# What is a Solid?

Much of the matter we typically deal with in our everyday lives is a solid. The idea of "solid" is something that retains is shape. This is an idealization -- it really means "it doesn't change its shape while I'm watching it."  As we know, a solid can change its shape if you push on it hard enough (by deforming or breaking). Some things that appear solid will change their shape slowly under the gentle pull of gravity. Some glass in very old windows shows a small amount of sagging.  And what is it with butter, anyway?

A uniform solid is one where every part of it is the same as every other part.  This is a model statement, since all matter is composed of atoms and at the atomic level no matter is uniform since there are spaces between the atoms. When we say something is a "uniform solid" we mean that we are going to be examining it on a scale large enough that we can ignore atomic discontinuities.

Some uniform solids consist of atoms or ions in a regular pattern, such as diamonds composed only of carbon atoms in a regular lattice, or a salt crystal composed of sodium and chloride ions in a regular array.  However, these are relatively uncommon and so for the most part we will consider solids to made up of molecules.  Solids can be formed from a single compound where all the molecules are the same, or multiple compounds, with a mixture of molecules.  A multi-component solid is sometimes harder to characterize as it can be a non-uniform mixture or conglomerate.

Biological solids can be quite complex.  They are often not uniform, but instead are composites, made of particles embedded in layers composed of different materials.  Your skin is a good example.  It is composed of a thick layer of connective tissue (dermis) underlain by a  membrane and overlaid by a surface (epidermal) layer. The dermis is actually a three dimensional network of collagen fibers that are embedded in a protein-polysaccaride matrix.  The stretchiness of your skin is provided by additional elastin fibers which are distributed throughout the dermis.\*