Newton's 1st Law

Objective:

Introduce Newton's 1st Law

Understand forces and free body diagrams

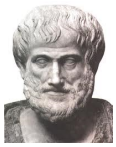
"Why do objects behave the way they do?

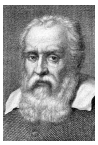
History of Motion

- Aristotle 300 B.C. natural state of object is at rest.

- Galileo (1564-1642) force is needed to start and stop and object.

- Newton (1642-1727) 3 laws of motion.





Newton's 1st Law

- An object at rest will remain at rest

- An object in motion will remain in motion (at the same speed & direction)

- Unless acted on by an outside force

Inertia

- resistance to change.

- Objects at rest, stay at rest.
  Objects in motion, stay in motion.

- Inertia ~ mass (increase mass = increase inertia)

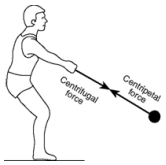
Force

- Push or pull
  - Balanced forces – opposite and equal.
  - Unbalanced forces – unequal.

- Unit: Newton (N)

1 lb = 4.5 N

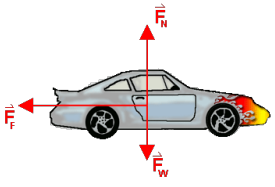
1 N = .22 lbs.



Newton 1st Law: $\Sigma F = 0$

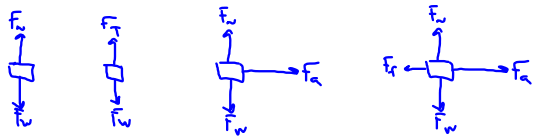
Types of Forces

- Applied F_a
- Gravity F_w
- Friction F_f
- Normal "support" F_N
- Air Resistance F_{AR}
- Tension string/rope F_T

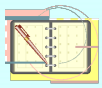


Free Body Diagrams (FBD)

- shows all forces acting on an object
- use a vector for each force



Assignments . . .



- Begin Chapter 3 HW # 1 - 8