

7th grade Changing Speeds & Motion Graphs

Changing Speeds

Terms to know:

Velocity: is the speed
AND direction of the
object.

Vector: arrow that shows
force **AND** direction

Constant- means “stays
the same”

Changing Speeds

Terms to know:

Constant speed- when the speed of a moving object stays the same

Acceleration- any **CHANGE** of speed or direction; speeding up or slowing down (deceleration)

Constant acceleration- when the object is increasing speed at a certain rate. Example: the car is increasing speed every second it is moving

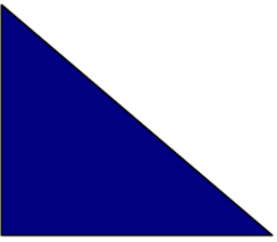
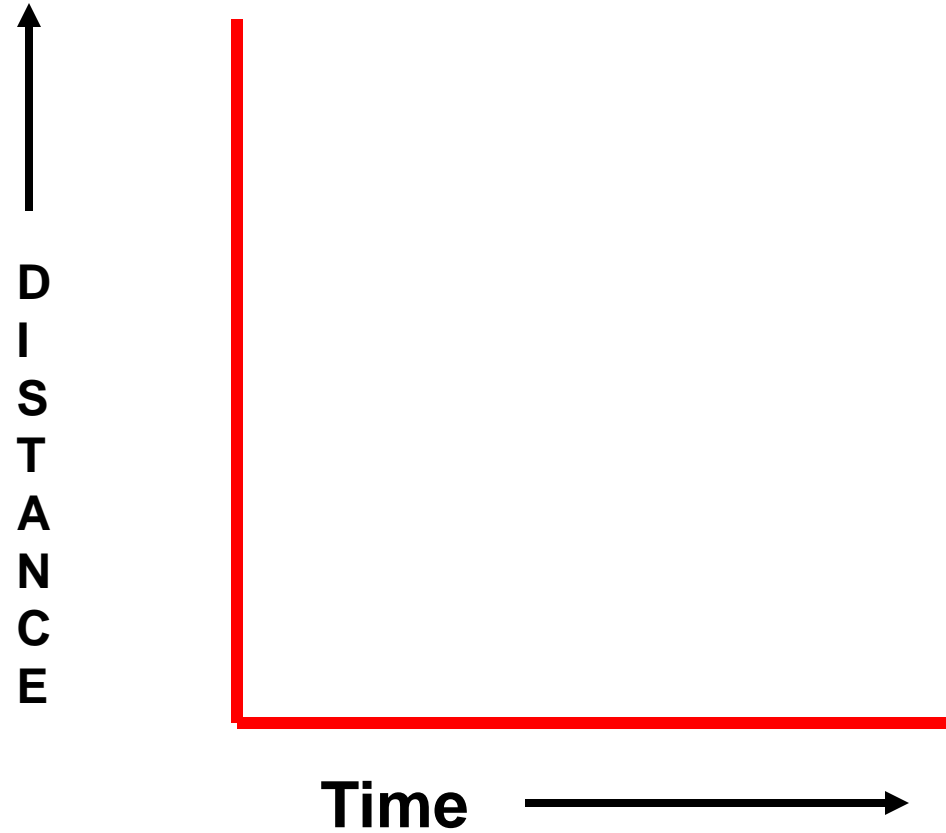
Changing Speeds

Position can change at different rates. Changes in speed can be shown on a graph

Example: as you walk somewhere you may walk for a while, then stop and then start running

Changing Speeds

C-notes



Motion Graphs

Describing the motion of an object is occasionally hard to do with words. Sometimes **graphs** help make motion easier to picture, and therefore understand.

Remember:

- **Motion** is a change in position measured by distance and time.
- **Speed** tells us the rate at which an object moves.
- **Velocity** tells the speed and direction of a moving object.
- **Acceleration** tells us the rate speed or direction changes.

DISTANCE-TIME GRAPHS

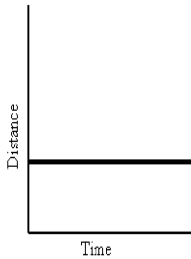
Plotting distance against time can tell you a lot about motion. Let's look at the axes:



Time is always plotted on the X-axis (bottom of the graph). The further to the right on the axis, the longer the time from the start.

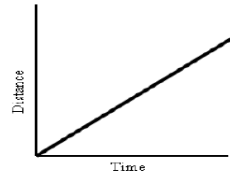
Distance is plotted on the Y-axis (side of the graph). The higher up the graph, the further from the start.

If an object is not moving, a horizontal line is shown on a distance-time graph.



Time is increasing to the right, but its distance does not change. It is not moving. We say it is **At Rest**.

If an object is moving at a constant speed, it means it has the same increase in distance in a given time:

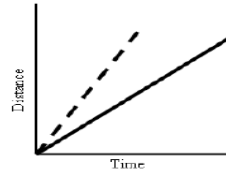


Time is increasing to the right, and distance is increasing constantly with time. The object moves at a **constant speed**.

Constant speed is shown by straight lines on a graph.

Let's look at two moving objects:

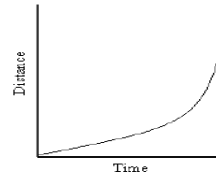
Both of the lines in the graph show that each object moved the same distance, but the steeper dashed line got there before the other one:



A steeper line indicates a larger distance moved in a given time. In other words, **higher speed**.

Both lines are **straight**, so both speeds are **constant**.

Graphs that show acceleration look different from those that show constant speed.



The line on this graph is curving upwards. This shows an **increase in speed**, since the line is getting steeper:

In other words, in a given time, the distance the object moves is change (getting larger). It is **accelerating**.

Summary:

A distance-time graph tells us how far an object has moved with time.

- The steeper the graph, the faster the motion.
- A horizontal line means the object is not changing its position - it is not moving, it is at rest.
- A downward sloping line means the object is returning to the start.

