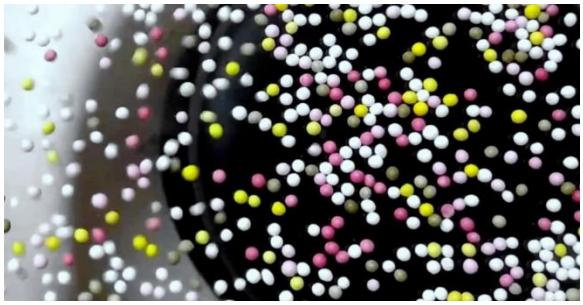
Dancing Sprinkles

The University of Manchester



You will need:

- A large bowl
- Plastic food wrap
- A strip of paper that fits around the bowl
- Sprinkles or rice
- A portable speaker
- A mobile phone

What to do

1. **Ask an adult for permission** before you start.
2. Place the speaker in the bowl and cover the bowl tightly with the plastic wrap.
3. Tape a strip of paper around the edge of the bowl to prevent the sprinkles from falling off.
4. Pour some sprinkles on top of the wrap.
5. Use your phone to play sounds through the speaker. What happens to the sprinkles?

What is going on?

Sounds are caused when objects vibrate, making the stuff around them such as air vibrate. When the vibrations reach your ears, your eardrums and the tiny bones connected to them also vibrate. Information about the vibration is carried to your brain by your auditory nerve. Your brain interprets the signal as sound.

In the bowl, the sound from the speaker causes air particles to vibrate. When the vibrations reach the plastic wrap, it vibrates like your eardrums. This causes the sprinkles to shake about. Louder sounds cause stronger vibrations and more movement than softer sounds.

Explore Further

Experiment with different sounds
You could try loud and soft sounds, music with lots of bass or lots of treble. Which sounds cause the most movement?
If you don't have a speaker you can try banging a baking sheet with a wooden spoon, as close as you can to the bowl without touching it.
If you don't have any sprinkles, try rice, lentils or small seeds.

What we do

We are a research group at the University of Manchester. We use mathematics to model and test the properties of materials and waves. Examples of our research include understanding and reducing noise; modelling the behaviour of ligaments and tendons; and the design of *metamaterials*: special materials with extraordinary properties.

Mathematics of Waves and Materials