

# Oobleck

## What to do

1. Place the Oobleck onto the shaker
2. Turn on the shaker and tune the frequency to about 10Hz

Oobleck is a mixture of water and cornflour, which thickens when stress is applied to it. This behaviour can be used to make shapes rise out of the fluid if it's shaken in the right way. Most fluids are Newtonian fluids, which means their viscosity is linearly related to the shear stress acting on the fluid. Thus, an object's difficulty of passing through a Newtonian fluid increases with the speed at which the object is travelling. Both water and air are Newtonian fluids.



Non-Newtonian fluids, however, display counter-intuitive behaviour. Non-Newtonian fluids include shear-thinning and shear-thickening fluids, whose viscosity increases and decreases with increasing shear stress on the fluid. Examples of shear-thinning fluids include whipped cream and nail polish; the harder you push these fluids, the easier it is to move them. If you try to pass your hand through a shear-thickening fluid, however, it will thicken around your fingers. Weirdly, the harder you try to push your hand through, the more difficult it is. If you remove your hand, the mixture reverts to a liquid consistency. Shear-thickening fluids include Oobleck and sand in water. This behaviour can be seen when walking across a wet beach; as the sand in water thickens when you step onto it and thins when you remove your foot.

Wave patterns can be seen in the Oobleck at most frequencies of shaking. The shaking places enough stress on the fluid that part of the mixture is thickened. When shaken more vigorously, the stress on the oobleck can allow different shapes to rise out of the fluid.



Oobleck is easy to make at home. Simply mix about two parts corn-flour or corn-starch to one part water and start experimenting.