Today	**Ch 18** Electric Force	**HW8**
Monday	**Ch 19** Electric Potential	**HW9**
Lab	**3** Electrostatics	

18.1.1 The Force on a Point Charge Due to Two or More Other Point Charges
The forces are vectors, so they must be treated as such

Example 1: Pr. 13 An equilateral triangle has sides 0.15 m, Charges of –9.0 +8.0 and + 2.0 µC at each corner. Find the magnitude of the net force electric force on the particle with a charge of + 2.0 µC.

18.2   The Electric Field
Fields
- **Action at a Distance**
- **Conceptual cue from Sound**
- **Apply Sound model to Action-at-a-distance**
    - **Gravitational Example**
    - **Electrical Demo: Vander Graff Generator and tin foil ball.**

18.2.1 Definition.

Ex 2. There are three charged particles arranged as shown. Particle 1, with the +4.0 µC charge then ended-up subject to a net electrical force of magnitude F = 23 N and pointing 24° up off the x-axis. What is the electric field at the location of Particle 1?

- **Field leads to Force**
    - **Demo: Vander Graff Generator & charged Rabbit hair**

Ex 3. Fields of Multiple Sources: Two positive point charges, $q_1 = +16$µC and $q_2 = +$ 4.0 µC are separated in a vacuum by a distance of 3.0 m. Find the spot on the line between them where the net electric field is zero.

- **Analogy to g in Gravitation**
    - **Gravitational Field**
        - **Mathematical Convenience**
        - **Property of Space, not mass**

18.3   Electric Field Lines
- **Rules**
- **Point Charge**
    - **Water Analog**
    - **Demo: Pascal's principle water squirter**
- **Dipole**

18.3.1 Dipole Moment
18.3.2 Examples drawing Field Lines
- **Parallel plates**

26. Review Conceptual Example 12 as an aid in working this problem. Charges of -4q are fixed to diagonally opposite corners of a square. A charge of +5q is fixed to one of the remaining corners and a charge of +3q is fixed to the last corner. Assuming that ten electric field lines emerge from the +5q charge, sketch the field lines in the vicinity of the four charges.

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29. Two charges are placed on the x axis. One charge (q_1 = +8.5 µC) is at x_1 = + 3.0 cm and the other (q_2 = -21 µC) is at x_2 = +9.0 cm. Find the net electric field (magnitude and direction) at (a) x = 0 cm and (b) x = +6.0 cm.

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32. A chrge of q = + 7.50 µC is located in an electric field. The x and y components of the electric field are E_x=6.00×10^{3}N/C and E_y = 8.00×10^{3}N/C, respectively. (a) What is the magnitude of the force on the charge? (b Determine the angle that the force makes with the + x axis.