CP1/SP1 Motion

1. Vectors and Scalars	
Magnitude	The size of something, such as the size of a force or the measurement of a distance.
Scalar quantity	A quantity that has a magnitude (size) only, but not a direction.
Scalar examples	Distance – 10 m Speed – 25 m/s Mass – 50 kg Energy – 300 J
Vector quantity	A quantity that has both a magnitude (size) and a direction.
Vector arrows	Vectors can be represented by arrows, with the length of the arrow representing the magnitude.
Displacement	The distance travelled in a particular direction.
Velocity	The speed of an object in a particular direction.

2. Speed	
Speed	A measure of the distance an object travels in a given time.
Units of speed	Metres per second (m/s)
Instantaneous speed	The speed at one particular moment in a journey.
Average speed	The speed worked out from the total distance travelled divided by the total time taken for a journey. v = x/t.
Measuring speed	Measure the distance between two points and time how long an object takes to pass, then calculate using v = x/t.

3. Distance-Time Graphs	
Distance-time graph	A graph showing the distance travelled against time for a moving object. Time is on the x-axis and distance on the y-axis.
Distance-time graphs – stationary	Horizontal line **C** on diagram below
Distance-time graphs – line gradient	A measurement describing the steepness of the line on a graph. Steeper line = faster, so **A** is faster than **B** below

4. Acceleration	
An object accelerates when it…	- Speeds up - Slows down - Changes direction
Units of acceleration	Metres per second squared (m/s^2)
Positive and negative acceleration	Positive acceleration = speeding up Negative acceleration = slowing down
Deceleration	Slowing down, negative acceleration.

5. Velocity-Time Graphs	
Velocity-time graph	A graph of velocity against time for a moving object. Time is on the x-axis, velocity is on the y-axis.
Calculating acceleration on a velocity-time graph	Acceleration = change in velocity / change in time = gradient gradient = change in y / change in x
Calculating distance travelled from a velocity-time graph	Distance = area under the graph. Divide the graph into rectangles and triangles, find the area of each and add them together.

6. Calculating instantaneous speed (HIGHER ONLY)	
Instantaneous speed	Draw a tangent to the curve of the graph at the time you want to calculate the instantaneous speed for. Find the gradient of the tangent line by calculating the change in distance on the y axis and the change in time on the x axis. Instantaneous speed = gradient of tangent = change in distance / change in time