Chapter 2: Properties of Matter

I.   Classifying Matter
     A. Pure substance =
         1. matter that has the same composition
         2. Every sample of same substance has same properties
         3. Fixed (doesn't change) composition
         4. There are two types of pure substances
             a) Elements =
                 (1) Can not be broken down into simpler substance
                 (2) An atom is the smallest amount of an element
                 (3) Must be found on periodic table
                     (a) Ex. = C, Al,
                 (4) Contains only one capital letter in formula
             b) Compounds =
                 (1) made of two or more simpler substances chemically combined
                 (2) Can be broken down into simpler substances again
                 (3) Often has different properties than the substances that make it up
                 (4) Substances are combined in a fixed ratio or proportion
                 (5) Have at least two capital letters in their formula
                     (a) Ex. H_2O, CO
     B. Mixtures:

1. What is a pure substance?

2. Are chocolate chip cookies a pure substance? Use definition to explain why?

3. What does the word fixed mean in relation to classifying matter?

4. How many and what are the types of pure substances?

5. What is an element? Can you give an example? Where are they found? Characteristics?

6. What is a compound? Can you give an example? Characteristics?

7. How can you tell by the formula that a substance is a compound?

1. Properties of a mixture can vary/change
   a) Example is air quality (air is a mixture)
2. Made of two or more substances physically combined
3. The individual substances that make up the compound keep their individual properties
4. Can be separated by physical processes based on physical properties
   a) Example = filtration due to size
   b) Refer to foul water lab
5. Examples = sand, salsa, air, brass
6. Two types of Mixtures are:
   a) Heterogeneous = parts of the mixture are noticeably different/not same throughout
      (1) Ex = sand, concrete, granite, pizza
      (2) Suspensions are heterogeneous mixtures which separate into layers over time
         (a) Ex = muddy water or salad dressing
   b) Homogeneous = parts are evenly dispersed / can not distinguish one part from another
      (1) Ex = air (usually), sugar water, brass, stainless steel
      (2) When you dissolve a substance to form a homogenous mixture it is called a solution
         (a) Solutions that are

8. What is a mixture?
9. Can mixtures of the same substances be different? Explain
10. Are mixtures physically or chemically combined?
11. Do substances keep their physical properties or do they change once mixed?
12. What are some examples of mixtures?

13. What are the two main categories of mixtures?
14. Can you define and give an example of each type of mixture?
15. What is a solution? Is it homogeneous or heterogeneous?
16. What is a suspension and can you give an example?

17. What does aqueous mean?

made with water are called aqueous (aq)

        (i) Ex = NaCl (aq)

    (3) Colloid = homogenous solution in which larger particles are suspended in solution

        (a) The larger particles are not big enough to see with naked eye but large enough to scatter light (Tyndall effect)

        (b) Ex. = fog and milk

        (c) Remember demo

II. Physical Properties: = any characteristic that can be observed/measured without changing the substance composition

    A. Examples =

        1. Viscosity = resistance to flow

           a) High viscosity means flows hard

        2. Conductivity = ability to allow heat/electricity to flow

           a) Metals have high

        3. Malleability = metal that can be hammered without shattering

        4. Melting point and boiling point

        5. Density = Mass divided by volume

           a) Can be used to identify a substance

           b) Must use displacement method to determine the

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18. What is a colloid?
19. Is a colloid homogeneous or heterogeneous?
20. What affect do colloids show that solutions do not? Explain and give an example

21. What is the definition of a physical property?

22. Can you give at least 4 examples of physical properties?

23. What is the formula for density?
24. What is the method called for determining the volume of a non-uniform shaped object?

volume of an irregularly shaped object
        c) Refer to density lab
B. Any physical property can be used to separate mixtures:
      1.

property	process
size	filtration
Boiling point	distillation
magnetic	magnetism
solubility	dissolve
density	decanting

25. Can you name at least 3 or 4 physical properties and the process that is used to separate a mixture based on that property?

III. Chemical Property = any ability to change the composition of matter
    A. Only can be observed when substance changes into another substance
        a. Examples =
            i.   Flammability
           ii.   Reactivity
           iii.   Oxidation (rusting)
    B. Chemical change = changing one substance into another
        a. Evidence =
            i.   Change in color
           ii.   Production of gas
           iii.   Formation of precipitate (solid that forms and separates from a liquid mixture)
Refer to crime scene lab

26. What is a chemical property?

27. Can you name at least two chemical properties?

28. What occurs when a chemical change happens?

29. What are three possible pieces of evidence that a chemical change has occurred?

30. Boiling water produces bubbles. Is boiling water a chemical change? Why or why not?

Particle Diagrams: