August 27th

Chapter 22
Helproom Policies

- Helproom (PLC) is for collaborative learning
- TAs will sit at the tables and wear a badge with their name and course
- Computers are for entering answers
  - Not for reading email or browsing the web
  - Will be logged out automatically after 15 min
  - Computer use may be monitored
  - Printer is only for printing a copy of HW
- No food or drink is allowed in helproom!
Electric Force

- The magnitude of the electrostatic force, \( F \), between 2 charged particles with charges \( q_1 \) and \( q_2 \), respectively, and separated by a distance \( r \) is defined as

\[
F = \frac{k |q_1||q_2|}{r^2}
\]

- This is Coulomb’s law where \( k \) is electrostatic constant

\[
k = \frac{1}{4\pi\varepsilon_0} = 8.99 \times 10^9 \text{ N} \cdot \text{m}^2 / \text{C}^2
\]
Coulomb’s Law

- Does Coulomb’s law hold for all charged objects?
  
  **NO**

- Only for charged particles, charged particle-like objects and spherical shells (including solid spheres) of uniform charge
Electric Charge

- **Shell theorems for electrostatics**
  - A shell of uniform charge attracts or repels a charged particle that is outside the shell as if all the shell’s charge were concentrated at its center.
  - If a charged particle is located inside a shell of uniform charge, there is no net electrostatic force on the particle from the shell.
Electric Charge

Demo of putting a container of styrofoam chips on top of the Van de Graaf. In a plastic container they become charged and fly out due to repulsive force. Inside a metal container there is no force and they do no fly out.