Motion Essential Knowledge Organiser

Scalar quantities have magnitude only.
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A vector quantity may be represented by an arrow. The length of the arrow represents the magnitude, and the direction of the arrow the direction of the vector quantity.
Distance is how far an object moves. Distance does not involve direction.
Distance is a scalar quantity.
Displacement includes both the distance an object moves, measured in a straight line from the start point to the finish point and the direction of that straight line.
Displacement is a vector quantity.
Speed does not involve direction
Speed is a scalar quantity.
The speed at which a person can walk, run or cycle depends on many factors including: age, terrain, fitness and distance travelled. Typical values may be taken as: • walking 1.5 m/s • running 3 m/s • cycling 6 m/s.
For an object moving at constant speed the distance travelled in a specific time can be calculated using the equation: distance travelled = speed× time $s = v\,t$ distance, s, in metres, m speed, v, in metres per second, m/s time, t, in seconds, s
The velocity of an object is its speed in a given direction. Velocity is a vector quantity.
If an object moves along a straight line, the distance travelled can be represented by a distance–time graph.
The speed of an object can be calculated from the gradient of its distance–time graph.
If an object is accelerating, its speed at any particular time can be determined by drawing a tangent and measuring the gradient of the distance–time graph at that time
The average acceleration of an object can be calculated using the equation: acceleration= change in velocity/time taken $a=(v-u)/t$ acceleration, a, in metres per second squared, m/s$_2$ change in velocity, V-U, in metres per second, m/s time, t, in seconds, s
An object that slows down is decelerating.
The acceleration of an object can be calculated from the gradient of a velocity–time graph
The distance travelled by an object (or displacement of an object) can be calculated from the area under a velocity–time graph