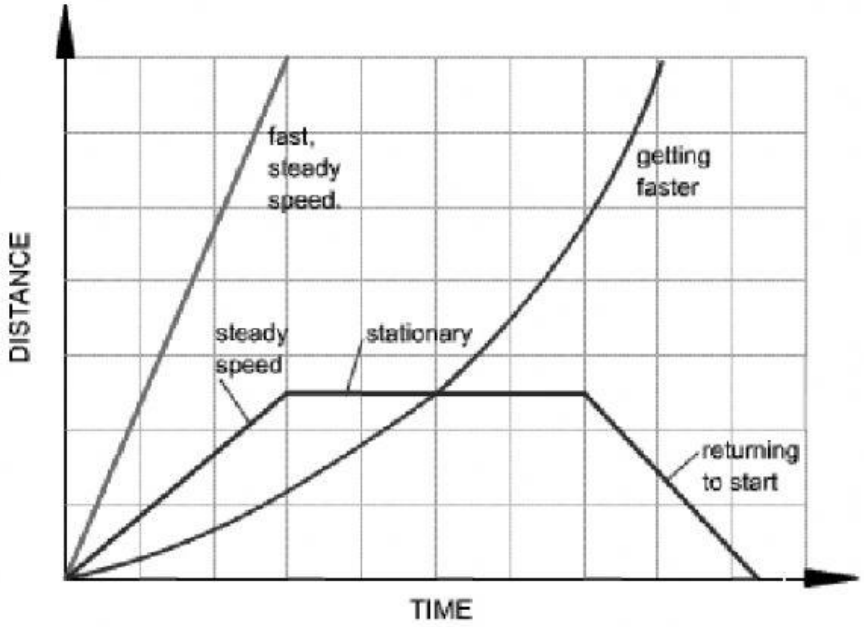
Motion Graphs

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.



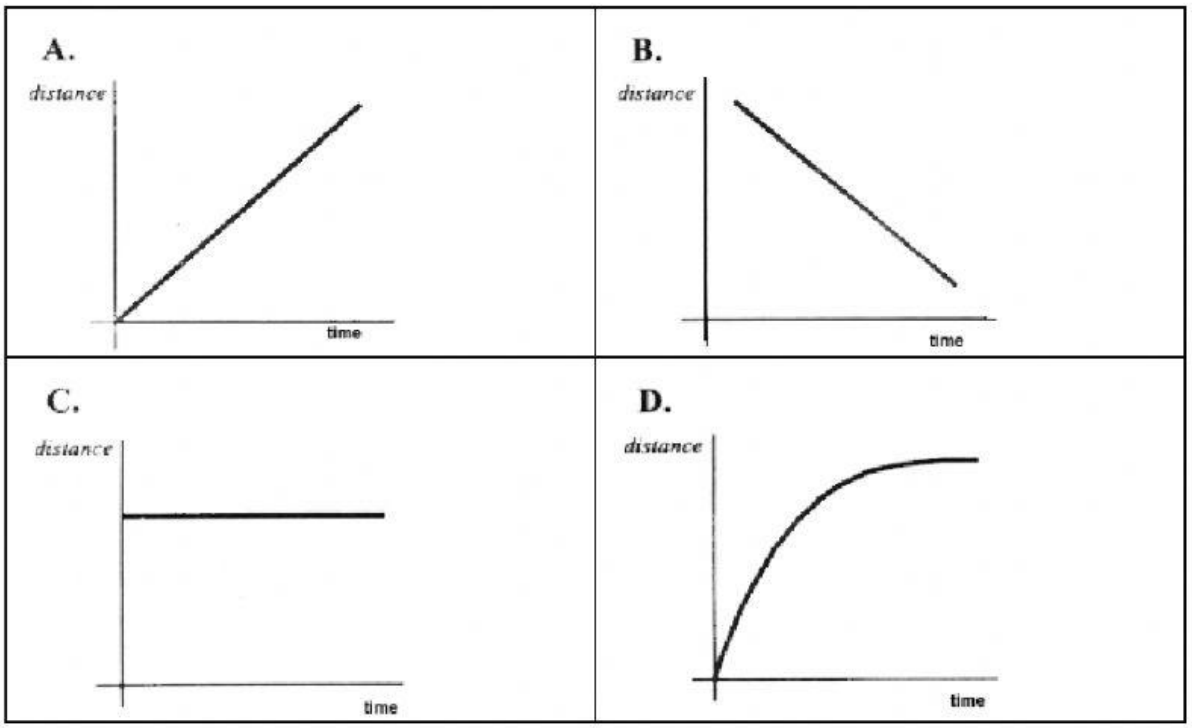
A distance-time graph tells us how far an object has moved with time.

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.

The distance-time graphs below represent the motion of a car. Match the descriptions with the graphs. **Explain your answers.**

Descriptions:

1. The car is stopped.
2. The car is traveling at a constant speed.
3. The speed of the car is decreasing.
4. The car is coming back.



Graph A matches description_____ because_____.

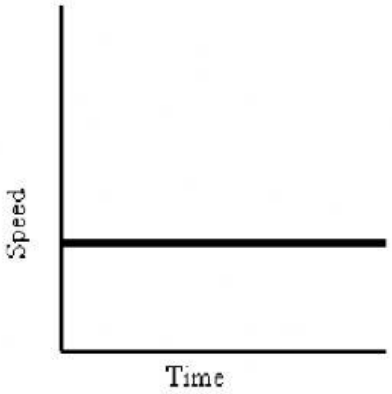
Graph B matches description_____ because_____.

Graph C matches description_____ because_____.

Graph D matches description_____ because_____.

SPEED-TIME GRAPHS

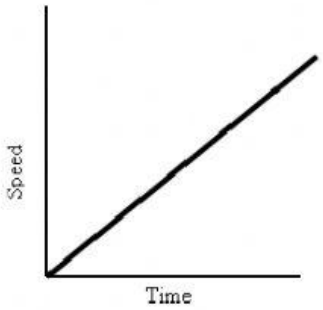
Speed-Time graphs are also called Velocity-Time graphs.



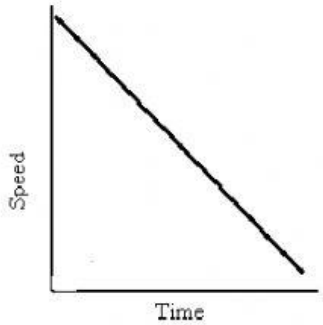
Speed-Time graphs look much like Distance-Time graphs. Be sure to read the labels!!
Time is plotted on the X-axis. Speed or velocity is plotted on the Y-axis.

A straight horizontal line on a speed-time graph means that speed is constant. It is not changing over time.

A straight line does not mean that the object is not moving!

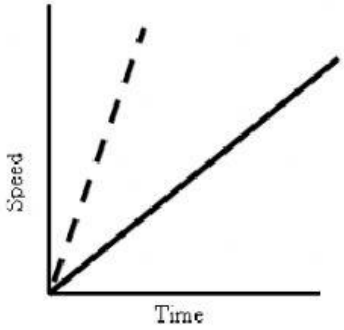


This graph shows increasing speed. The moving object is **accelerating**.



This graph shows decreasing speed. The moving object is **decelerating**.

What about comparing two moving objects at the same time?



Both the dashed and solid line show increasing speed.

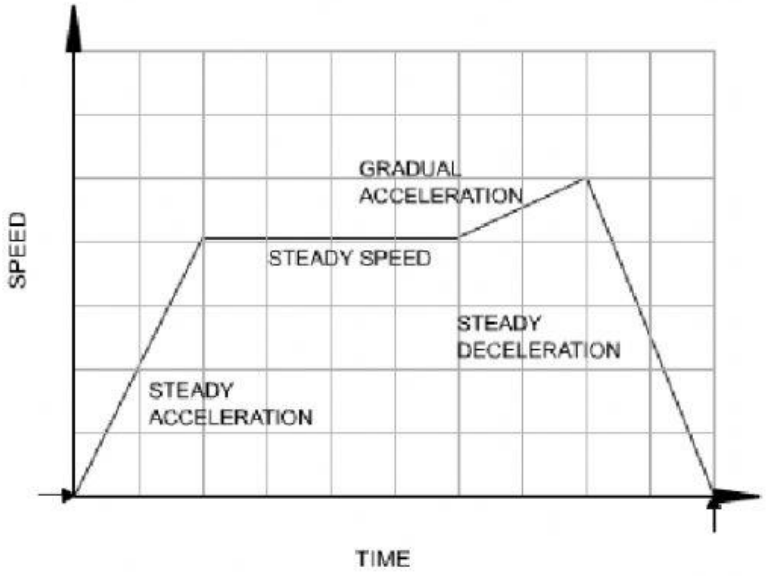
Both lines reach the same top speed, but the solid one takes longer.

The dashed line shows a greater acceleration.

Summary:

A speed - time graph shows us how the speed of a moving object changes with time.

- The steeper the graph, the greater the acceleration.
- A horizontal line means the object is moving at a constant speed.
- A downward sloping line means the object is slowing down.

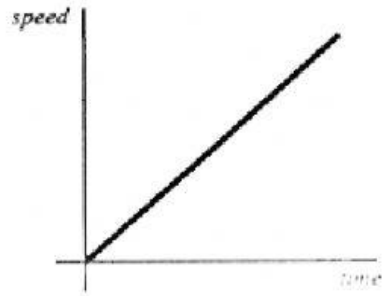


The speed-time graphs below represent the motion of a car. Match the descriptions with the graphs**. Explain your answers.**

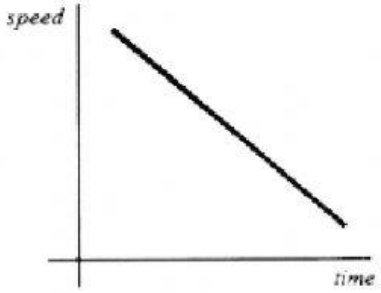
Descriptions:

5. The car is stopped.
6. The car is traveling at a constant speed.
7. The car is accelerating.
8. The car is slowing down.

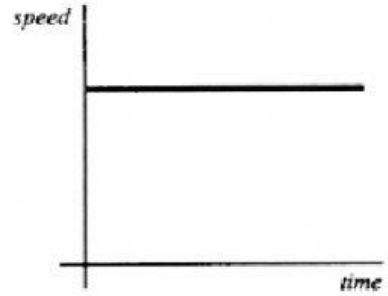
E.



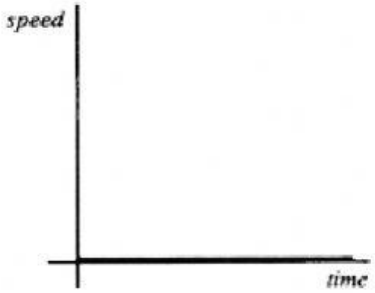
F.



G.



H.



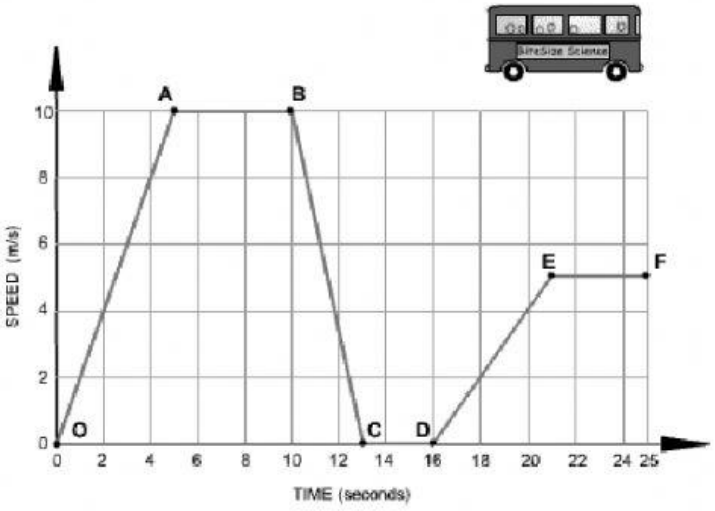
Graph E matches description_____ because_____.

Graph F matches description_____ because_____.

Graph G matches description_____ because_____.

Graph H matches description_____ because_____.

The graph below shows how the speed of a bus changes during part of a journey



Choose the correct words from the following list to describe the motion during each segment of the journey to fill in the blanks.

- accelerating
- decelerating
- constant speed
- at rest

Segment 0-A The bus is_____. Its speed changes from 0 to 10 m/s in 5 seconds.

Segment A-B The bus is moving at a_____of 10 m/s for 5 seconds.

Segment B-C The bus is_____. It is slowing down from 10 m/s to rest in 3 seconds.

Segment C-D The bus is_____. It has stopped.

Segment D-E The bus is_____. It is gradually increasing in speed.