

Teacher: Sayan Chakraborti

Student:

Measurement and Units

In the world of physics, we rely on precise measurements. We use the International System of Units (SI) to standardize measurements. Let's explore SI units for length, mass, and time.

SI Units:

Length: The meter (m) is defined as one ten-millionth of the shortest distance from the North Pole to the equator passing through Paris, (which makes the Earth's circumference about 40,000 kilometers).

Mass: The kilogram (kg) is defined as the mass of one liter of water at its maximum density, which occurs at 4 degrees Celsius.

Time: The second (s) is historically defined as $1/86400$ of a day. This definition stems from the division of the day into 24 hours, then into 60 minutes, and finally into 60 seconds each ($24 \times 60 \times 60 = 86400$).

Conversions:

1 meter (m) = 39.37 inches (in)

1 kilogram (kg) = 2.2046 pounds (lb)

Class Practice Questions:

1. Convert 2 meters to inches.
2. Convert 5 kilograms to pounds.
3. If a car travels at a speed of 20 meters per second, what is its speed in miles per hour (mph)? (Hint: 1 mile = 1,609.34 meters)
4. If an object has a density of 3,000 kilograms per cubic meter (kg/m^3), what is its density in pounds per cubic inch (lb/in^3)? (Hint: $1 \text{ m}^3 = 61,023.7 \text{ in}^3$)