

Nothing matters



Location

First floor, Space gallery exhibition

In a nutshell

See how the sound from a ringing bell is affected by removing the air from around it and creating a vacuum, recreating the conditions in space.

What to do

Press the button and see what happens to the bell, balloon and the pressure gauge as the air is sucked out of the bell jar.

Time Required

KS3 & KS4 2 minutes per student.

What's happening?

The area in between planets and stars is enormous and contains almost nothing. Space is a vacuum, which isn't a good environment for humans.

Rather than show you what would happen to a fragile human, our exhibit uses a bell and a balloon. As the air empties from the chamber it creates a vacuum. With no particles to vibrate and bump into each other the sound waves from the bell can no longer pass to your eardrum.

The difference between the air pressure in the balloon and outside the balloon becomes greater as the air is pumped out of the chamber. The air pressure on the outside of the balloon is reduced so the air inside can push against the balloon wall and make it grow bigger.

Curriculum links

Curriculum links	
KS3	<p>Science - Pressure in fluids</p> <ul style="list-style-type: none"> - atmospheric pressure, decreases with increase of height as weight of air above decreases with height - pressure measured by ratio of force over area – acting normal to any surface <p>Science - Sound waves</p> <ul style="list-style-type: none"> - sound needs a medium to travel, the speed of sound in air, in water, in solids <p>English - Reading</p> <ul style="list-style-type: none"> - learning new vocabulary, relating it explicitly to known vocabulary and understanding it with the help of context and dictionaries <p>English - Spoken</p> <ul style="list-style-type: none"> - using Standard English confidently in a range of formal and informal contexts, including classroom discussion <p>Mathematics - Number</p> <ul style="list-style-type: none"> - understand and use place value for decimals, measures and integers of any size
KS4	<p>Science - Pressure and pressure differences in fluids (Single)</p> <ul style="list-style-type: none"> - recall that the pressure in fluids causes a force normal to any surface, and use the relationship between the force, the pressure, and the area in contact - describe a simple model of the Earth's atmosphere and of atmospheric pressure, and explain why atmospheric pressure varies with height above the surface <p>Science - Particle model and pressure (Single)</p> <ul style="list-style-type: none"> - recall that gases can be compressed or expanded by pressure changes and that the pressure produces a net force at right angles to any surface - explain how increasing the volume in which a gas is contained, at constant temperature can lead to a decrease in pressure <p>Mathematics - Ratio, proportion and rates of change</p> <ul style="list-style-type: none"> - use compound units such as speed, rates of pay, unit pricing, density and pressure

Relates to:

Workshops & Theme Days	Shows	Trails	Other exhibits
<ul style="list-style-type: none"> • Destination space (KS3) • The Force of Attraction (KS3 & KS4) • Atoms to Astrophysics (KS3 & KS4) • Is there anybody out there? Theme day (KS3 & KS4) 	<ul style="list-style-type: none"> • Exploring the galaxy (Planetarium, KS3) • We are Aliens! • (Planetarium, All ages) 		<ul style="list-style-type: none"> • Thermal challenge • View of Earth • Hearing range • Sound bite

