FORCES

Try the quiz:
http://www.bbc.co.uk/bitesize/ks3/science/energy_electricity_forces/forces/revision/1/

Forces can change the shape of objects and change the way they are moving. Weight, pressure and turning moments are all the result of forces too.

What are forces?

A force can be a **push** or a **pull**. For example, when you push open a door you have to apply a force to the door. You also have to apply a force to pull open a drawer.

You cannot see a force but often you can see what it does. Forces can change the speed of something, the direction it is moving in or its shape. For example, an elastic band gets longer if you pull it.

Measuring forces

A force meter is used to measure forces.

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Forces can be measured using a **force meter**. Force meters contain a spring connected to a metal hook. The spring stretches when a force is applied to the hook. The bigger the force applied, the longer the spring stretches and the bigger the reading.

The unit of force is called the **newton**, and it has the symbol **N**. So 100 N is a bigger force than 5 N.

Weight, mass and gravity

People often confuse mass and weight. Remember that weight is a force, and is measured in newtons. Mass is measured in kilograms (kg).

Mass

The mass of an object is the **amount of matter** or "stuff" it contains. The more matter an object contains, the greater its mass. An elephant contains more matter than a mouse, so it has a greater mass. Mass is measured in **kilograms**, **kg**, or **grams**, **g**.

A 100 kg object has a greater mass than a 5 kg object. Remember an object's mass stays the same wherever it is.

Gravity

All objects have a force that attracts them towards each other. This is called **gravity**. Even you attract other objects to you because of gravity, but you have too little mass for the force to be very strong.

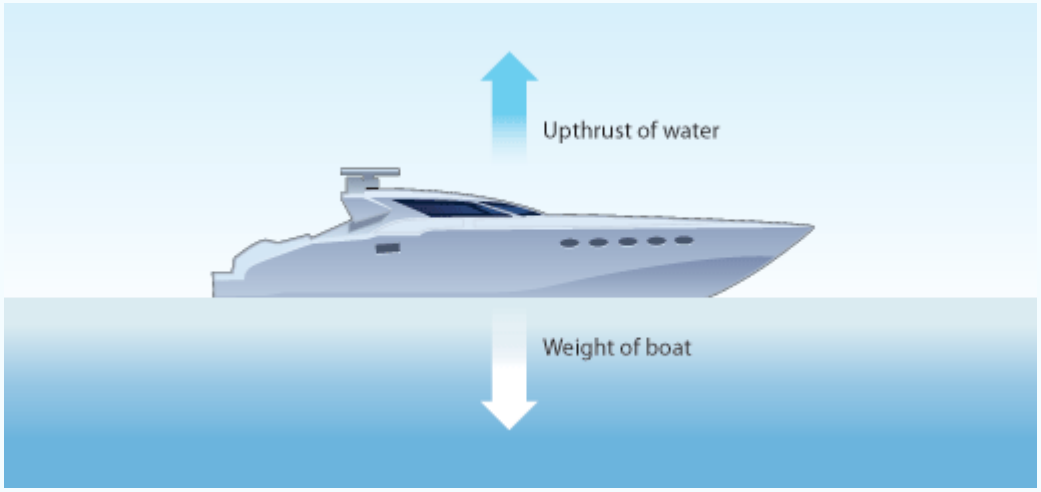
Gravitational force increases when:

- the masses are bigger
- the objects are closer

Gravity only becomes noticeable when there is a really massive object like a moon, planet or star. We are pulled down towards the ground because of gravity. The gravitational force pulls in the direction towards the centre of the Earth.

Floating in water

Objects float in water when their weight is balanced by the upthrust from the water. The object will sink until the weight of the water it pushes out of the way is the same as the weight of the object.



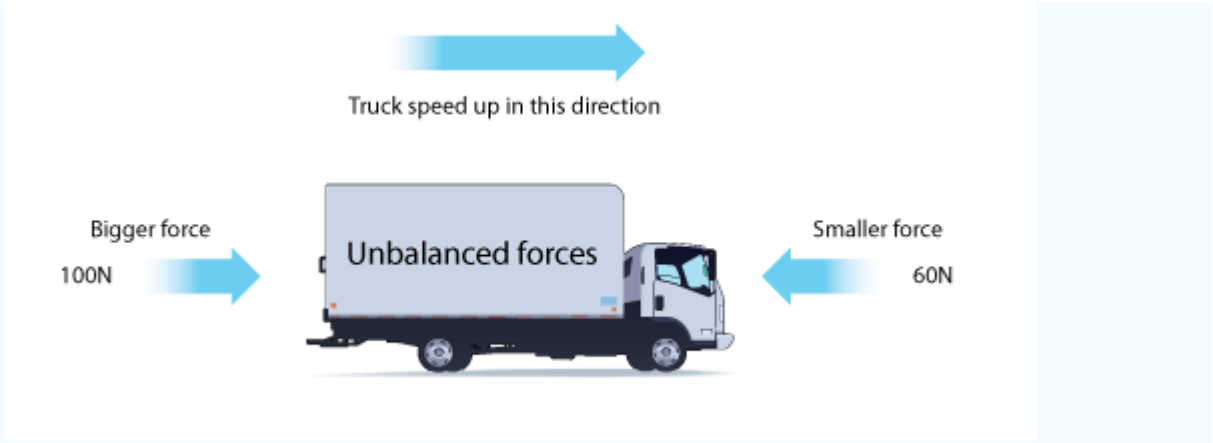
A boat floats because its weight is balanced by the upthrust from the water

Unbalanced forces

When two forces acting on an object are not equal in size, we say that they are **unbalanced** forces.

If the forces on an object are unbalanced this is what happens:

- **an object that is not moving starts to move**
- **an object that is moving changes speed or direction**



Air resistance

Bikes, cars and other vehicles experience **air resistance** as they move. Air resistance is caused by the frictional forces of the air against the vehicle. The faster the vehicle moves, the bigger the air resistance becomes. The top speed of a vehicle is reached when the force from the cyclist or engine is balanced by air resistance.