2.1 Matter and the Elements

Explaining the diversity of matter

There are probably a million different kinds of matter in and around your classroom. Think about every different ingredient in the air, the soil, the walls and floor, the books and desks, and everything else. How do we make sense of such variety? Are the millions of different kinds of matter actually mixtures of a few simpler things?

Substances contain only a single kind of matter

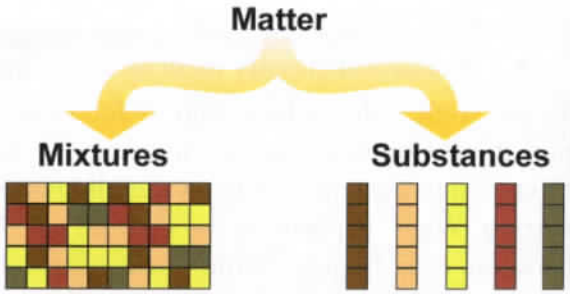
The first step toward finding an answer is to search for pure *substances*. A **substance** cannot be separated into different kinds of matter by physical means such as sorting, filtering, drying, dissolving, heating or cooling. Corn oil is a pure substance. Salad dressing is not, because it contains oil, water, spices and other substances. In oterh words, something is a pure substance if it is a single chemical throughout.

Corn oil is a pure ***substance***

Oil and vinegar dressing is a ***mixture*** of substances

Mixtures contain more than one kind of matter

"Pure" is a much looser word in every day language. A container might say "pure orange juice". However, to a chemist, orange juice is a **mixture**. Orange juice can be separated into water, different flavoring chemicals, citric acid, sugars and fruit pulp. A mixture is matter that contains more than one substance. Wood is a mixture because there are many substances in wood including water, cellulose, tannic acid, lignin and other chemicals.



Most ordinary matter is mixtures

Mixtures can be separated by physical means

Mixtures are made of substances. They can be separated into their component substances by physical means such as sorting, filtering, heating or cooling. Chicken noodle soup, for example, could be separated into its components by using strainers and filters of different sizes. The separation process does not change the characteristics of each substance. You still have water, salt, fats, noodles and chicken.

substance - a kind of matter that can't be separated into other substances by physical means such as heating, cooling, filtering, drying, sorting or dissolving.

mixture - matter that contains more than one substance.