Scientific Notation, SI Units, and the Metric System

Read from **Lesson 2 Chemistry as a Quantitative Science** in the **Chemistry Tutorial Section, Chapter 1** of **The Physics Classroom**:
Part 2a: Scientific Notation Part 2b: Units and the Metric System Part 2c: Quantities and Their Meaning

Scientific Notation
Scientific notation represents numbers as the product of a coefficient and 10 raised to an exponent. This method is particularly useful for handling extremely large or small numbers.

1. Convert these numbers from standard decimal notation to scientific notation.

a. 6,023 = _____ b. 0.00741 = _____

c. 23,000,409 = _____ d. 408,987 = _____

e. 0.700 = _____ f. 0.28450000001 = _____

g. 101 = _____ h. 0.080808 = _____

i. 82 = _____ j. 8,800,088,000,000 = _____

2. Convert these numbers from scientific notation to standard decimal notation.

a. 8.0×10^{3} = _____ b. 8.0×10^{-3} = _____

c. 4.567×10^{8} = _____ d. 1.02×10^{-5} = _____

e. 6.732×10^{-2} = _____ f. 6.09×10^{10} = _____

g. -9.05×10^{-4} = _____ h. -2.2×10^{2} = _____

i. 1.60×10^{-19}= _____

j. 6.02×10^{23} = _____

Systems of Measurement

The **Metric System** (or *Systemes International*, SI) is a widely adopted system of measurement used in nearly every country. There are seven base units – these are fundamental units used in science.

3. Answer the following questions about base units to obtain clues about the words hidden in the word search (on the next page). Letters to spell out each word are used once. Words will zigzag around the puzzle and all letters will be used.

See if you can find the following words:
The base unit for mass_____
The plural of the base unit for time_____
The base unit for temperature_____
The base unit for electric current_____
The base unit for the amount of a substance_____
The system of measurement for chemists_____

S	**T**	**E**	**M**	**M**	**A**
N	**Y**	**E**	**R**	**P**	**R**
I	**V**	**S**	**E**	**E**	**E**
L	**E**	**C**	**E**	**M**	**T**
S	**K**	**I**	**L**	**M**	**M**
E	**S**	**R**	**O**	**R**	**A**
C	**D**	**E**	**T**	**G**	**K**
O	**N**	**M**	**O**	**L**	**I**

4. For each of these measurements, give the appropriate abbreviations and make the requested conversion. For example,

	Abbreviation	Conversion
102 centigrams	102 cg	= 102 g
a. 5 kilometers	_____	= _____ m
b. 25 milliliters	_____	= _____ L
c. 43.7 decimoles	_____	= _____ mol
d. 237 micrograms	_____	= _____ g
e. 99 nanometers	_____	= _____ m
f. 714 milliseconds	_____	= _____ s
g. 4.24 liters	_____	= _____mL
h. 18.7 meters	_____	= _____ cm
i. 6000 grams	_____	= _____ ng
j. 12.8 moles	_____	= _____ μmol