17.1 Chemical Reactions

Physical Science

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

Chemical reactions occur when substances go through chemical change. The substances go through change resulting in new substances. Chemical reactions are not the same thing as a physical change. Recall that physical changes are a change in state of matter.

Chemical reactions rearrange atoms. Note that energy is conserved in chemical reactions. Even though energy may APPEAR to not be conserved – the total energy of everything combined remains the same amount of energy before and after the reaction.

Chemical reactions are sometimes exothermic. Sometimes they are endothermic. You need to remember this fact, and to distinguish between the two words.

Exothermic means that energy is released to the surroundings.

Endothermic reactions need more energy to break the bonds in the reactants than is given off by forming bonds in the products.

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Describing Reactions

1

2

You can describe the reaction between atoms and molecules in several ways. One way is to write a word equation. A word equation shows the names of the products and reactants. Another way is to use molecular models, which can be used to show how the atoms are rearranged during the reaction.

The clearest way is to write a chemical equation. A chemical equation uses symbols (from the Periodic Table) to represent a chemical reaction. The equation shows the relationship between the reactants and the products of a reaction. Here is an example:

$$CH_4 + 2O_2 \Rightarrow CO_2 + 2H_2O$$

Adapted from Physical Science (Holt) Chemical Equations page 225.

Re-write words you underlined

3

_____ _____ _____

_____ _____ _____

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Stoichiometry

Pretend you want to make chocolate chip cookies. You have a great recipe handed down from your grandmother that calls for two cups of chocolate chips, but you only have one cup of chocolate chips in the house. It's raining outside, and you don't feel like going to the store. So, what do you do? Do you make the cookies with half the chocolate chips the recipe calls for? No way! Who wants to eat cookies with only half the chocolate?

Instead, you determine the ratio of chocolate chips on hand to amount needed, which is 1:2. Then, you adjust the ratio of all the other ingredients in the recipe. Essentially, you have just performed stoichiometry, one of the fundamental aspects of chemistry. Stoichiometry is a word derived from two Greek words: 'stoicheon' meaning element, and 'metron,' meaning measure. This is pretty cool because stoichiometry is essentially the measurement of elements, or the study of chemical quantities consumed or produced in a chemical reaction.

Performing stoichiometry involves the use of a special chemical counting unit: the mole. Just to review for a moment, a mole isn't an animal. Well, it is, but not in chemistry. In chemistry, a mole is a unit of measurement, such that one mole of a substance contains $6.022*10^{23}$ particles.

In chemistry, particles can be atoms, molecules, or compounds. Conveniently, one mole of a substance has a mass that is equal to its atomic mass expressed in grams. This relationship is known as molar mass. For example, one atom of carbon has a mass of 12.011 amu, one mole of carbon has a mass of 12.011 grams.

When we do stoichiometry, we always want to speak about chemicals in terms of how many moles are present. The essence of stoichiometry involves comparing how many moles of chemicals are present. We may be simply comparing the number of moles of each reactant needed, or the number moles reactant to number of moles product.

http://study.com/academy/lesson/mole-to-mole-ratios-and-calculations-of-a-chemical-equation.html

Draw Illustration

Copy and Label the Illustration in the Space Provided

Reaction Types

Combination
Decomposition
Substitution
Double-substitution
Combustion

HoneycuttScience.com

Draw (Copy) the Illustration Here

Answer the Three Questions

Subscripts vs. Coefficients

$$3\ CuCl_2 + 2\ Al \rightarrow 2\ AlCl_3 + 3\ Cu$$

On the *reactant side* of the equation:

How many **copper (II) chloride molecules** react?

How many **total chlorine atoms** are there?

How many **aluminum atoms** are there?

http://slideplayer.com/slide/9189050/

Show-Off Your Smarts!

Instructions

- Complete as an individual or small group.
- Discuss your ideas/answers/responses in a small group.
- Select one person to present your responses to the class.

Q1. How can this information be applied to a young-person's life?

Q2. How does this information apply to (or impact) communities?

Q3. When do scientists need to apply this information? How?

Q4. How would a person from 100 years ago view this information?

Q5. How does this topic connect to other science topics or math?

Write down at least three words introduced or covered by this topic.

1.
2.
3.
4.
5.
6.

Make a Poster

In the space provided here, create/draw a poster which conveys the concepts you have learned on this topic.