Physical Science Chapter 11 Notes

Forces change motion

* A **force** is a push or pull
* Types of forces
  + **Contact Force**
    - One object pushes or pulls another object by touching it
    - First object is applying a contact force to the second
  + **Gravity**
    - Force of attraction between two masses
    - Strength of gravitational force between the objects depends on their masses
  + **Friction**
    - Force that resists motion between two surfaces that are pressed together
  + Balanced vs. Unbalanced Forces
    - **Net Force** – overall force acting on an object when all the forces are combined
      * If Net force = zero then all forces acting on the object are balanced
    - *Balanced forces* – have same effect as no force at all. (motion of the object doesn’t change)
      * Cannot change object’s speed or direction
    - *Unbalanced forces* – can change the motion of an object (doesn’t matter if the ball started at rest or was already moving)
* **Newton’s First Law**
  + Objects at rest stay at rest
  + Objects in motion stay in motion
    - \*\*\*unless acted on by outside force
  + **Inertia** – resistance of an object to change in the speed or the direction of its motion
* Force and mass determine acceleration
* **Newton’s Second Law -** 
  + Force and mass determine acceleration
  + **F = ma**
  + Acceleration of an object increases with increased force and decreased with increased mass
    - *Centripetal force* – any force that keeps an object moving in a circle. The force points toward the center of the circle
  + Forces can change the direction of motion
* **Newton’s Third Law –**
  + Forces act in *pairs*
  + For every **action** there is an equal and opposite **reaction**
* Newton’s three laws describe and predict motion
* Forces transfer momentum
  + **Momentum**: measure of mass in motion
    - Product of its mass and its velocity
    - P = mv
    - Momentum = mass x velocity
    - Momentum can be *transferred* from one object to another
      * *Collision* – two objects in close contact exchange energy and momentum
  + Momentum is *conserved*
    - *Principle of conservation of momentum* – total momentum of a system of objects does not change, as long as no outside forces are acting on that system