Classes of Matter- Part I

Annotation
Several types of household matter will be placed at different lab stations and students will be asked to identify if it is a solution, mixture, compound or element, and what type, if applicable. Justification for student answers can be written on the worksheet or can be discussed in class. Purity misconceptions should also be discussed. This lab can be remediated or extended by including more identifications of less obvious classification.

Hypothesis
All matter can be classified based on the behavior of the sample and the physical and chemical properties all or a portion has.

Primary Learning Outcome
1. Students should be able to classify matter based on its appearance and characteristics
2. Students will have to use an orderly and systematic method of thinking to accurately classify

Assessed GPS
1. SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations
2. SCSh3. Students will identify and investigate problems scientifically
3. SCSh6. Students will communicate scientific investigations and information clearly
4. SC1. Students will analyze the nature of matter and its classification
5. SC4. Students will use the organization of the Periodic Table to predict properties of elements

Total Duration
30 minutes for discussion of classification
30-60 minutes to conduct lab (varies with number of samples to identify and if student's reasoning is written on their paper or discussed in class)

Materials and Equipment
1. All can be brought from home. Just include a variety based on classification, color, particle size, phase of matter, etc.
2. To emphasize discussion of purity, bring a clear liquid substance that is not pure. Most students will say it is pure because it is clear, but only substances that have consist chemical and physical properties are pure.

Procedures
1. Arrange samples around the classroom (10 minutes)
2. Students should fill out worksheet at each station (30-60 minutes- see above)
3. Discuss student answers and reasoning. Correct misconceptions.

Assessment
Student assessment of this lab will be based on correct identification of the samples and proper reasoning, if students were required to write individual reasoning.

Extension
In addition to more samples of less obvious classification, students can also complete Classes of Matter- Part II which asks students to determine classification using experiments to determine chemical and physical properties.

Classes of Matter- Part I Data Page

Heterogeneous matter

- All parts are not alike (mixtures)
- Properties of one portion not like the properties of another
- Heterogeneous mixture- not well mixed
- Homogenous mixture- well mixed
- Examples from lab:

Solutions

- Homogeneous mixture- particles dissolves into another (all phases possible)
- Particles are not large enough to be seen
- All particles are evenly spread out but retain individual chemical properties
- Examples from lab:

Alloys

- Metal and nonmetal solutions
- Examples from lab:

Homogenous matter (pure substance)

- All parts are alike
- The properties of one portion are equal to the properties of another portion
- Examples from lab:

Elements

- Cannot be changed into simpler substance by any process
- Can change phases but still same element
- Atom- smallest particle of an element with same properties
- Examples from lab:

Compounds

- Broken down into elements through heat and chemical processes
- Made of molecules- two or more atoms chemically bonded
- Has different properties than the individual elements
- Examples from lab: