

It's a solid! It's a liquid! It's Oobleck!

By Linda Butler



What is that slimy, squishy, goeey, crumbly substance? It drips like water, but when you pound it it's hard like cement! It's Oobleck, a simple combination of water and cornstarch which is actually a complex substance!

Oobleck was named for the Dr. Seuss book, "Bartholomew and the Oobleck." In the book, King Derwin of Didd is tired of the boring things that fall from the sky: rain, sunshine, fog, and snow. He commands the royal magicians to create something more exciting. They conjure up a gooey green globular substance called Oobleck, which rains down from the sky

and causes a royal mess. The wise page boy, Bartholomew Cubbins, helps the king solve this huge problem—the magic is undone when the king humbles himself and offers a simple apology.



Making Oobleck

Simple to make, Oobleck can be a fun way to learn about complex subjects—such as Non-Newtonian fluids!

Mix together in a plastic or metal bowl—1 cup cornstarch

½ cup water

2-3 drops food coloring (optional—if you add color, add it to the water before mixing it into the cornstarch)

Put the cornstarch into the bowl. Feel how smooth it is. The smoothness is caused by how fine the particles are—1 to 10 microns in size, smaller than the diameter of a human hair. Cornstarch is known in England, Australia and New Zealand as cornflour. It's a finer powder than wheat flour. In cooking, cornstarch is used to thicken soups, puddings, and sauces. Cornstarch is the only powder or flour that can make Oobleck.

Pour the water into the cornstarch and slowly stir it. Soon it will become hard to stir. Dig in your hands and keep mixing it. If it's too runny, add another tablespoon of cornstarch; if it's too hard, add a teaspoon of water. Note how the different thicknesses (or viscosities) of Oobleck act.

Cleaning up Oobleck

Oobleck is non-toxic, but it can be messy. Cleanup isn't hard. Scrape up as much as you can with a spatula. Wipe up the rest with a damp cloth. Any that falls on the floor can be easily swept up after it dries and then wiped up with a damp cloth. Pouring Oobleck down the drain can potentially cause blockage, so it should be dried then put in the trash. The dried powder can also be sprinkled onto compost.

You can also save dried Oobleck in an airtight container to rehydrate for another play session. It looks a bit grainy when dried, but when rehydrated, will again be a smooth strange substance.

Experimenting with Oobleck

Scoop up a handful of Oobleck. Squeeze it. What happens? Scoop up more Oobleck and cradle it in your hands, then spread your fingers apart and wait a few seconds. What happens now? Roll some into a ball, place it on the table and watch it soften.

Oobleck is not actually a mixture. It's a suspension of starch grains in water. The starch doesn't completely dissolve in the water so the tiny starch grains rub against each other when it's liquid. If you try to pound Oobleck with a potato masher or a mallet, it is solid. But if you gently lay your masher or mallet on the surface of the Oobleck, it will slowly begin to sink—now Oobleck is a thick liquid.

If your child is a Wizard of Oz fan, use a bit of rather dry Oobleck to make a conical Wicked Witch hat. Drop several drops of water onto the tip of the hat and watch what happens: "I'm melting, melting! Ohhh, what a world, what a world!"



The Science of Oobleck

Back in the late 1600s, Issac Newton studied the behavior of fluids. He discovered that most fluids flow, and that they are of various thicknesses or viscosities, such as water (highly viscous) and honey (not very viscous.) A Newtonian fluid, such as water, milk, or vegetable oil can flow faster when it's warm. We can't really see the difference between cold and hot water, but we certainly know that cold honey flows much more slowly than warm honey. When water freezes it becomes hard as ice!

Oobleck doesn't follow Newton's rules. Oobleck isn't temperature sensitive. It gets hard when you squeeze or hit it. When Oobleck is at rest or is moving slowly (dripping), the water in the Oobleck acts as a cushion or lubricant, allowing the starch grains to move freely. A sudden force on Oobleck, such as squeezing or pounding, pushes the water out of the suspension, forcing the starch grains against each other, forming a solid mass. Once you release the pressure by opening your hand, the starch unlocks, the Oobleck becomes more fluid, and begins to drip from between your fingers.

Scientists are still studying the unique properties of non-Newtonian substances. These could have many practical uses. One would be in bulletproof vests. While worn, the vest would be flexible and move with the wearer. But when a bullet hits, the solidification could absorb the impact and save a life!

Another possible use could be quick pothole repair on freeways or highways. A blob of an Oobleck-like substance could be dropped into the pothole, quickly flowing out to fill it and be level with the road surface but act as solid roadway when a speeding car passes over it.

Quicksand—Nature-made Oobleck

Quicksand is also a non-Newtonian fluid of sand mixed with water. When you first step on it, it seems solid, but your movement causes vibration which changes its viscosity into a thick liquid. Quicksand can be found anywhere if conditions are right, but it's most common near the coast, in marshes, or along riverbanks.

Quicksand can also form during an earthquake. The earth's vibration can liquify viscous soil which can engulf cars and even buildings. Non-Newtonian flow may be the science behind the children's song about the wise man who built his house upon a rock and a foolish man who built his house upon the sand. The rain and the sand combined to become a viscous non-Newtonian fluid which couldn't bear the house's weight, thus causing it to tumble down.



“Bartholomew and the Oobleck” by Dr. Seuss, can be found in Picture Books at the Pleasant Grove Library. The library also has a large collection of science activity books on the shelf: J Science Experiments.



Cool facts about corn!

Corn is the major feed grain grown for animals in the USA.

Most of our corn is grown in Illinois, Iowa, Nebraska and Minnesota. Eight neighboring states also grow a lot of corn. This Midwest area is known as “The Corn Belt.”

An average ear of corn has 600-800 kernels.

It takes about 1300 kernels to make a pound of corn.

An acre of corn (about the size of a football field) yields 7-10 million kernels of corn!

Corn is eaten by people and livestock. Corn is also used in fuel, solvents, animal bedding, clothing fibers (nylon) and adhesives. Parts of corn are found in cereal, snack foods, and even peanut butter!

Sir Isaac Newton

He was born 4 January 1643 and died 20 March 1727. Sir Isaac Newton was an English mathematician, physicist, astronomer, theologian, and author who was one of the most influential scientists in history.

His numerous accomplishments include his Three Laws of Motion, identifying Gravity as a universal force, fluid physics, and inventing the reflecting telescope.

In 1687 he published “Principia Mathematica,” a monumental volume which is the foundation of modern science and was instrumental in scientific thought which spawned the Industrial Revolution.

He was knighted in 1705 by Queen Anne of England.

