2018-02-07

Electric Charge

- Electrical charge comes in positive and negative
  - Measured in **Coulombs(C)**
  - The charge of an elementary particle is $e = 1.602 \times 10^{-19} C$
- Charge is also **quantized**
  - Really just a fancy way of saying it only increases in discrete chunks of e

Force Laws in E&M

- Dynamics learned in 8.01 still apply
  - But new force laws will be introduced
- **Coulomb's Law** = force law for charged particles

$$\vec{F} = \frac{1}{4\pi\epsilon_0}\frac{q_1 q_2}{r^2}$$

Fields

- One big difference between 8.02 and 8.01 is that 8.02 is oriented around **fields**
  - **Field** = a function that takes in parameters that span space and returns a value
    - Value can be a vector or a scalar
      - Scalar field examples (temperature map, density map, etc)
      - Vector field examples (wind map, **force field**, etc)
- Generally, force fields obey the principle of superposition

Field Lines

- **Field line** = a continuous curve that indicates a direction along itself that represents the direction of acceleration at each point in an electrical field