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NAME _____

Counting Atoms Worksheet 1

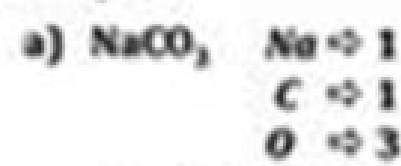


For each problem, you must follow these steps:

- ▶ Recognize and record individual elements.
- ▶ Recognize the **subscripts** as the number of atoms for an element.
- ▶ Recognize the **coefficient** as the number of molecules of that substance.
- ▶ Calculate the total number of atoms making up the chemical formula.

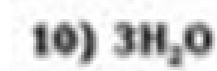
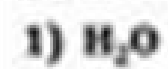


Examples:



Answer: 5 total atoms

Answer: 30 total atoms



Matter Homework Packet

Name _____
 Period _____

Physical and Chemical Changes and Properties of Matter Worksheet

Classify the following as chemical change (cc), chemical property (cp), physical change (pc), or physical property (pp).

- | | |
|-------------------------------------|-------------------------------|
| 1. <u>PP</u> Heat conductivity | 8. <u>CP</u> Combustible |
| 2. <u>CC</u> Silver tarnishing | 9. <u>PC</u> Water freezing |
| 3. <u>PC</u> sublimation | 10. <u>CC</u> Wood burning |
| 4. <u>PC</u> magnetizing steel | 11. <u>CP</u> Acid resistance |
| 5. <u>PP</u> length of metal object | 12. <u>PP</u> Brittleness |
| 6. <u>PC</u> shortening melting | 13. <u>CC</u> Milk souring |
| 7. <u>CC</u> exploding dynamite | 14. <u>CC</u> baking bread |

Identify the following as being true or false to the left of the sentence.

- T 15. A change in size or shape is a physical change.
T 16. A chemical change means a new substance with new properties was formed.
F 17. An example of a chemical change is when water freezes.
T 18. When platinum is heated, then cooled to its original state, we say this is a physical change.
F 19. When milk turns sour, this is a physical change because a change in odor does not indicate a chemical change.
T 20. When citric acid and baking soda mix, carbon dioxide is produced and the temperature decreases. This must be a chemical change.

Identify each of the following as a physical or chemical change.

21. CC You leave your bicycle out in the rain and it rusts.
 22. PC A sugar cube dissolves.
 23. CC Scientist break-up water into oxygen and hydrogen gas.
 24. CC Burning coal for a barbecue.
 25. PC Trimming a bush because it has grown too tall.

6. Compute the cost at 5.0 ¢ / kWh of operating an electric motor for 8.0 hours, which takes 15.0 amps at 110.0 volts.

$$\frac{15.0 \text{ C}}{1 \text{ sec}} \times \frac{110.0 \text{ J}}{\text{C}} = 1650 \frac{\text{J}}{\text{sec}} = 1650 \text{ watt} \times \frac{1 \text{ kWatt}}{1000 \text{ watt}} = 1.65 \text{ kWatt} \times 8.0 \text{ hr}$$

$$= 13.2 \text{ kWh} \times 5.0 \text{ ¢} = \boxed{.66 \text{ ¢}}$$

7. How long would it take to deposit 100. grams of Al(s) from an electrolytic cell containing Al₂O₃ in solution at a current of 125 amps?

$$100. \text{ g Al} \times \frac{1 \text{ mol Al}}{26.98 \text{ g}} \times \frac{3 \text{ mol e}^-}{1 \text{ mol Al}} \times \frac{96500 \text{ C}}{1 \text{ mol e}^-} \times \frac{1 \text{ sec}}{125 \text{ C}} \times \frac{1 \text{ min}}{60 \text{ sec}} = \boxed{\frac{8580 \text{ sec}}{143 \text{ min}}}$$

8. Electrolysis of aqueous NaCl leads to the production of gaseous Cl₂. How much energy in kWh must have been used to produce 9.0718 x 10⁹ kg of Cl₂ when this type of cell operates at 4.6 volts and 3.0 x 10⁵ amps?

$$9.0718 \times 10^9 \text{ kg Cl}_2 \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ mol Cl}_2}{70.90 \text{ g Cl}_2} \times \frac{2 \text{ mol e}^-}{1 \text{ mol Cl}_2} \times \frac{96500 \text{ C}}{1 \text{ mol e}^-} \times \frac{4.6 \text{ J}}{1 \text{ C}} \times \frac{1 \text{ kWh}}{3.6 \times 10^6 \text{ J}}$$

$$= \boxed{3.2 \times 10^{10} \text{ kWh}}$$

9. A current of 3.0 amps running for 45.0 minutes electrolyzes a solution containing a +2 metal ion. What is the identity of the metal if 2.67 grams of it plate out in this cell?

$$45.0 \text{ min} \times \frac{60 \text{ sec}}{1 \text{ min}} \times \frac{3.0 \text{ C}}{1 \text{ sec}} \times \frac{1 \text{ mol e}^-}{96500 \text{ C}} \times \frac{1 \text{ mol X}}{2 \text{ mol e}^-} = .0420 \text{ mol X}$$

$$2.67 \text{ g} / .0420 \text{ mol} = \boxed{63.57 \text{ g/mol} = \text{Cu}}$$

10. Galvanizing is placing a thin layer of zinc on an iron nail to protect the nail from corrosion. Find the energy in kWh required to electrolyze 12.6 grams of zinc on an iron nail sitting in an electrolytic cell of Zn²⁺(aq) with a potential of 5.00 volts.

$$12.6 \text{ g Zn} \times \frac{1 \text{ mol Zn}}{65.39 \text{ g Zn}} \times \frac{2 \text{ mol e}^-}{1 \text{ mol Zn}} \times \frac{96500 \text{ C}}{1 \text{ mol e}^-} \times \frac{5.00 \text{ J}}{1 \text{ C}} \times \frac{1 \text{ kWh}}{3.6 \times 10^6 \text{ J}} = \boxed{0.0517 \text{ kWh}}$$

Name _____

ILS

Elements, Compounds & Mixtures Worksheet

Part 1: Read the following information on elements, compounds and mixtures. Fill in the blanks where necessary.

Elements:

- A pure substance containing only one kind of _____.
- An element is always uniform all the way through (homogeneous).
- An element _____ be separated into simpler materials (except during nuclear reactions).
- Over 100 existing elements are listed and classified on the _____.

Compounds:

- A pure substance containing two or more kinds of _____.
- The atoms are _____ combined in some way. Often times (but not always) they come together to form groups of atoms called molecules.
- A compound is always homogeneous (uniform).
- Compounds _____ be separated by physical means. Separating a compound requires a chemical reaction.
- The properties of a compound are usually different than the properties of the elements it contains.

Mixtures:

- Two or more _____ or _____ NOT chemically combined.
- No reaction between substances.
- Mixtures can be uniform (called _____) and are known as solutions.
- Mixtures can also be non-uniform (called _____).
- Mixtures can be separated into their components by chemical or physical means.
- The properties of a mixture are similar to the properties of its components.

Part 2: Classify each of the following as elements (E), compounds (C) or Mixtures (M). Write the letter X if it is none of these.

___Diamond (C)	___Sugar (C ₆ H ₁₂ O ₆)	___Milk	___Iron (Fe)
___Air	___Sulfuric Acid (H ₂ SO ₄)	___Gasoline	___Electricity
___Krypton (K)	___Bismuth (Bi)	___Uranium (U)	___Popcorn
___Water (H ₂ O)	___Alcohol (CH ₃ OH)	___Pail of Garbage	___A dog
___Ammonia (NH ₃)	___Salt (NaCl)	___Energy	___Gold (Au)
___Wood	___Bronze	___Ink	___Pizza
___Dry Ice (CO ₂)	___Baking Soda (NaHCO ₃)	___Titanium (Ti)	___Concrete

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