

MEASUREMENT**I. Description and Measurement**

- A. **Measurement** – way to describe objects and events with numbers; for example, length, volume, mass, weight, and temperature.
- B. **Estimation** – method of making an educated guess at a measurement; using the size of something familiar to guess the size of a new object.
- C. **Precision and Accuracy**
 - 1. **precision** – describes how closely measurements are to each other and how carefully measurements were made. **Ex. same bowling pins knocked down**
 - 2. **accuracy** – compares a measurement to the true value. **Ex. newspaper @ door**
 - 3. **rounding a measurement**
 - 1). look at the digit to the right of the place being rounded to:
 - a). if the digit to the right is 4 or less, the number remains the same.
 - b). if the digit to the right is 5 or greater, round up.
 - 2). the digits to the right of the digit being rounded to are deleted if they are to the right of the decimal point. If they are to the left of the decimal they are changed to zeros.

II. SI - International System of Units, related by multiples of ten, designed to provide a worldwide standard of physical measurement. **Metric system****A. SI Base Units of Measurement:**

- 1. length: **meter** (m)
 - a. area: square meters (m^2)
 - 1). Area= length x width
 - b. volume - the amount of space an object occupies: cubic meters (m^3)
 - 1). Volume = Area of the base x height
- 2. **mass** - amount of matter in an object: **kilogram** (kg)
- 3. temperature: **Kelvin** (K)
- 4. time: second (s)
- 5. electric current: ampere (A) **fuses**
- 6. amount of substance: mole (mol) **chemistry**
- 7. intensity of light: candela (cd) **rotating spotlights that shine in the sky**

B. Most commonly used units of measurement: (instruments used)

- 1. length: mm, cm, m, and km (**meter stick**)
- 2. volume of a liquid: L, mL (**graduated cylinder**)
 - a. volume by immersion: the difference in the volume of water before and after the addition of an object equals the volume of the object.
 - b. ($mL = cm^3 = cc$)

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3. mass: g, kg (triple beam balance)
4. **weight** - measurement of force that depends on gravity: Newton (N) (spring scale)
5. temperature: degrees Celsius (°C) (thermometer)
6. time: h, min, s (stop watch)
7. **rate**: km/h, m/s (speedometer)

III. Tools used to collect, organize, summarize, and display data:

- A. Drawings - can emphasize things that are necessary to show, show things you can't see, and show hidden things.
 1. scale drawing – used to represent something that is too large or too small to be drawn its actual size.
 - a. floor plan of your room
 - 1). scale: 2 cm = 1 m **1st #: drawing; 2nd #: actual size**
 - b. size of a cell
 - 1). scale: 1 cm = .01 mm **1st #: drawing; 2nd #: actual size**
- B. Photographs - show an object exactly as it is at a single moment in time.
- C. **Tables** - present information in rows and columns, making it easier to read and understand. **Indep. Var. – 1st column; Dep. Var. – 2nd column**
- D. **Graphs** - used to collect, organize, and summarize data in a visual way, making it easy to use and understand. **Indep. Var. - x-axis; Dep. Var. - y-axis**
 1. **line graph** - type of graph used to show the relationship between two variables that are numbers on an x-axis and a y-axis.
 2. **bar graph** - type of graph that uses bars of varying sizes to show the relationship among variables.
 3. **circle graph** - type of graph that shows the parts of a whole; sometimes called a pie graph, each piece of which represents a percentage of the total.
 4. broken scale - a scale on a graph that doesn't start at zero; used to highlight small but significant changes.