

Standards Of Measurement (p. 14 – 21)

I. Units & Standards

1. Define the term standard.

Standard – exact quantity that people agree to use to compare measurements

II. Measurement Systems

1. Define the term metric system.

Metric System – system of measurement based on multiples of ten
(U.S. = English System) (Track + Field)

2. Define the term SI units.

SI Units – standards that are universally accepted and understood by scientists throughout the world

3. Match the SI base unit with the correct quantity measured.

- | | |
|------------------------------------|------------------|
| 1. <u>E.</u> - Temperature | A. Kilogram (kg) |
| 2. <u>A.</u> - Mass | B. Mole (mol) |
| 3. <u>G.</u> - Light Intensity | C. Ampere (A) |
| 4. <u>D.</u> - Length | D. Meter (m) |
| 5. <u>B.</u> - Amount Of Substance | E. Kelvin (K) |
| 6. <u>F.</u> - Time | F. Second (s) |
| 7. <u>C.</u> - Electric Current | G. Candela (cd) |

4. Complete the following table.

SI Prefixes			
Prefix	Symbol	Meaning	Multiple Unit By
<u>Kilo-</u>	k	Thousand (10^3)	<u>1000</u>
Deci-	<u>d</u>	Tenth (10^{-1})	0.1
<u>Centi-</u>	c	Hundredth (10^{-2})	<u>0.01</u>
Milli-	<u>m</u>	Thousandth (10^{-3})	0.001
<u>Micro-</u>	μ	Millionth (10^{-6})	<u>0.000001</u>
Nano-	<u>n</u>	Billionth (10^{-9})	0.000000001

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Illustrations
of
Measurements

II. Measuring Distance

1. What unit is used to identify the area (length X width) of an object (using meters)?

m²

(Measure twice, cut once.)

III. Measuring Volume

1. Define the term volume.

Volume - amount of space occupied by an object

(1 Meter is slightly longer than 1 Yard)

↳ Older track times = "Faster"

2. What unit is used to identify volume (l X w X h) of a solid object (using meters)?

m³

3. One cubic centimeter (cm³) is equivalent to how many milliliters?

1 mL

IV. Measuring Matter

1. Define the term mass.

Mass - measurement of the quantity of matter in an object
(What is weight?)

2. Define the term density.

Density - mass per unit volume of a material

$$D = \frac{\text{Mass}}{\text{Volume}} = \frac{g}{\text{cm}^3}$$

3. Calculate the density if the mass of a solid material is measured as 15.0 grams and its volume is measured as 5.0 cm³.

$$D = \frac{15.0g}{5.0 \text{ cm}^3} = 3.0 \text{ g/cm}^3$$

V. Measuring Time & Temperature

1. Define the term kelvin (K).

Kelvin - SI unit of temperature (K = °C + 273)

2. Complete the following table.

(0K = -273°C (absolute zero))

Temperature Scales of Measurement		
Temperature Scale	Temp. Water Freezes	Temp. Water Boils
Fahrenheit $^{\circ}\text{F} = \frac{9}{5}(^{\circ}\text{C}) + 32$	32° F	212° F
Celsius $^{\circ}\text{C} = \frac{5}{9}(^{\circ}\text{F} - 32)$	0° C	100° C
Kelvin	273 K	373 K

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