abstract representation of E field

Field line model

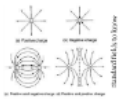
E tangent to field line

E greater where lines closer together

lines point away from + /towards -

lines originate on + and terminate on -

lines representing total Y don't cross



Coulomb Force

http://prezi.com/sksjdjcialiqiw/coulomb-force/

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

These are vector problems!

more than 2 charges

Superposition

interaction is independent of other charges

allows solution of multicharge problems

further abstraction of the complex abstract idea of a field

$\overline{F} = q\overline{E}$

qualitative behavior

Newton's 1

$\overline{F}_{net} = m\overline{a}$

test charge in pocket:)

Electric Field

$$E = k\frac{q_{source}}{r^2}$$

philosophic problem

action at a distance

basic charge ideas

in solids: electrons are mobile, nuclei are not

in liquids: electrons are mobile, ions are mobile but slow (massive)

3rd grade rule: opposites attract, likes repel

Newtonian Mechanics

Forces

Newton's Laws $\overline{F}_{net} = m\overline{a}$

Work/Energy

Circular Motion

Freebody Diagrams

Momentum

All the tools you develop to understand and describe the Newtonian universe are embedded. Electromagnetism just provide some additional forces that may be present in a particular setting.

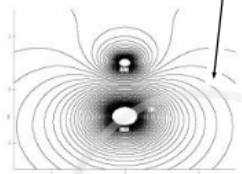
$\overline{E} = \frac{\Delta V}{\Delta x}$

downhill

energy needed to assemble

work/energy

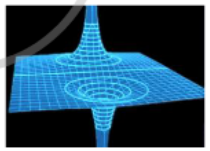
$W_{AB} = q \cdot \Delta V_{AB}$



equipotential maps

points of equal electric potential

perpendicular to E field



Electric Potential

$$\Delta V_A = k\frac{q_{src}}{r_A}$$

$$\Delta V_{AB} = \frac{W_{AB}}{q}$$