

Lesson 10

Chemistry 0

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Week 9 HW Review

- Determine if each is a physical or chemical change.
 - a. glass breaking
 - b. hammering wood together to build a playhouse
 - c. a rusting bicycle
 - d. separating sand from gravel
 - e. mixing lemonade powder into water
 - f. corroding metal
 - g. bleaching your hair
 - h. fireworks exploding
 - i. squeezing oranges to make orange juice
 - j. burning leaves



Week 9 HW Review

- Please name the following compounds:

NO:	Nitrogen Monoxide
AlCl ₃	Aluminum Chloride
KF	Potassium Fluoride
CO ₂	Carbon Dioxide
H ₂ O	Water

Week 9 HW Review

- Please write the chemical formula for the following compounds:

dinitrogen tetroxide:



phosphorus pentachloride:



phosphorus trichloride:



magnesium oxide:



methane:





Counting Atoms

- Learning how to count the atoms of a given element will help to understand how to balance a chemical reaction.
- A chemical formula can tell you how many which type of atom are bonded together. It can also tell you the nature of the bond, whether or not the bond is ionic or covalent.



Counting Atoms

- NH_3
- H_2O
- C_3H_8
- K_2CO_3
- $\text{Ca}(\text{OH})_2$
- $\text{Mg}_3(\text{PO}_4)_2$

A subscript denotes when more than one atom of a given element is present in a molecule.



Counting Atoms

- 4 H₂O
- 5 Al₂O₃
- 6N₂
- 8 C₂H₅OH
- 3(NH₄)₂SO₄

A coefficient is a number that appears to the left of a molecule. It tells you how many molecules are present.



Balancing Equations

- A chemical equation indicates which compounds are involved in the reaction.
- The left side of the equation has the **reactants** added together, while the right side of the equation has the **products** added together.
- The equation has a yield (\longrightarrow) symbol rather than an equal (=) sign. The reaction “yields” the products.
- A balanced equation tells you how much of each reactant is needed to form the products.



Balancing Equation Exercise #1

- Hydrogen gas reacts with Oxygen gas to produce water



The equation needs to be balanced when there are equal numbers of each type of atom on both sides.

Balancing Equation Exercise #1

- Hydrogen gas reacts with Oxygen gas to produce water



1. Focus on one element first:

Hydrogen atoms: left side- 2; right side- 2

Oxygen atoms: left side- 2; right side -1

Balancing Equation Exercise #1

- Hydrogen gas reacts with Oxygen gas to produce water



2. Let's balance oxygen atoms:



3. Let's count the atoms on both sides again:

Hydrogen atoms: left side- 2; right side- 4

Oxygen atoms: left side- 2; right side -2

4. Let's balance hydrogen atoms:



All balanced!!



Balancing Equations

- When balancing a chemical equation, the goal is to have the same number of each type of atom on each side of the equation.
- Count the number of each type of atom on each side to make sure all is balanced.
- If it is not balanced, add a coefficient somewhere to try and balance one type of atom at a time.
- Sometimes, when you add a coefficient, it balances one type of atom, but a different atom becomes unbalanced. Try again through trial and error.

Balancing Equation Exercise #2

- Zinc reacts with Sulfur in the form of S₈ to yield zinc sulfide.



1. Let's count atoms on both sides:

Zinc atoms: left side- 1, right side -1

Sulfur atoms: left side- 8, right side -1

Balancing Equation Exercise #2

- Zinc reacts with Sulfur in the form of S_8 to yield zinc sulfide.



2. Let's balance sulfur atoms by adding a coefficient:



Zinc atoms: left side- 1, right side -8

Sulfur atoms: left side- 8, right side -8

Balancing Equation Exercise #2

- Zinc reacts with Sulfur in the form of S₈ to yield zinc sulfide.



3. Let's balance Zinc atoms by adding a coefficient



Zinc atoms: left side- 8, right side -8

Sulfur atoms: left side- 8, right side -8

All balanced!!

Balancing Equation Exercise #3

- Iron Oxide reacts with Carbon Monoxide to yield Iron and Carbon Dioxide.



1. Let's count atoms on both sides:

Iron atoms: left side- 2, right side -1

Oxygen atoms: left side- 4, right side -2

Carbon atoms: left side- 1, right side -1

Balancing Equation Exercise #3

- Iron Oxide reacts with Carbon Monoxide to yield Iron and Carbon Dioxide.



2. Let's balance Iron atoms first by adding a coefficient:



Balancing Equation Exercise #3

- Iron Oxide reacts with Carbon Monoxide to yield Iron and Carbon Dioxide.



3. Let's balance Oxygen atoms next by adding a coefficient:



4. Carbon atoms are balanced already!!

All balanced!!



Balancing Equation Rules

- Begin by balancing one element at a time.
- First balance elements that appear only once on each side of the equation.
- Balancing multi-element compounds before balancing single-element compound.
- Balance H and O atoms last.
- Use trial and error. Be patient.
- Add up all of the kinds of atoms on both sides of the equation to make sure it is completely balanced.