My name is Mike Gentile.
(you can call me "Mike")
mgentile@physics.rutgers.edu

Welcome!

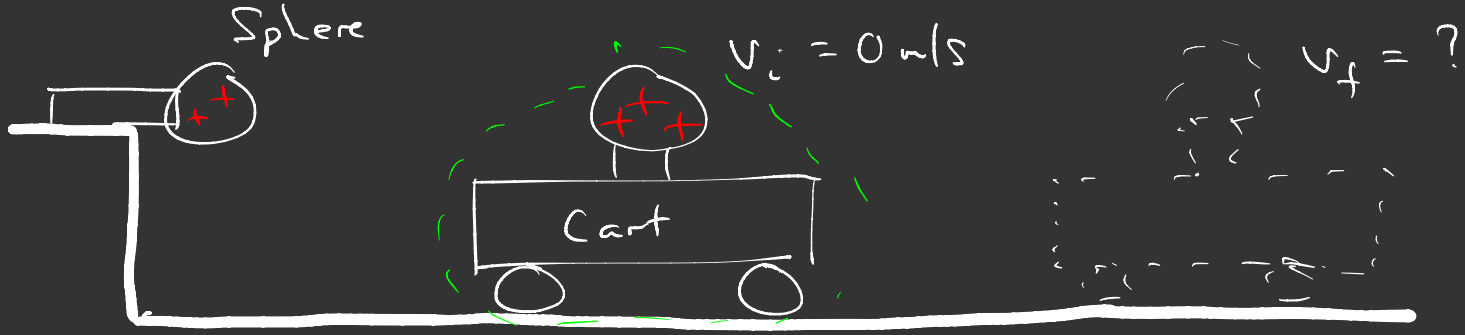
Physics 194 - Lecture 5

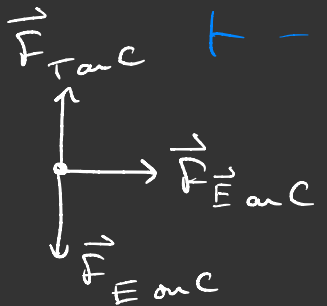
Have a question during class? Please ask it right away, even if it means interrupting in the middle of a thought. I want you to!

Agenda

- Electric potential energy
- The electric potential field
- Intro. to electric circuits

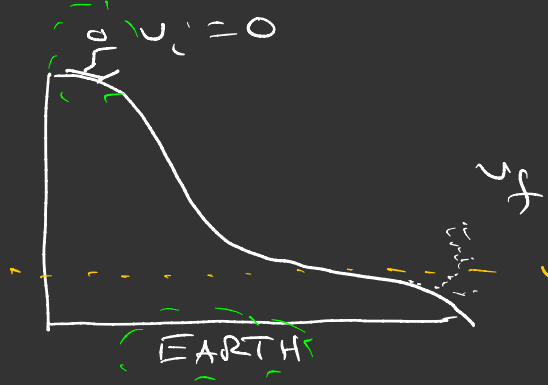
Class starts @2:15 pm

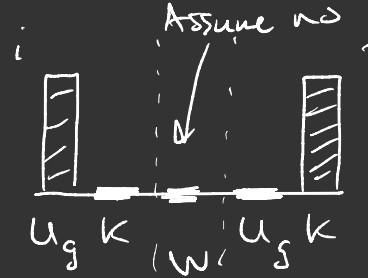




10cm 10cm

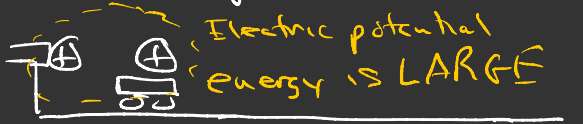
Determining v_f is challenging because $\vec{F}_{E\,on\,C}$ is continuously changing (decreasing in magnitude) as the cart moves further from the sphere.





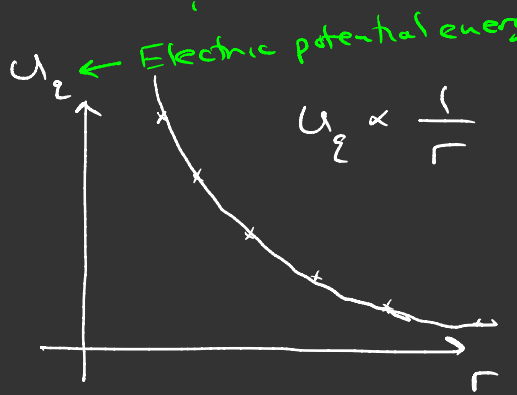
$$mgy_i = \frac{1}{2}mv_f^2 \longrightarrow v_f = \sqrt{2gy_i}$$

Electric potential energy ... (observational expt)

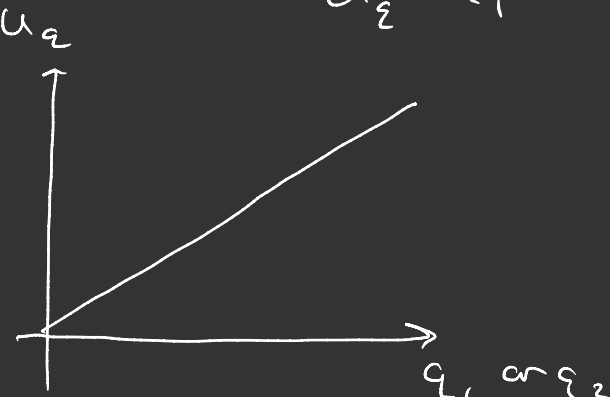


$$\frac{1}{2}mv_f^2$$

$$\frac{1}{2}mv_f^2$$



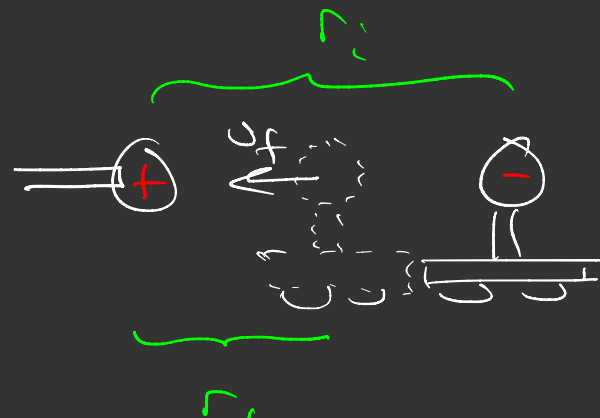
$U_e \propto q_1 \quad U_e \propto q_2$



$$\longrightarrow U_e = k\frac{q_1 q_2}{r}$$

i

f Original question: Determine v_f when it passes through 0.2 m from the sphere.

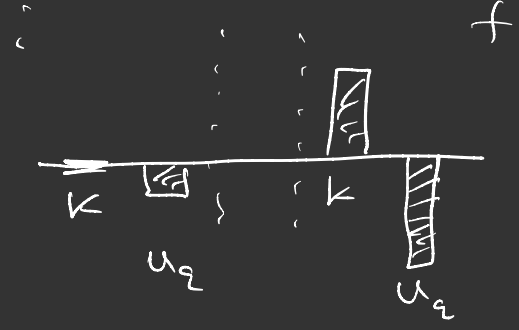


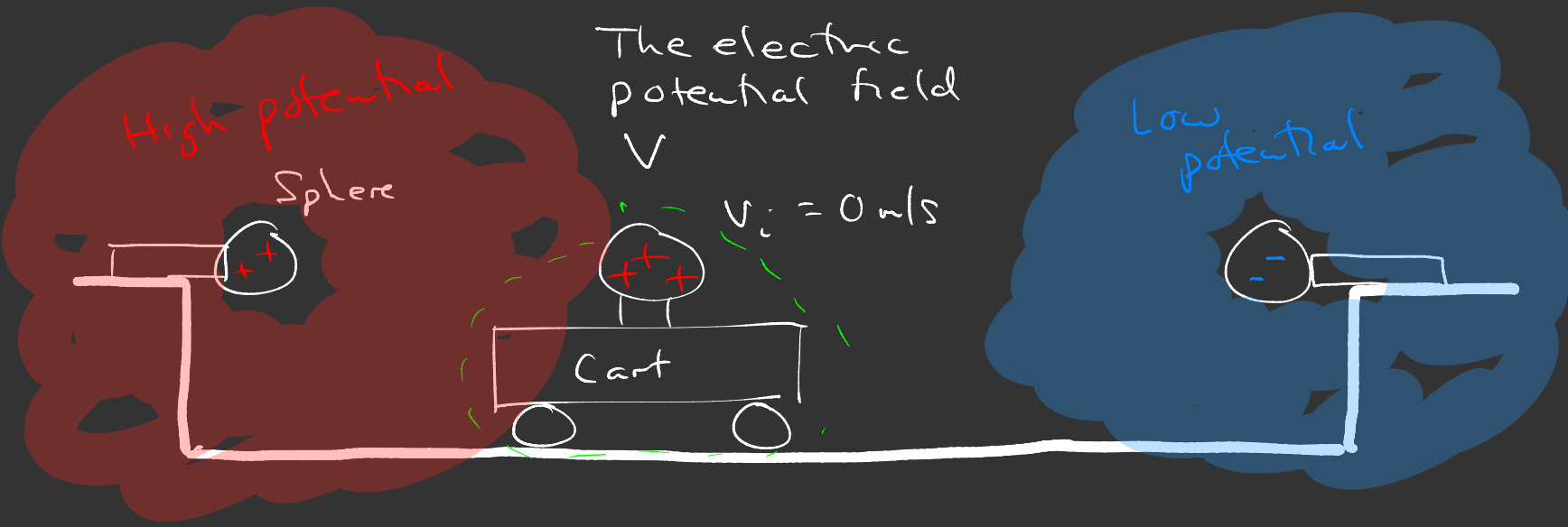
$$0 + U_{q,i} + 0 = K_f + U_{q,f}$$

$$k\frac{q_s q_c}{r_i} = \frac{1}{2} m_c v_f^2 + k\frac{q_s q_c}{r_f}$$

$$k q_s q_c \left(\frac{1}{r_i} - \frac{1}{r_f}\right) = \frac{1}{2} m_c v_f^2$$

$$\sqrt{\frac{2 k q_s q_c}{m_c}\left(\frac{1}{r_i} - \frac{1}{r_f}\right)} = v_f$$





1) Positive charges create regions of high potential (V)
   Negative charges " " " low " "
2) Positively charged objects accelerate towards lower potential regions. Negatively charged objects accelerate towards higher potential regions.

Circuit