Forces & Motion Unit Outline (3/19)

I. **Forces:** pushes or pulls

A. Contact forces
1. friction (2 things rubbing together; **opposite** direction of motion)
2. direct push or pull (pull a wagon; kick a ball)

B. Field forces (act at a distance)
1. electromagnetism
a. like poles/charges repel
b. opposite poles/charges attract
c. closer to field source, stronger the field
d. better domain alignment/more extra charges, stronger

2. gravity
a. attraction between any two masses
b. more mass and/or closer to mass, stronger gravity

C. Force diagrams
1. name force
2. arrow indicates *direction* of force
3. size of arrow indicates *strength* of force

II. Newton's Laws of Motion (Isaac Newton English 1642-1727)

A. First law--Law of Inertia
1. objects at rest remain at rest unless forced to move
2. objects in motion remain in motion (in straight line, at constant speed) unless forced to change.

B. Second law--F = ma
1. A ***force*** acting on an object is determined by the ***mass*** of the object and the ***acceleration*** of the object.
a. as mass increases, acceleration increases
b. as force increases, acceleration decreases

C. Third law--Action-Reaction
1. For every action there is an equal and opposite reaction.
[A pushes B; B pushes A]