

Somewhere over the rainbow...

Learn about density and make a rainbow in a glass

You can use physics to do a great trick and make a liquid rainbow in a glass.

What you need:

- A glass or clear plastic cup
- Water
- Red food colouring
- Runny honey
- Vegetable or sunflower oil
- Washing up liquid



The oil and food colouring can cause stains and damage fabric, so be careful. Ask an adult for help if you need to.

How to:

1. Squeeze or spoon some runny honey into the bottom of the glass until it is 2-3cm deep.



2. Tip the glass slightly and slowly squeeze the same amount of washing up liquid down the inside of the glass (avoid making bubbles).



3. In a jug, add a few drops of red food colouring to a small amount of water.

4. Again, tip the glass and **very carefully** pour the coloured water in to the glass. Make sure you dribble it down the side so that it doesn't mix with the washing up liquid.



5. Finally, tip the glass and gently pour the same depth of oil down the inside of the glass.



6. Stand the glass upright and admire your liquid rainbow.

What's happening?

The different liquids all have different densities.

Density means how much "stuff" there is in something. Not the thing's weight nor its size, but how many atoms it has in it.

For example, if you had a shoe box full of feathers and another full of stones, which would be heaviest? It would be the one full of stones.

Although both boxes are the same size, the box full of stones has a lot more "stuff" stuffed into it, whereas the box of feathers is mostly air.

We say the stones are **denser** than the feathers.

So in our liquid rainbow, honey is the densest layer and sits at the bottom of the glass, then the washing up liquid comes next and floats on top. The honey is also very viscous (thick) which stops it mixing, but we'll deal with that another time).

The layer of coloured water is less dense than the washing up liquid, and finally the oil is the least dense of all and floats on top. Voila! A rainbow in a glass. Just, whatever you do, **don't** try drinking it!