Module 1: Foundations
Describing and Classifying Matter

Fundamentals of Chemistry Open Course

Learning Objectives | Module 1

1. Extract useful quantitative information from problems; generate a list of known and unknown quantities from the text of a problem.
2. Solve equations for a single unknown variable using standard algebraic operations.
3. Draw and interpret graphs relating physical variables with relevance to chemistry.
4. Recognize the essential components of a measurement.
5. Apply dimensional analysis with knowns and unknowns to solve equations involving measured quantities.
6. Calculate measures of accuracy and precision to assess the quality of a set of measurements.
7. Express quantities calculated from measurements at the appropriate level of precision by applying the rules for significant digits.
8. Recognize and distinguish between physical and chemical properties.
9. Classify different types of matter as pure substances or mixtures; compare and contrast homogeneous and heterogeneous mixtures.
10. Describe and apply the scientific method.

Classification of Matter

- **Matter** is anything that has mass and takes up space.

- Matter is classified according to…
  - **State:** solid, liquid, or gas?
  - **Composition:** what kinds of substances compose it, and in what amounts?

- **Pure substances** contain only a single type of atom, molecule, or formula unit.
  - **Elements** cannot be broken down into simpler substances.
  - **Compounds** are composed of two or more elements in fixed and definite proportions.

- **Mixtures** are composed of two or more different types of atoms or molecules combined in variable proportions.
  - **Heterogeneous** mixtures differ in composition at different points in the substance.
  - **Homogeneous** mixtures have the same composition at every point in the mixture.

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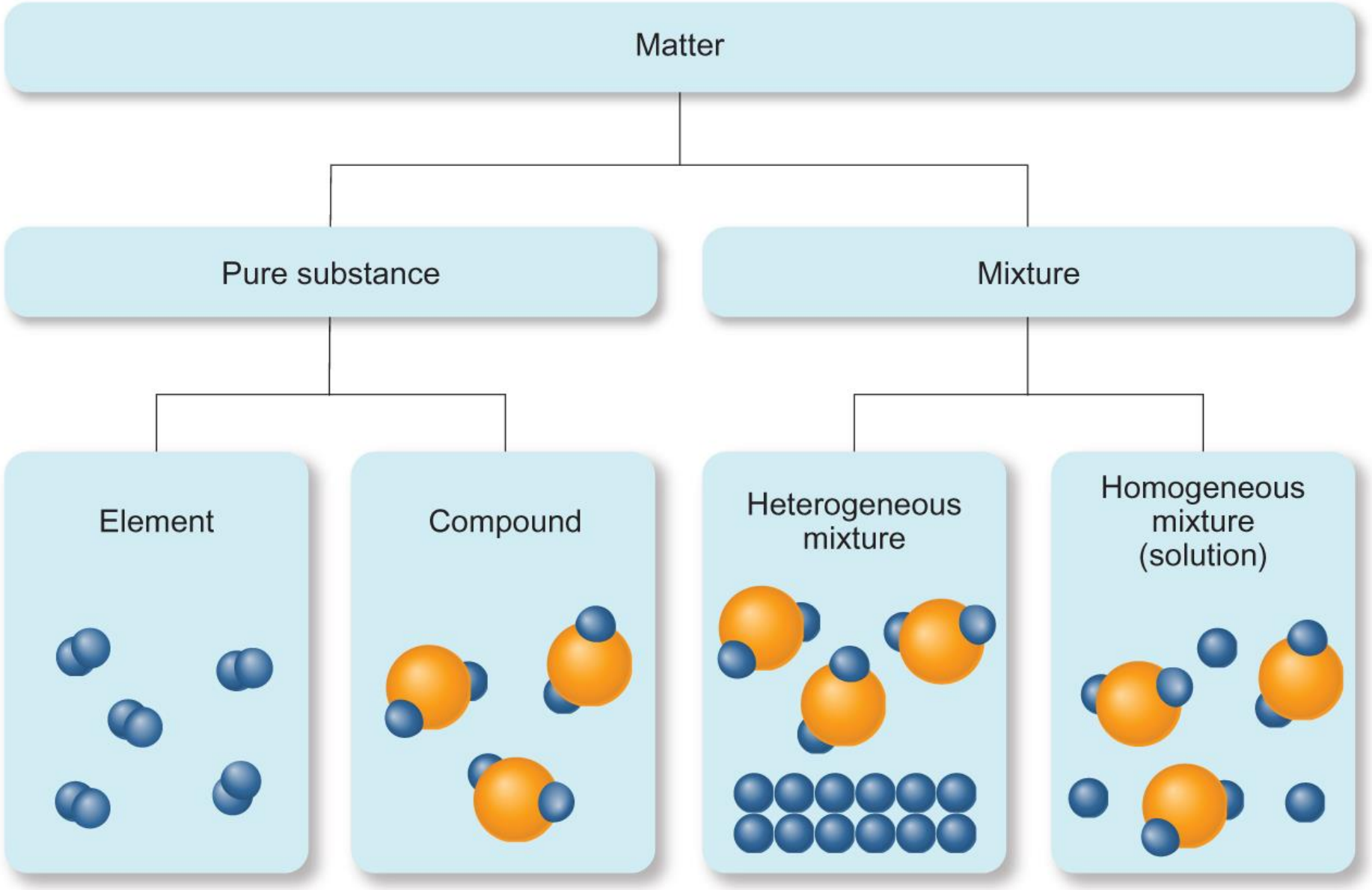

Example. Using visual inspection, how would you classify each of the substances shown below?