



Atmospheric Ninja!

CLASS: 4th- 6th

Activity and Demonstration

SESE

Learning Objectives - WALT (We are learning to...)

1. Introduce the idea of atmospheric pressure
2. Think about the amount of air above us and demonstrate it



Curriculum links Pressure and Forces

- **Physics** – Air pressure, mass, force and atmospheric pressure
- **Geography** – Weather systems

Engineering
Observing
Experimenting
Environment
Predicting

Teaching Methodologies

- **Talk and Discussion** - listening, questioning
- **Collaborative/Cooperative Learning** - group work
- **Active Learning** – Hands on learning experience with real life examples.
- **Skills through Content:** observing, predicting, describing, recording, classifying.

Under Pressure!

What is atmospheric pressure – well it's a force in an area pushing down on us or a certain point by the weight of air in Earth's atmosphere above. The earth has a layer of air all around it. However, this layer is not distributed evenly around the globe. So that means that's sometimes there's more of it above you than others However on average there's about 10 tonnes of weight per square metre on top of us (at sea level). So by just standing in one spot you've got the weight of a small car on top of you!

The reason we don't feel it is that the fluid and air in our bodies (in our lungs and stomachs, for example) is pushing back out with the same pressure outwards, so we're all good! Phew!

So, how do you show it?

The one you can try yourself!

First way is pretty simple, although you may break your ruler. Place the large newspaper perfectly flat on a smooth table with the ruler underneath. A little bit of the ruler should be sticking out over the edge of the table. Be careful but give the ruler a sharp chop. The atmospheric pressure is large enough to keep the end of the ruler underneath the paper rigid. As a result paper doesn't fly off even though it really light! There is a danger that the ruler will snap so be careful!

The one that you'll need help with!

So this one involves heat so only adults or people being supervised by responsible adults should do it. The process we describe below is for an electric hob but you can use other heat sources as you see fit. You will need 1. An aluminium can 2. A bowl 3. water 4. Ice 5. Tongs 6. Heat source 7. Protective gloves.

Procedure

1. Take your bowl fill it with cold water and add the ice. There should be enough water in can to easily dunk the can in it.
2. Get your heat source ready to get it started but again remember safety first. Adult help needed.
3. Once all of your bits are in place, practice picking up the can with the tongs and dunking it upside down in the water. It can be a little tricky so better to figure it out when there's no heat involved. Protective gloves are a good idea and so is grabbing the can at the bottom.
4. Put two to three tablespoons of water into the can
5. Turn your electric stove on to high heat – again being careful and put the can on top of it
6. Leave the can on the heat source until you see steam coming out of the top of the can for at least a minute
7. Using the tongs, grab the can near the bottom and safely turn it over so the open end goes into the icy bath! Crunnnnnnnch!

How??

So, at the start the can is filled with water and air. By heating the water, the water changes states from a liquid to a gas. The gas takes up more space and pushes the air that was originally inside the can out. When the can is turned upside down and dunked in the ice water, all of the gas that pushed the air out of the can and filled up the inside of the can turns into only a drop or two of liquid, which takes up way less space. There is now much less pressure on the inside of the can and because of the water no air can get back in to balance it. The result is the pressure of the air pushing from the outside of the can is too great and you get the crush or implosion!



REFER BACK TO YOUR WALT GOALS AND
HAVE THE CHILDREN SHARE WHAT THEY
LEARNED TODAY AS WELL AS RECAPPING
ON ANYTHING THEY MISSED!

