

Chapter 3 and 4 Review Questions

Name: _____

Chapter 3 Review: Different Forms of Energy

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| <p>1. What is solar energy? Give an example
Energy that comes from the light and heat from the sun. (Ex: Sun and solar panels)</p> <p>3. What is energy transfer? Give two examples
Energy transfer is the movement of energy from one place to another.
Ex: Electricity travelling through wires.</p> | <p>2. What is thermal energy? Give an example
Energy from the random motion of all particles in a substance. (Ex: fire, the sun)</p> <p>4. What is energy transformation? Give two examples.
Energy transformation is the changing of energy from one form to another.
EX: Electricity in a toaster transforms into heat and light energy.</p> |
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5. Explain why the total amount of energy in a system always remains constant.
Energy cannot be created or destroyed so the amount of energy in a system never changes and it remains constant.

6. What is the formula to find energy efficiency?

$$\frac{\text{amount of useful energy}}{\text{amount of energy consumed}} \times 100$$

7. Why are most substances not 100% efficient?
Energy is often lost to the environment which is why most substances are not 100% efficient.

8. To perform 1200 J of useful energy, a machine consumes 20 000 000 J. What is the energy efficiency of this machine?

$$\frac{\text{Useful energy}}{\text{Energy consumed}} \times 100 \rightarrow \frac{1200 \text{ J}}{20\,000\,000 \text{ J}} \times 100 \rightarrow 0.006\%$$

9. An electric lawn mower consumes 30 000 J of energy in order provide 12 500 J of useful energy. What is its percent efficiency?

$$\frac{\text{Useful}}{\text{Consumed}} \times 100 \rightarrow \frac{12\,500 \text{ J}}{30\,000 \text{ J}} \times 100 \rightarrow 41.66\%$$

10. A kettle that is 85% efficient provides 16 700 J of useful energy. How much energy does it consume?

$$\frac{85\%}{100} = \frac{16\,700\text{ J}}{x}$$

$$\begin{aligned} 85x &= 16\,700 \cdot 100 \\ 85x &= 1\,670\,000 \\ x &= 16\,700\,000 / 85 \\ x &= 19\,647,05\text{ J} \end{aligned}$$

11. An electric razor that is 56% efficient consumes 5 800 J of energy. How much useful energy does it provide?

$$\frac{56\%}{100} = \frac{x}{5800\text{ J}}$$

$$\begin{aligned} 100x &= 56 \cdot 5800 \\ 100x &= 324\,800 \\ x &= 324\,800 / 100 \\ x &= 3248\text{ J} \end{aligned}$$

12. What is the difference between heat and temperature?

Heat is the transfer of thermal energy between two environments with different temperatures. Temperature is the speed of particles in a substance.

Chapter 4 Review: Changes in Matter

1. What is a physical change? Provide two examples.

A physical change doesn't change the nature or characteristics of matter. Examples include ripping a paper or an ice cube melting.

2. What is a chemical change? Provide two examples.

A chemical change alters the nature and characteristics of matter, and a new substance is formed. Examples include propane gas burning in a barbecue or cooking an egg.

3. What is a nuclear transformation? Provide an example.

A nuclear transformation is when new elements are formed. During uranium fission, atoms split to form new substances.

4. What signs point to the occurrence of a chemical change? List 5.

- Release of a gas
- Emission or absorption of heat
- Emission of light
- Change in colour
- Formation of a precipitate

5. What is the law of conservation of mass?

The total mass of reactants is always equal to the total mass of products. The mass before the chemical change will be the same as the mass after the chemical change.

6. What is acid-base neutralization?

An acid-base neutralization is a chemical change involving the reaction of an acid with a base which produces a salt and water.



7. What is oxidation?

Oxidation is a chemical change involving oxygen or a substance with properties similar to those of oxygen.

8. What is combustion?

Combustion is a form of oxidation that releases a large amount of energy.

9. What is cellular respiration?

Cellular respiration is a chemical change in which glucose and oxygen are used to produce energy, carbon dioxide and water. It is a form of slow combustion.



10. What is photosynthesis?

Photosynthesis is a chemical change that produces glucose and oxygen from solar energy, carbon dioxide and water. Photosynthesis is the opposite reaction to cellular respiration.



11. To learn how to control fires, firefighters have to study the three necessary conditions for a fire to start. What are these conditions?

An oxidizing agent, fuel and ignition temperature.

12. What is the difference between an oxidizing agent and a fuel? Give an example of each.

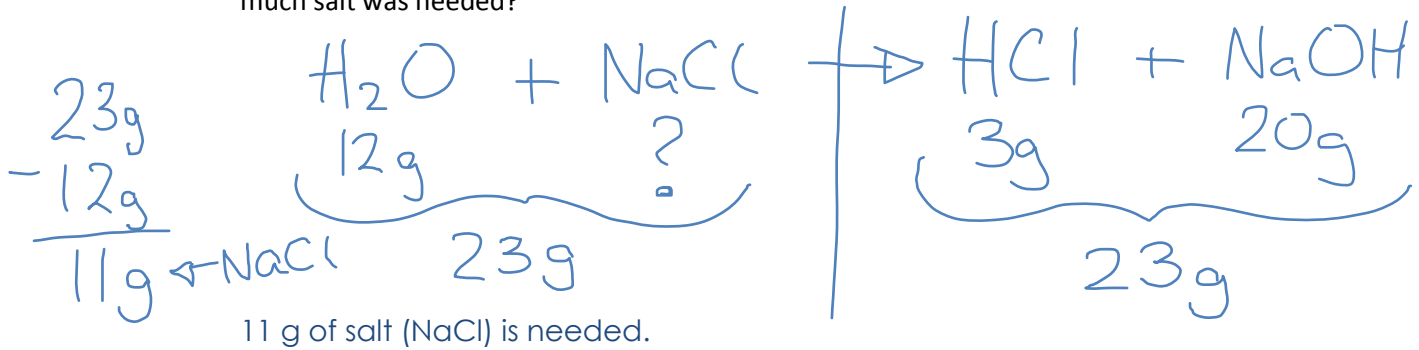
An oxidizing agent causes combustion (such as oxygen), while a fuel undergoes combustions (such as wood).

13. What is the law of conservation of mass?

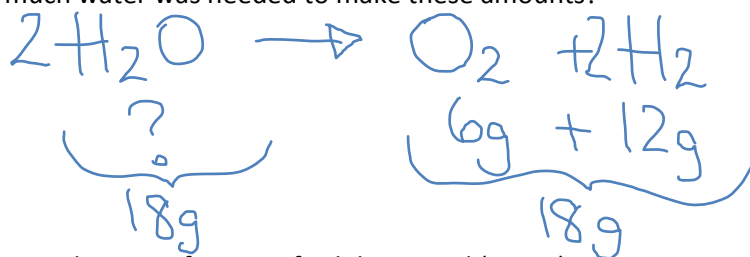
Oops! This is the same as question #5.

The total mass of reactants is always equal to the total mass of products. The mass before the chemical change will be the same as the mass after the chemical change.

14. If 12 grams of water react with salt (NaCl) to create 3 grams of HCl and 20 grams of NaOH, how much salt was needed?



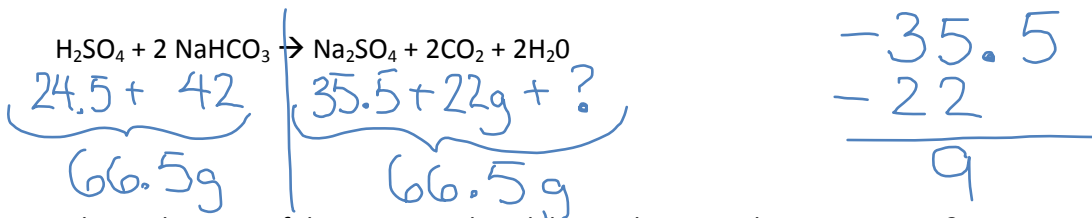
15. In a chemical reaction, 6 grams of oxygen gas is produced along with 12 grams of hydrogen gas. How much water was needed to make these amounts?



18 g of water is needed.

16. The neutralization of 24.5 g of sulphuric acid (H_2SO_4) requires 42 g of sodium bicarbonate (NaHCO_3). This neutralization reaction produces 35.5 g of sodium sulphate (Na_2SO_4), 22 g of carbon dioxide (CO_2) and a certain amount of water (H_2O).

The balanced equation for this reaction is:



What is the mass of the water produced during this neutralization reaction?

The mass of water produced is 9 g

17. Balance the following equations:

