Chapter 18

Exercises

6.

Substance	Classification
Salt, sodium chloride	compound
Flour, natural product	mixture
Stainless steel, mix of iron and carbon	mixture
Tap water, dihydrogen oxide plus impurities	mixture
Sugar, chemical name: sucrose	compound
Vanilla extract, natural product	mixture
Butter, natural product	mixture

8. Box a: mixture.
Box b: compound.
Box c: element.
There are three different types of molecules shown altogether in all three boxes: one with two open circles joined, one with a solid and open circle joined, and one with two solid circles joined.

13 The transformation of elements into a compound is necessarily a chemical change. To go backwards - from the compound back into the elements - would also be an example of a chemical change. The only way to separate an element from a compound, therefore, would be by chemical means.

16. Based upon the differences in physical properties. The iron fillings are attracted to a magnet while the cereal is not. Try this with your next box of iron fortified cereal.

18. The pill is not pure acetaminophen. Rather, the acetaminophen is mixed with some other, likely inert, ingredients. Interestingly, starch is often used because it helps to hold the medicine together in pill form. Gel coatings are also used so that the medicine doesn't start to dissolve until it reaches your stomach or intestines. If the pill had a mass of less than 500 milligrams, then that would be a case for calling the pharmaceutical company on their quality assurance practices.

19. To tell whether a sugar solution is saturated or not, add more sugar and see if it will dissolve. If the sugar dissolves, the solution was not saturated. Alternatively, cool the solution and see if any sugar precipitates. If it precipitates then the solution was saturated. Because sugar forms supersaturated solutions so easily, however, neither of these methods is always successful.

28. Distilled water is pure only before you drink it. Once in your stomach, it mixes with everything else to make up a nutrient filled solution. The only difference is that tap water may have contributed a few more milligrams of hard water ions, such as calcium, which your body actually uses as a mineral. But there's nothing wrong with drinking water that has been distilled. In fact, it is about as pure as any water as you'll ever be able to drink.

Problems

1. Multiply concentration by volume: (0.5 g/L)(5 L) = 2.5 g.

2. Mass = (Concentration)(Volume)
   = (3.0 g/L)(15 L)
   = 45 g.