Ch 1 An Introduction to Chemistry

TODAY'S DATE

1.1 chemistry

chemistry - is the science of the composition, structure, properties, and reactions of matter, especially of atomic and molecular systems

1.3 matter

matter - anything that has mass and occupies space
- the entire universe consists of matter & energy
- matter is discontinuous & is composed of discrete, tiny particles called atoms

What physical states can matter exist in?

physical states of matter:
- **solid** - is a state of matter having definate shape and a definate volume, whose particles cohere rigidly to one another, so that solid can be independent of its container
  - >most are crystalline w/ particles in regular, repeating, 3D, geometric patterns

> some are amorphous - a solid w/o shape or form (e.g., plastics, glass, and gels do not have any regular, internal geometric pattern)

- liquid - a state of matter in which the particles moves about freely while the substance remains a definite volume; thus liquids flow and take the shape of their containers
- gas - a state of matter that has no shape or definite volume so that the substance completely fills the container
  > particles in a gas have gained enough energy to overcome the attractive forces that held them together as liquids or solids
  > particles press continuously in all directions on the walls of the container
  > gases can be compressed

1.4

substance	substance – matter that is homogeneous and has a definite, fixed composition; substances occur in two forms – as elements and as compounds – also known as pure substances – e.g. of elements = copper, gold, oxygen – e.g. of compounds = salt, sugar, water
how is matter classified?	matter is classified as homogeneous or heterogeneous – homogeneous – matter that has uniform properties – heterogeneous – matter w/o. a uniform composition – having two or more components or phases
phase	phase – a homogeneous part of a system separated from other parts by a physical boundary
system	system – a body of matter under construction

mixture	mixture - matter containing two or more substances, which can be present in variable amounts; mixtures can be homogeneous (e.g. sugar water) or heterogeneous (e.g., sand and water)
how to distinguish mixtures from pure substances	mixture vs. pure substances 1. mixtures always contain 2 or more substances that can be present in varying amts. 1. a pure substance (element or compound) always has definite composition by mass 2. the components of a mixture do not lose their identities + may be separated by physical means 2. the elements in a compound lose their identities and may be separated only by chemical means
another name for homogeneous mixture	homogeneous mixtures are also known as solutions