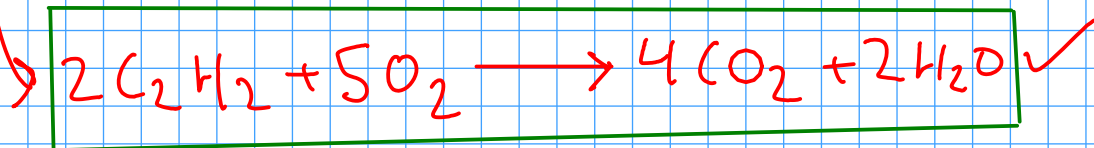
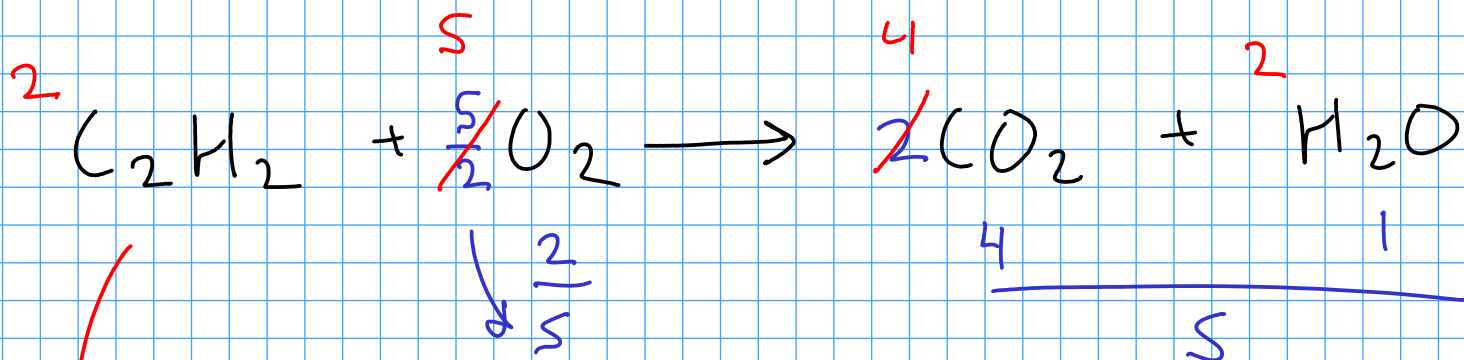
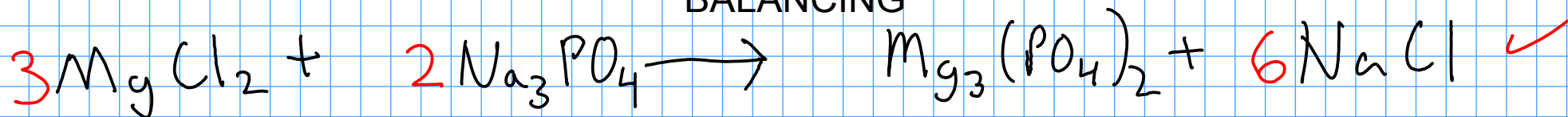
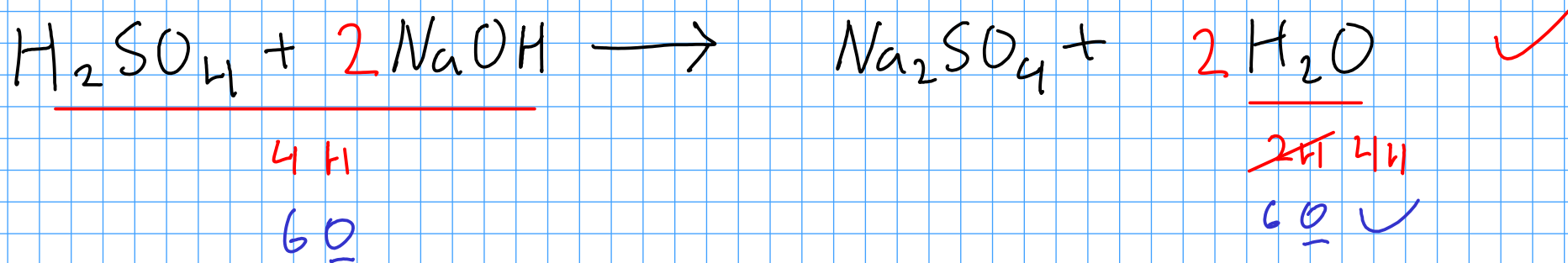


BALANCING



To get one oxygen atom from O₂, you need HALF (1/2) of an O₂. So to get FIVE oxygen atoms, you need 5/2 O₂. To get rid of the 5/2, multiply EVERY coefficient by 2. That will give us the smallest whole number ratio!



IDENTIFYING REACTIONS

You may see one or more of these signs when a chemical reaction occurs

- ① - A change in temperature that can't be explained in another way.
- ② - Emission of light that can't be explained in another way
- ③ - The formation of a solid - or PRECIPITATION - in a previously liquid solution. (Not a simple phase change!) *or gas formation!*
- ④ - Color change (not simply lightening of color caused by diluting a solution!)

CLASSIFYING REACTIONS

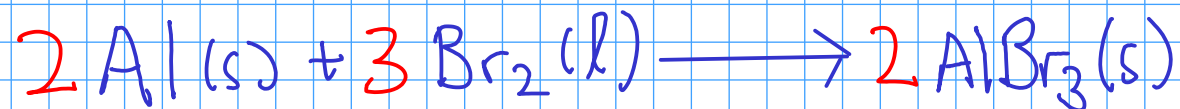
- It's simpler to talk about different reactions if we can classify them into a small number of classes.
- We will discuss five classes of chemical reaction. (You may learn additional ways to classify reactions in more advanced chemistry courses!)

① COMBINATION REACTIONS

- Reactions that involve two or more simple substances **COMBINING** to form a **SINGLE** product
- Often involve large energy changes. Sometimes violent!



Example:

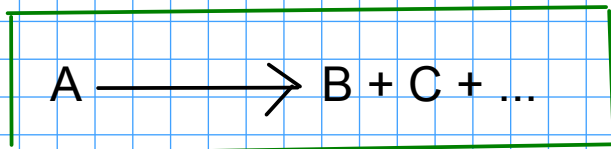


CLASSIFYING REACTIONS

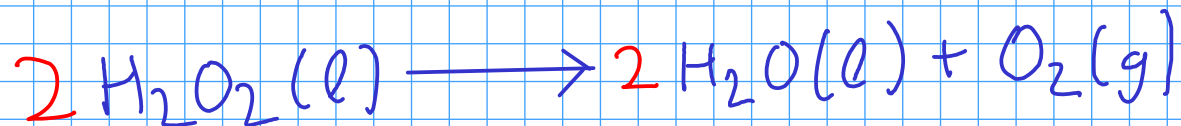
② DECOMPOSITION REACTIONS

- Reactions where a SINGLE REACTANT breaks apart into several products

- Form:



Example:



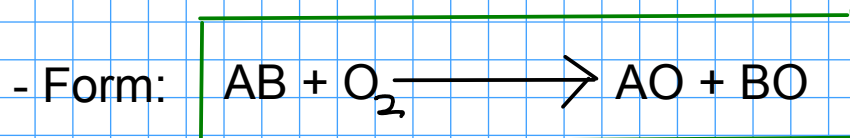
* This reaction is NOT a combustion reaction, even though O_2 is involved!

* Combustion reactions CONSUME O_2 , while this reaction PRODUCES O_2

CLASSIFYING REACTIONS

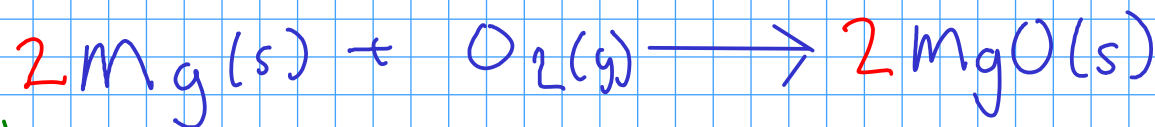
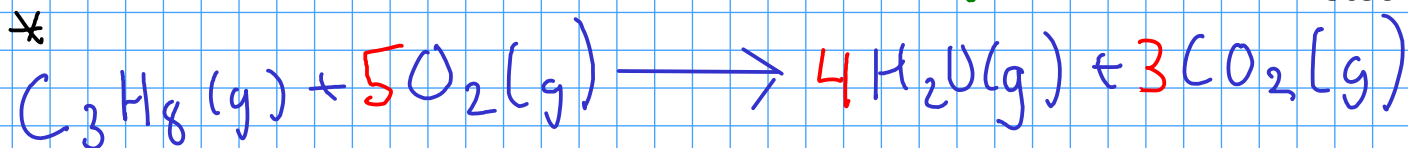
3 COMBUSTION REACTIONS

- Reactions of substances with MOLECULAR OXYGEN (O_2) to form OXIDES.
- Combustion forms an OXIDE of EACH ELEMENT in the burned substance!



Oxide: a compound containing OXYGEN and one other element!

Examples:



This reaction can also be called a combination!
Two reactants form a single product.

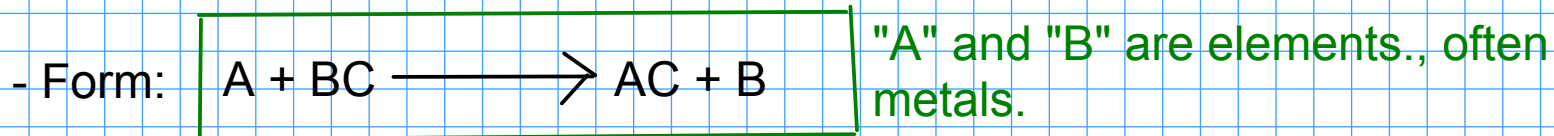
* Combustion of hydrocarbons makes carbon dioxide and water, if enough oxygen is present. In low-oxygen environments, carbon monoxide is made instead!

Oxides!

CLASSIFYING REACTIONS

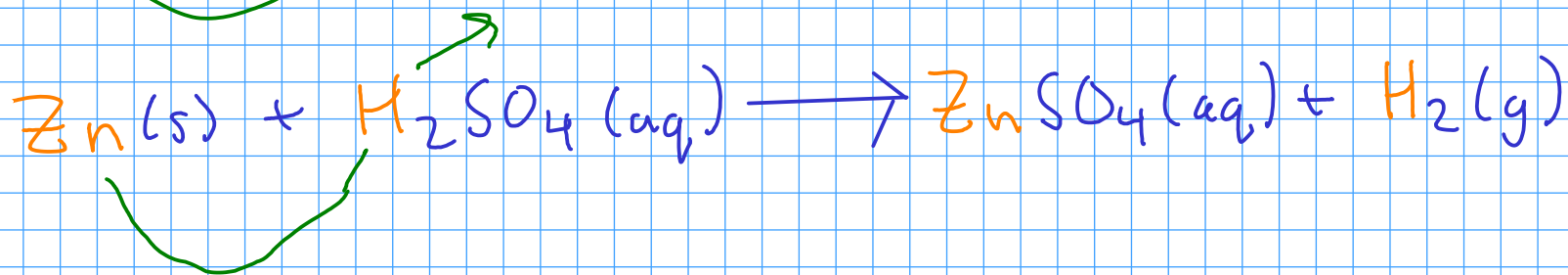
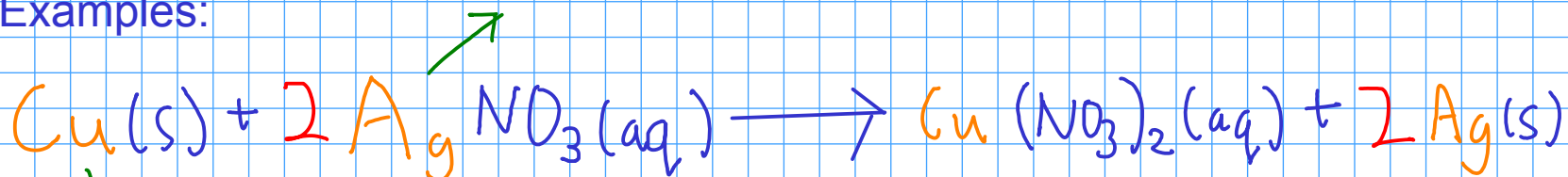
④ SINGLE REPLACEMENT REACTIONS

- Reactions where one element REPLACES another element in a compound.
- Can be predicted via an ACTIVITY SERIES (more on that later!)



- Easy to spot, since there is an element "by itself" on each side of the equation.

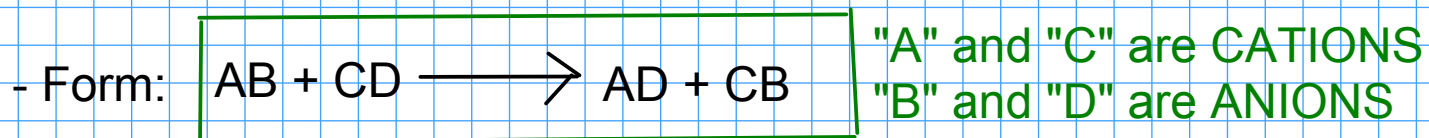
Examples:



CLASSIFYING REACTIONS

5 DOUBLE REPLACEMENT REACTIONS

- Also called "exchange" reactions
- The ions in two ionic compounds (one compound may also be an acid) EXCHANGE PARTNERS, forming two new compounds.



- Can be predicted based on the characteristics of the potential products (More on that later!)
- Occur in AQUEOUS SOLUTION

Examples:

