CP2/SP2 Forces and Motion

1.Resultant forces	
Scalar quantity	A quantity with magnitude (but no direction).
Vector quantity	A quantity with magnitude and direction.
Force arrows	Arrows can be used to represent forces: - Direction = direction of force - Length = size of force
Resultant force	The force left over when forces acting in opposite directions are cancelled out.
Calculating resultant force	Subtract the total force in one direction from the total force in the other direction.
Balanced forces	When the resultant force is zero (because forces acting in opposite directions are the same size).
Unbalanced forces	When the resultant force is non-zero (because there is more force in one direction than another).

2. Newton's first law	
Newton's first law of motion	An object will move at the same speed and direction unless it experiences a resultant force.
The effect of resultant forces	Resultant forces cause acceleration: speeding up, slowing down or changing direction
The effect of forces on motion	Forces make you start moving, stop moving or change direction, they are not needed to keep you moving!

3. Mass and weight	
Mass	The quantity of matter in an object is made of. Units = kilograms (kg)
Weight	A force caused by gravity pulling downward on an object. Units = newtons (N)
Force meter	An instrument for measuring forces. They usually have a spring that stretches more the greater the force applied.

Gravitational field strength	The strength of gravity, which is different on different planets. Units = newtons per kilogram (N/kg)
Air resistance	A force caused by the air pushing against you as you move. Faster movement → greater air resistance.
Motion whilst falling	Falling objects accelerate until the air resistance is equal to the weight; now there is no resultant force so speed stays constant (**terminal velocity**).

4. Newton's second law	
Newton's second law of motion	Force = mass x acceleration
Acceleration is greater when…	- The force is greater - The mass is smaller

6. Newton's third law	
Newton's third law	For every action force there is an equal but opposite reaction force.
Action force	The force you push or pull with.
Reaction force	A force of the same size but opposite direction to an action force.
Action-reaction forces	If, A applies an action force to B, B applies a reaction force of same size and opposite direction to A.
Action-reaction vs balanced forces	Similarities: same sizes, opposite directions Differences: balanced forces act on one object, action-reaction act on two different objects

8. Stopping distances	
Stopping distance	The total distance travelled from when a hazard is seen to when you fully stop.
Thinking distance	The distance travelled from when a hazard is seen to when you brake.
Braking distance	The distance travelled from when you brake to when you fully stop.
Calculating stopping distance	Stopping distance = thinking distance + braking distance