

THE HILL AT HOME

Explorers
Edition

Crazy corn flour concoction

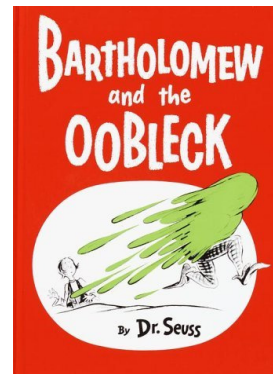
This weird gloop is fun to play with, so be careful that you don't make a mess!

You will need:

- A bowl or dish to hold your mix
- corn flour
- Water

1. Fill the bowl half the way up with corn flour then add water slowly, while mixing
2. After you have added about half as much water the mix will start acting really strangely!
3. This mix acts as a liquid until you put pressure on it, then it becomes solid!

Congratulations! You have successfully made a mix called "Oobleck" The name comes from the Dr Seuss book "*Bartholomew and the Oobleck*" In the story a king bored with rain, snow and fog causes green ooze to fall from the sky!



Things to try:

- If you slowly dip your hand into it, your fingers will sink in, but quickly punch it, and you will bounce off.
- Try rolling a ball of the mixture quickly between your hands, it will feel solid, and if your mix is right will even bounce off a table! When you stop squeezing it will become a liquid and flow through your fingers!

So what's going on?!

To understand why the Oobleck moves so strangely, we have to know more about the mix we have made. Is it a solid, or is it a liquid? - Its both!

The particles of corn flour are 'suspended' in the water, this means that they are evenly spread throughout the water, not dissolved into the water, clumped together at the bottom or floating at the top.



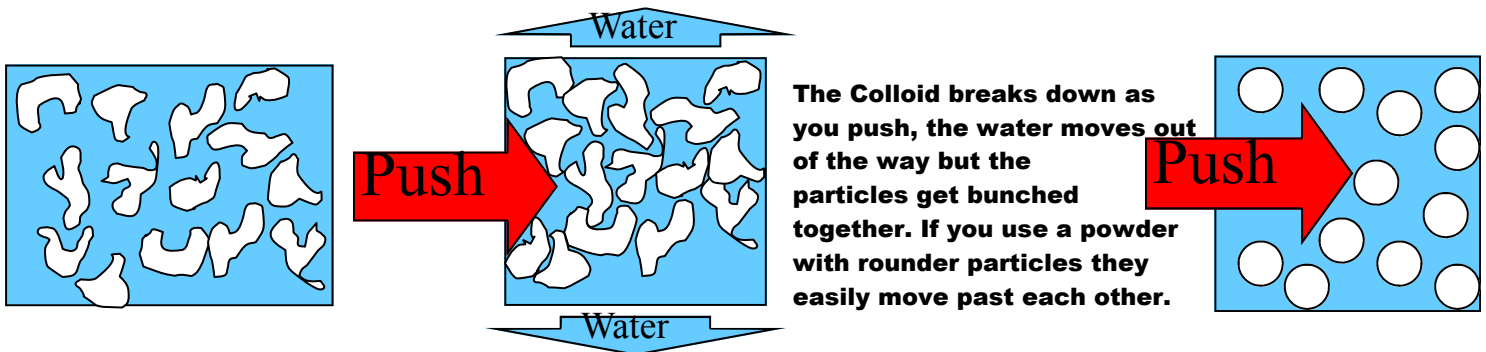
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What makes powdered corn flour unique is that unlike many powdered solids like sugar, salt or baking flour, corn flour is made up of particles with a variety of different shapes and sizes. When compacted together these particles jam together to make a solid wall. This is the key to its weird behavior. If you substitute corn flour for another solid powder with a regular shape like regular flour, the particles slip past each other far easier and the mix still behaves like a liquid.

When moving slowly, the odd shaped particles have time to drift around each other as the water that surrounds them moves with the particles. When you push quickly, the water quickly flows away from the shock, but the corn flour particles become bunched together and cant slip past each other, they make a solid barrier that resists your push.

Toothpaste is a mix of chemicals with the reverse properties, it is solid when undisturbed, but becomes



more liquid when put under pressure, so it squeezes out of a tube, to stay solid on the brush. It becomes a liquid once you start pushing it against your teeth so brushing your teeth with toothpaste doesn't feel like brushing your teeth with Jell-O (give it a try!)

A mix of materials

This kind of mix of materials is known as a 'colloid' (rhymes with droid) A colloid is a mix of small bits of material spread throughout another base material. Colloids are an imperfect mix, the suspended material is not broken down to its smallest size or dissolved. There are many variations of colloid, and they are used in many common products that you will have heard of. There are no gas in gas colloids because gases always mix very thoroughly.

Colloids are useful because they can have the benefits of both ingredients. For example Styrofoam is both

Types of Colloid	Gas particles in...	Liquid drops in...	Solid particles in...
...a mass of Gas	There are no gas/gas colloids — they mix too well!	Liquid aerosol—i.e. spray deodorant, fog, clouds	Solid aerosol—i.e. smoke
...a mass of Liquid	Foam — i.e. Whipped cream	Emulsion—i.e. Milk, Italian Salad dressing	Sol—i.e. inks, Cocoa , Oobleck
...a mass of Solid	Solid Foam—i.e. Styrofoam	Gel—i.e. gelatin dessert	Solid Sol—i.e. Metal alloys, Pearl

solid and light. We can see that our "Oobleck" is a "Sol" type of colloid, a mix of solid corn flour particles suspended in water.

What other materials do you know of that could be colloids?