Organization of Matter Worksheet

1. Fill in the table below by putting a '√' if the liquid will react to the test or an 'x' if it will not react to the test.

	CCP	BLP	RLP	Conductivity
Acid	√	B turns R	x	√
Base	√	x	R turns b	√
Distilled water	√	x	x	x
Salt water	√	x	x	√
Alcohol	x	x	x	x

2. Fill in the table for synthesis and decomposition reactions.

	Explantation	Mass change (increase or decrease)	What are the products? (Elements or compound)
Synthesis	2 substances combine & form a new product	increase	compound
Decomposition	compound breaks down to 2 elements	decrease	elements

3. When two elements chemically bond, what is produced? What happens to the mass of one of the original elements?

increase ↓ compound.

4. When a compound chemically separates, what is produced? What happens to the mass of the original compound?

decreases ↓ elements

5. What test allows you to distinguish between saltwater and distilled water?

distilled water does not conduct, saltwater does

6. Why is it more important to have a characteristic property than a non-characteristic one? - can't

a characteristic property can help us identify something (unique)

7. You put a chain in 50 mL of water. The water rises to 55 mL with the chain. The chain had a mass of 25 g. What is the density of the chain?

55 - 50 = 5 mL

$\frac{25}{5} = 5\ g/mL$

8. A cube had a length of 3 cm, a height of 5 cm and a width of 7 cm. Its mass was 16 g. What is the cube's density?

$3 \times 5 \times 7 = 105\ cm^3$

$16/105 = 0.15\ g/cm^3$

9. 30 mL of a liquid was put into a cylinder weighing 25 g. The liquid and cylinder together weighed 55 g. What is the liquid?

$55 - 25 = 30\ g$ $\quad \frac{30\ g}{30\ mL} = 1\ g/mL$ = water

10. Explain the procedure in detail to find the density of a regular solid.

$D = \frac{m}{V}$ ① weigh substance on balance. ② measure l x w x h ③ divide m by V.

11. Explain in detail the procedure to find the density of an irregular solid.

$D = \frac{m}{V}$ ① mass ② water displacement

12. What is the difference between a compound and an element? Are they pure substances or mixtures? Element: chemical at it's simplest form

Pure substances { compound: 2 or more chemically bonded elements

13. Explain if an element can become a compound after a chemical reaction.

Yes - it bonds with other elements

14. Answer the questions regarding the following chemical reaction:

$Na + Cl \rightarrow NaCl$

A) What is this type of chemical reaction called? synthesis.

B) What happens to the mass after the reaction? increases

15. Answer the questions regarding the following chemical reaction:

$CO_2 \rightarrow C + O_2$

A) What is this type of chemical reaction? decomposition

B) What happens to the mass after the chemical reaction? decreases

compound.

16. You are given a red powder and asked to determine its composition. After heating the red powder at high temperature, you obtain a liquid and a gas. From these results state whether the substance was an element or a compound. Justify your answer.

broke down to 2 elements - liquid & gas.

17. For each example indicate whether there is a chemical or physical change occurring.

	Chemical change	Physical change
a person making "clouds" with their breath		✓
a cut apple turning brown	✓	
a person digesting a meal	✓	
a crumpled piece of paper		✓
a person cleaning a grease spot with soap		✓
a person producing a compound NaCl	✓	
limewater that becomes milky when exposed to carbon dioxide	✓	
A person chewing a piece of steak		✓

18. Give three examples for each of the following:

Heterogeneous mixture	Homogeneous mixture	Pure substance	Element	Compound
oil & water	Jell-O	CO_2	C	NaCl
paper & water	kool-aid	O_2	Li	CO_2
salt + pepper	coffee	H_2O	O	H_2O
fruit salad				

19. A student is given 2 liquids. She records her observations:

	Liquid number 1	Liquid number 2
Density	1.0 g/mL	0.77 g/mL
Cobalt chloride Paper	Turned pinkish Beige	No reaction
Electrical conductivity	Does not conduct electricity	Does not conduct electricity
Litmus paper	No change for red or blue litmus paper	No change for red or blue litmus paper

Based on these results the student arrived at 3 correct conclusions: Explain each test that proves each of her conclusions ARE correct.

Conclusion 1) Liquid number 1 must be distilled water reacted to CCP but did not conduct electricity + density is 1g/mL

Conclusion 2) Liquid number 2 does not contain water negative for CCP.

Conclusion 3) Neither liquid is an acid or a base

negative for litmus paper

20. During a lab experiment, a student heats 15 g of copper powder which has a red-brown colour. After several minutes the students notices that the copper powder has become a black powder. He takes the mass of the black powder after the reaction and the mass has increased to 18.3 g.

A) What type of chemical reaction occurred during the experiment? synthesis.

B) Why had the mass of the copper powder increased? formed a new substance

C) Is the copper powder an element or compound?

D) Is the black powder an element or compound?

21. Four students were given the task to identify an unknown substance. Each student thought of a different test they could use to identify the substance.

Bob wanted to weigh the substance
Carol wanted to take its temperature
Fred wanted to find its melting point
Sue wanted to smell it

Who's method would allow them to identify the object and why would it work? Fred. melting point is a characteristic property

Multiple Choice Section

22. To find the density of a solid, a student measured its mass and then determined its volume by the displacement of water. The measurement results are given in the table below.

	Volume	
Mass	Water	Water + Solid
12.32 g	15.0 mL	19.4 mL

12.32 / 4.4

What is the density of this solid?

A) 0.36 g/mL B) 0.64 g/mL C) 2.8 g/mL D) 4.4 g/mL

23. During a synthesis reaction, which of the following is always formed?

A) A compound
B) A compound and an element
C) An element
D) A compound or an element

24. Which of the following are not examples of characteristic properties?

1- Iron's density is 6.5 g/cm^3 ✗
2- Water's boiling point is 100 °C ✗
3- The mass of zinc is 65 g ✓
4- Water turned cobalt chloride paper pink
5- Zinc's temperature is 33 °C ✓
6- Aluminium is silver in colour ✓

A) 1, 4 and 5
B) 1, 2 and 3
C) 1, 2 and 4
D) 3, 5 and 6

25. Looking at the following reaction: $KClO_3 \rightarrow KCl + O_2$
What type of chemical reaction is represented and how will the mass change?

A) It is a synthesis reaction and the mass increases
B) It is a synthesis reaction and the mass decreases
C) It is a decomposition reaction and the mass increases
D) It is a decomposition reaction and the mass decreases

26. Louis found five unmarked bottles in a workroom. Each of the bottles contained a pure substance. He noted the following properties for each of these colourless liquids :

1) boiling point
2) mass
3) volume
4) density

Which properties does Louis need to know to identify these liquids?

A) 1 and 2 B) 1 and 3 C) 2 and 4 D) 1 and 4

27. Three properties of an unknown solid are listed below.

Mass: 9.8 g
Volume: 1.1 cm^3
Magnetism: no

$\frac{9.8}{1.1} = 8.98 g/cm^3$

You are also given the following table of information:

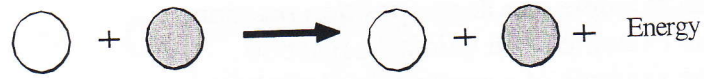
Substance	Density (g/cm^3)	Magnetism
Bismuth	9.8	No
Copper	8.9	No
Iron	7.9	Yes
Nickel	8.9	Yes

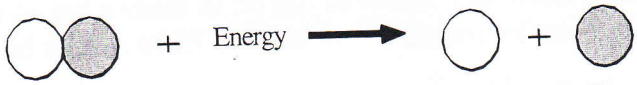
Which of the following is the unknown solid?

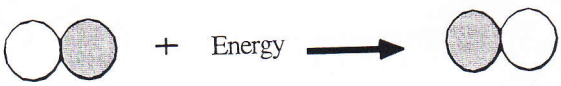
A) Bismuth C) Iron
B) Copper D) Nickel

28. Which of the following illustrates a decomposition reaction?

A) 

B) 

C) 

D) 

29. Below are example of chemical and physical changes. Which are chemical changes?
1- Rust forming on a bike
2- Clothes drying on a clothes line
3- A cake baking in the oven
4- Hydrogen and oxygen boning to form water
5- Ripping paper

A) 1, 3 and 4 B) 1, 2 and 5 C) 3 and 4 D) 2, 3 and 4

30. Which answer best explains how to find the mass and volume of a cube?

	Mass	Volume
A)	Liquid mass	Water displacement
B)	Weigh it	Water displacement
C)	Water displacement	LxWxH
D)	Weight it	LxWxH

31. After heating the red powder at high temperature, you obtain a liquid and a gas. Your teacher says the gas formed is oxygen. From these results was the original powder an element or a compound and what test could be administered to verify whether or teacher was right or not?

A) The powder was an element and the glowing splint test should cause a popping sound
B) The powder was an element and the flaming splint test should cause the splint to re-light
C) The powder was a compound and the glowing splint test should cause the splint to re-light
D) The powder was a compound and the flaming splint test should cause a popping sound

32. The following statements indicate possible reactions that occur during a chemical change:
1- The mass decreased
2- The mass increased
3- A purple gas was formed
4- A colorless liquid was produced
5- A grey liquid and colorless gas was produced

Which of them indicate the substance was originally a compound?

A) 1 and 5 B) 2 and 5 C) 2 and 4 D) 1 and 3

33. Looking at the chemical reaction below, choose the correct answer.

$$Mg + O_2 \rightarrow MgO$$

A) The above reaction is an example of a synthesis reaction
B) The above reaction is an example of a decomposition reaction
C) The above reaction is an example of an oxidation reaction
D) The above reaction is an example of a synthesis and oxidation reaction