

Day 2: Chemical Reactions (3 ec)

#5 Reactions: Chemical reactions are processes in which atoms are rearranged into different combinations of molecules.

- Reactant atoms and molecules interact to form products with different chemical properties.
- The idea of atoms explains the conservation of matter: In chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.
- Chemical reactions usually liberate heat or absorb heat.
- Physical processes include freezing and boiling, in which a material changes form with no chemical reaction.
- Know how to determine whether a solution is acidic, basic, or neutral.

Brainpop: Compounds & Mixtures: Take Notes: _____

Vocabulary - Write the definitions for the following terms:

a. Chemical Reaction _____

b. Reactants _____

c. products: _____

d. 4 phases of matter:

- _____ the state in which matter has a definite volume and shape
- _____ the state in which matter has a definite volume but takes the shape of its container
- _____ a state in which matter changes in volume and shape
- _____ : a state that does not have a definite volume and shape, but whose particles have broken apart

e. physical property: _____

f. chemical property _____

g. physical change: _____

h. chemical change: _____

Are state changes (ie freezing, melting) examples of chemical or physical change? **Any state change is a PHYSICAL CHANGE!** This is because the substance is still the same before and after, it has just changed its shape. For example, ice and water vapor are two different states (solid and gas), but they are still water. Sublimation, condensation, freezing, melting, evaporation...all are physical changes.

Physical versus Chemical PROPERTIES: Elements, substances, & compounds have both physical & chemical properties. **Physical properties** are those that can be described using the senses & can be determined without destroying the object. **Chemical properties** describe how a substance reacts with another substance & the original is changed into something else. Classify each term as a physical (P) or chemical (C) property **BEFORE class!**

_____ density	_____ reacts with acid	_____ hardness	_____ flammability
_____ taste	_____ reacts with oxygen	_____ odor	_____ melting point
_____ color	_____ reacts with a base	_____ luster	_____ neutralizes a base
	_____ Water boils at 100 ^o Celcius		_____ Vinegar will react with baking soda.

In a **physical change**, the original substance still exists, it has only changed form. These include all state changes. In a **chemical change**, a new substance is produced. Chem. changes always includes a change in energy & a phys. change. Chemical reactions involve chemical changes. Write **P** for physical change or **C** for chemical change. **BEFORE CLASS**

_____ glass breaking	_____ cutting grass	_____ separating sand from gravel
_____ corroding metal	_____ burning leaves	_____ fireworks exploding
_____ burning toast	_____ dying your hair	_____ water evaporating from a pond
_____ whipping cream	_____ dry ice sublimating	_____ freezing a Capri Sun to make it a slushie
_____ spoiling/rotting food		

Chemical Reactions Involve Energy Change: In a chemical reaction, energy is usually liberated (released) or absorbed in the form of **HEAT**. State whether each of the following equations is an endothermic change or exothermic.

Electrolysis of Water – $2\text{H}_2\text{O} + \text{Energy} \rightarrow 2\text{H}_2 + \text{O}_2$ _____

Methane Combustion – $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{energy}$ _____

What does “liberate” heat mean? To liberate heat means _____ heat. This would be an _____ reaction (heat leaves) This reaction would feel _____

What does “absorb” heat mean? To absorb heat means to _____ heat. This would be an _____ (heat in) reaction. This reaction would feel _____

Brainpop: Conservation of Mass Take Notes: _____

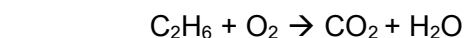
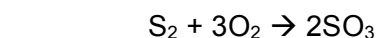
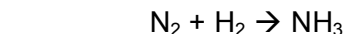
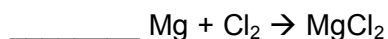
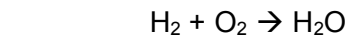
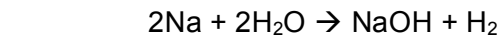
HWK: Define: What is the law of conservation of mass (matter)? _____

The left and right sides of the equations have the same stuff...just in different combinations!!!!

Below is an example of a *balanced* equation. Write the name & number of each element below the molecule. The first one (2Al) is done for you.



HWK: Notice how there is the *exact same number & type* of atom on BOTH sides of the equation. This means the total mass stayed the same. Below, next to each chemical equation, write **Yes** if the equation is balanced (the total mass stayed the same) or **No** if the equation is unbalanced.



Brainpop: Balancing Equations Take Notes: _____

Acids, Bases, Neutrals & the pH Scale:

HWK: Definitions: acid: _____

base: _____

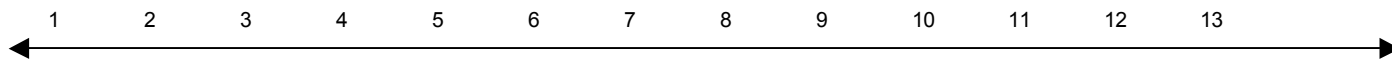
neutral: _____

Quick pH Lab:

Take 5 drops of chemical 1 Add 5 drops of cabbage juice What color did it turn?? Record your results Repeat for chemical 2 & chem 3 Using litmus paper... Dip into chem 1: record the color Repeat for chem 2 & chemical 3	Information...in cabbage juice: A strong acid will turn a BRIGHT pink A strong base will turn a bright green or yellow A neutral will remain purple and not change the indicator color With litmus paper A strong acid will turn this litmus paper red A strong base will turn this litmus paper blue A neutral will not change the paper color	What about weak acids or bases??? Take 5 drops of chemical 4 Add 5 drops of cabbage juice What color did it turn?? Record your results Repeat for chemical 5 Using litmus paper... Dip into chemical 4: record the color Repeat for chemical 5	
What is the chemical 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	Results w/ cabbage juice: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	Results w/ litmus paper: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	Results w/ pH meter reading: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____

Conclusion: _____

Label the pH scale with the following terms: strong acid, weak acid, neutral, weak base, strong base.



State whether each of the following is an Acid (**A**), Base (**B**) or Neutral (**N**).

_____ tastes bitter	_____ react with baking soda to produce CO ₂	_____ sodium chloride
_____ may be corrosive	_____ excess hydroxide ions (OH ⁻)	_____ found in vinegar
_____ used to de-ice roads	_____ changes red litmus blue	_____ slippery
_____ used to make soap	_____ changes blue litmus red	_____ tastes sour
_____ pH less than 7	_____ produces hydronium ions (H ⁺)	_____ pH greater than 7
_____ found in drain cleaner	_____ formed from a neutralization reaction	_____ found in orange juice

Brainpop: Acids & Bases Take Notes: _____

Brainpop: pH Scale Take Notes: _____
