

Vocabulary & Study Guide: Week 2: Tools, Measurement and Safety (Pt. I)

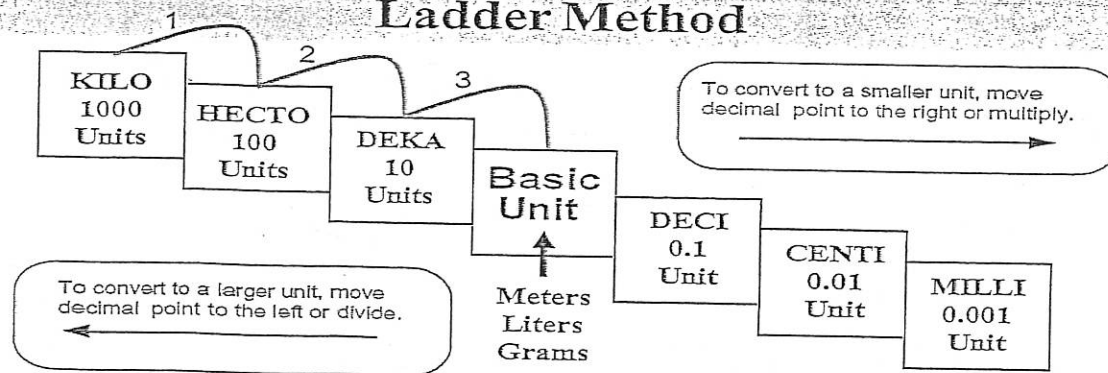
Area	Kelvin	Beaker
Volume	Dichotomous Key	Erlenmeyer Flask
Mass	Double Pan Balance	Forceps
Weight	Triple Beam Balance	Scalpel
Temperature	Spring Scale	Scanning Electron Microscope
Density (know how to use formula)	Graduated Cylinder	Transmission Electron Microscope
Meter stick	Pipette	Caliper
Common base SI Units:		
Length: meter (m)		
Volume: cubic meter (m)		
Mass: kilogram (kg)		
Weight: Newton (N)		
Temperature: Kelvin (K)		
		<i>Typical Units:</i>
		$\text{Density} = \frac{\text{MASS}}{\text{VOLUME}}$
		$\frac{\text{g}}{\text{cm}^3}$

Text Readings: pp. 20-25, 52-55, 84-87

Be able to:

- Select the appropriate SI unit for a specific measurement & explain why SI units are preferred for scientific measurement and communications
- Draw the "metric ladder" from memory, and demonstrate its use
- List and describe lab safety equipment and procedures
- Convert measurements from one SI unit to another
- Visually identify laboratory equipment and provide the correct name for each item
- Select the best laboratory tool for a specific task
- Explain the difference between mass and weight
- Explain the difference between precision and accuracy
- Use the appropriate units for area and volume calculations (ex. m^2 vs. m^3)
- Describe a Dichotomous Key and explain how it is used to identify an object
- ...plus any additional key items covered in class....

Ladder Method



How do you use the "ladder" method?

- 1st – Determine your starting point.
- 2nd – Count the "jumps" to your ending point.
- 3rd – Move the decimal the same number of jumps in the same direction.

$$4 \text{ km} = \frac{\quad}{\quad} \text{ m}$$

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 Starting Point Ending Point

How many jumps does it take?

$$4. \underset{1}{\underbrace{\quad}} \underset{2}{\underbrace{\quad}} \underset{3}{\underbrace{\quad}} = 4000 \text{ m}$$

Weeks 2 & 3: "Tools, Measurement & Safety" Vocabulary Help

NB: The below definitions are "starting points" only. Be sure to update with your own clarifying notes, definitions and examples from your readings and from class discussions to fully prepare for quizzes and tests!

Area	A measure of the size of a surface or a region; units always "squared"; ex. cm^2
Volume	A measure of the size of a body or region in three-dimensional (3-D) space; units always "cubed"; ex. cm^3
Mass	A measure of the <u>amount of matter</u> in an object; mass is NOT the same as weight
Weight	A measure of the <u>force of gravity</u> on an object; weight is NOT the same as mass
Temperature	A measure of how hot or cold something is; a measure of the average kinetic energy of the particles in an object
Density	The amount of matter in a given volume; The ratio of the mass of a substance to the volume of the substance; $D=m/v$
Meter stick	A measuring device which is the basic unit of length in the SI system
Kelvin	The official SI base unit for temperature; Water boils at 373 K & freezes at 273 K
Dichotomous Key	A key based on a series of choices between two alternate identification characteristics that lead the user to the correct name of a given item; DRAW PICTURE:
Double Pan Balance	A type of balance that has two pans. Between the pans is a pointer which indicates whether the masses on the pans are equal; Used to measure <u>mass</u> ; DRAW PICTURE:
Triple Beam Balance	A type of balance with a pan on one side connected to three beams with sliding masses. At one end of the beam is a pointer that indicates whether the mass on the pan is equal to the masses on the beams; Used to measure <u>mass</u> ; DRAW PICTURE:
Spring Scale	Also called a force meter; Used to measure a <u>force</u> (such as gravity) pulling on the scale; DRAW PICTURE:
Graduated Cylinder	Used to measure the volume of a liquid; Correct volume of read at the BOTTOM of the meniscus (the curved surface of the liquid in the graduated cylinder); DRAW PICTURE:
Pipette	A laboratory instrument used to transport a measured volume of liquid; DRAW PICTURE:
Beaker	A simple container for stirring, mixing and heating liquids commonly used in the lab; DRAW PICTURE:
Erlenmeyer Flask	A cone-shaped flask with a wide base and narrow neck used to manipulate solutions; DRAW PICTURE:
Forceps	Tool used to manipulate small, solid objects; DRAW PICTURE:
Scalpel	A small, extremely sharp bladed instrument used for surgery & dissection; DRAW PICTURE:
Scanning Electron Microscope	A type of microscope where electrons are <u>reflected/bounced off the surface</u> of the specimen being magnified to create a <u>3-D image</u> ; specimen does not have to be sliced; Magnifies specimen up to 100,000 times
Transmission Electron Microscope	A type of microscope where electrons are <u>shot through</u> an extremely thin slice of a specimen; specimen must be sliced; Magnifies specimen up to 100,000,000 times
Caliper	A device used to measure thickness between two surfaces, especially for small or precise measurements; DRAW PICTURE:
Precision	The exactness and consistency of measurement; Precision is NOT the same as accuracy
Accuracy	Depends on the difference between the measurement and an actual value; The smaller the difference, the more accurate the measurement; Accuracy is NOT the same as precision