Ear Ear! What's all this then?

When we spin around too much or get through about on a fairground ride we sometimes find it difficult to walk straight afterwards. Why is that?

Background information

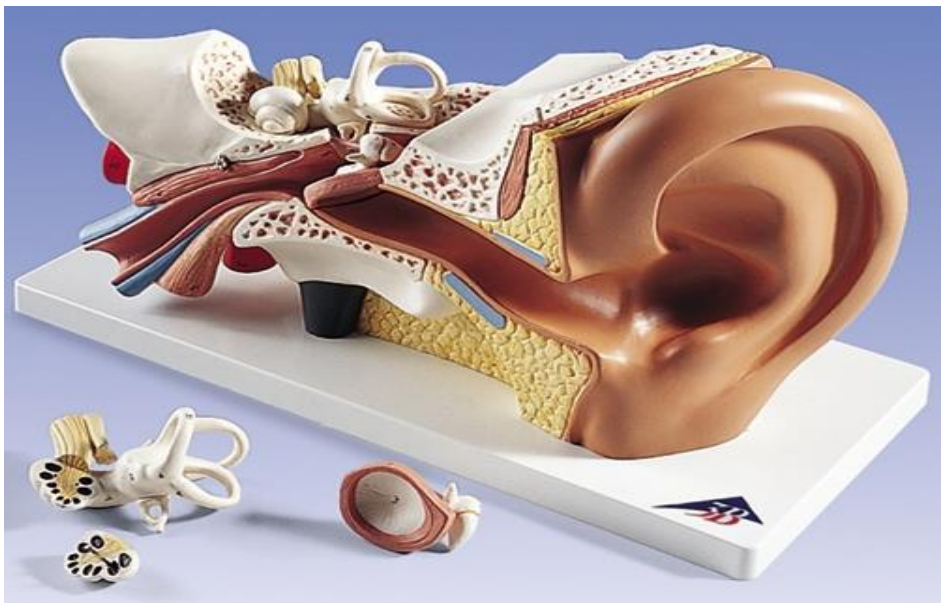
Its called getting dizzy and it happens due to how fluid moves inside our ears! There are 3 main parts to our ears.

Outer ear: This is the part you can see and they all little slightly different. The outer ear is where sounds are guided along the ear canal toward the middle ear. The middle ear is separated from the outer ear by the eardrum.

Middle ear: Vibrations from the eardrum travel through the little bones of the middle ear (ossicles) and are sent to the inner ear. The space in the middle ear is filled with air.

Inner ear: This is where the vibrations from the middle ear create nerve signals. The nerve signals send the messages to your brain that become the sounds you hear.

Your semicircular canals are three tiny, fluid-filled tubes in your inner ear that help you keep your balance. When your head moves around, the liquid inside the semicircular canals sloshes around and moves the tiny hairs that line each canal. We're going to build a model of what happens in these canals.



Equipment

Clear water bottle or plastic bag, some water, old fish tank decoration or similar

Skills

- *Investigating*
- *Estimating*
- *Observing*

Safety

Hygiene –Add a small amount of dilute Milton solution to the bottle and this will hinder any bacterial growth over time.

Preparation

Carefully put the fish tank decoration or similar into the plastic bottle. Sometimes it helps to stick a small weight like a stone to the bottom of it. Next add water to the bottle but leave a little room at the top for air. Seal the bottle or plastic bag.

Activity

Slowly move the bottle back and forth from side to side and observe what is happening to the fish tank decoration as you move. What happens to it when you stop moving?

Next try spinning around once and see what effect that has on the system? Was is different?

Finally trying spinning the bottle or spinning yourself whilst holding the bottle a few times. If you are able to, spin around 5 times before stopping. Before you begin though, estimate what you think will happen. Will the water and plant behave differently?

Follow-up activities

Ice skaters are able to perform lots of spins without showing any signs of dizziness, so how do they do it? The answer is that they will stare at a fixed point at the end of each spin move, but they typically don't whip their heads around quickly like some dancers do.

They try to keep their eyes horizontal, so the view only spins around one axis, and gradually training oneself to overcome the dizziness over the course of extensive practice. The main trick is just long hours of practice. They certainly feel dizzy, but they usually but a rest bit in after the more spinny bits! Why not see if you can find some footage of dancers or figure skaters spinning. See if you can spot the more relaxed bits after they've spun a lot.