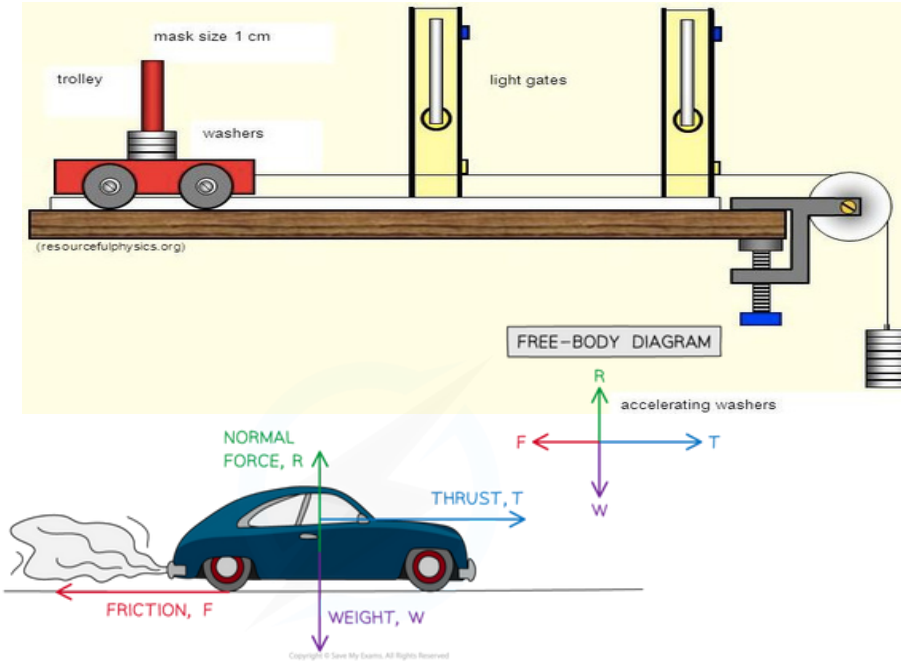
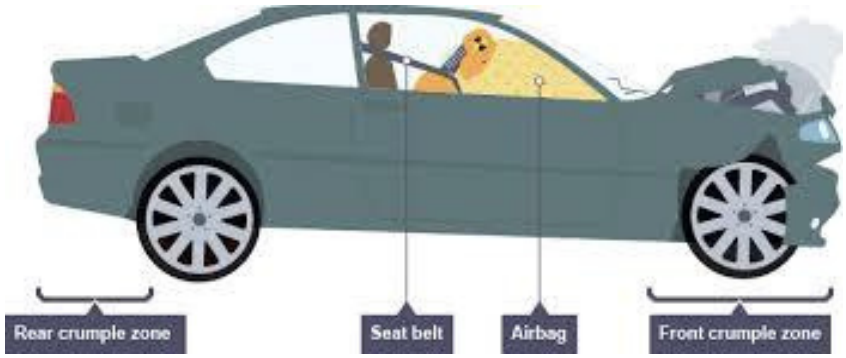
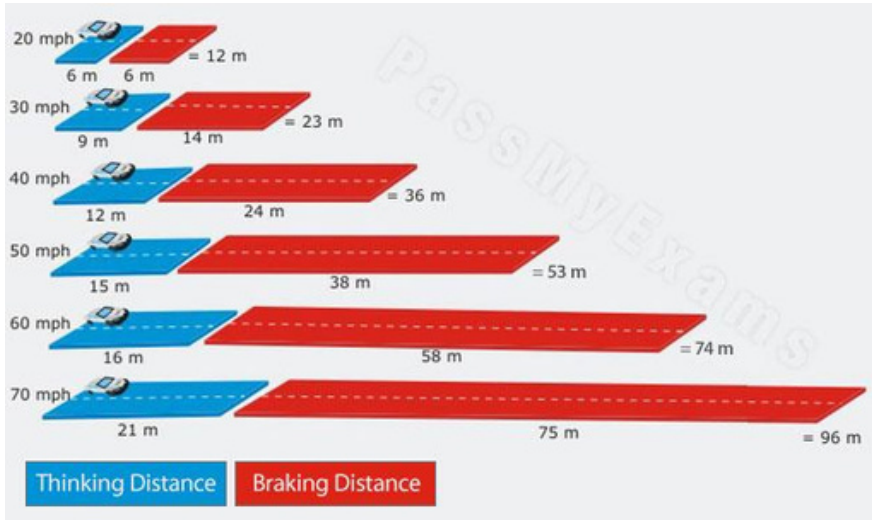
1	A **resultant**force is the **sum**of all the **forces**acting on an object.
2	A **free body diagram**represents all ofthe forces acting on one object and the forces are represented as arrows,the **size of the arrow** represents the **size of the force**and the direction of the arrow represents the direction the force is acting in.
3	To find the **resultant force** when two forcesare acting on an object in **opposite directions** you **subtract**the smaller force from the larger force.
4	To find the **resultant force** when two forces are acting on an object inthe **same**direction you **add**the forces together.
5	**Newton's first law of motion** states that **unless**an **external force** acts on the object then a moving object will continue to move at the same speedand direction and a stationary object will remain at rest.
6	A centripetal force can be any one of several different forces that keep an object moving in a circle. **(higher tier only)** Examples of centripetal force include gravity, friction and tension.
7	
8	Thegravitational field strength on Earth is 10 N/kg
9	Weight (N) = mass (kg)x gravitational field strength (N/kg). W = m x g
10	Weight is a force sothe standard units of measurement for weight are Newtons (N).
11	Newton's second law of motion states that the acceleration in the direction of a resultant force depends on • The size of the force (forthe same mass, the bigger the force the bigger the acceleration) • The mass of the object (for the same force the more massive the object is the smaller the acceleration)
12	Force (N) = mass (kg) x acceleration(m/s^2). F = m x a



13	**Inertial mass** of an object is the **force** on it **divided** by the **acceleration**the force produces.
14	**Newton's third law of motion** states that for **every action force** there is an **equal and opposite reaction force**.
15	Newton's third law applies to forces acting on **two separate objects**.
16	Momentum is a measure of how difficult it is to stop an object that is moving.
17	Only objects that are moving have momentum.Objects that are **not moving** have a **momentum of zero**.
18	**Momentum(kg m/s) = mass (kg) x velocity (m/s).** **P = m x v**
19	**Momentumis conserved** (this means **total momentum before = total momentum after**). This applies when we look at momentum in collisions.

1	The **stopping distance** of a vehicle =the **thinking distance** + the **braking distance**.
2	The **thinking distance** is the distance the vehicletravels during the time it takes for the driver to react.
3	Factors that can **increase**the **thinking distance**are things that can increase the drivers reaction time such as being under the influence of **alcohol, drugs** or **tiredness**.
4	Most people have a typical reaction time of 0.25s
5	The braking distance is the distancethe car travels during the time it takes for the vehicle to come to a complete stop once the driver has applied the brakes.
6	Factors that can **increase**the **braking distance** are things that can effect the vehicle itself. Examples of this include the **condition of the road surface, condition of the brakes** and the **mass**of the vehicle.
7	The speedthe vehicle is travelling at can effect both the thinking and the braking distance. The faster the speed of the vehicle, the further it will travel in a given time.
8	The energytransferred by a force acting over a distance is called **work done**.
9	**Work done** (J)= **force**(N) x **distance**(m). **E = f x d**
10	The energy stored in a moving object is calledkinetic energy.
11	**Kinetic energy** (J) = ½ x **mass**(kg) x **velocity2**(m/s) **KE = ½ X m x v2**
12	The **braking distance**of a vehicle depends on its kinetic energy and so it depends on the square of its velocity. This means that if the **velocity doubles**, the **braking distance** is multiplied by 22 which is 4 (**quadrupled**).





13	The **force**in a road collision depends on the **rate of change of momentum**. This can be shown as **F = (mv –mu) ÷t**
14	Crumplezones and air bags increase the time taken for the momentum of the driver to decrease which produces a smaller impact force.