

### Must Remember

- Forces are a push or a pull, measured in newtons (N) using a newtonmeter.
- Contact forces occur when objects are touching.
- Friction, air resistance, and water resistance are contact forces.
- Friction can be reduced by lubrication, streamlining can be used to reduce air resistance and water resistance.
- Solid surfaces provide a support force when they are compressed.
- Springs or ropes extend when you apply a force.
- For some objects if you double the force the extension doubles. This is Hooke's Law.
- Gas pressure is due to collisions of gas molecules with the sides of the container or object.
- If the gas is hotter, or compressed into a smaller volume, or if there are more gas molecules in the same space, there is be more collisions and the pressure will be greater.
- Atmospheric pressure is due to the collisions of air molecules with objects.
- Atmospheric pressure decreases with height because there are fewer air molecules higher up.
- Liquids are incompressible. The pressure at a particular depth in a liquid depends on the weight of water above it.
- Pressure = force/area, measured in  $\text{N/m}^2$ . The pressure tells you how the force is spread out over an area.



### Maritime Futures – Upthrust and Buoyancy

Buoyancy or upthrust, is an upward force exerted by a fluid that opposes the weight of a partially or fully immersed object. The amount of salt in sea water can affect how an object or a boat floats. To calculate upthrust measure the weight of an object in air using a newton meter, place the object in water and measure the weight again. Upthrust = weight in air – weight in water.

### Further Study

[BBC Bitesize – Pressure](#)

### Nice to know that...

- Moments are the turning effect of a force. The unit for the moment is newton metres (Nm).
- To calculate the moment, you multiply the force applied by the distance from the pivot. The bigger the force, or further the distance, the bigger the moment.
- During equilibrium, all the clockwise moments added together must equal all of the anticlockwise moments added together.

### Key Terms

- **Air Resistance** - The force on an object moving through the air that causes it to slow down (also known as drag).
- **Atmospheric Pressure** - Pressure caused by the collisions of air molecules that produce a force on an area.
- **Contact Force** - A force that acts when an object is in contact with a surface, air, or water.
- **Drag Force** - The force acting on an object moving through air or water that causes it to slow down.
- **Friction** - The force that resists movement because of contact between surfaces.
- **Gas Pressure** - The force exerted by air particles when they collide with a surface.
- **Hooke's Law** - The law that says that if you double the force on an object the extension will double.
- **Law of Moments** - An object is in equilibrium if the clockwise moments equal the anticlockwise moments.
- **Lubrication** - A substance that reduces friction between surfaces when they rub together.
- **Moment** - A measure of the ability of a force to rotate an object about a pivot.
- **Streamlined** - Shaped to reduce resistance to motion from air or water.