

Distance-time graphs

James Stewart: You can draw a distance-time graph to represent how the distance of an object changes over time.

On a distance-time graph such as this, the y-axis represents distance travelled, against time on the x-axis.

A horizontal line represents a stationary object, and as time passes, distance doesn't change.

On this graph, the object is stationary at a distance of three metres.

A straight sloped line represents a constant speed.

The object moves the same distance with each passing second.

If you follow the points on this graph, you can see that for every one second that passes, the object moves one metre.

The gradient of the line equals the change in distance over the change in time, the very definition of speed.

So, we can find the speed by finding the gradients.

First, choose two points on the line.

Then, find the change in distance.

And then, the change in time.

Now divide the change in distance by time to get the gradient, and you have found the speed.

If the object is speeding up or accelerating, the line gets steeper.

The steeper the gradient of the line, the faster the object is traveling.

The line becomes less steep if the object is slowing down or decelerating.

On a curve, you can find the object's instantaneous speed, or its speed at any given moment, by drawing the tangent.

First, pick the point.

Then use a ruler to draw a straight line that touches only that point.

It should have the same gradient as the line at the point.

That is your tangent.

It helps to make the tangent line as long as possible.

Then find the gradient just as before, so the speed is one metre per second.

Distance time graphs are different from velocity-time graphs.

Remember, on distance-time graphs, a horizontal line represents a stationary object.

A straight, sloped line represents constant speed, and a curve represents acceleration or deceleration.

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