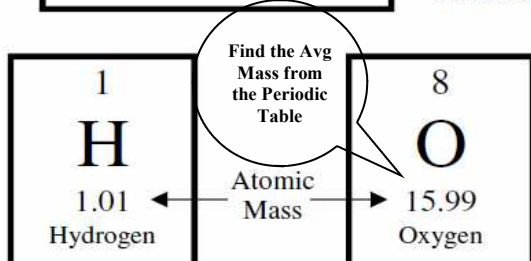


In any closed reaction mass is never created or destroyed only transformed.

MASS MUST BE CONSERVED!

Molecular Mass

The molecular mass tells you how heavy a molecule is. To find the molecular mass add up the atomic masses of the individual atoms.



Example: Find the molecular mass of water.

$H_2O = 2 H + 1 O$	2nd method:
$= (2 \times 1.01) + (1 \times 15.99)$	1.01
$= 2.02 + 15.99$	+ 1.01
$= \mathbf{18.01}$	<u>+ 15.99</u>
	18.01

Open vs. Closed Reactions

Only a closed reaction can prove the Law of Conservation of Mass, since you can still measure the mass.

Closed System



Products are trapped.



Before:
54 grams

Mass is not lost.

After:
54 grams

Open System



Products can escape.



Before:
54 grams

Mass seems to be lost.

After:
51 grams

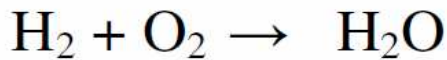
Actually, it just escaped!

Mass Must Be Conserved

The mass of the reactants must equal the mass of the products. SO, the number of reacting atoms must equal the number of product atoms.

This is the Law of Conservation of Matter!

NOT BALANCED

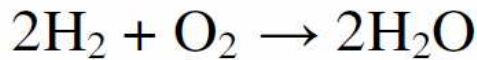


$(2 \times 1.01) + (2 \times 15.99)$	$(2 \times 1.01) + (1 \times 15.99)$
2.02 + 31.98	2.02 + 15.99
34 before	18.01 after

UNEQUAL MASS, SO NOT BALANCED

The 2 sides have to have the same Molecular Mass

BALANCED

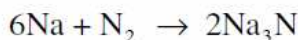


$(4 \times 1.01) + (2 \times 15.99)$	$(4 \times 1.01) + (2 \times 15.99)$
4.04 + 31.98	4.04 + 31.98
36.02 before	36.02 after

EQUAL MASS, SO BALANCED

When both side are equal, the formula is balanced

Example 1:



g g ? g

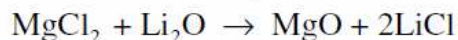
How much Sodium Nitride was created?
Mass must be conserved so the reactants must equal the products, so:

$$g + \quad g = ?g$$

$$g = ?g$$

Check with Mr. Neddo to see if you are correct

Example 2:



g g g ? g

How much Lithium Chloride was created?
Since mass must be conserved, the reactants must equal the products. So:

$$g + \quad g = \quad g + ?g$$

$$g = \quad g + ?g$$

$$g - \quad g = ?g$$

$$g = \quad g \text{ of LiCl}$$


Check with Mr. Neddo to see if you are correct

So, 20 g of LiCl was created in the reaction!

1. Closed System	A. In a closed reaction mass cannot be lost.	Find the molecular mass of the following compounds. N ₂ CaF ₂ CO ₂ Na ₂ SO ₃
2. The Law of Conservation of Mass	B. When the reactants equal the products.	
3. Open System	C. When the reaction is closed and gases can't escape.	
4. Atomic Mass	D. How heavy a compound or molecule is.	
5. Molecular Mass	E. When gases aren't caught by the experimental setup.	
6. Balanced Reaction	F. The decimal numbers on the periodic table.	

Find the atomic masses for the following elements

A. Sodium = _____ E. Gold = _____
 B. Chlorine = _____ F. Hydrogen = _____
 C. Iron = _____ G. Neon = _____
 D. Mercury = _____ H. Lead = _____



Open or closed reaction?

Will you be able to prove the Law of Conservation of Mass with this setup? Why or why not?

Will the mass of his products be greater than, less than, or equal to his reactants?

Why?

$4K + O_2 \rightarrow 2K_2O$ If 25 g of Potassium is reacted with 5 g of Oxygen, how much Potassium Oxide is produced?
 25g + 5 g ? g

$2Mg + O_2 \rightarrow 2MgO$ If 23 g of Magnesium is reacted with Oxygen to produce 38 g of Magnesium Oxide, how much Oxygen was used in the reaction?
 23g + ? g 38 g

$2KCl + Li_2O \rightarrow K_2O + 2LiCl$ Using the numbers given, find how much K₂O is produced in the reaction.
 21g + 4 g ? g 12 g

How many total molecules are there?

_____ 2H₂O _____ 5Be₂Br _____ 8CO₂
 _____ 3NaCl _____ O₂ _____ MgS

$Li_2O + MgCl_2 \rightarrow 2LiCl + MgO$

Name the first reactant: _____

Name the second product: _____

How many Magnesiums on the product side? _____

How many total atoms are there?

_____ 2H₂O _____ 2Be₂Br _____ 7CO₂
 _____ 6NaCl _____ 4O₂ _____ 2MgS

$2K_3N + 3CaCrO_4 \rightarrow Ca_3N_2 + 3K_2CrO_4$

Circle the second reactant. Underline the first product.

How many Nitrogen atoms on the reactant side: _____

How many Calcium atoms on the product side? _____

$2AlCl_3 + 3Na_2CO_3 \rightarrow Al_2(CO_3)_3 + 6NaCl$

Circle the first product. Underline the first reactant.

How many Sodium atoms on the product side? _____

How many AlCl₃ molecules on the reactant side? _____

$Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$

Circle and Name the first reactant: _____

How many total atoms on the product side: _____

How many total molecules on the reactant side: _____