Diffusion of gases

No durian beyond this point

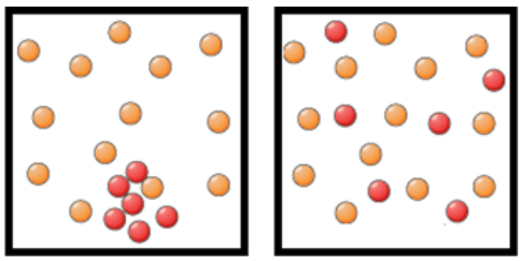
If someone is eating durian in the living room, it doesn't take long for the smell to travel around the house to other rooms. This is because of diffusion.

Diffusion in gases

When chemicals, like the smell of the latest Taylor Swift's perfume or durian, or even a burning toast, are let loose in the room, the particles mix with the air particles. The particles of the 'smelly' gas are free to move quickly in all directions. They eventually spread through the whole room. This is called **diffusion**. Hence, diffusion is the movement of particles from a region of high concentration to another region of low concentration.

How do the gas particles mix?

You don't have to mix the gases by waving your arms around – it mixes on its own. Diffusion in gases is quick because the particles in a gas have high energy and move quickly. It happens even faster in hot gases, since at higher temperature, the particles possess higher energy. Just like when you have more energy, you are more likely to move faster too!



How do we smell it?

Particles of the perfume scent escape from the container, where they are present in very high concentration. They spread outward in every direction to regions where they are in low concentration. Your nose is able to detect the smell of the cologne or perfume even if you are quite a distance from the bottle that has been opened.

Why does the smell disappear after a while?

Now, the smell of the durian or perfume does not disappear. It is in fact, after diffusion, the particles of the smell are so spread out that you no longer smell them. Just imagine trying to locate ten people who have spread themselves across Singapore. It would be very difficult to locate them.

Where else can we observe diffusion?

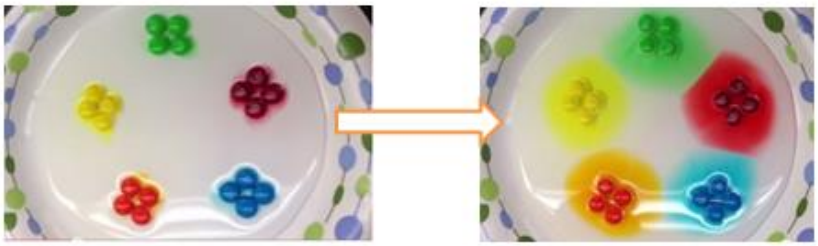
Diffusion occurs in all states of matter: solid, liquid, and gas. It occurs rapidly enough to be observable in a reasonable period of time, however, only in **liquids** and **gases**.

You can demonstrate diffusion easily in your home. Fill a glass with water. Then add 10 drops of food colouring (any color) to the water very carefully. The ink sinks to the bottom of the glass because it is denser than water. Place the glass in a place where it will not be disturbed and make observations of it every day. Over time, the colored ink at the bottom of the glass spreads upward. It moves from a region of high concentration to one of low concentration.

Eventually, the water in the glass is the same shade. The original black, blue, or red ink has been diluted with water to produce the paler shade. Diffusion eventually stops because no region of high ink concentration remains. The concentration of ink and water is the same throughout the glass. That rule applies to all cases of diffusion. When differences in concentration no longer exist, diffusion stops.

More fun with M&M chocolates

Diffusion can also be observed when you add the M&M chocolates to water. Watch how the colours start to diffuse in the water!



Before diffusion After diffusion

Article adapted from http://www.scienceclarified.com/Di-El/Diffusion.html#ixzz3NZyzssIh , http://www.bbc.co.uk/bitesize/ks3/science/chemical_material_behaviour/behaviour_of_matter/revision/4/ and https://www.youtube.com/watch?v=P0zVz_nkK9I