

Unit 3 Changes in Matter Study Guide

Name ANSWER KEY

Unit 3 Test: Wednesday, December 13, 2019

- The three types of changes matter can go through are:
 - PHYSICAL** - Changes the appearance of the matter.
 - CHEMICAL** - Changes the arrangement of atoms to form new substances.
 - NUCLEAR** - Changes in the structure of the atomic nucleus.

- For each observation, tell whether it is physical or chemical.

Observation	Physical or Chemical	Observation	Physical or Chemical
Copper can oxidize.	CHEMICAL	Bromine is a liquid.	PHYSICAL
Ice can melt.	PHYSICAL	Bananas will rot.	CHEMICAL
Bleach is a base.	CHEMICAL	Iron will rust.	CHEMICAL
Paper is flammable.	CHEMICAL	Alcohol will evaporate.	PHYSICAL
Salt will dissolve in water.	PHYSICAL	Mercury is toxic.	CHEMICAL

- Identify the following parts of a chemical formula by **drawing a circle around the coefficients** and a **triangle around the subscripts**.



- List the **elements** and the number of atoms in each formula.

Al₂O₃

Elements	Number of Atoms
ALUMINIUM	2
OXYGEN	3
Total: 2	Total: 5

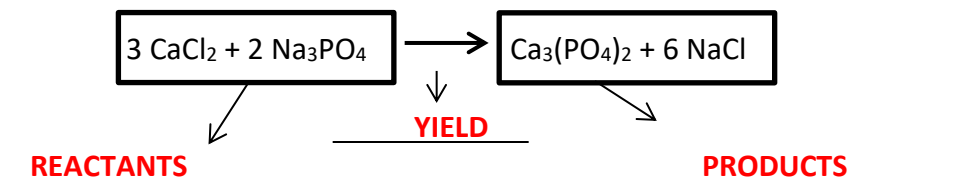
3H₂SO₄

Elements	Number of Atoms
HYDROGEN	6
SULFUR	3
OXYGEN	12
Total: 3	Total: 21

2(CH₃)₂CO

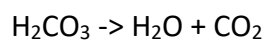
Elements	Number of Atoms
CARBON	6
HYDROGEN	12
OXYGEN	2
Total: 3	Total: 20

- Label the reactants, yield, and products in the following equation.

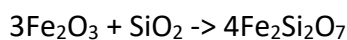


- Determine if the following equations are balanced or unbalanced. Show your work.

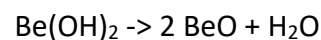
balanced or unbalanced



balanced or **unbalanced**

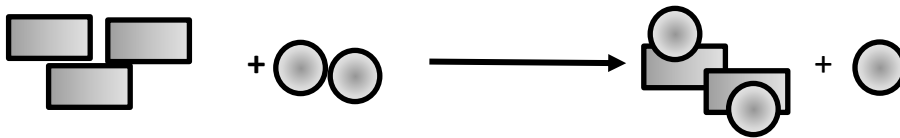


balanced or **unbalanced**



- The Law of Conservation of Mass states that mass cannot be **CREATED** or **DESTROYED**.

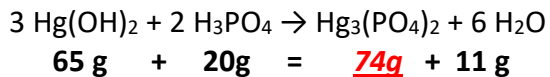
- Is the Law of Conservation of Mass correctly illustrated by the following equation?



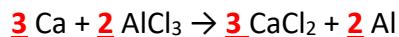
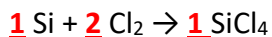
YES or NO Explain:

The same number and type are not present in the reactants and the products.

- According to the Law of Conservation of Mass how many grams of mercury phosphate will be formed in the following chemical reaction?



- Balance the following chemical equations. Show your work.

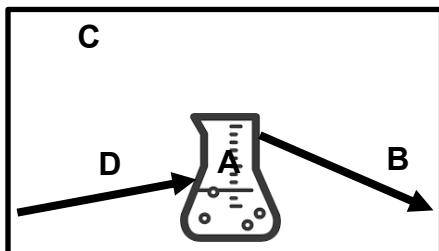


- A chemical change always results in the production of one or more **NEW SUBSTANCES**.
- Chemical changes are not usually **REVERSIBLE**.
- When observing a reaction, what are the clues that would indicate it is chemical?

PRODUCES A GAS
UNEXPECTED COLOR CHANGE
INCREASE OR DECREASE IN TEMPERATURE

PRODUCES A PRECIPITATE
CHANGE IN SMELL

- Label the reaction diagram below using the terms: **Environment, Exothermic, Endothermic, Reaction**



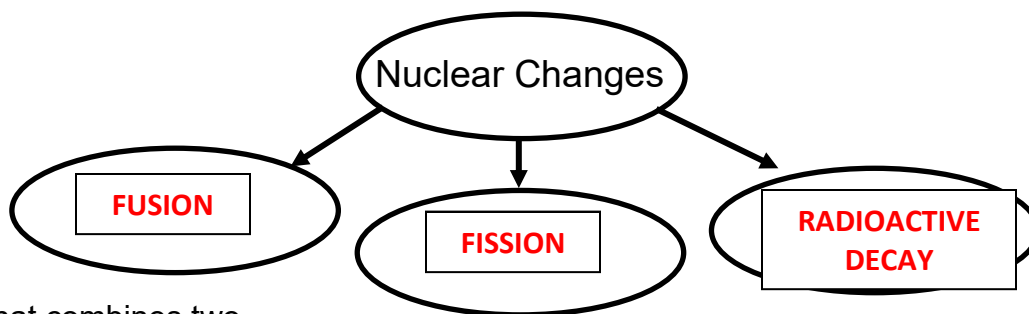
A. REACTION
B. EXOTHERMIC
C. ENVIRONMENT
D. ENDOTHERMIC

- A.** In an exothermic reaction energy is flowing from the **REACTION** into the **ENVIRONMENT**
- This means the temperature of the environment will (**increase**/decrease).
- In an endothermic reaction energy is flowing from the **ENVIRONMENT** into the **REACTION**
- This means the temperature of the environment will (increase/**decrease**).

- The rate of reaction can be increased or decreased by different factors. Tell if the following factors would usually cause an increase or decrease in the reaction rate.

FACTOR	INCREASE OR DECREASE
Adding a catalyst	INCREASE
Decreasing concentration of a reactant	DECREASE
Adding an inhibitor	DECREASE
Increasing temperature	INCREASE
Increase the surface area	INCREASE

- Label the three types of nuclear changes based on the definitions.



Process that combines two or more lighter nuclei into a heavier nucleus.

Process that splits a heavier nucleus into two or more lighter nuclei.

Process in which an unstable isotope transforms into a new element giving of radioactive particles.

<p>Fusion Diagram:</p> <p>Where does fusion occur: STARS(OUR SUN)</p> <p>Why don't we use fusion to produce electricity?</p> <p>TEMPERATURES NEED TO CREATE FUSION ARE TOO HOT FOR US SUSTAIN.</p>	<p>Fission Diagram:</p> <p>Where does fission occur: NUCLEAR POWER PLANTS, NUCLEAR WEAPONS, NUCLEAR SHIPS/SUBS</p> <p>Two benefits of using fission to produce electricity: NO AIR OR WATER POLLUTION NO GREENHOUSE GASES RELIABLE SOURCE OF POWER AT LOW COST</p> <p>Two drawbacks of using fission to produce electricity: RADIOACTIVE WASTES NUCLEAR ACCIDENTS</p>
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This study guide should be used with your notes and assignments to study for the Unit 3 Test.