science physics

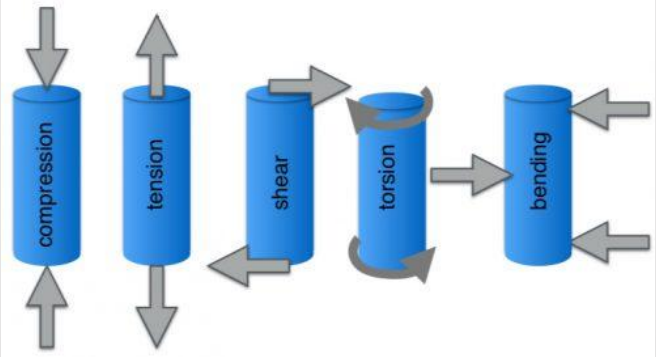
Y8 Forces 2 – Contact Forces & Pressure

1. Forces

Forces are measured in **Newtons (N)**
Forces can be contact or non-contact
Contact – e.g. air resistance, friction and tension
Non-contact – e.g. gravitational, magnetic

2. How forces affect objects

Forces can affect shape causing…



Forces can affect movement…

Balanced forces affect:

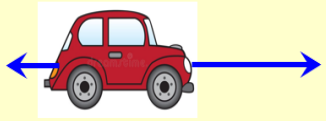
Stationary

Initial speed = 0 km/hr

Constant speed

Initial speed = 20 km/hr

Unbalanced forces affect:

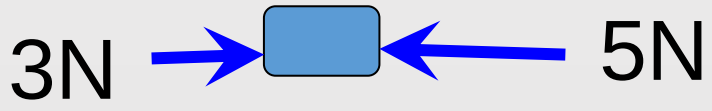


Accelerate

Decelerate

Forces can also affect the direction of travel.

3. Resultant forces



The resultant force is 2N to the left.
You must state the direction in which the force is acting.
The arrows should be scaled to represent the size of the force.
We use arrows to represent forces acting on an object.

These can add together or cancel each other out. The leftover force is then called the **RESULTANT FORCE**.

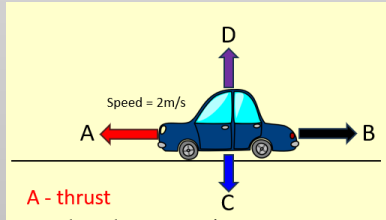
Forces that act in the same direction can be added together.

Forces that act opposite to each other can be taken away.

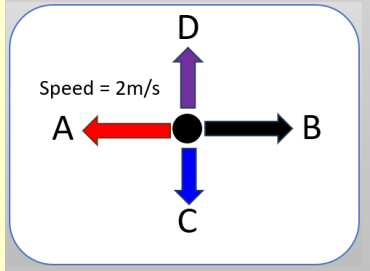
Forces that act vertically and horizontally CANNOT be added and taken away from each other and MUST be considered separately.

4. Free body diagram

Free body diagrams remove the object and replace it with a circle to make the diagram simpler.



A - thrust
B – air resistance or drag
C – gravity or weight
D – reaction force



5. Hooke's law

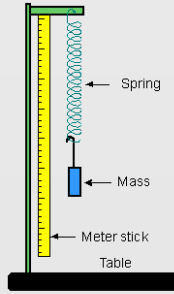
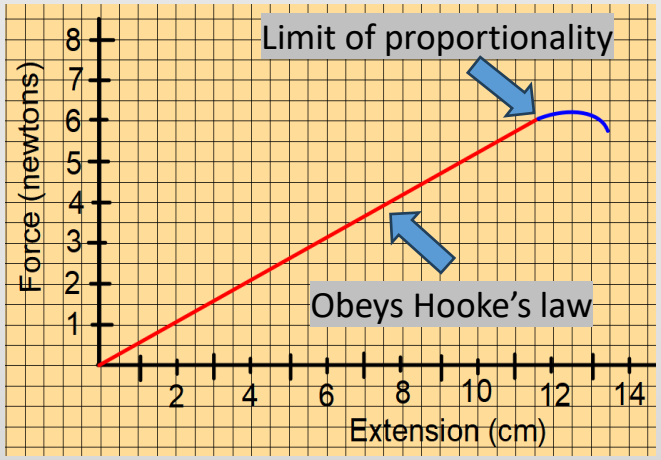


Figure 7.2 - Simple harmonic oscillation.

The amount a spring stretches is directly proportional to the mass added UNTIL it reaches its elastic limit. After this point it will not spring back to its original and has reach its limit of proportionality. This is known as HOOKES LAW (extension is directly proportional to the force applied).

Force = Spring constant x extension

The graph you would see if you were to do an experiment



6. Friction and drag

Friction is the force that opposes movement. It is referred to as drag when it is produced by a fluid e.g. air or water.

Friction can be helpful when we want to, walk or slow a car down using brakes.

Friction can be not helpful when we want to use ice skates or make a bike chain turn.

Friction can be reduced using oil as a lubricant.

chaseterrace academy

science physics

Y8 Forces 2 – Contact Forces & Pressure

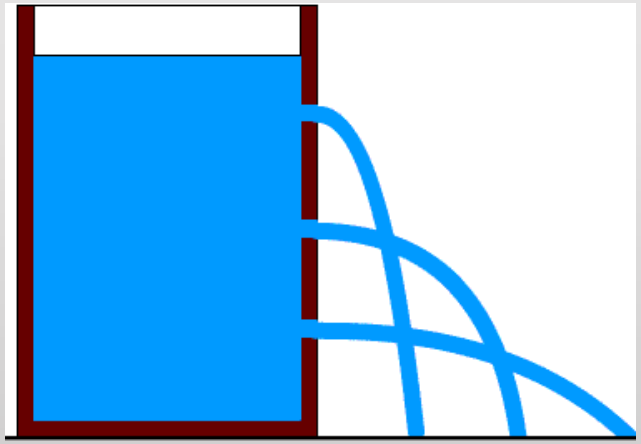
7) Pressure

Pressure is measured in **pascals (Pa)**

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}}$$

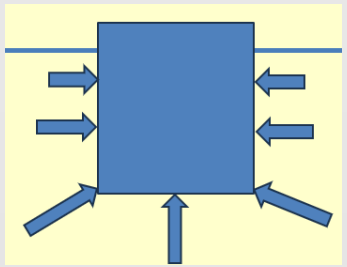
8) Pressure in liquids

- The pressure at a particular depth of a liquid depends upon the weight of water above it.
- Pressure increases with depth.
- Liquids are incompressible.



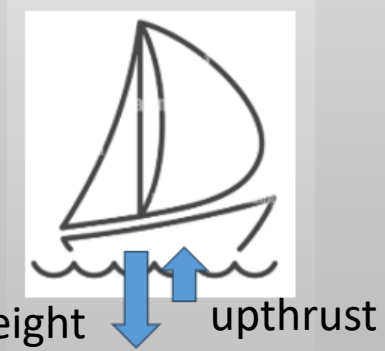
9) Floating and sinking

An object that is submerged has a greater pressure on its bottom surface than on its top surface.
This causes a resultant force upwards. This force is called **upthrust**



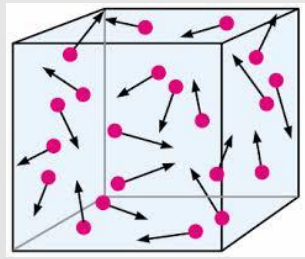
Floating – Upthrust is equal to the weight of the object

Sinking – Upthrust is less than the weight of the object.

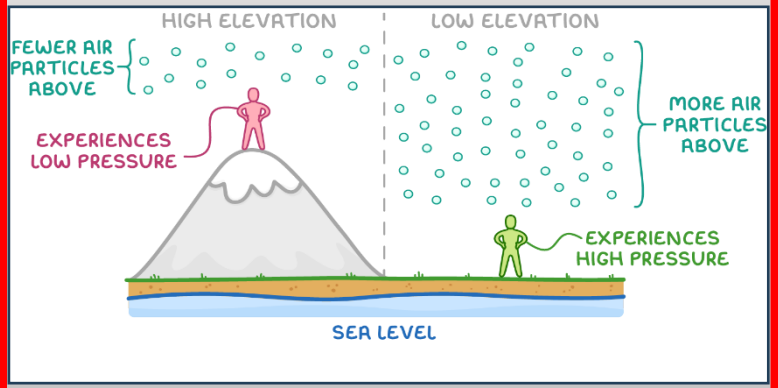


10) Gas pressure

- Gas pressure is due to the collisions of gas molecules with the sides of a container. If the gas is hotter, or compressed, there will be more collisions, increasing pressure.
- The hotter the temperature, the more kinetic energy the gas particles have. They move faster, colliding with the sides of the container more often.
- Gas particles can move around freely and will collide with other particles and the walls of the container. This is the pressure of the gas.



- The higher your altitude the fewer air particles there are above you to create pressure. Therefore, as altitude increases air pressure decreases.



chaseterrace academy