**Electric Field (Ch 16, 7-9)**
- Electrostatic & gravitational force
  - act at a distance, no direct push or pull
  - “uncomfortable” concept
- Electric Field
  - extends out from every charged object
  - other charges interact with field
  - direction of field determined by motion induced on a positive test charge

**Electric Field**
\[
\vec{F} = \vec{E} = q \vec{E} = \frac{kqQ}{r^2}
\]

**Electric Field - Ch 16, Prob 23**
- What are the magnitude and direction of the electric force on an electron in a uniform electric field of strength 2360 N/C that points due east?

**Electric Field - Ch 16, Prob 24**
- A proton is released in a uniform electric field, and it experiences an electric force of \(3.75 \times 10^{-14}\) N toward the south. What are the magnitude and direction of the electric field?

**Electric Field - Ch 16, Prob 30**
- What is the electric field strength at a point in space where a proton (m = 1.67 x 10^{-27} kg) experiences an acceleration of 1 million “g’s”?

**Think-Pair-Share**
- Electric field is electric force per unit charge. What is the analogous quantity for gravitational force? Derive a mathematical expression for gravitational field. Have you seen this quantity before?
Electric Field Lines

- Draw field lines for the following charge distributions

(a) +
(b) -

What would the electric field lines look like for a uniform electric field?

Gravitational Field

- Draw gravitational field lines around the earth.

Electric Field and Conductors

- Electric field inside a conductor is zero (when charges are at rest)
- Any net charge on a conductor is on the surface
- The electric field is always perpendicular to the outside surface of a conductor.
Electric Fields and Conductors

Electrical Shielding

Faraday Cage

Boston Museum of Science