

3 • What Happens When Chemicals Are Put Together?

STUDY LIST

What Happens When Fuels Burn?

I can...

- state that burning is called combustion
- write the reactants and products for a complete combustion reaction of a hydrocarbon fuel
- balance combustion equations
- include “heat” as a product of combustion

How Do We Symbolize A Chemical Reaction?

I can...

- define and give examples of “reactants,” “products,” and “coefficients”
- explain the difference between a chemical reaction and a chemical equation
- write a chemical equation given a word equation for a chemical reaction
- balance chemical equations making certain that each side of the equation has the same number and kind of atoms
- explain that chemical equations are balanced because the number and kind of atoms do not change during a chemical reaction, they are merely rearranged. Mass is conserved.
- use the symbols (s), (l), (g), and (aq) to describe the reactants and products

(s)	solid
(l)	liquid, melted, “molten”
(g)	gas
(aq)	“aqueous”, dissolved in water

Can We Classify Reactions?

I can...

- state four types of chemical reactions (besides combustion) and show their patterns:
 double replacement $(XY + AB \rightarrow XB + AY)$
 single replacement $(XY + A \rightarrow AY + X)$
 synthesis $(X + Y \rightarrow XY)$
 decomposition $(XY \rightarrow X + Y)$
- match actual chemical equations to these four types and combustion

- make, collect, and identify three gases, H_2 , O_2 , and CO_2 . Additionally, I can classify the chemical reactions used to make and test these gases according to the four types studied in class.
- state that active metals and acids form H_2 gas
- define “precipitate” as a solid product in a double replacement reaction
- write the molecular, ionic, and net ionic equations for a precipitation reaction
- identify “spectator ions” in a precipitation reaction
- use a solubility chart to predict whether an ionic compound is a precipitate

What Are Ionic Compounds Made Of?

I can...

- define an ion as an atom or group of atoms with a charge
- state that a positive ion results when an atom loses electrons while a negative ion results when an atom gains electrons
- memorize 40 common ions so I can give the symbol and charge when given the name and vice versa
- state the charges of some ions because of their position on the periodic table
- write an ionic compound from any positive and negative ion
- use parentheses appropriately when writing compound that involve polyatomic ions
- use the terms “anion” for a negative ion and “cation” for a positive ion

What is Oxidation-Reduction?

I can...

- state that oxidation means a chemical is losing electrons and reduction means a chemical is gaining electrons
- recognize oxidation and reduction given a chemical equation

Are All Compounds Ionic?

I can...

- recognize molecular compounds formed between two non-metals
- name molecular compounds using the prefixes mono-, di-, tri-, tetra-, penta-, hexa-, hepta-, octa-, nona-, and deca-, etc.
- recognize acids as ionic compounds where the positive ion is H^+
- name acids according to the ending of the negative ion

ending	acid name	example
ide	hydro___ic acid	HCl hydrochloric acid
ate	___ic acid	HClO ₃ chloric acid

- add "ur" or "or" when sulfur or phosphorus are part of the ion

What Is Stoichiometry?

I can...

- use the coefficients in a balanced as a conversion factor for calculations
- calculate the mass, volume, or number of particles of any substance in a chemical reaction given the mass, volume, or number of particles of any other substance in the chemical reaction
- identify the limiting reactant (the reactant that runs out first) when amounts of two reactants are mixed
- solve limiting reactant problems in which two given values are supplied