1 ❑ *Observing Motion*

←Object is in motion if it's moving compared to a *reference point.*

←Ex: earth's surface

2 ❑ *Speed*

←Speed = Distance/Time

←SI unit is m/s(meters per second)

←Average speed = Total Distance/Total Time

←Math break p.421

3 ❑ *Velocity*

←Speed in a given direction

←Examples: Wind, airplanes, boats, current

←Velocity changes if speed or direction changes.

←Self check p. 422

4 ❑ *Combining Velocities*

←If velocities are in the same direction - you add them.

←If velocities are in different directions - you subtract.

←Ex: boat velocity - 25 m/hr N and current velocity - 10 m/hr S combined velocity = 15m/hr N.

5 ❑ *Acceleration*

←Speed at which velocity changes

←Change in speed or direction

←Acceleration = $\frac{Vf - Vi}{\text{time velocity changes}}$

Mathbreak p. 425

Circular motion = acceleration

6 ❑ *Force*

←Push or pull

←Size and direction

←Measured in Newtons (N)

7 ❑ *Forces in Combination*

←Combination of all forces acting on a object = *net force*

←Forces in same direction-add

←Opposite directions-subtract

←Self check p. 429

8 ❑ *Unbalanced Forces*

←Produce a change in motion (Newton's 1st Law)

←Balance forces=no change in motion

9 ❑ *Friction*

←Force opposing motion

←Caused by roughness of all surfaces

←>force = >friction

←>roughness = >friction

10 ❑ *Types of Friction*

←Static - not enough force to move

←Sliding - ex. Pushing furniture across floor - strong force

←Rolling - on wheels etc. Less force

11 ❑ *Fluid Friction*

←Opposing motion of objects in fluids

←Less than rolling friction

←Includes liquids and gasses

12 ❑ *Friction: Friend or foe*

←Good: safety - tire treads, pencil and paper

←Bad: hard to move

←Lubricant: reduces friction

13 ❑ *Gravity*

←Newton - all matter in universe exerts force on all other matter

←Two factors: mass and distance Mass>, gravity >

←Distance>, gravity<

←Weight measures gravity (N)