

## Fascinating Fluids

Fluids are amazing. Fluids flow. Liquids have variable shapes but almost constant volumes. Gases take the shape of their containers, and can be squeezed and stretched relatively easily. We are made of fluids, mostly water, arguably the most interesting compound in the universe.

What is fine sand? It is a solid, but it can behave like a liquid, flowing yet maintaining its volume. What is Jello™? It is certainly not a solid! Smoke has solids in it, but it is not solid either. Then there is the seriously weird world of superfluid helium. Liquid helium a few degrees above absolute zero can climb out of its cup, leak through molecule size pores in materials, and if swirled, can continue to revolve forever.

Try this: mix some corn starch with cold water, enough to make it thick and creamy. Pour it from one container into another and watch how it moves. Dip your finger in it slowly and then quickly. Stir it slowly and quickly. Try to splash it or throw it out of a cup. Have fun with it, you are doing science!

Pour some white glue into a small cup. Dissolve Borax in water until some solid remains in the bottom no matter how much you stir. This is called a saturated solution. Add solution to the glue a little at a time while you stir the mixture. In a short time you will be able to take the glue out of the cup and knead it. If it gets sticky, dip it back into the solution. What is going on here? Don't let your ball dry on fabric or furniture.

Borrow a disposable diaper from someone with a baby. Cut it open and pull some of the dust out. Put it in a cup or glass. Add about 2 times as much water by volume. Watch what happens. This is a superabsorbent polymer (very large molecule that loves water) and it is forming a gel. The water is still there and still liquid, but it is being encapsulated by long molecules. The same thing happens in Jello.

Mix up a large cup of hot chocolate. Stir the mixture, then thump the spoon several times gently on the bottom of the cup. What do you hear? Stir it again and repeat the thumping. Continue to this as the drink cools, but not until it is so cold that you no longer want to drink it.