Matter

Matter is anything that has mass and takes up space. Chemistry is the study of the properties of matter and how matter changes. In chemistry, a substance is a single kind of matter that is pure. Every form of matter has two kinds of properties—physical properties and chemical properties. A physical property is observed without changing a substance into another substance. Examples of physical properties are hardness, texture, colour, and ability to dissolve in water. A chemical property is the ability of a substance to change into different substances. Some chemical properties are burning and rusting. All matter is made up of elements. An element is a pure substance that cannot be broken down into any other substance. Elements are the simplest substances. Each element is identified by its specific physical and chemical properties. An atom is the basic particle that makes up an element. Atoms of most elements can combine with other atoms. A chemical bond is the force that holds two atoms together. Atoms often combine to form molecules, which are larger particles made of two or more atoms held together by chemical bonds. When elements are chemically combined, they form compounds having properties that are different from those of the uncombined elements. A compound is a pure substance made of two or more elements chemically combined in a set ratio. A compound may be represented by a chemical formula. A chemical formula shows the elements in the compound and the ratio of atoms. For example, the chemical formula for carbon dioxide is CO2. In carbon dioxide, there are always two oxygen atoms to every one carbon atom. Elements and compounds are pure substances, but most of the materials you see every day are not. Instead, they are mixtures. A mixture is made of two or more substances that are together in the same place, but are not chemically combined. Mixtures differ from compounds in two ways. Each substance in a mixture keeps its individual properties. Also, the parts of a mixture are not combined in a set ratio. A mixture can be heterogeneous or homogeneous. In a heterogeneous mixture, you can see the different parts. The substances in a homogeneous mixture are so evenly mixed that you cannot see the different parts. A solution is an example of a homogeneous mixture. Air is a solution of nitrogen gas, oxygen gas, plus small amounts of other gases. Unlike compounds, mixtures are easily separated into their components. For example, iron filings can be easily removed from salt with a magnet.