

Must Remember

- Forces are a push or a pull, measured in newtons (N) using a newton meter.
- Forces exist when objects interact – this produces an interaction pair.
- Forces can deform objects, change their speed, or the direction of motion.
- When the forces acting on an object are equal in size and acting in opposite directions they are balanced. The object is in equilibrium.
- If the forces are not balanced the object will speed up, slow down, or change direction.
- Speed = distance/time, measured in metres per second (m/s). Average speed is the total distance travelled/total time taken.
- You can show what is happening to the position of an object on a distance-time graph. The slope of the distance-time graph is the speed.

Key Terms

- **Acceleration:** The amount by which speed increases in one second.
- **Average Speed:** The total distance travelled in the total time taken for a complete journey.
- **Balanced:** Forces acting on an object that are the same size but act in opposite directions.
- **Distance-Time Graph:** A graph that shows how far an object moves each second.
- **Driving Force:** The force that is pushing or pulling something.
- **Instantaneous Speed:** The speed at a particular moment.
- **Interaction Pair:** When two objects interact there is a force on each one that is the same size but in opposing directions.
- **Metres per Second:** A unit of speed.
- **Newton (N):** The unit of force, symbol N.
- **Newtonmeter:** A piece of equipment used to measure weight in newtons.
- **Relative Motion:** The difference between the speeds of two moving objects, or of a moving and a stationary object.
- **Speed:** A measure of how far something travels in a given time.
- **Unbalanced:** Opposing forces on an object that are unequal.

Nice to know that...

- The normal unit for time taken in science is seconds, and distance is normally measured in metres.
- Average speed is the total distance travelled/total time taken.
- Relative motion is the movement of one object relative to another.
- You can show what is happening to the position of an object on a distance-time graph.
- The slope of a distance time graph is the speed.
- A speed camera works by measuring how long it takes for a vehicle to travel a specific distance.
- Using distance/time a speed camera can determine speed.
- Speed cameras are used to increase the safety on the roads and to reduce the numbers of accidents causing injury or death.



Maritime Futures – Forces acting on a Boat

Forces work in pairs known as interaction pairs, when these forces are the same size, they are said to be balanced. When one of the pairs in the pair is a different size to the other force then the forces are unbalanced. Drag is a resistive force, when a boat speeds up the driving force must be greater than drag. Drag can be caused by the water. To reduce drag some boats use hydrofoils, these lift the boat out of the water reducing drag.

Further Study

[BBC Bitesize – Forces](#)