REVIEW OF CH30

CH40S *MR. WIEBE*

1

SCIENTIFIC NOTATION

Put the following measurement into scientific notation.

5732 grams

If moving the decimal makes the number smaller, then the exponent gets larger.

2

SCIENTIFIC NOTATION

Put the following measurement into scientific notation.

0.0050 m

If moving the decimal makes the number **larger,** then the exponent gets smaller.

3

MULTIPLYING SCIENTIFIC NOTATION

$(3.0 \times 10^5 cm)\ (2.0 \times 10^4 cm) = ?$

4

DIVIDING SCIENTIFIC NOTATION

$$\frac{(4 \times 10^{-3}\ s)}{(1 \times 10^{-5}\ s)}$$

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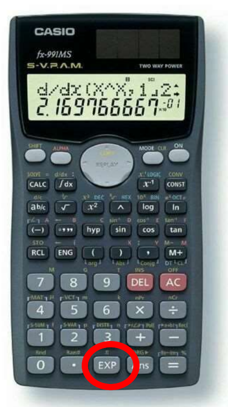
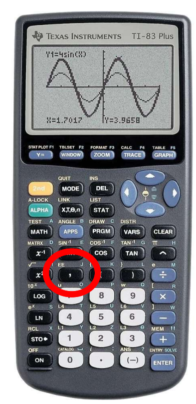
SCIENTIFIC NOTATION ON YOUR CALCULATOR





Calculate the volume of a container with a length of 3.25×10^3 m, width of 8.93×10^5 m and height of 2.11×10^{-2} m.

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UNIT ANALYSIS

In the far away country of Yrtsimehc, the monetary currency is based on "izzles" rather than "dollars". The following relationships are true in this currency:

1 frizzle = 8 crizzles   6 drizzles = 0.5 sizzles   2 crizzles = 10 drizzles

If you have 75 frizzles in the bank, how many sizzles is this equivalent to?

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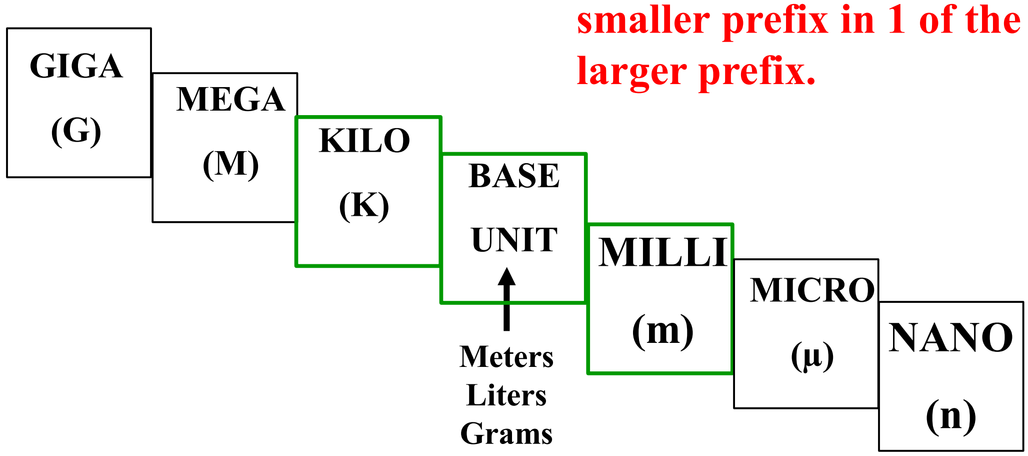
Very big

There are 1000 or 10^3 of the smaller prefix in 1 of the larger prefix.



Very small

Gigantic Megaphones Killed 1 Million Microscopic Nanobots

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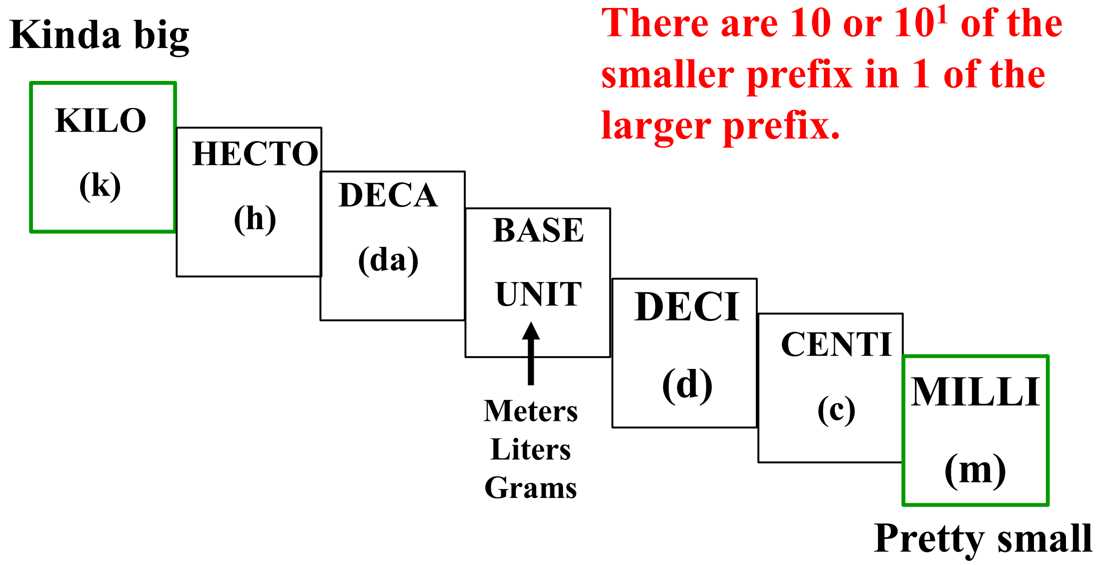
There are 10 or 10^1 of the smaller prefix in 1 of the larger prefix.



King **H**enry **D**ied **D**rinking **C**hocolate **M**ilk

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UNIT ANALYSIS

Given that:

2.21 lb = 1.00 kg
1.00 atm = 101.3 kPa
14 lb = 1 stone
16 oz = 1 lb

4.54 L = 1.00 gal
1.61 km = 1.00 mile
2000 lb = 1 ton

Mr. Wiebe weighs 14.3 stone. How many kilograms is this?

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UNIT ANALYSIS

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A recipe calls for 4 oz of sugar. How many grams of sugar would this be?

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IONIC COMPOUNDS

Example: Aluminum oxide

Example: $CaCl_2$

Example: Iron(III) chloride

Example: Cu_2S

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IONIC COMPOUNDS

Example: barium nitrate

Example: Zinc hydroxide

Example: NH_4NO_3

Example: $Ca_3(PO_4)_2$

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COVALENT MOLECULES

Some elements naturally exist in **molecule form** rather than atom form. They are called **diatomic elements**

$H_2,\ N_2,\ F_2,\ O_2\ ,\ I_2,\ Cl_2,\ Br_2$

"**H**ave **N**o **F**ear **O**f **I**ce **C**old **B**eer!"

14

14

COVALENT COMPOUNDS

Example: P_2O_5

Example: N_2O

Example: carbon monoxide

Example: nitrogen triiodide

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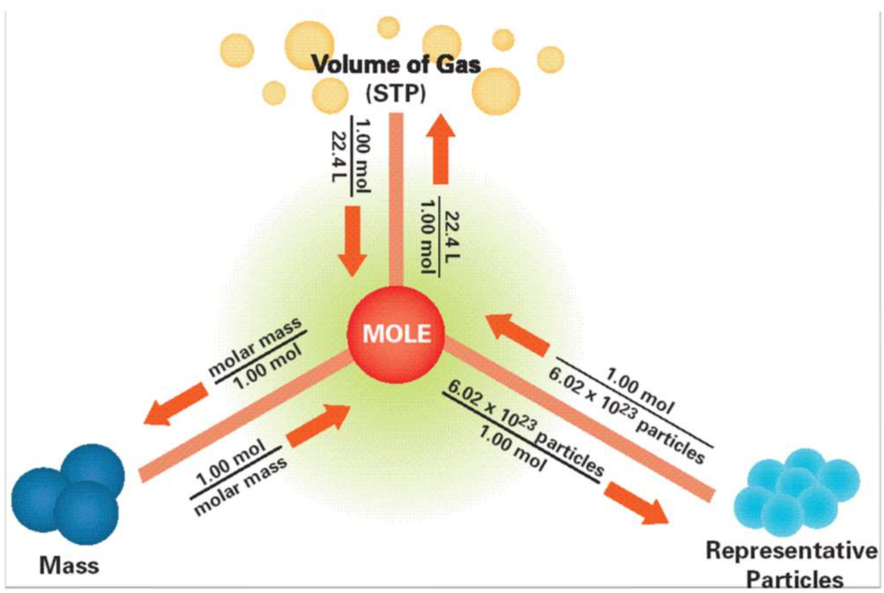
THE MOLE



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MOLAR MASS

He

CO_2

lithium nitrate

$Ni_2(CO_3)_3$

Molar mass is used as a conversion factor between the mass of a chemical and the number of moles of that chemical.

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EXAMPLE #1

A liter of regular gasoline typically contains about **19 moles** of octane molecules (C_3H_8).

How many **grams** of octane would this be?

How many **molecules** of octane are present?

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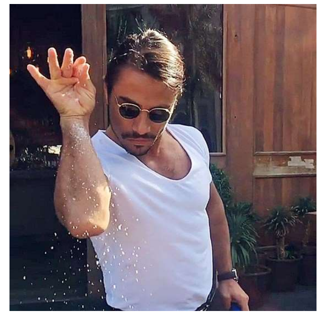
EXAMPLE #2

It is recommended that a person eat no more than **6.0 g** of table salt (sodium chloride) per day.



How many **moles** of salt would this be?

How many **molecules** of salt is this?

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BALANCING CHEMICAL EQUATIONS

___ Al + ___ O_2 → ___ Al_2O_3

___ Na(OH) + ___ $Fe(NO_3)_3$ → ___ $Na(NO_3)$ + ___ $Fe(OH)_3$

___ C_2H_6 + ___ O_2 → ___ CO_2 + ___ H_2O

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BALANCED FORMULA EQUATIONS

A piece of iron reacts with oxygen gas to produce rust, Fe_2O_3.

Words			
Formulas			
Pictures			
Balanced Equation			

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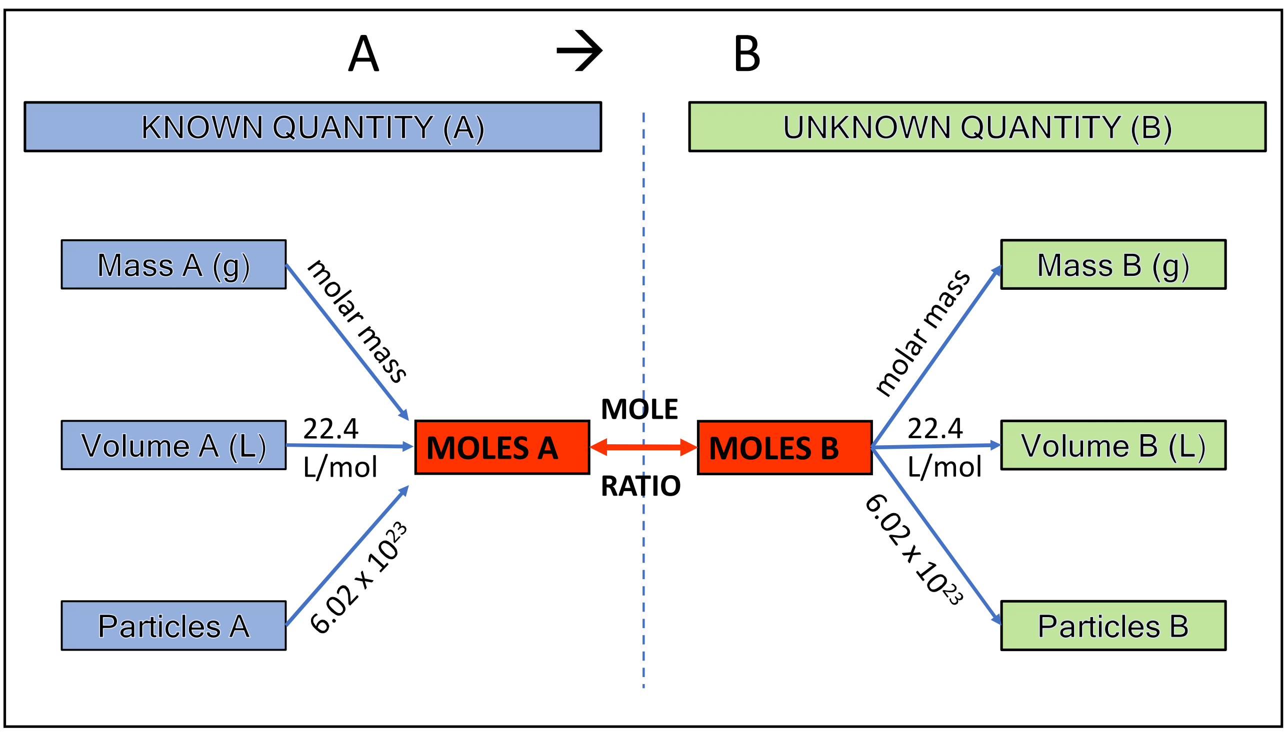

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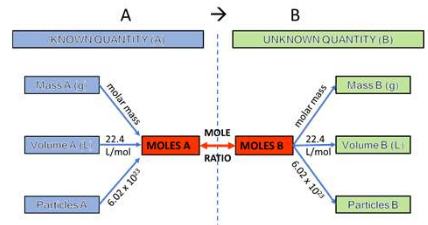
STOICHIOMETRY



Balanced Equation:

What mass of iron must have been present to produce 25.0 g of rust?

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STOICHIOMETRY

$$\text{Percentage Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100\%$$

5.0 g of iron is completely reacted with excess oxygen and forms 6.29 g of rust. What is the % yield of this reaction?

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MOLARITY

The number of **moles** of the chemical solute per **litre of solution**.

mol/L = M

For example:

1.8 M HCl means 1.8 moles of HCl per litre of solution.

Table 1 Amount Concentrations of Common Stock Acid Solutions

Stock acid	Amount concentration (mol/L)
hydrochloric acid, $HCl(aq)$	12
nitric acid, $HNO_3(aq)$	16
sulfuric acid, $H_2SO_4(aq)$	18

$$\text{Molarity} = \frac{\text{moles of solute}}{\text{volume of solution in liters}}$$

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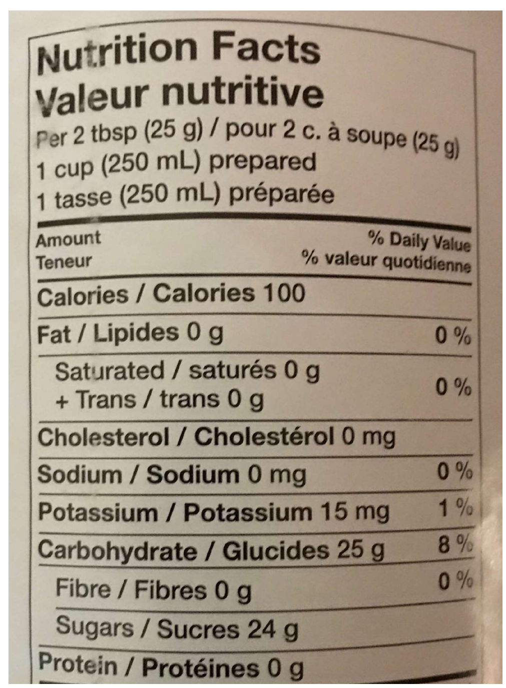
CALCULATING MOLARITY

A student makes some iced tea as per the instructions on the container. Calculate the molarity of **sugar** in the juice. (Assume the sugar in powdered drinks is all **sucrose** $C_{12}H_{22}O_{11}$

$$\text{Molarity} = \frac{\text{moles of solute}}{\text{volume of solution in liters}}$$



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WORKING WITH MOLARITY

Household chlorine bleach is a 0.067 M solution of sodium hypochlorite. What mass of NaClO solute is required to prepare 225 mL of bleach solution?

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DILUTION

Concentrated solutions have a relatively **high** molarity.

Dilute solutions have a relatively **low** molarity.

It is often **faster** to prepare a standard solutions by **diluting** a more concentrated solution.

The following **equation** can be used to solve **dilution problems** – when **water** is **added** or **removed** from a solution.

$$M_1V_1 = M_2V_2$$

M_1 = the initial molarity M_2 = the final molarity

V_1 = the initial volume V_2 = the final volume

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DILUTION

A student measures 100.0 mL of a 5.0 M potassium chloride solution and adds enough water to it to make the volume 2.0 L. What will be the molarity of this new solution?

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DILUTION

How much water would you need to add to 200.0 mL of a 1.50 M sodium nitrate solution to dilute it down to 0.250 M?

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DILUTION

If you were to mix 200.0 mL of a 0.750 M NaCl solution with 300.0 mL of a 0.250 M NaCl solution, what would the final molarity of the solution be?

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