

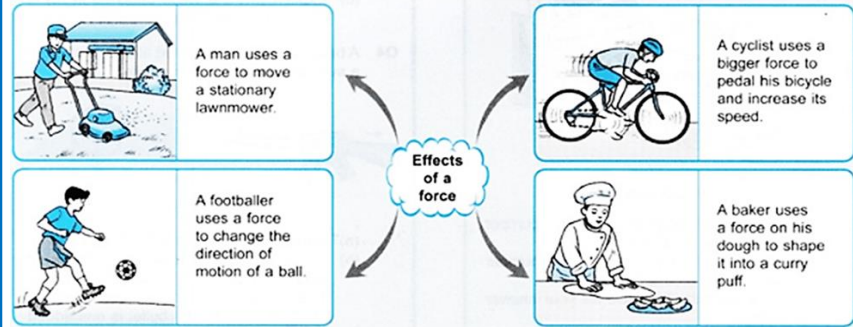
Box 1: Keywords

Word	Definition
Force	A push, pull or twist that changes the shape or movement of an object
Newton	The unit of Force (N)
Newton meter	Equipment to measure the size of a force
Mass	The amount of matter in an object (in kg)
Weight	The effect of gravity on mass (in N)
Contact force	A force that arises when two objects are touching e.g. friction; reaction force
Non-contact force	A force that arises when two objects are not touching e.g. magnetism; static; gravity
Air resistance	Occurs when an object moves through air
Water resistance	Occurs when an object moves through water
Upthrust	A force that keeps things afloat
Friction	Occurs between two surfaces
Balanced forces	Opposing forces are equal
Unbalanced forces	Opposing forces are not equal

Box 2: Key skills

Using a Newton meter; reading a scale; plotting graphs; making observations; drawing conclusions; performing calculations; constructing accurate force diagrams

Box 3: Forces and their effects



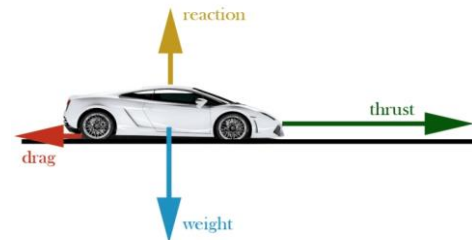
A force can **change the shape** of an object; can make something **move** or, in the case of a moving object, can make it **speed up**, **slow down** or **change direction**

Box 4: Showing and measuring forces

Forces are shown using **arrows**

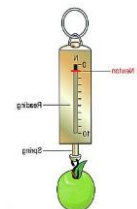
The **size** of the arrow represents the **size** of the force

The **direction** of the arrow represents the **direction** the force is acting



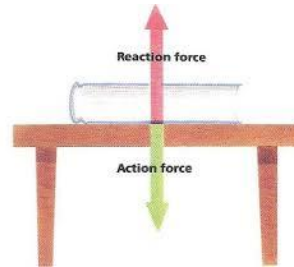
Forces are measured with a **newtonmeter**

The **units** of forces are **Newtons (N)**

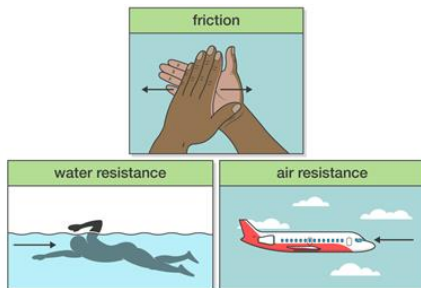


Box 5: Interaction pairs

When two objects push or pull against each other, the forces that they feel are **equal and opposite**. These forces are called **action** and **reaction** forces. The two forces together are called an **interaction pair**.



Box 6: Friction and drag



Friction occurs when two surfaces are touching and moving over each other. Friction may be **useful** or **not useful**. **Air resistance** and **water resistance** are both special types of friction (also called **drag**). Friction can be partly overcome by **lubrication** or **streamlining**.

Box 7: Mass and weight

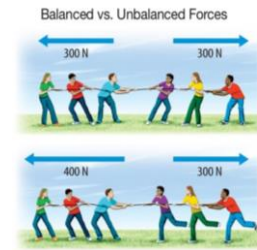
Mass is a measure of the amount of matter in an object and is measured in **Kilograms (kg)**.

Weight is a **force** – the effect of gravity acting on a mass. It is measured in **Newtons (N)**.



Your mass stays the same wherever you are in the universe but your weight changes due to the different gravitational field strength of different planets. This is 9.8N/kg on earth.

Box 8: Balanced and Unbalanced forces



300
- 300
ON
Balanced

400
- 300
100 N
Unbalanced

If two forces act in **opposite** directions and are equal in size, they are **balanced**. If they are different sizes they are **unbalanced** and there will be a **resultant force**. Resultant forces always have an **effect**.

	Balanced	Unbalanced
Stationary object	Remains stationary	Starts to move
Moving object	Stays moving at same speed and in same direction	May stop; change speed and/or change direction

Box 9: Pathway

Previous knowledge: KS2 Forces; changing shape of objects

Future links: KS4 Motion and forces; Forces and pressure

Careers: Athletes; Personal trainers; Sports equipment designers; Physiotherapists; Engineers; Builders; Architects; Acrobats; Divers

Box 10: Cross curricular links