SPEEDING UP

Forces

A force can be a **push or a pull,** for example when you open a door you can either push it or pull it. You can not see forces, you can only see what they do.

When a force is applied to an object it can lead to a change in the objects

- **Speed**
- **Direction of movement**
- **Shape (think about a rubber band)**

Forces can also be divided into 2 types, contact forces and non contact forces.

1. Contact forces for example friction, are caused when two objects are in contact.
2. Other forces for example gravity, are non contact forces. The two objects do not need to be in contact for the force to occur.

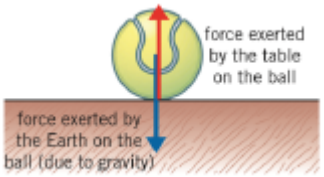
Balanced forces – an object is at rest, or moving in a straight line at a constant speed.

Unbalanced forces – the object is speeding up, slowing down, changing direction or changing shape

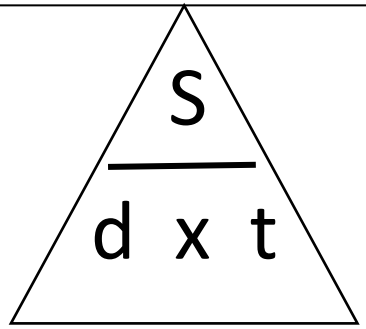
Name of Force	What causes it?	Example
Friction	When two objects rub together	Car tyres moving on a road.
Air resistance	When an object rubs against air particles	A sky diver falling through the air
Reaction	A force that acts in the opposite direction	A book on a desk, the force acting up is a reaction force
Weight	The force an object exerts on the ground due to gravity	You will exert a force on the ground, that is your weight
Thrust	The force that drives on objects with an engine	Thrust moves a plane forwards

Representing Forces

We can use force diagrams to show forces. The arrows always start from the object that we are thinking about and point outwards. The size of the arrow shows how large the forces are. If they are the same size, the force is **balanced**, if they are different, the forces are **unbalanced**

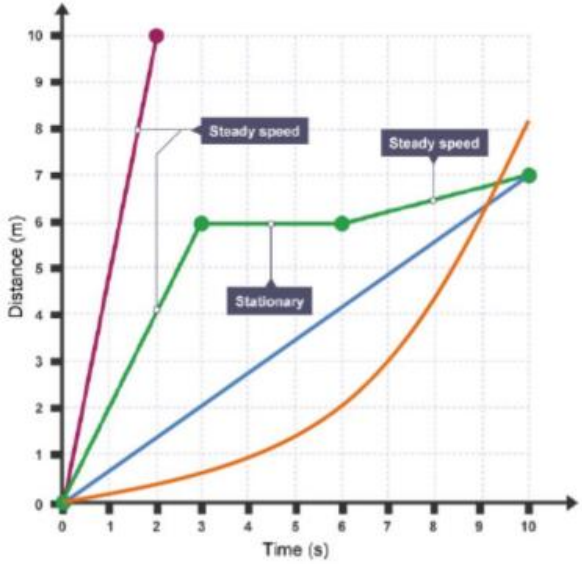


$$\text{speed (m/s)} = \frac{\text{distance travelled (m)}}{\text{time taken (s)}}$$

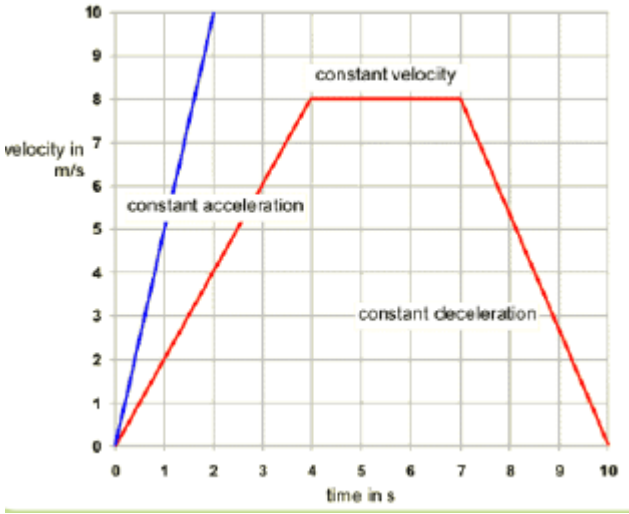


Distance-Time graphs – these show how far an abject has moved from its starting point over time.

- A straight diagonal line of a distance-time graph shows that the object is travelling at a steady/constant speed.
- A straight horizontal line on a distance-time graph shows that the object is not moving (stationary)
- If a curved line were to appear on a distance-time graph (orange line) this shows the object is accelerating.



Velocity – Time graphs



The steeper the line, the faster the acceleration.

Flat lines show a constant velocity

Useful links

https://www.bbc.co.uk/bitesize/topics/z4brd2p/articles/zs3896f

https://www.youtube.com/watch?v=8-yT0UUMyUM