left, $V_b$ has a higher voltage because it is closest to the positive plate, which has the highest voltage
- Everything at $V_b$ has the same voltage because it is the same distance away from the positive plate at any point in the $V_b$ equipotential surface → takes no work to move a test charge from one area to the next on $V_b$

Walk through problems:
Chapter 15 Number 6:

$\leftarrow 2.174m \rightarrow = 2.17 \times 10^{-6} m$

$F = -kx$

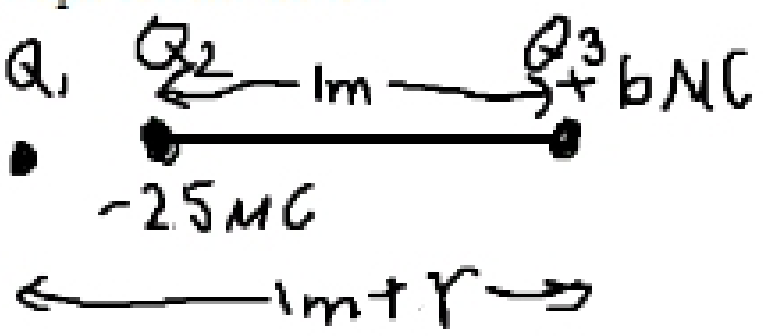
$F = \frac{kq_1q_2}{r^2} \quad \frac{(9\times10^9)(1.6\times10^{-19})(-1.6\times10^{-19})}{(2.17\times10^{-6})^2} = F$

$1\%$ of $2.174m = 2.17 \times 10^{-8} m = x$

$-k = \frac{F}{x}$

$K = 2.25 \times 10^{-9} N/m$

Chapter 15 number 27




$$F = \frac{kq_1q_2}{r^2}$$

$$\frac{kq_1q_2}{r^2} = \frac{kq_2q_3}{r^2} \qquad \frac{q_2}{r^2} = \frac{q_3}{(1+r)^2}$$

$$\frac{2.5\,\mu C}{r^2} = \frac{6.0\,\mu C}{(1+r)^2}$$

$r = 1.8\,m$ to the left of the $-2.5\,\mu C$ charge