

# NON-NEWTONIAN FLUIDS

## ISAAC NEWTON

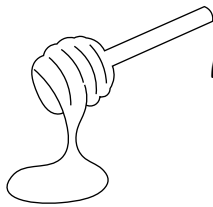


Lived Jan 4, 1643-Mar 31, 1727, in England.  
He was a professor at Cambridge University.

Newton was a scientist who liked to observe how things worked. He would then record his ideas for *how* and *why*. His book *Mathematical Principles of Natural Philosophy*, which is often referred to simply as *Principia*, was pretty much the start of modern physics.

Newton discovered a lot of very important things - such as calculus and gravity. He wasn't the first person to observe gravity, but he was the first person to extrapolate that if the earth pulled an apple down, the apple must pull on the earth too. Wow! He was right, and that's just one small example of some of his cool observations.

## NEWTONIAN FLUIDS



HONEY: GETS THICKER WHEN IT'S COLD, THINNER WHEN IT'S WARM. NO CHANGE IN THICKNESS WHEN STIRRED.

Newton said that fluids only change how thick they are (their viscosity) in response to temperature.

## NON-NEWTONIAN FLUIDS



CORNSTARCH OOBLECK GETS THICKER UNDER PRESSURE.



KETCHUP GETS THINNER UNDER PRESSURE, WHICH IS WHY YOU SOMETIMES NEED TO SHAKE THE BOTTLE TO GET IT TO COME OUT.

Non-Newtonian fluids change their viscosity in response to pressure. Which is pretty crazy!

## WATER AND CORNSTARCH OOBLECK - make your own non-newtonian fluid!

### Directions:

Add 1/2 cup water to 1 cup cornstarch.  
Slowly and carefully mix together.

*Do you notice how the mixture behaves like a liquid when you stir slowly, and like a solid (cracking apart) when you stir with more force? If necessary, you can add just a few spoonfuls more of water to get the right consistency.*

RECORD YOUR OBSERVATIONS ABOUT THE CORNSTARCH OOBLECK HERE!