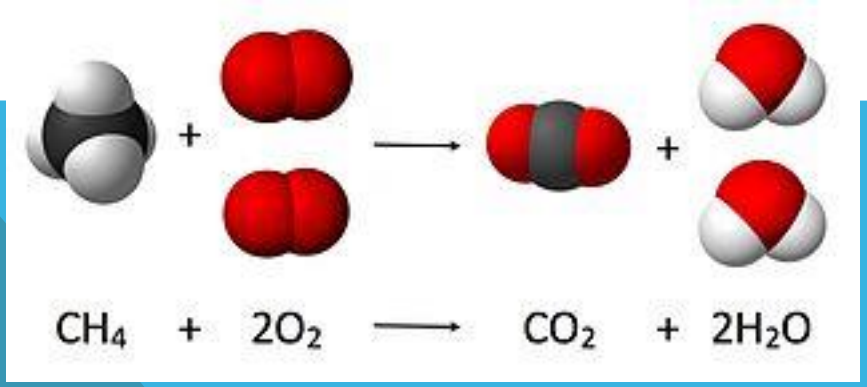
CHEMICAL REACTIONS

LAW OF CONSERVATION OF MASS

- Mass can not be **CREATED** or **DESTROYED**

- This means that in a chemical reaction the number of atoms you start with is the **SAME** as the number of atoms you end with



CHEMICAL FORMULAE

- Chemical Formulae (plural of formula) are <u>how we express compounds</u>
- Just as H is a symbol for hydrogen, H_2O is a symbol for water
- The small numbers present in the formulae are call **subscript** and they indicate **how many of each type of atom** is in the compound or molecule

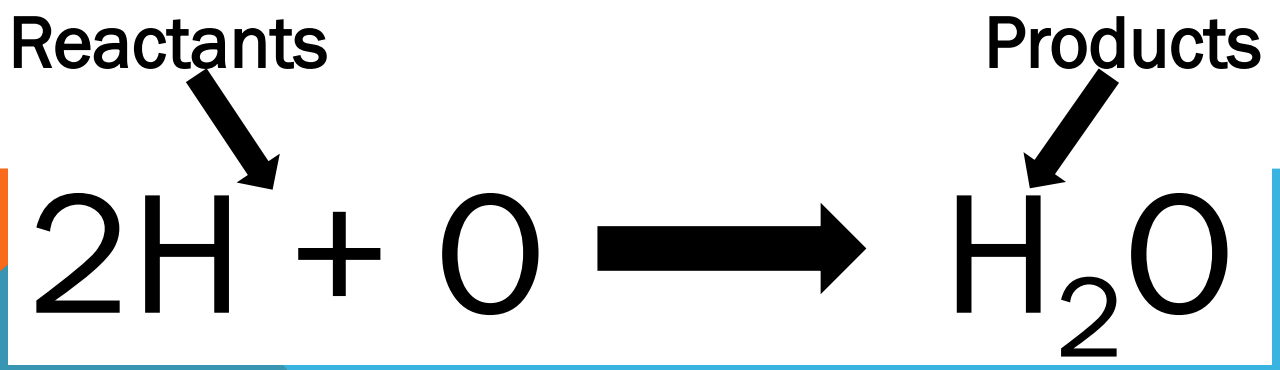
- Some other common chemical formulae….
  - CO_2
  - $C_6H_{12}O_6$
  - NaCl

CHEMICAL EQUATIONS

- Chemical reactions can be written out as chemical equations these are similar to mathematical equations but instead of an "=" you use an arrow to separate the sides ➡

REACTANTS AND PRODUCTS

- The elements or compounds that are on the LEFT side of the arrow are your **reactants** the elements and compounds on the RIGHT hand side are called the **products**

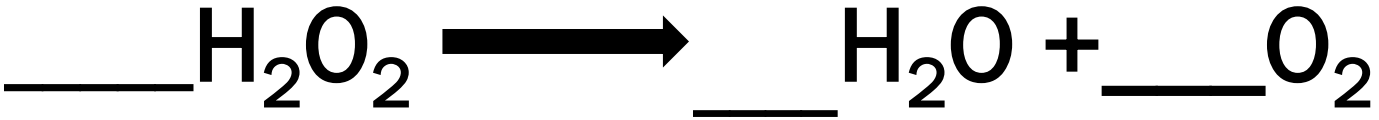


BALANCING CHEMICAL EQUATIONS

- Chemical reactions always follow the law of conservation of mass…the number of atoms of each element must be equal before the reaction (the reactants) and after the reaction (the products)
- To balance the number of atoms on each side of the equation, you must add a coefficient in front of certain compounds or elements to show the number of each atom being used in the reaction.
- Think about distributive property in math!

PRACTICE BALANCING

Hydrogen Peroxide and Yeast:



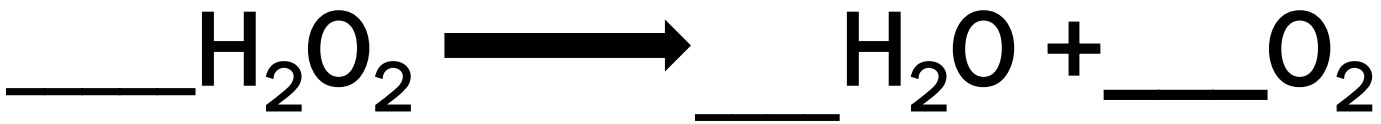
- 1st – make a list of the TOTAL number of each type of atom on the left and on the right

Left: 2 Hydrogen	Right: 2 Hydrogen
2 Oxygen	3 Oxygen

If the numbers all match then you're done, the equation is balanced! If not we'll need to do some math…

IF YOU HAVE DIFFERENT NUMBERS OF ATOMS

Hydrogen Peroxide and Yeast:



- 2nd- If you have **different numbers of <u>any type</u> of atom** on the left and right do the math to make them match.
- Putting **coefficients** in front of a compound or element in a chemical reaction means there is more than one of that element. Just like in math if you do not see a **coefficient** assume there is only one.

FIND THE CORRECT COEFFICIENT

Hydrogen Peroxide and Yeast:

$$\_\_\_\_H_2O_2 \longrightarrow \_\_H_2O + \_\_\_O_2$$

- In this case if we give both hydrogen peroxide (H_2O_2) and water (H_2O) a coefficient of 2 and leave oxygen (O_2) with a coefficient of 1 then we end up with:

$$2H_2O_2 \longrightarrow 2H_2O + O_2$$

DOUBLE CHECK

$$2H_2O_2 \longrightarrow 2H_2O + O_2$$

- 3rd- count the atoms on both sides **again** to double check that we're following the law of conservation of matter (same number of atoms on both sides)****be sure to distribute the coefficient!!*****

Left: 4 Hydrogen 4 Oxygen	Right: 4 Hydrogen 4 Oxygen

- Since we have the same number of Hydrogen and Oxygen atoms on both side the equation is **balanced**!