

Year 10 Physics Unit Two: Forces and Motion

A force is an amount of energy applied to an object that makes it do certain things. There are two types of forces; push force, and pull force. Then these are classified even further as contact force, and non-contact force. Below is some useful vocab for the topic.

Some useful vocabulary

For this topic, there is some important key words you should know for tests, exams etc. Here is a table of them

Word	Meaning
Force	An energy that pushes or pulls an object in a direction.
Motion	Movement of an object caused by forces.
Velocity	Another term for speed. The rate of change in speed
Acceleration	throughout a journey; in slowing down, or speeding up.

Newton's Laws Three, and Balanced/Unbalanced Forces

An important part of this unit, a physics unit, is Isaac Newton's three laws. After an apple landed on his head while he was sleeping under a tree (don't ask me why he was there), he wrote three laws... I will explain his laws in detail because it will probably appear on your test for this topic. The importance for the laws is because of their link to Balanced and Unbalanced forces.

Law One

Law One of Newton's Three Laws states that if forces acting on an object are balanced, it will stay stationary or carry on moving at a constant speed. This basically means if an object is moving, it will stay moving, or if it is stationary, it will stay stationary, until touched by unbalanced forces.

Law Two

If unbalanced forces act on an object, the object will accelerate in the direction of the larger force. This means that if unbalanced forces act on an object, it will speed up, slow down, or stop because of the force. It will move in the direction of the Net Force acts - the larger force minus the smaller force.

Law Three

Law Three states that when a force acts on an object, equal and opposite reaction occur (Action - Reaction). Basically, forces come in pairs, when one thing happens, say, a ball is hit by a hockey stick, and the ball also pushes away from the stick.

Mass, Weight and Density

In Science, Mass is the amount of matter in an object (measured using g, kg, mg), and weight is the force of gravity acting on that object (measured in Newtons). Therefore, because the Moon has less gravity than the Earth, things weigh less on the Moon, although they have the same mass. Gravity on the Moon is one-sixth of the Earth's gravity. Density is measured by the formula mass divided by volume. Measured by the kgm^3 .

Some useful formulae

As you may recall from reading the title of this page, and the introductory bit, this is a Physics topic. Because of this, we have to learn formulas specific to our calculations. Because of the importance of the formulas in the tests, they get their own special section. I will list the formulas and their formula triangles here

DST/DVT Formulas

DST stands for Distance, Speed, Time (respectively). It can also be called Distance, Velocity, Time.



DST TRIANGLE

From this triangle, we get these formulas:

Unit Wanted	How to get the Unit
Distance (d)	Speed x Time
Speed (s(also v))	Distance / Time
Time (t)	Distance / Speed

VAT Formulas

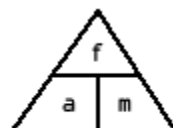


VAT TRIANGLE

From this triangle, we get these formulas

Unit Wanted	How to get the Unit
Velocity (v)	Acceleration x Time
Acceleration (a)	Velocity / Time
Time (t)	Velocity / Acceleration

FMA Formulas

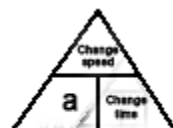


FAM TRIANGLE

From this triangle, we get these formulas

Unit Wanted	How to get the Unit
Force	Acceleration x Mass
Mass	Acceleration / Force
Acceleration	Force / Mass

Acceleration Formulas



AT TRIANGLE

From this triangle, we get these formulas

Unit Wanted	How to get the Unit
Acceleration (a)	Change in Speed / Change in Time
Change of time (t)	Change in speed / Acceleration
Change in speed (s)	Acceleration x Change in time

Graphing

Graphing is important for this particular topic. The basic thing that you need to know for graphing is that there are two main types of graph that are covered in class.

Different types of graphs

Distance-Time, which graphs the distance travelled. The graph has a steeper incline if the object is moving away from or toward the starting point faster and will incline or decline at a standard rate if the object is moving at a constant speed.

Velocity-Time, which graphs the distance travelled. The graph has a steeper incline if the object is accelerating or decelerating at a faster rate. The graph will have a steady inclination when the object is travelling at a constant speed.

To find out how to draw graphs refer to the graphing section of the Science 101 page [here](#).

Examples of graphs

This graph is a Distance-Time Graph. Off this graph, you can calculate the distance it travelled in a particular time. You can also calculate the acceleration by finding the slope of the graph. (Refer to Distance-Time and Acceleration Formulas). When the slope is flat, the object is stationary.

object is stationary.

This graph is a Speed-Time Graph. It can calculate the speed an object was travelling at for a particular time. You can also calculate the distance the object travelled by finding the area of the underside of the graph. (Refer to the Velocity-Time formula, as well as basic shape area formulae; Triangle = $1/2bh$, and Square = bh).