

Review #1: Classification of Matter

1. Write a definition or explanation for the following terms:

Chemistry	Chemical Property	Element	Solvent
Matter	Physical Change	Compound	Solute
Qualitative property	Chemical Change	Solution	Metal
Quantitative property	Pure Substance	Homogeneous	Non-metal
Physical Property	Mixture	Heterogeneous	Metalloid

2. Explain the difference between the following:

- | | |
|--|--|
| a) a compound and a solution | d) a molecule and a mole |
| b) a mixture and a solution | e) a chemical change and a physical change |
| c) a physical property and a chemical property | f) a metal and a non-metal |

3. Classify each of the following as either an element, compound, solution, or mechanical mixture. Which items are pure substances, and which ones are mixtures?

- | | |
|-------------------------------------|--|
| a) an iron bar | j) iron (III) oxide (rust) |
| b) Lucky Charms cereal | k) ozone (O ₃) |
| c) concrete (sand, gravel and lime) | l) sterling silver (silver and copper) |
| d) ammonia gas (NH ₃) | m) 24 karat (pure) gold |
| e) brass (zinc and copper) | n) chocolate milk |
| f) aluminum foil | o) stainless steel (iron, carbon and chromium) |
| g) tap water | p) sulfur |
| h) won-ton soup | q) distilled water |
| i) granite rock | r) silver nitrate |

4. Complete the following chart comparing the characteristic properties of metals and non-metals. Classify each property as being a physical (P) or chemical (C) property.:

Characteristic Property	Chemical or Physical Property?	Metals	Non-metals
Usual state at SATP.			
Common (usual) colour			
Malleable or Brittle as Solids?			
Conductor of electricity when pure?			
Ductility			
Description of melting point (high or low)			
General number of valence electrons			
Gain or lose electrons to form ions?			
pH of solution of the element in water?			
pH of the solution of the oxide in water?			

5. What are six (or more) physical properties and three (or more) chemical properties for the element aluminum? What is aluminum's electron configuration? Is it a metal or a non-metal? Show the ionization reaction that occurs when aluminum gains or loses electron(s) to form an ion.

6. Repeat question #5 for the elements: hydrogen, chlorine, magnesium and sulfur.
7. What are the four indications (signs) that a chemical change has taken place?
8. Classify each of the following as physical or chemical changes. If it is a chemical change, what is the evidence that a chemical change had occurred?
 - a) toasting bread _____
 - b) sugar dissolving in coffee _____
 - c) allowing pop to go flat _____
 - d) boiling water _____
 - e) alka-seltzer fizzing in water _____
 - f) evaporation of water _____
 - g) boiling an egg _____
 - h) breaking glass _____
 - i) tarnishing of silver _____
 - j) grinding coffee beans _____
 - k) heating platinum until it glows red _____
 - l) explosion of nitroglycerin _____
 - m) firing a cap pistol _____
 - n) zinc dissolving in hydrochloric acid _____