The World Around You

- Objects and Properties
- Measurement Systems
- Metric System
- Understanding from Measurements
Standard Units for Metric System

- Fundamental Units
  - Length - L
    - Meters (m)
  - Mass - M
    - Kilograms (kg)
  - Time - T
    - Seconds (s)
  - Charge - Q
    - Coulombs (c)

- Derived units
Metric Prefixes

- K : Kilo = 1000
- M : Mega = 1,000,000 (10^6)
- G : Giga = 1,000,000,000,000 (10^9)
- T : Tera = 1,000,000,000,000,000 (10^{12})

- c : Centi = 0.01 (10^{-2})
- m : Milli = 0.001 (10^{-3})
- μ : Micro = 0.000001 (10^{-6})
- n : Nano = 0.000000001 (10^{-9})
Understanding from Measurements

- Cube: Side 2 inch

- Area of the cube
  - Area = side*side
  - 2*2 = 4 inch²

- Volume of the cube
  - Volume = side*side*side
  - 2*2*2 = 8 inch³
Data Interpretation

Do U Like Science??

- Graphing Data
- Statistical Analysis
- Errors in Measurements

Like Science
Don't Like Science
Not Sure
Equation of the Straight Line:
- \( y = mx + b \)
- \( b \) = y-intercept
- \( m \) = slope (rise/run)
- \( m = \Delta y / \Delta x \)
Conversion of Units

- 1 inch = 2.54 cm
- 1 lb = 453.6 g
- 1 minute = 60 seconds

Activity Session:
- Convert 10 inches to millimeters
- Convert 10 inches to meters
- Convert 15 lbs to kg
- Convert 2 hours to sec
- Your height in meters
Motion in One Dimension

- Kinematics
  - Speed
  - Velocity
  - Acceleration
- Forces
- Falling Objects
- Galileo Vs Aristotle
- Projectile Motion
Kinematics

- Kinematics: Branch of Science dealing with motion
- Types of motion
  - Simple - Linear 1-D motion
  - Projectile Motion
  - Angular Motion
Properties of Motion:

- Change of Position and Time of an object
- Displacement ‘d’
- Speed
- Velocity ‘v’
- Acceleration ‘a’

WOOAH, HOLD ON,
I just read Speed and Velocity : Aren’t they the same thing?

OR ARE THEY DIFFERENT?
Scalar Quantity

- Measure of the variable
- Has just the Magnitude
- No direction
- **Example of Scalar**
  - Length, Area, Volume,
  - Position, Speed
  - Charge
The driver of a car moving at 72 km/hr drops a road map on the floor. It takes 3 s to locate and pick up the map. How far did he travel during this time?

Speed = Distance/Time

Distance = Speed * Time

\[ d = \left( \frac{72000 \text{ m}}{3600 \text{ s}} \right) \times 3 \text{ s} = 60 \text{ m} \]
Vector Quantity

- Measure of the variable
- Magnitude
- Direction
- Examples
- Displacement
- Velocity
- Acceleration
- Force
Velocity

- **Average Velocity**
  - \( V_i = \text{initial velocity} \)
  - \( V_f = \text{final velocity} \)
  - \( \bar{V} = \frac{d}{t} \)
  - \( \bar{V} = \left( \frac{V_i + V_f}{2} \right) \)

- **Instantaneous Velocity**
  - \( V_a \)
Measuring Motion

Activity Session: