

Mr. Schneider presents...

# Mechanics Topics

## Linear & 2D Motion

- **SI units**
- **Friction slows moving objects**
- Displacement vs. distance
- Velocity vs. speed
- Average vs. instantaneous velocity
- Frames of reference
- **Acceleration**
- **Acceleration of gravity (free fall)**
- **Distance/velocity/acceleration vs. time graphs**
  - Velocity is the slope of displacement
  - Acceleration is the slope of velocity
- **Scalars vs. vectors**
- **Adding vectors**
- Vector components
- Ballistic motion
- Centripetal acceleration

## Newton's Laws

- **Newton's three laws**
- **Inertia**
- **Weight**
  - Weight is a force
  - Difference between weight and mass
- **Free fall**
- **Balance of forces/net force**
- Friction
  - Sliding/static friction
  - Air resistance
- **Conservation of momentum**
- Impulses change momentum
- Elastic vs. inelastic collisions

## Energy & Machines

- **Work is energy**
- **Gravitational potential energy (GPE)**
- **Power**
- **Friction produces heat ("wasted" energy)**
- **Kinetic energy (KE)**
- **Work-energy theorem (conservation of energy)**
- **Simple machines**
  - Trading force and distance
  - Mechanical efficiency
- **Universal law of gravitation**
- Rotational Mozi
- Moment of inertia (distribution of mass about axis)
- Conservation of Angular Momentum
- Torque