

THE LAW OF CONSERVATION OF MATTER



CONSERVATION OF MASS

The Law of Conservation of Matter
states that matter *cannot be created or*
destroyed, it can only change forms.



Matter can change its form through physical & chemical changes ...

Examples:

- The evaporation of a puddle of water
- Rust forming on a metal fence



PHYSICAL



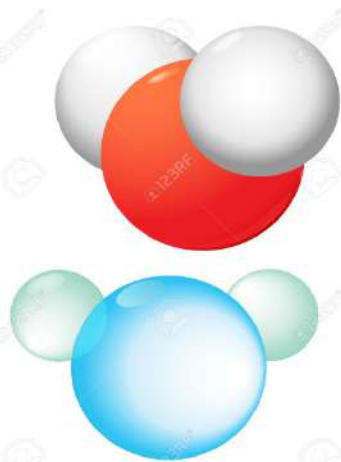
CHEMICAL

Chemical equations are used to illustrate the Law of Conservation of Matter:

For example: When iron reacts with oxygen & water in the air, they form rust or IRON OXIDE.

The chemical equation is written as:

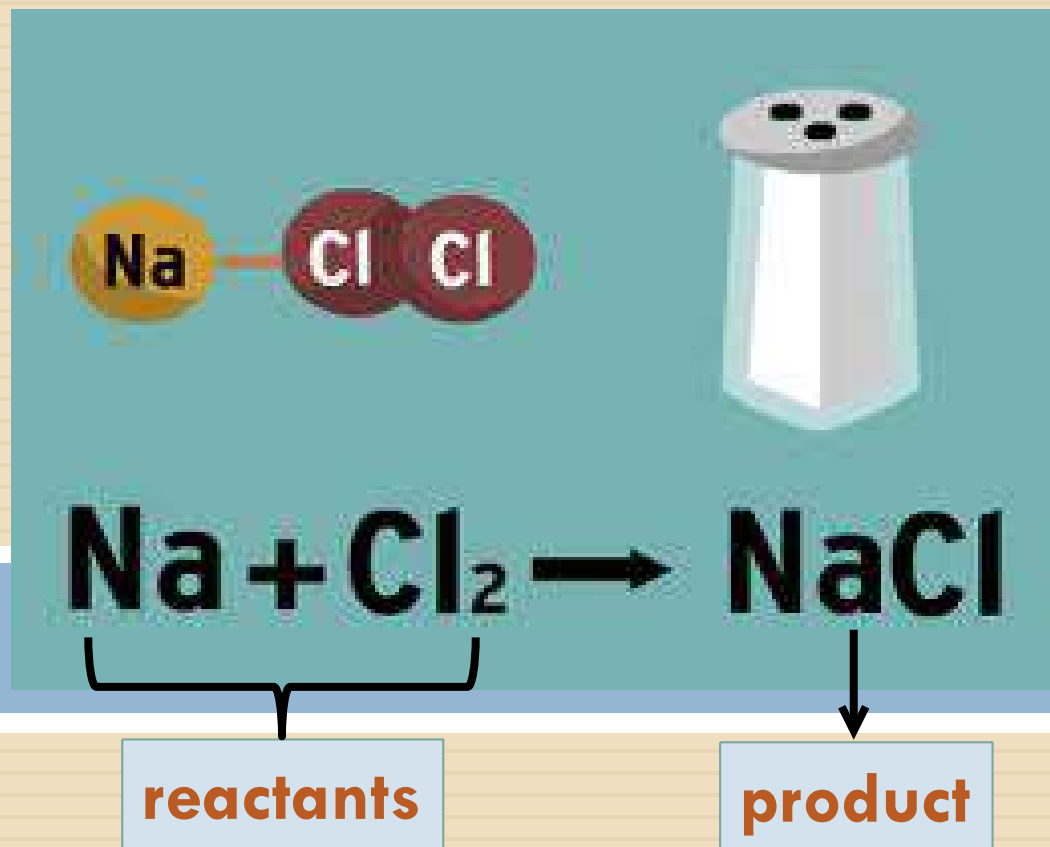
iron + oxygen + water  iron oxide



CHEMICAL REACTIONS

- In every chemical reaction there are **REACTANTS & PRODUCTS**.
- **REACTANTS** are the substances combined in a chemical reaction.
- **PRODUCTS** are substances that are produced in the reaction.

Example:

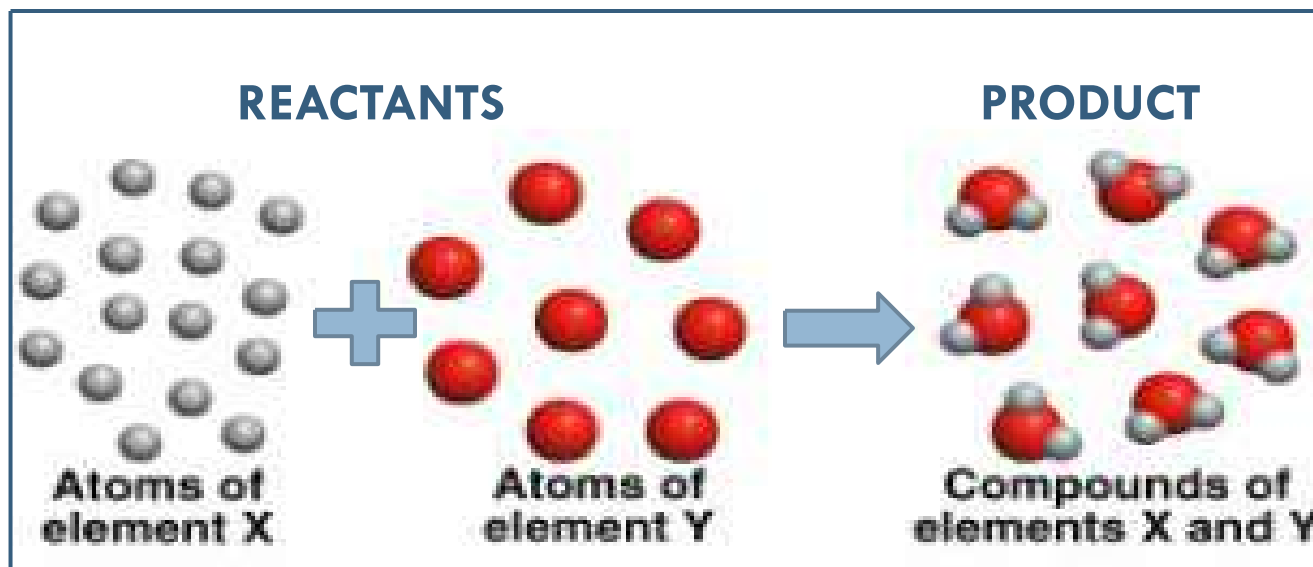


REACTANTS & PRODUCTS

- Even though matter may change from one form to another during a **reaction**, the total number of atoms before and after the reaction DOES NOT CHANGE!

NUMBER OF ATOMS IN REACTANTS = NUMBER OF ATOMS IN PRODUCT

Example:

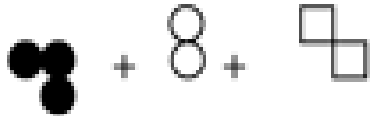


OF X = ____

OF Y = ____

OF X = ____ ; # OF Y = ____

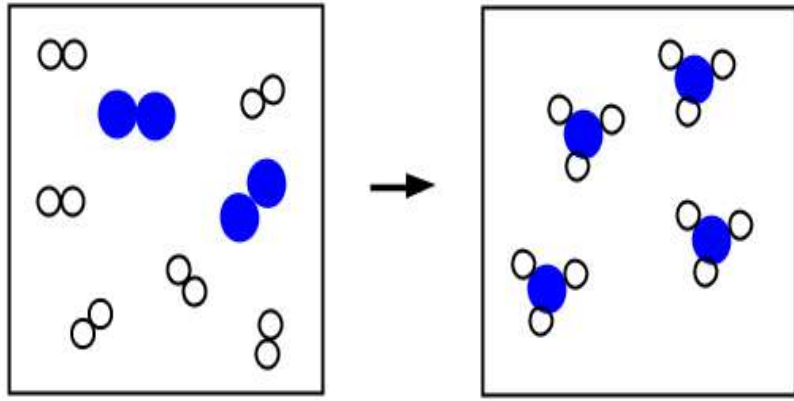
PRACTICE: DOES EACH EQUATION OBEY THE LAW OF CONSERVATION OF MATTER?

	Reactants	Products
I		
II		
III		
IV		

****REMEMBER: # of reactants MUST = # of products**

MORE PRACTICE: DO EACH OF THE FOLLOWING OBEY THE LAW?

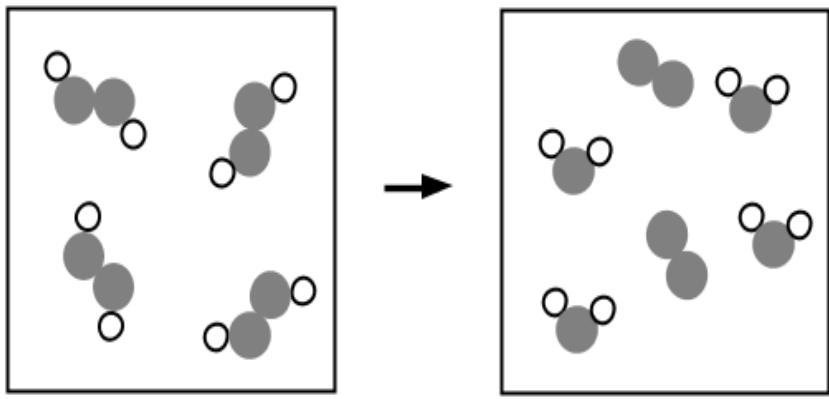
A.



○ = _____
● = _____

○ = _____
● = _____

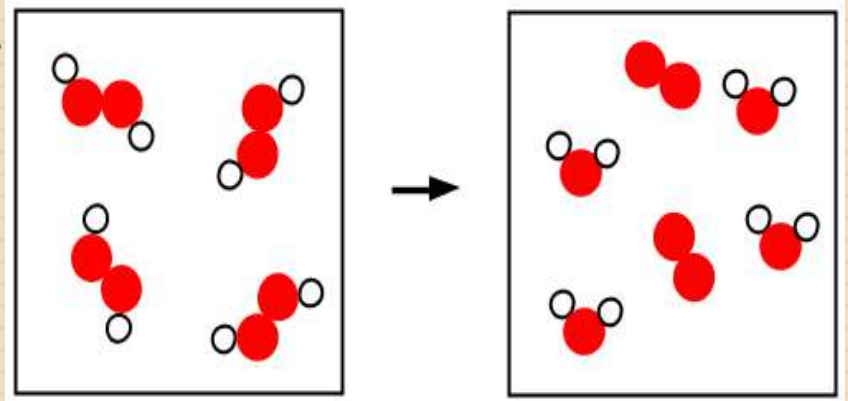
B.



○ = _____
● = _____

○ = _____
● = _____

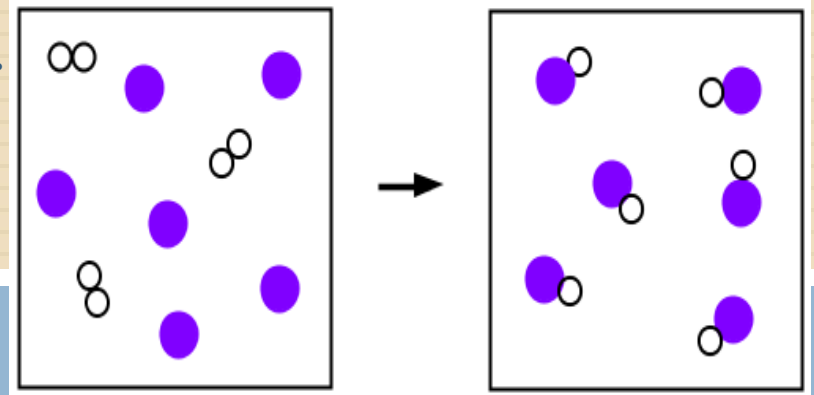
C.



○ = _____
● = _____

○ = _____
● = _____

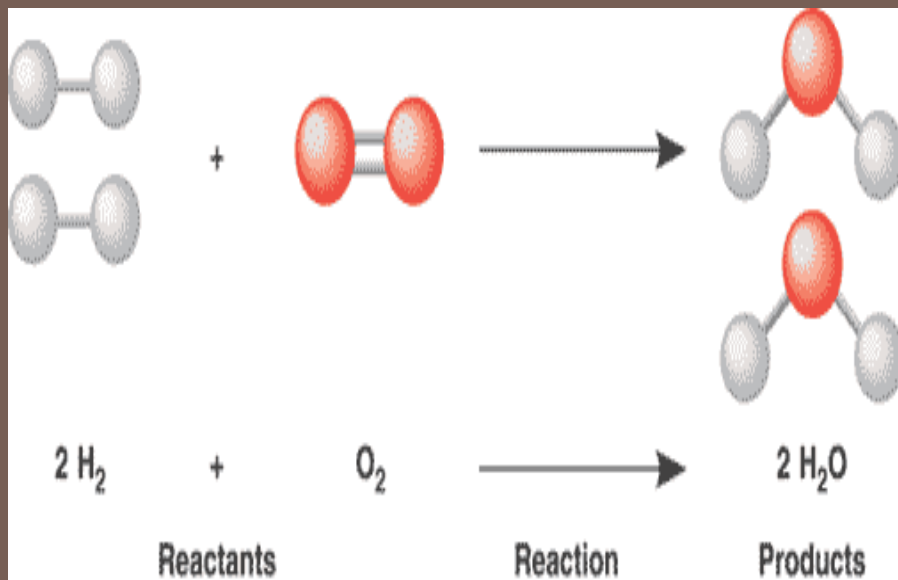
D.



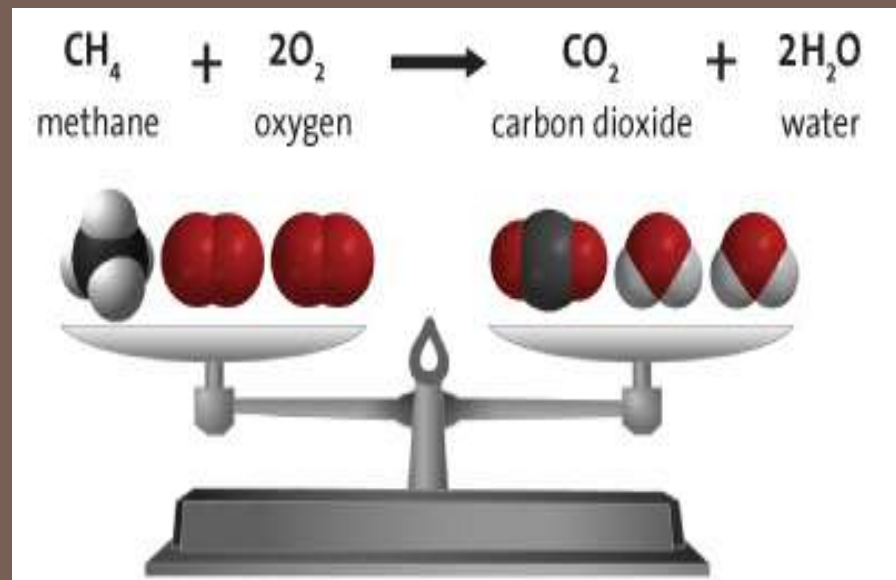
○ = _____
● = _____

○ = _____
● = _____

MORE PRACTICE: DOES EACH EQUATION OBEY THE LAW OF CONSERVATION OF MATTER?



H = ____ # O = ____ $\rightarrow$ # H = ____ ; # O = ____



C = ____

H = ____

O = ____

$\rightarrow$

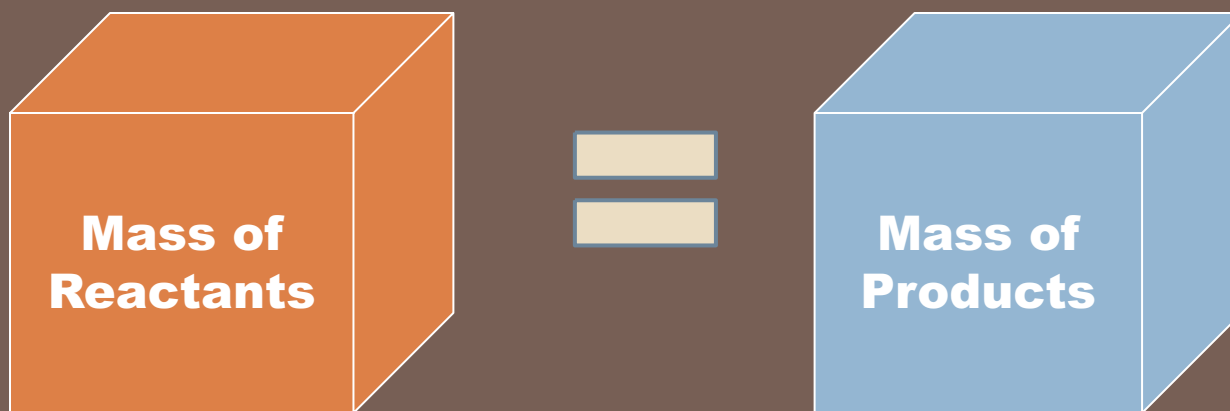
C = ____

H = ____

O = ____

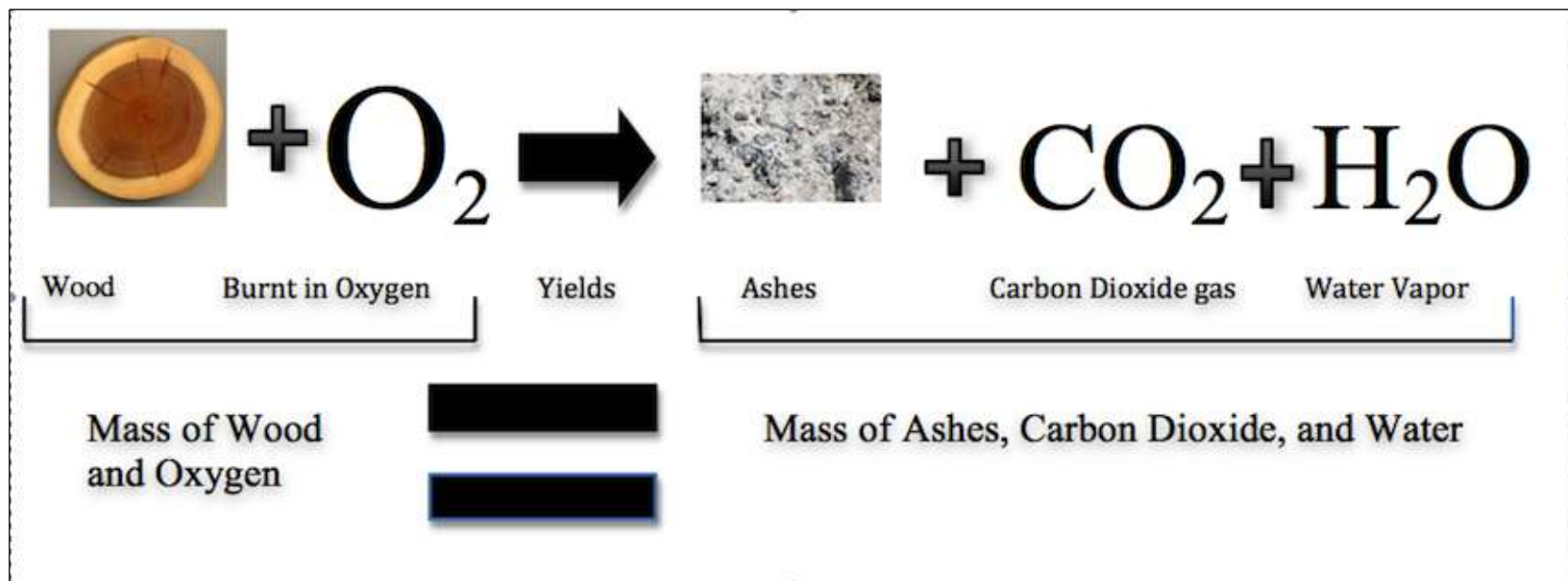
CONSERVATION OF MASS

- Although matter changes in a reaction, the total amount of mass DOES NOT CHANGE!
- The mass of the reactants is ALWAYS EQUAL to the mass of the product(s).



CONSERVATION OF MASS

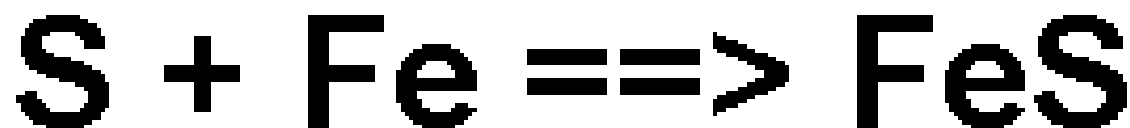
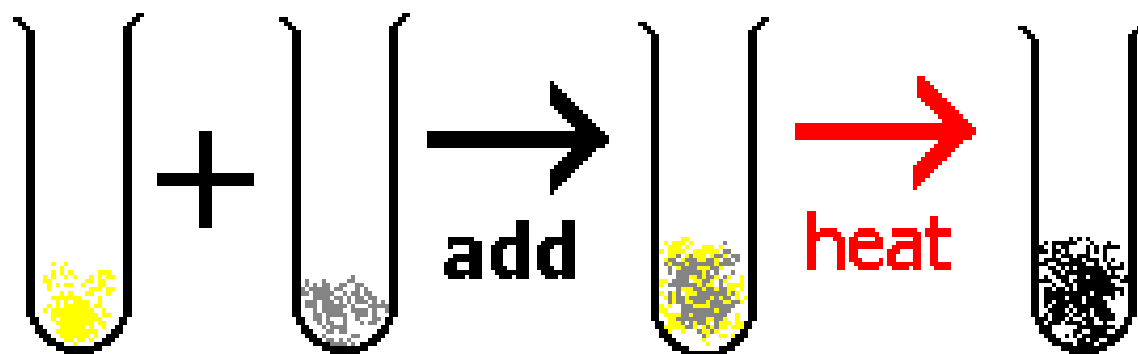
□ The mass of materials is the same BEFORE and AFTER the reaction



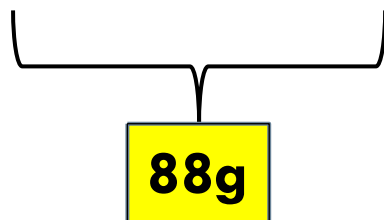
Products = 100g

Reactants = 100g

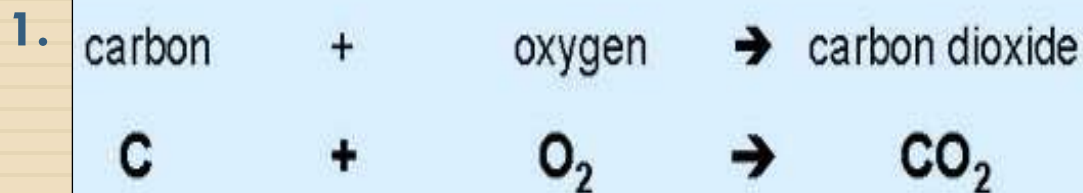
Example:



32g + 56g reactants $\implies$ 88g products


88g

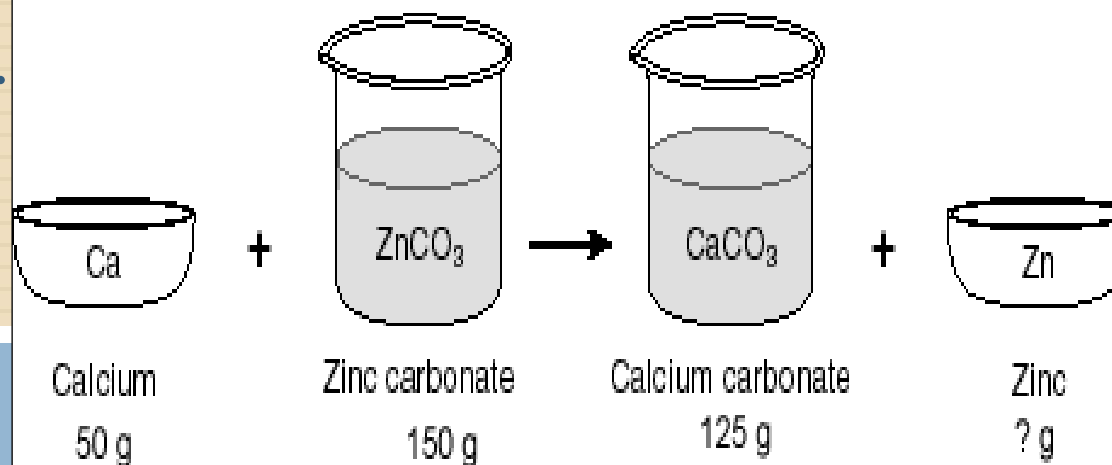
More Examples:



12g 32g 44g

So we need 32g of oxygen to react with 12g of carbon and 44g of carbon dioxide is formed in the reaction.

2.



- What are the reactants? products?
- What is the total mass of the reactants?
- What is the mass of zinc produced?
- What is the total mass of the reactants?

YOU TRY! 😊

3. Assume that the chemical reaction started out 6g of potassium and 6g of water. How many grams of potassium hydroxide will be produced by the chemical reaction?

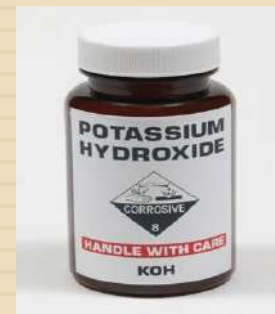
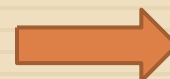


6g

+



6g



?

4. If 50g of sodium reacts with chlorine to form 125g of salt. How many grams of chlorine reacted?



50g

+



?



125g