1. Name two household products that have an HHPS on them and state the symbol.
2. What does WHMIS stand for? What does HHPS stand for?

Workplace Hazardous Materials Information System
Hazardous Household Product Symbols
3. Differentiate between an element and a compound. Give an example of each.

An element contains one type of atom, $\mathrm{Cu}, \mathrm{Ag}, \mathrm{Au}$ etc., a compound contains two or more types of atoms combined in a fixed ratio $\mathrm{CO}_{2}, \mathrm{Al}_{2} \mathrm{O}_{3}$
4. Differentiate between physical and chemical properties.

Physical properties describe the substance chemical properties describe how a substance will react with substances
5. State two physical and two chemical properties of matter.

- colour
- malleability
- reaction with an acid
- Iuster
- odour
- reaction with water
- ductility
- brittlenes
- reaction with oxygen

6. State four clues that a chemical change has taken place.

- change in colour
- bubbles of gas are formed
- a new odour
- a precipitate is formed

7. Periodic Table: know what group each element is in and how that relates to its valence electrons?

Alkali metals - one valence electron

8. What are metal groups $\square$ non-mental groups $\square$ and transition metals $\square$

9. Differentiation between an ionic compound and a molecular compound. Give an example of each
An ionic compound is made by a metal and a non-metal- calcium chloride, sodium sulfate aluminum phosphide, a molecular compound is made by two or more non-metals - carbon dioxide, sugar, nitrogen dioxide
10. How does an atom become an ion? Gaining or losing electrons.
11. Why do elements form ions? To get a full valence shell and become stable
12. Metals tend to lose electrons. Non-metals tend to gain electrons.
13. What is the charge of the ions of the following atoms?
a) Beryllium +2
b) Phosphorus -3
14. Which noble gases are the following ions isoelectronic with?
a) sodium - neon
b) phosphorous - argon
c) bromine - krypton
d) calcium - argon
15. Write the chemical formula for the following compounds
a) potassium oxide - $\mathrm{K}_{2} \mathrm{O}$
b) barium phosphide - $\mathrm{Ba}_{3} \mathrm{P}_{2}$
c) iron (III) chloride - $\mathrm{FeCl}_{3}$
d) calcium nitrate $-\mathrm{Ca}\left(\mathrm{NO}_{3}\right)_{2}$
e) aluminum nitride - AIN
f) copper (I) chlorate $-\mathrm{CuClO}_{3}$
g) calcium sulfate - $\mathrm{CaSO}_{4}$
h) disulfur heptaoxide $-\mathrm{S}_{2} \mathrm{O}_{7}$
i) ammonium fluoride - $\mathrm{NH}_{4} \mathrm{~F}$
16. Write the names of the following compounds
a) KBr - potassium bromide
b) $\mathrm{Na}_{3} \mathrm{~N}$ - sodium nitride
c) NiO - nickel (II) oxide
d) FeP - Iron (III) phosphide
e) $\mathrm{Br}_{3} \mathrm{O}_{8}$ - tribromine octoxide
f) $\mathrm{Ca}\left(\mathrm{NO}_{3}\right)_{2}$ - calcium nitrate
g) $\mathrm{Pb}_{3}\left(\mathrm{PO}_{4}\right)_{2}$ - lead(II) phosphate
h) $\mathrm{CCl}_{4}$ - carbon tetrachloride
i) $\mathrm{FeSO}_{4}$ - iron (II) sulfate
17. Fill in the following chart, to show how an ionic compound is formed

|  | Lewis Dot or Bohr Diagram of ATOM | Lewis Dot or Bohr Diagram of ION | Lewis Dot or Bohr Diagram of the formation of the COMPOUND, showing electron transfer |
| :---: | :---: | :---: | :---: |
| Magnesium | $\dot{M} \mathrm{~g} \bullet$ | $[\mathrm{Mg}]^{2+}$ | $\cdot M g \cdot \underset{: \ddot{\mathrm{Cl}}:}{\stackrel{\ddot{\mathrm{C}}}{ } \mathrm{:}} \rightarrow[\mathrm{Mg}]^{2+}+2[: \ddot{\mathrm{C} \mid}:]^{-}$ |
| Chlorine | $\bullet \bullet_{\bullet-}^{\circ}$ | $[: \ddot{\mathrm{Cl}}:]^{-}$ |  |
| Carbon | - $\stackrel{\bullet}{C}$ | NA | $: \stackrel{0}{0} \quad \stackrel{O}{0}$ |
| Oxygen |  | NA | $\rightarrow \mathrm{O}=\mathrm{C}=\mathrm{O}$ |

18. State the Law of Conservation of Mass.

Matter cannot be created or destroyed. The total mass of the reactants is equal to the total mass of the products
19. When 8.0 grams of methane is reacted with 16.0 grams of oxygen gas, 18.0 of water is produced how much carbon dioxide is produced?

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\begin{gathered}
\text { methane }+ \text { oxygen } \rightarrow \text { carbon dioxide }+ \text { water } \\
\text { mass of reactants }=\text { mass of products } \\
\text { mass of methane }+ \text { mass of oxygen }=\text { mass of carbon dioxide }+ \text { mass of water } \\
8.0 \mathrm{og}+16.0 \mathrm{~g}=\text { mass of carbon dioxide }+18.0 \mathrm{~g} \\
\text { mass of carbon dioxide }=6.0 \mathrm{~g}
\end{gathered}
$$

20. Count the number of atoms in each of the following (make a chart for yourself to keep track):
a) $\left(\mathrm{SO}_{4}\right)_{2}$
sulfur
2
oxygen 8
total 10
b) $\mathrm{Ba}_{3}\left(\mathrm{PO}_{4}\right)_{2}$ barium 3 $\begin{array}{ll}\text { phosphorus } & 2 \\ \text { oxygen } & 8 \\ \text { total } & 13\end{array}$
c) $3 \mathrm{Cr}_{3}\left(\mathrm{SO}_{4}\right)_{2}$
Chromium 9
sulfur 6
oxygen 24
total 39
21. Balance the following equations.
a) $2 \mathrm{Al}+3 \mathrm{Br}_{2} \rightarrow 2 \mathrm{AlBr}_{3}$
b) $\mathrm{Mg}+2 \mathrm{HNO}_{3} \rightarrow \mathrm{Mg}\left(\mathrm{NO}_{3}\right)_{2}+\mathrm{H}_{2}$
c) $\mathrm{C}_{3} \mathrm{H}_{8}+5 \mathrm{O}_{2} \rightarrow 4 \mathrm{H}_{2} \mathrm{O}+3 \mathrm{CO}_{2}$
d) $6 \mathrm{HCl}+\mathrm{Fe}_{2} \mathrm{O}_{3} \rightarrow 2 \mathrm{FeCl}_{3}+3 \mathrm{H}_{2} \mathrm{O}$
22. Convert the following word equations to a skeleton equation and then balance them
a) fluorine + calcium bromide $\rightarrow$ calcium fluoride + bromine
$\mathrm{F}_{2}+\mathrm{CaBr}_{2} \rightarrow \mathrm{CaF}_{2}+\mathrm{Br}_{2}$
b) methane + oxygen $\rightarrow$ carbon dioxide + water
$\mathrm{CH}_{4}+2 \mathrm{O}_{2} \rightarrow \mathrm{CO}_{2}+2 \mathrm{H}_{2} \mathrm{O}$
23. For each of the following reactions, predict the product(s), identify the TYPE of chemical reaction, write the chemical skeleton for the equation, and then balance it!
a. aluminum combines with chlorine
synthesis
$\mathrm{Al}+3 \mathrm{Cl}_{2} \rightarrow 2 \mathrm{AlCl}_{3}$
b. magnesium combines with aluminum chloride.
single displacement $\quad 3 \mathrm{Mg}+2 \mathrm{AICl}_{3} \rightarrow 2 \mathrm{Al}+3 \mathrm{MgCl}_{2}$
c. calcium chloride combines with sodium sulfide.

Double displacement $\mathrm{CaCl}_{2}+\mathrm{Na}_{2} \mathrm{~S} \rightarrow \mathrm{CaS}+2 \mathrm{NaCl}$
d. barium oxide is heated.
decomposition $\quad 2 \mathrm{BaO} \rightarrow 2 \mathrm{Ba}+\mathrm{O}_{2}$
e. methane fuel burns.
combustion
f. $\mathrm{Sn}+\mathrm{AgNO}_{3} \rightarrow$

Single displacement
g. $\mathrm{NiCO}_{3} \rightarrow$
decomposition
h. $\mathrm{CaCl}_{2}+\mathrm{F}_{2} \rightarrow$
single displacement
i. $\left(\mathrm{NH}_{4}\right)_{2} \mathrm{SO}_{4}+\mathrm{Ba}\left(\mathrm{NO}_{3}\right)_{2} \rightarrow$
double displacement $\quad\left(\mathrm{NH}_{4}\right)_{2} \mathrm{SO}_{4}+\mathrm{Ba}\left(\mathrm{NO}_{3}\right)_{2} \rightarrow 2 \mathrm{NH}_{4} \mathrm{NO}_{3}+\mathrm{BaSO}_{4}$
24. How would you know if a substance is an acid or a base looking at its chemical formula? State 3 other ways that you could tell if a substance was an acid or a base.

Acids will produce hydrogen ions when dissolved in water. They have a low pH and are also corrosive, and have a sour taste.

Bases contain hydroxide ions. They have a high pH and also have a bitter taste and slippery feel.
25. Complete the diagram of the pH scale below by adding the appropriate numbers

26. Write the general equation for a neutralization reaction.
acid + base $\rightarrow$ salt + water
27. Complete the following neutralization reaction
$2 \mathrm{HCl}+\mathrm{Ba}(\mathrm{OH})_{2} \rightarrow \mathrm{BaCl}_{2}+2 \mathrm{H}_{2} \mathrm{O}$
28. Explain what how the pH of a solution changes as the concentration of an acid is increased The pH decreases as the concentration of an acid increases

