

Worksheet - Physical and Chemical changes,
Law of conservation of mass

Name _____

Period _____

Date _____

Classify the following as being a physical or chemical change.

1. _____ Sodium hydroxide dissolves in water.
2. _____ Hydrochloric acid reacts with potassium hydroxide to produce a salt, water and heat.
3. _____ A pellet of sodium is sliced in two.
4. _____ Water is heated and changed to steam.
5. _____ Potassium chlorate decomposes to potassium chloride and oxygen gas.
6. _____ When placed in water, a sodium pellet catches on fire as hydrogen gas is liberated and sodium hydroxide forms.
7. _____ Evaporation
8. _____ Ice melting
9. _____ Milk sours
10. _____ Sugar dissolves in water.
11. _____ Wood rotting.
12. _____ Grass growing in a lawn.
13. _____ An Alka-Seltzer tablet releasing carbon dioxide gas when coming in contact with your stomach acid.
14. _____ Water is absorbed by a paper towel.
15. _____ Food is digested in the stomach.

Solve each of the following. Remember to follow rules of rounding and significant figures in your calculations.

16. In the complete reaction of 22.99 g of sodium with 35.45g of chloride, what mass of sodium chloride is formed?
17. A 12.2 g sample of X reacts with a sample of Y to form 78.9 g of XY. What is the mass of Y that reacted?
18. A 10.0 g sample of magnesium reacts with oxygen to form 16.6 g of magnesium oxide. How many grams of oxygen reacted?

19. From a laboratory process designed to separate water into hydrogen and oxygen gas, a student collected 10.0 g of hydrogen and 79.4 g of oxygen. How much water was originally involved in the process?
20. A student carefully placed 15.6 g of sodium in a reactor supplied with an excess quantity of chloride gas. When the reaction was complete, the student obtained 39.7 g of sodium chloride. How many grams of chloride gas reacted? How many grams of sodium reacted?
21. In a flask, 10.3 g of aluminum reacted with 100.0 g of liquid bromine to form aluminum bromide. After the reaction, no aluminum remained and 8.5 grams of bromine remained unreacted. How many grams of bromine reacted? How many grams of compound were formed?
22. A 3.5 kg iron shovel is left outside through the winter. The shovel, now orange with rust, is rediscovered in the spring. Its mass is 3.7 kg. How much oxygen combined with the iron?
23. When 5.0 g of tin reacts with hydrochloric acid, the mass of the products, tin chloride and hydrogen, totals 8.1 g. How many grams of hydrochloric acid were used?
24. Iron and oxygen combine to form iron oxide (rust). List the reactants and products of this reaction.
25. After burning for three hours, a candle has lost half of its mass. Explain why this example does not violate the law of conservation of mass.

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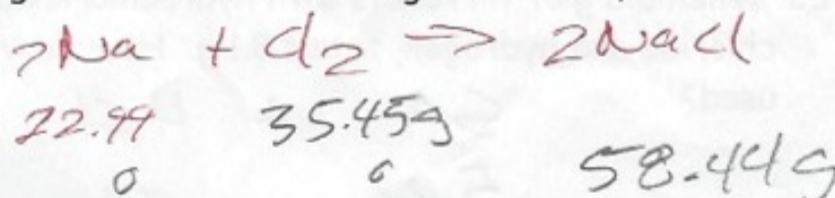
Date _____

Classify the following as being a physical or chemical change.

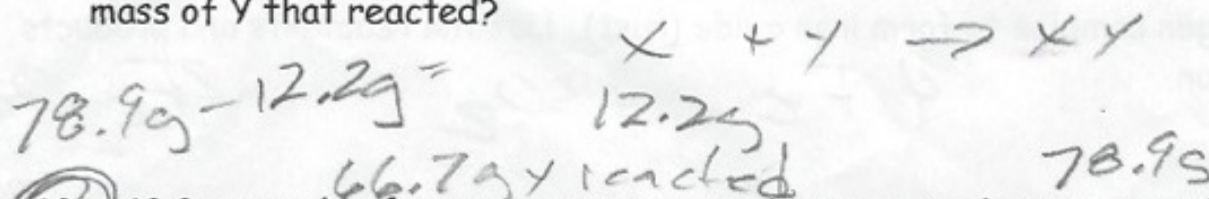
1. physical Sodium hydroxide dissolves in water.
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Solve each of the following. Remember to follow rules of rounding and significant figures in your calculations.

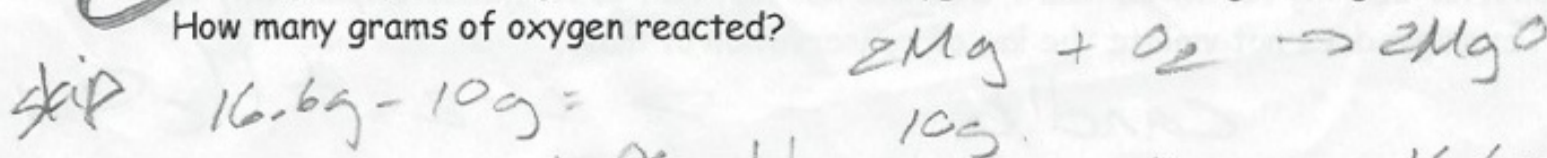
16. In the complete reaction of 22.99 g of sodium with 35.45g of chloride, what mass of sodium chloride is formed?



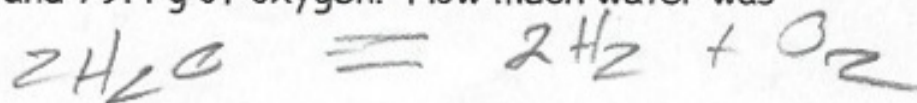
17. A 12.2 g sample of X reacts with a sample of Y to form 78.9 g of XY. What is the mass of Y that reacted?



18. A 10.0 g sample of magnesium reacts with oxygen to form 16.6 g of magnesium oxide. How many grams of oxygen reacted?



skip 19. From a laboratory process designed to separate water into hydrogen and oxygen gas, a student collected 10.0 g of hydrogen and 79.4 g of oxygen. How much water was originally involved in the process?



89.4g

10g 79.4g

skip 20. A student carefully placed 15.6 g of sodium in a reactor supplied with an excess quantity of chloride gas. When the reaction was complete, the student obtained 39.7 g of sodium chloride. How many grams of chloride gas reacted? How many grams of sodium reacted?

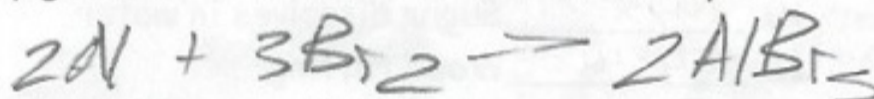


15.6g

39.7g - 15.6g =

39.7g

skip 21. In a flask, 10.3 g of aluminum reacted with 100.0 g of liquid bromine to form aluminum bromide. After the reaction, no aluminum remained and 8.5 grams of bromine remained unreacted. How many grams of bromine reacted? How many grams of compound were formed?



100.0g - 8.5g
= 91.5g Br₂ used

10.3g 100.0g
0 8.5g

101.8g

22. A 3.5 kg iron shovel is left outside through the winter. The shovel, now orange with rust, is rediscovered in the spring. Its mass is 3.7 kg. How much oxygen combined with the iron?



3.7kg
3.5kg

3.5kg ? 0.2kg

3.7kg

AlBr₃
made

23. When 5.0 g of tin reacts with hydrochloric acid, the mass of the products, tin chloride and hydrogen, totals 8.1 g. How many grams of hydrochloric acid were used?



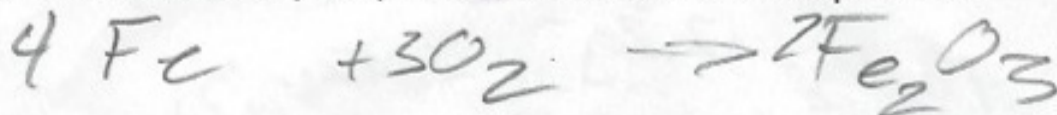
5.0g

3.1g

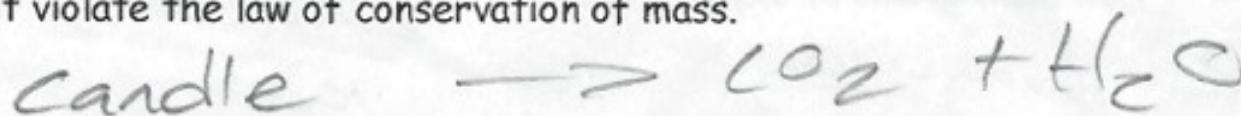
8.1g

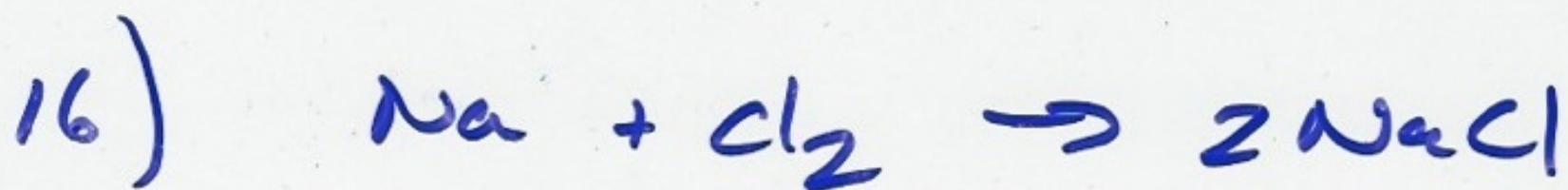
8.1 - 5.0g =

24. Iron and oxygen combine to form iron oxide (rust). List the reactants and products of this reaction.



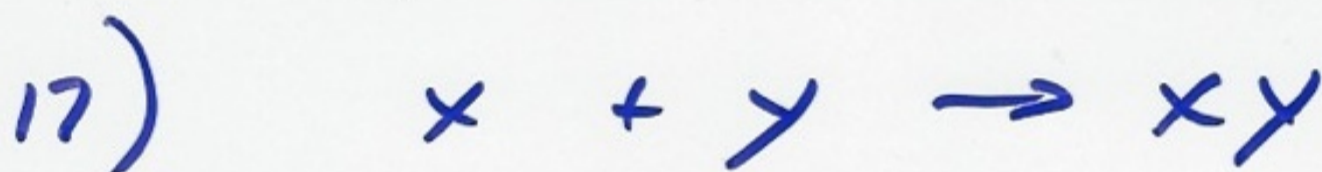
25. After burning for three hours, a candle has lost half of its mass. Explain why this example does not violate the law of conservation of mass.





$$22.99\text{g} \quad 35.45\text{g}$$

$$\quad \quad \quad 58.44\text{g}$$

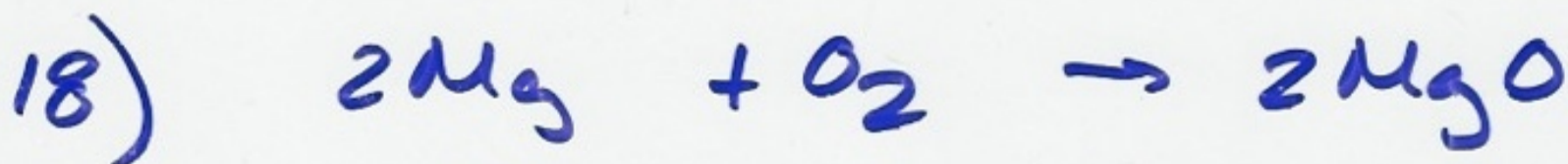


$$12.2\text{g}$$

$$28.7\text{g}$$

$$28.7\text{g } xy - 12.2\text{g } x_{\text{used}} =$$

$$16.5\text{g } y_{\text{used}}$$

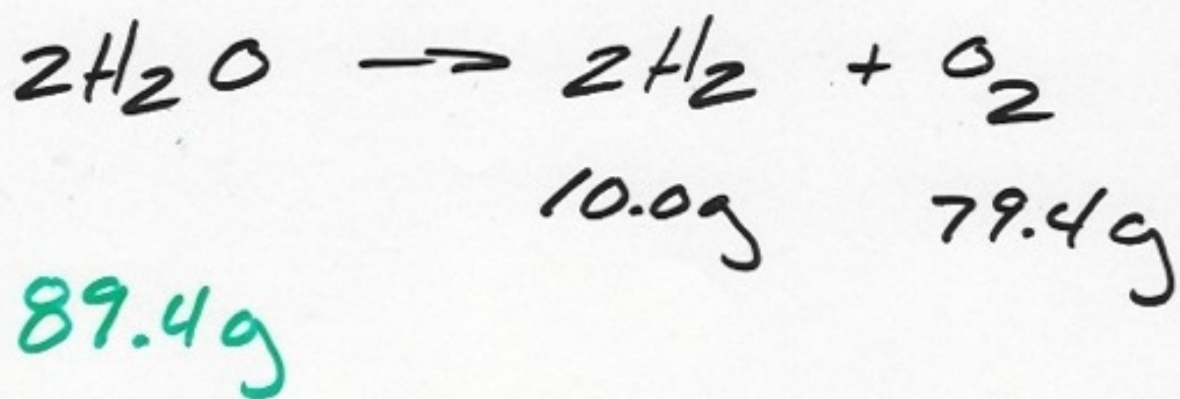


$$10.0\text{g}$$

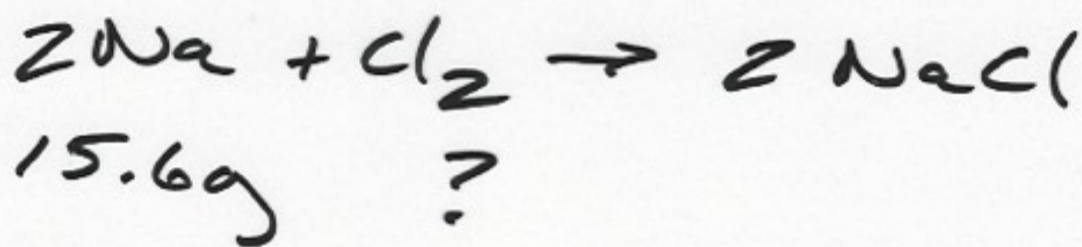
$$16.6\text{g}$$

$$16.6\text{g} - 10.0\text{g } \text{Mg}_{\text{used}} = 6.6\text{g } \text{O}_2_{\text{reacted}}$$

19

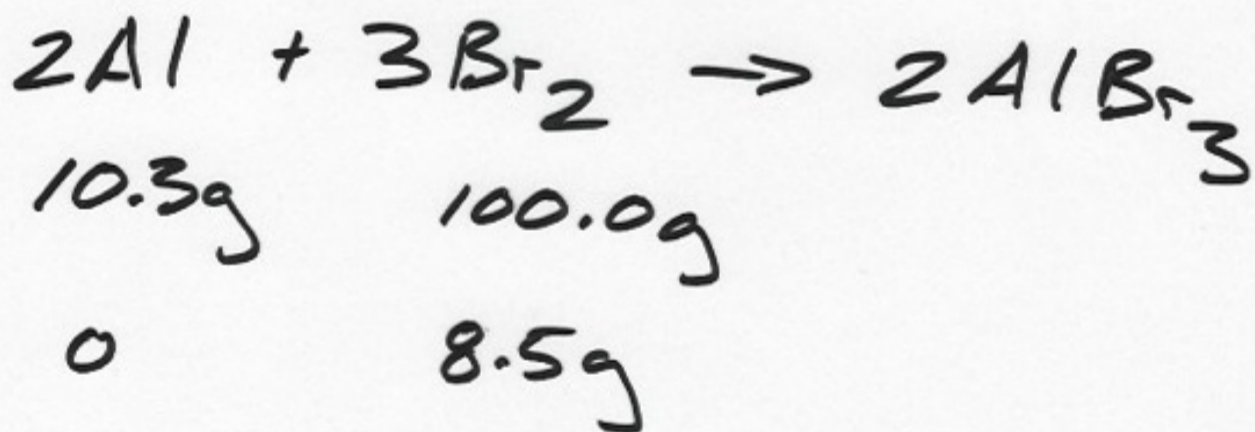


20



$$39.7\text{g} - 15.6\text{g} = 24.1\text{g} \quad 39.7\text{g}$$

21



$$100.0\text{g} - 8.5\text{g} = \underline{91.5\text{g Br}_2 \text{ used}}$$

$$91.5\text{g} + 10.3\text{g} = 101.8\text{g AlBr}_3 \text{ made}$$

22.



3.5 kg ?

3.7 kg

$$3.7\text{ kg} - 3.5\text{ kg Fe} = 0.2\text{ kg O}_2 \text{ used}$$

23.



5.0 g

8.1 g

$$8.1\text{ g} - 5.0\text{ g Sn} = 3.1\text{ g HCl used}$$

