

## Experimenting with air pressure to understand how it affects flying

### Materials

- › 4 x zip lock bags
- › A freezer
- › A big pair of lungs!



### Activity Overview

Learn about the difference that temperature makes to air pressure and density by experimenting with your own breath. Then think about how this applies to real life.

### Activity Plan

- › Take four zip lock bags. Zip the bags closed and then unzip them slightly so that you have a small hole.
- › Blow each bag up like a balloon, closing the zip on the last breath.
- › Make sure all bags are full and tense
- › All being well, you have just blown 37°C air into those bags, so leave them on the side for a few minutes to cool off. You want them to be room temperature.
- › Once they have gotten to room temperature, you will probably notice that the bags become a little deflated. Add one more puff of air to make them full again.
- › Put one bag in the freezer, one in the fridge, one in the shade and one in the sunshine for three minutes.
- › Now take the bags out and compare the size of them. Have they changed? How much have they changed?
- › Keep an eye on the bags as they return to room temperature. What happens?

### Learning Objective

- › The zip lock bag that has been in the freezer should have deflated. This is because cooler air is denser than warmer air
- › As the air heats up again, the bag will re-inflate to its original size.



### Reflection Questions

- › Imagine your zip lock bag is the tyre of a plane. What do you think will happen if our aircraft tyres operate in a hot location like Australia compared to a cold environment like Norway?
- › How can we stop the effects of this?



## Why air pressure is important

Babcock fly over 134,000 hours a year in our civil operations and support another 130,000 in our military operations. Every single one of these aircraft must account for air pressure in various different ways from cabin pressure to tyre pressure.

We also operate in a variety of different environments, all with their own unique temperature challenges. We can be working in snowy, icy conditions or we can be working in hot, arid conditions.



Cold temperatures can have a major effect on the air pressure within the tyres of our aircraft, rendering them unable to take-off or land safely. Aircraft tyres are specifically manufactured to accommodate for fluctuations in temperatures, however our pilots and engineers have to make sure that these temperatures changes don't effect the air pressure within the tyres.

This is also the same reason why motor vehicle drivers are advised to check their tyre pressures during the winter periods. Now that you know about the effects of cooler temperatures, what do you think happens when it gets very hot?

Advanced technology helps us to control the air pressure inside the cabin of an aircraft, ensuring that the aircraft itself (and the people inside it) is kept safe and the same shape!