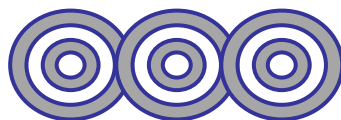




*Chemistry, Raymond Chang*  
*10th edition, 2010*  
*McGraw-Hill*



# Preface

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كرسي أبحاث  
المواد المتقدمة  
Advanced Materials  
Research Chair



جامعة  
الملك سعود  
King Saud University



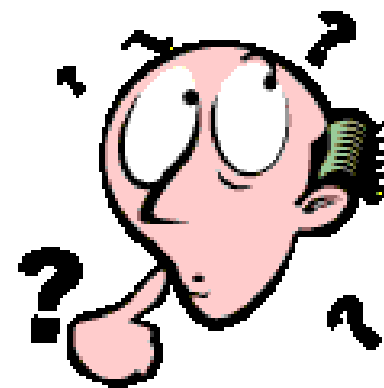
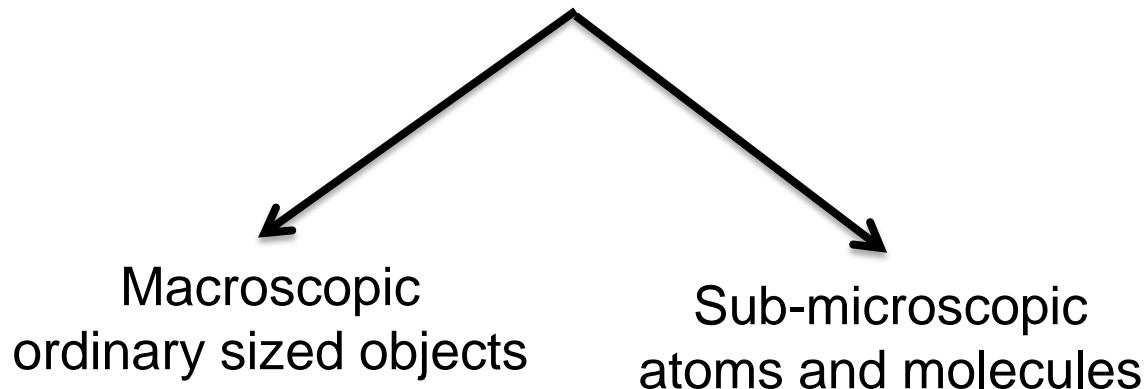
# What is Chemistry?

**Chemistry** is the study of the **properties** and **behavior** of **matter**.



# Why Study Chemistry?

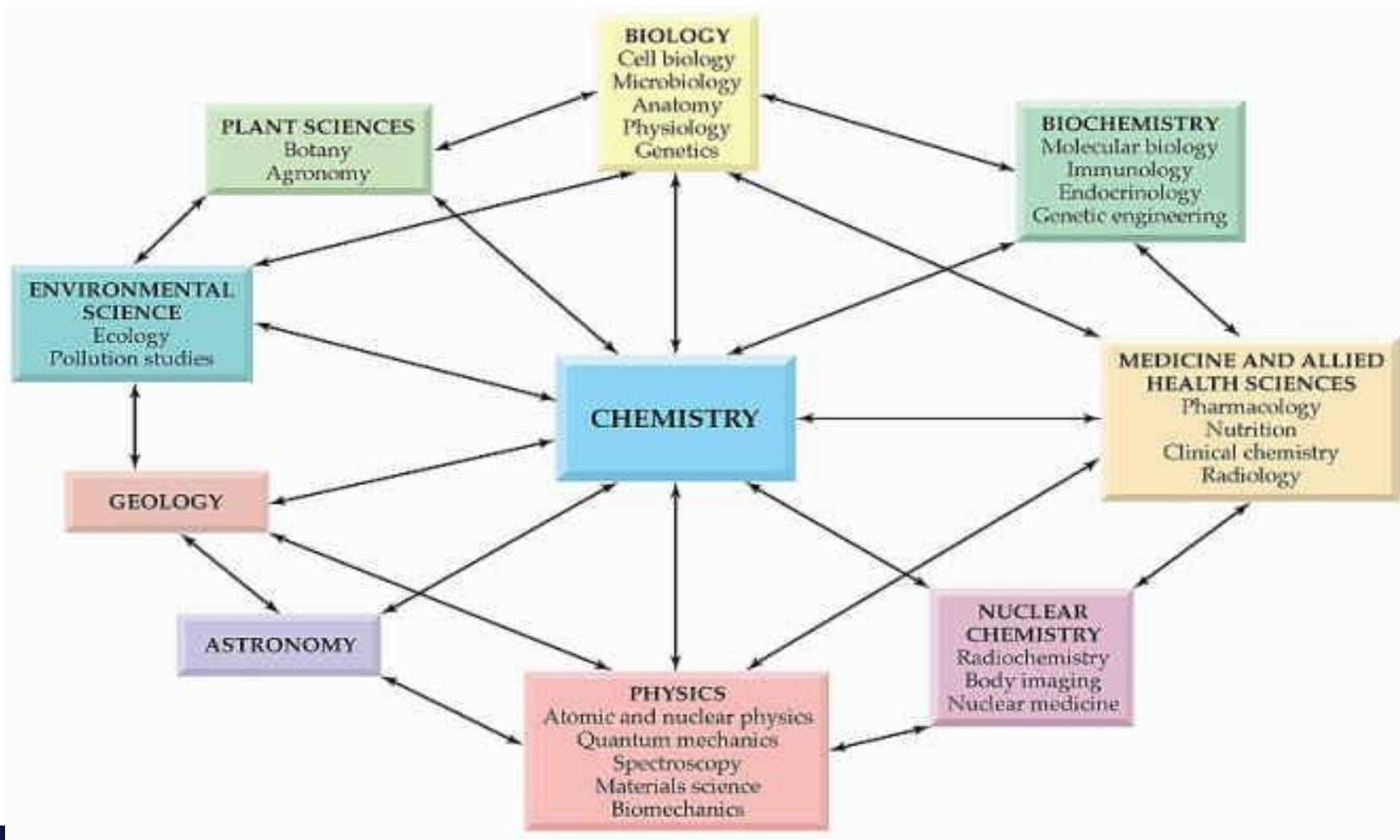
## Realms



Chemistry is the science that seeks to understand the properties and behavior of matter by studying the properties of atoms and molecules. Chemistry provides important understanding of our world and how it works.

# Chemistry = the central science

Chemistry is often called **the central science** because of its role in connecting the other sciences, with the life and applied sciences.

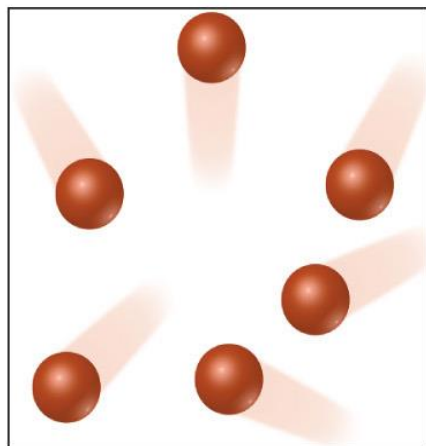


# Matter

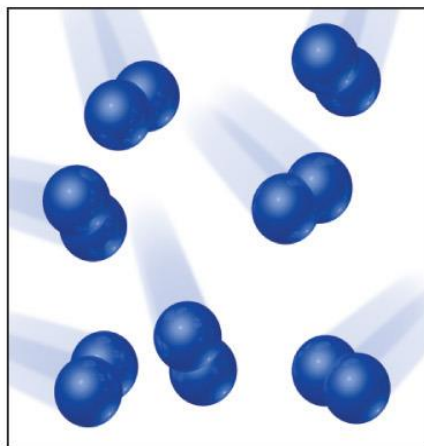
Is the physical material of the universe

We define matter as anything that has mass  
and takes up space.

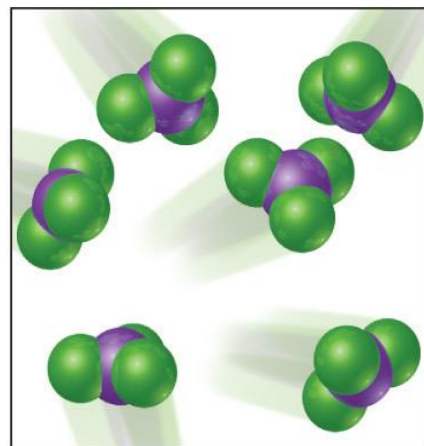
# Classification of matter according to its composition



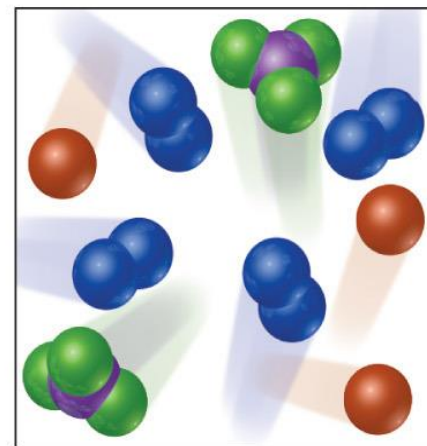
(a) Atoms of an element



(b) Molecules of an element



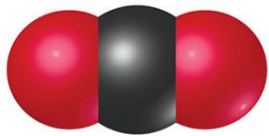
(c) Molecules of a compound



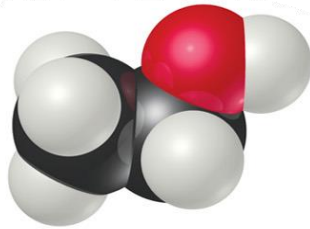
(d) Mixture of elements and a compound



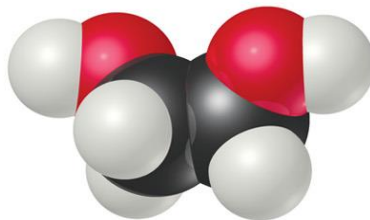
(b) Water



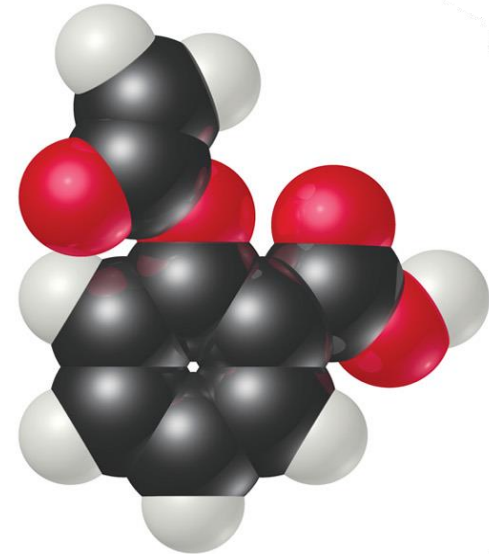
(c) Carbon dioxide



(d) Ethanol



(e) Ethylene glycol



(f) Aspirin

**Atoms** are the building blocks of matter.

Each **element** is made of the same kind of atom.

A **compound** is made of two or more different kinds of elements.

# Classification of matter according to its physical state

## Gas

has no fixed volume or shape, it conforms to the volume and shape of its containers, It can be compressed or expand

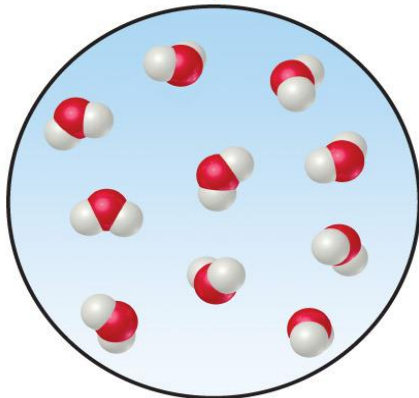


## Liquid

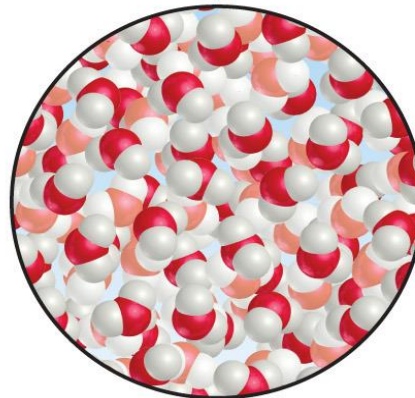
has distinct volume but has no specific shape

## Solid

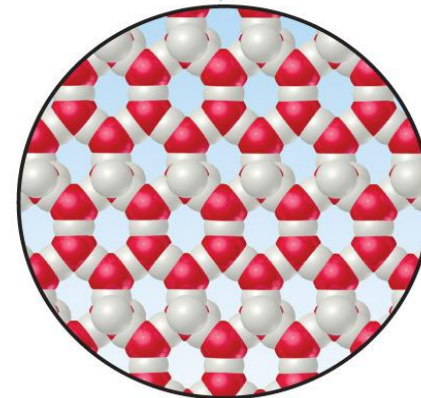
has both definite shape and volume



Gas



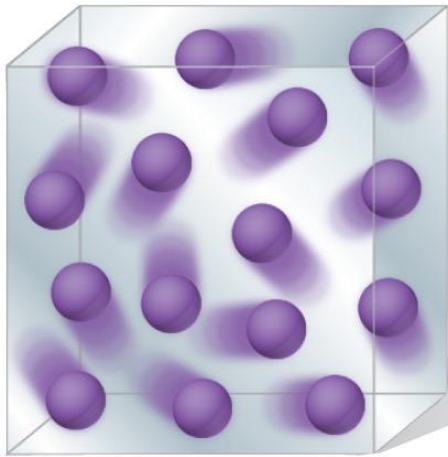
Liquid



Solid



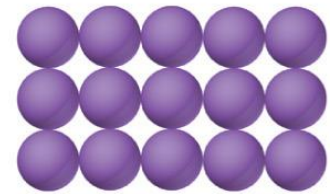
# States of Matter



Cool or  
increase  
pressure  
⇌  
Heat or  
reduce  
pressure



Cool  
⇌  
Heat



**Gas**

Total disorder; much empty space; particles have complete freedom of motion; particles far apart

**Liquid**

Disorder; particles or clusters of particles are free to move relative to each other; particles close together

**Crystalline solid**

Ordered arrangement; particles are essentially in fixed positions; particles close together

# Scientific Method

The scientific method is simply a systematic approach to solving problems.

