ACCELERATION

Essential Questions:

- **How is acceleration different from velocity?**
- **How do graphs of acceleration differ from graphs of other kinds of motion?**

Acceleration

Section4.3

- Rate of change in velocity
- If velocity changes, then acceleration occurs. That means if speed and/or direction change, acceleration occurs.
- Positive acceleration = speeding up
- Negative acceleration = slowing down

- Acceleration = change in velocity / time

- $A = V_{finish} - V_{start} / T$

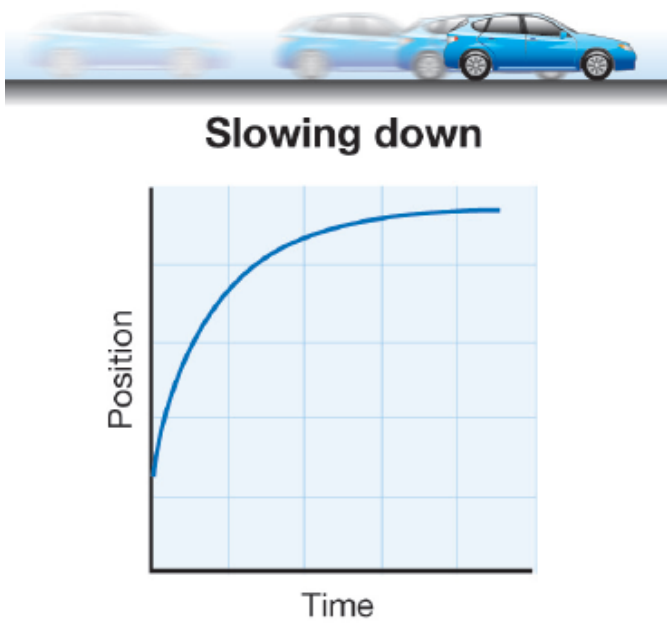
Calculate the acceleration of a runner who goes from 2.0 m/s to 5.0 m/s in 2.0 seconds.

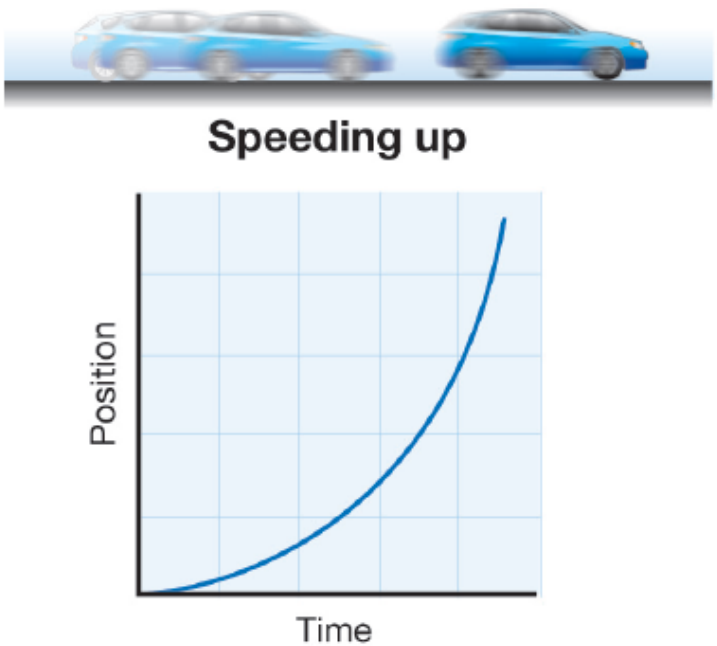
$A = 5.0 \text{ m/s} - 2.0 \text{ m/s} \div 2.0 \text{ s}$

$A = 1.5 \text{ m/s}^2$

Graphing acceleration

- You don't get a straight line because speed and/or direction is changing.





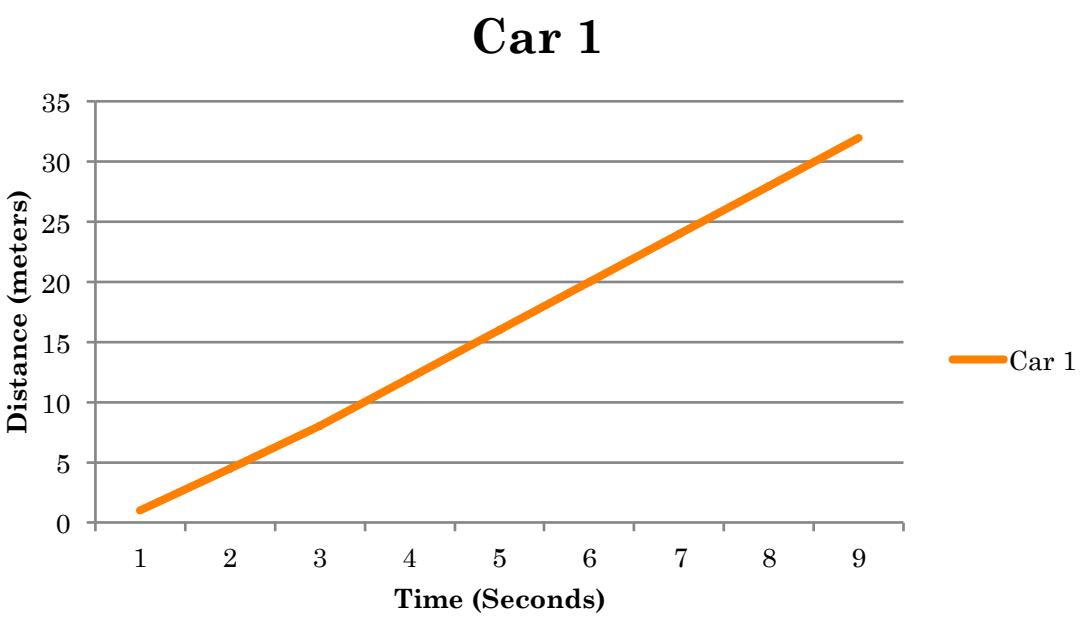
White board

- If a dog is <u>going at a constant speed</u> as it chases its tail, is it accelerating?
  - Yes (because it is changing direction)
- If a skateboarder slows down to avoid running over a little kid, is he accelerating?
  - Yes, slowing down is negative acceleration

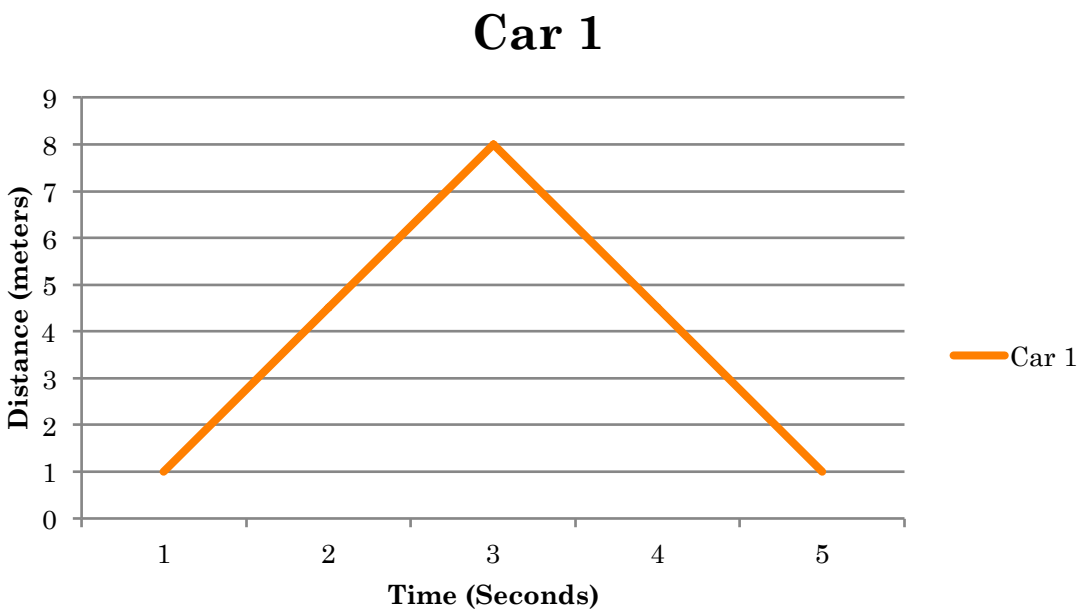
White board

- If a bowling ball is rolling at a constant speed in a straight line, is it accelerating?
  - No, because it is not changing its speed or direction.

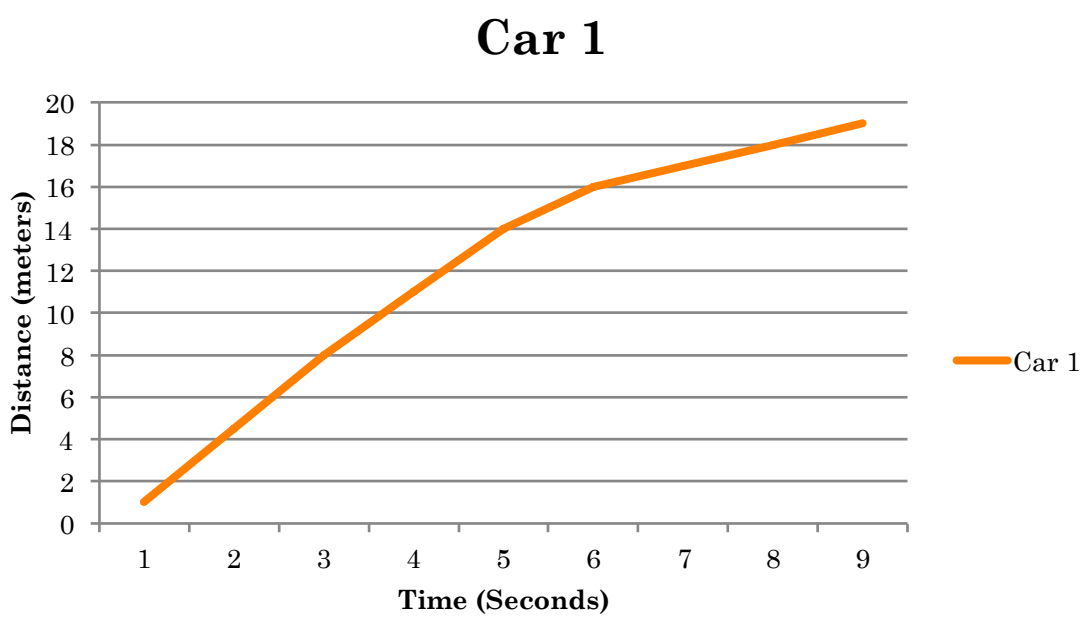
- Does this graph show acceleration?
  - No, it is a straight line which means the car was going at a constant velocity.



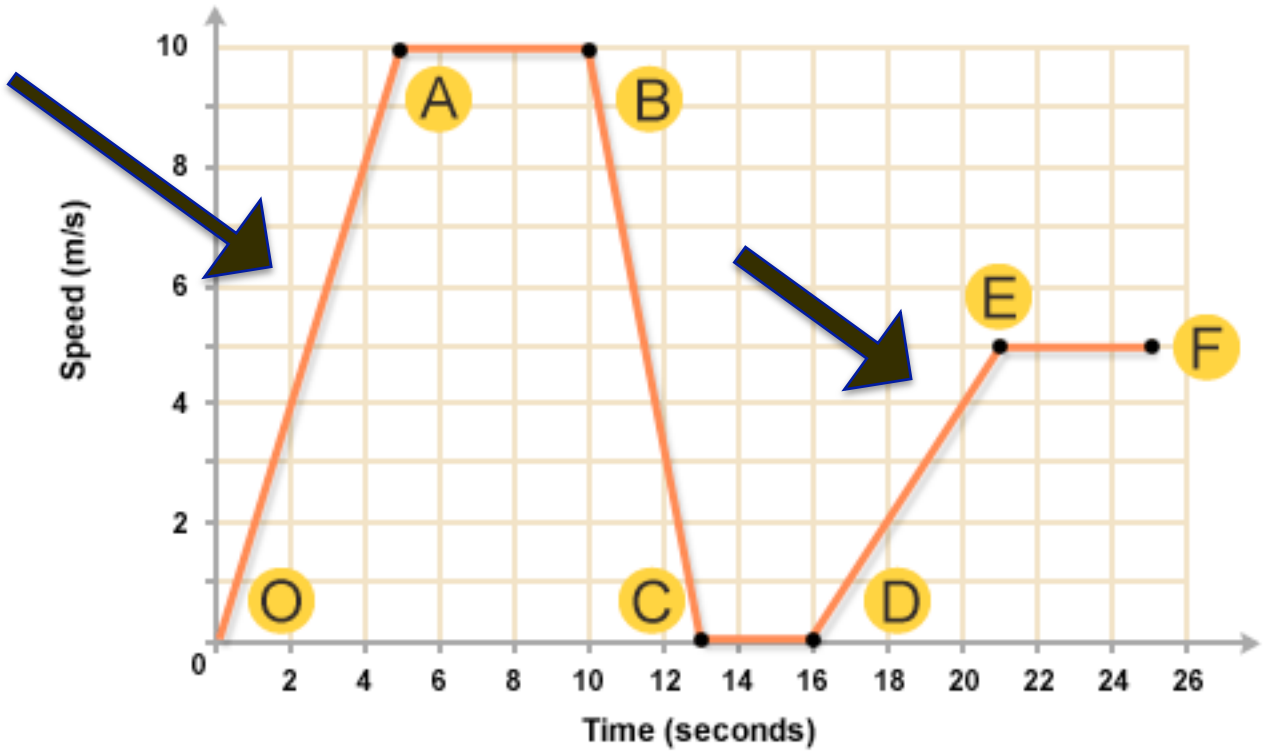
- Does this graph show acceleration?
  - Yes, because it shows the car changing direction.



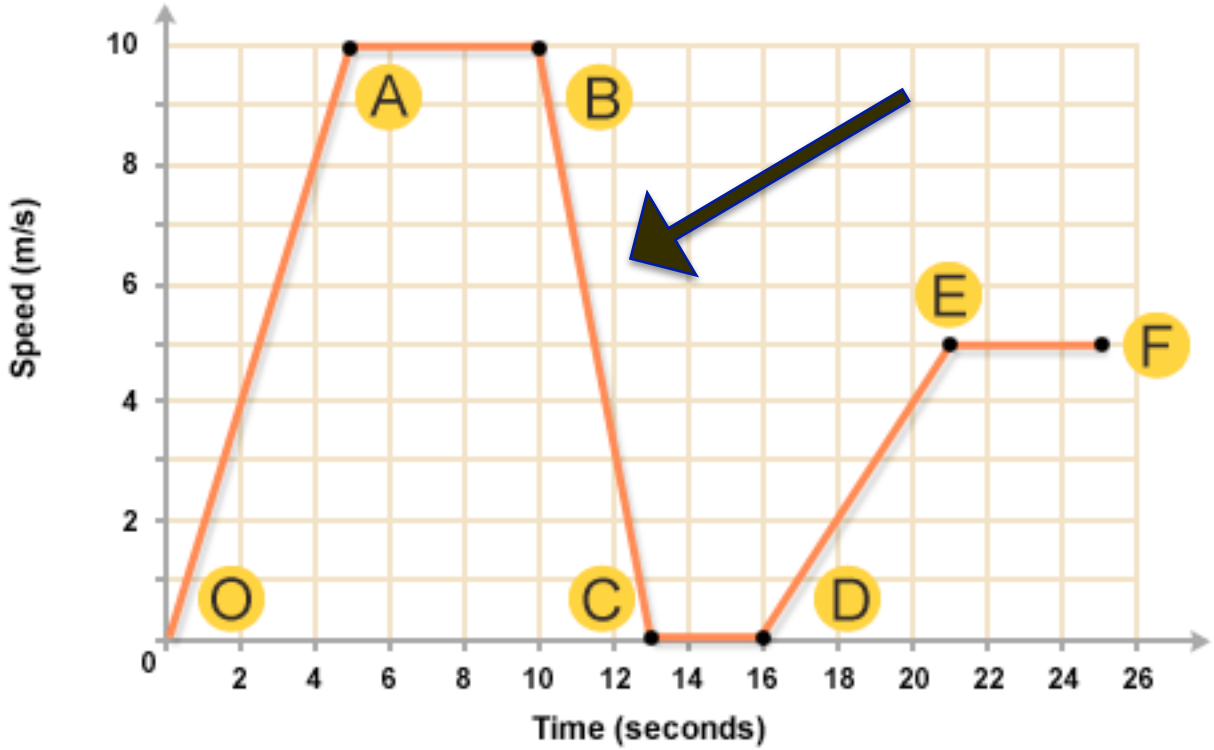
- Does this graph show acceleration?
  - Yes, because it shows the car slowing down (negative acceleration).



- What part of the graph shows the jogger speeding up?
  - O-A and D-E

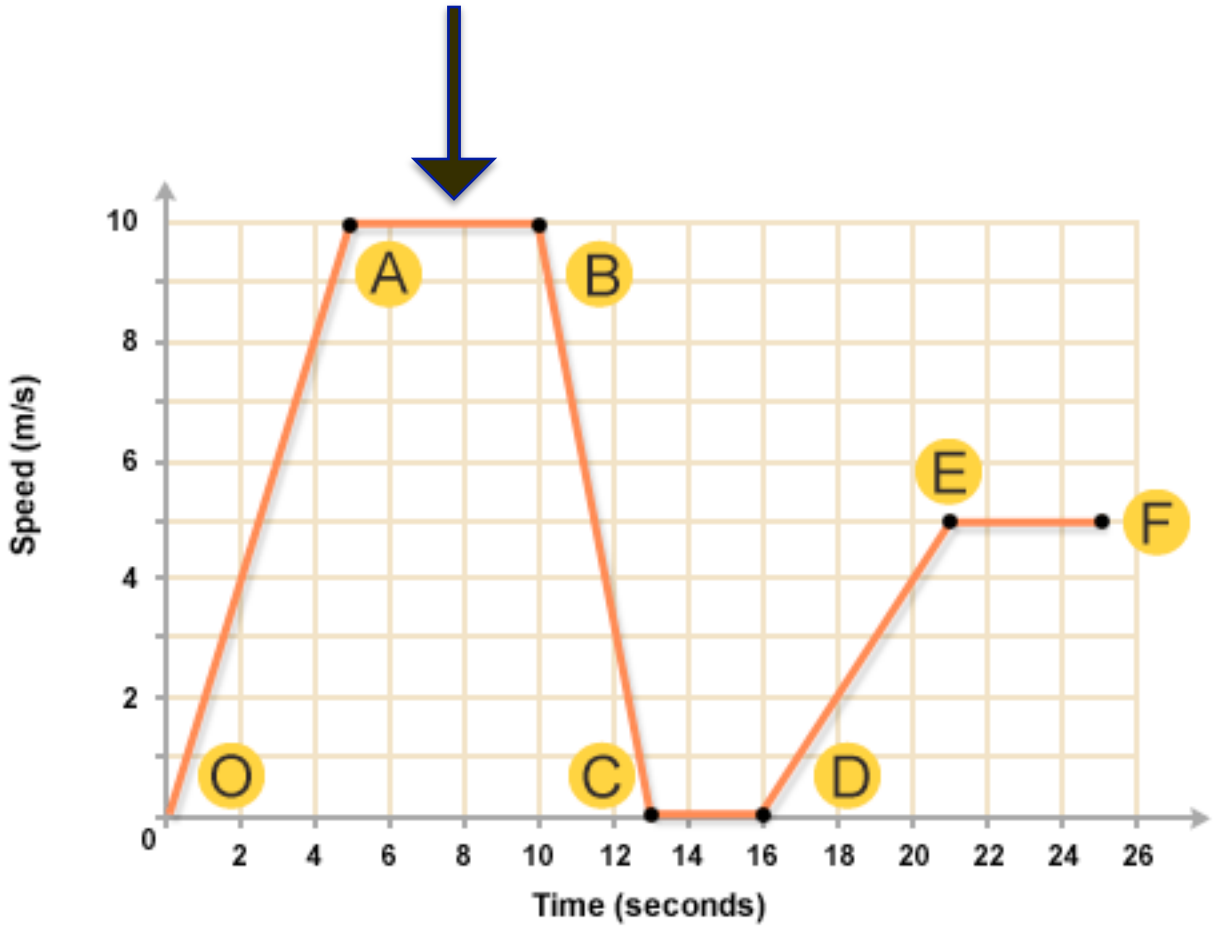


- What part of the graph shows the jogger slowing down?
  - B-C



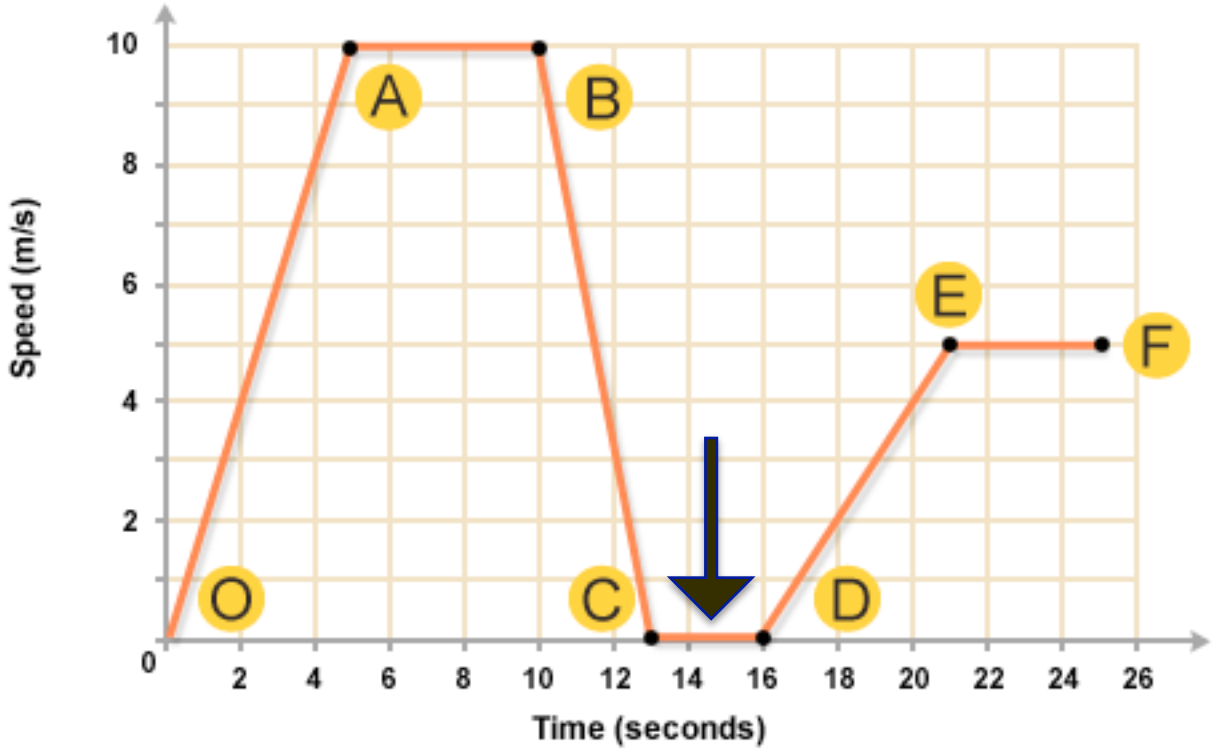
- What part of the graph shows the jogger going the fastest?

  - A-B

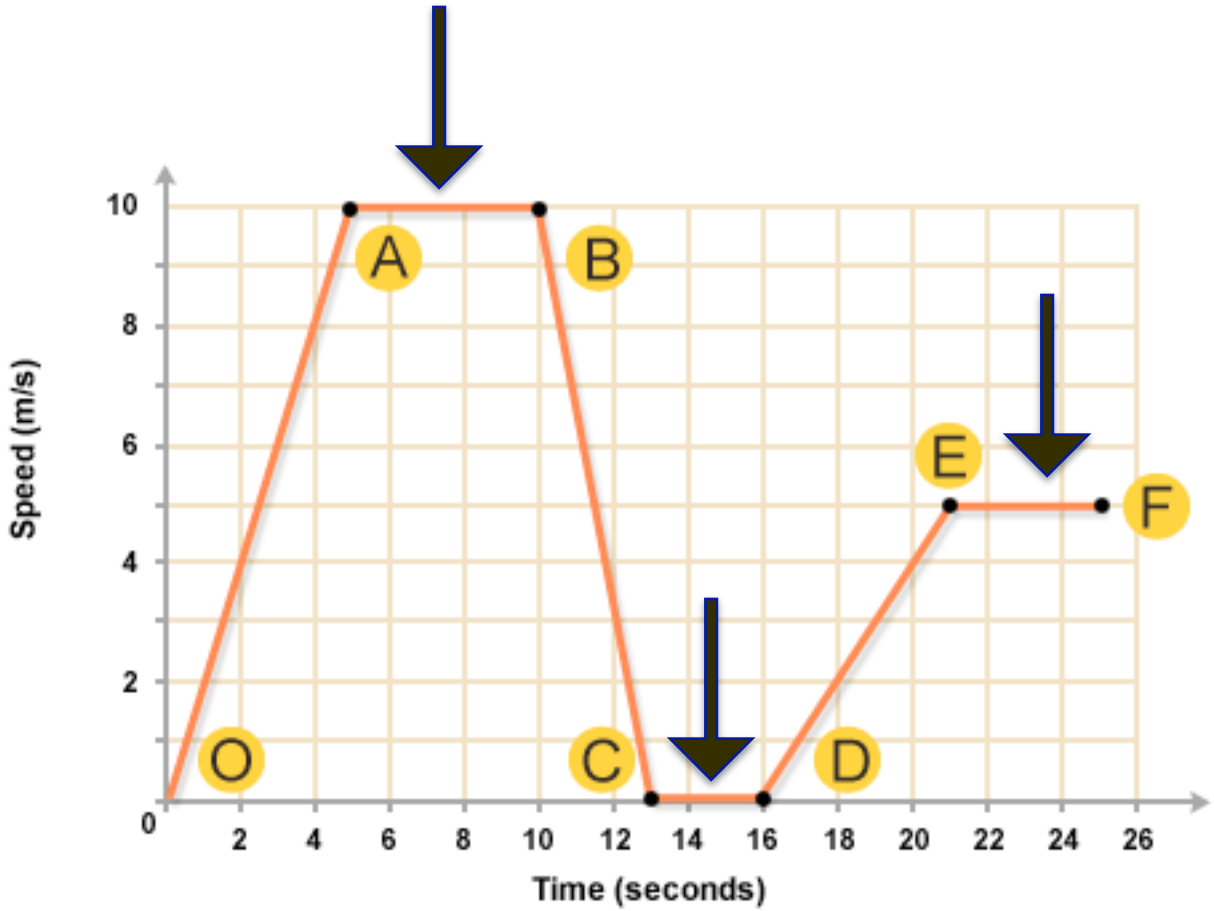


- What part of the graph shows the jogger stopped?

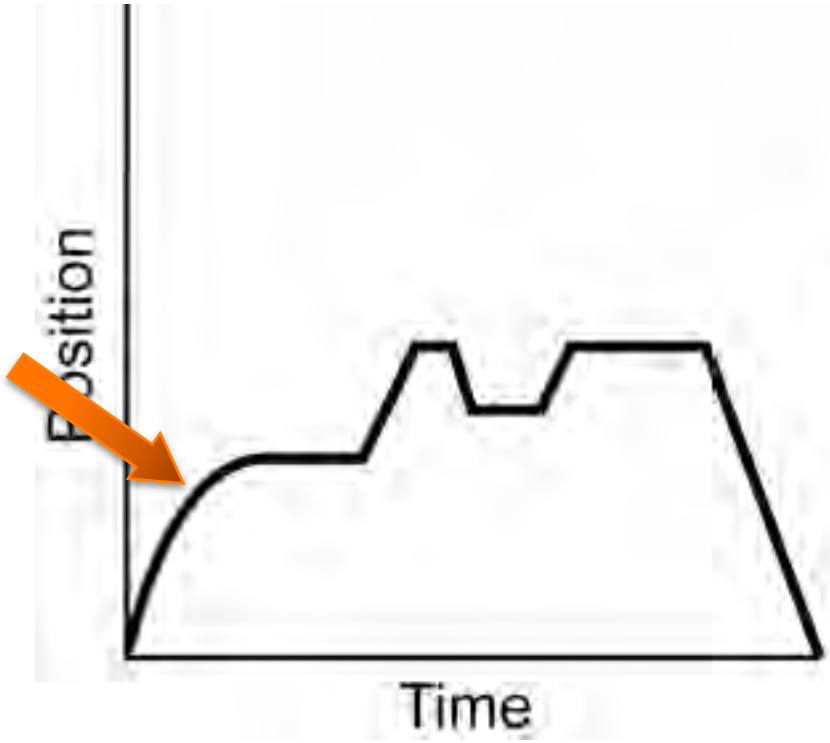
  - C-D

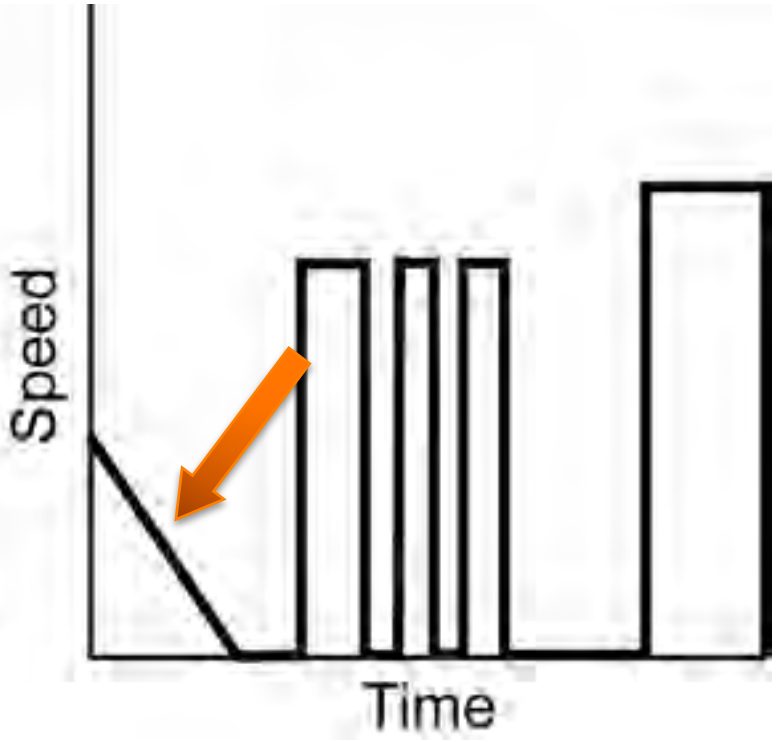


- What parts of the graph shows the jogger going at a constant speed?
  - A-B and C-D and E-F



- What's happening?
  - A. speeding up
  - B. slowing down
  - C. stopped





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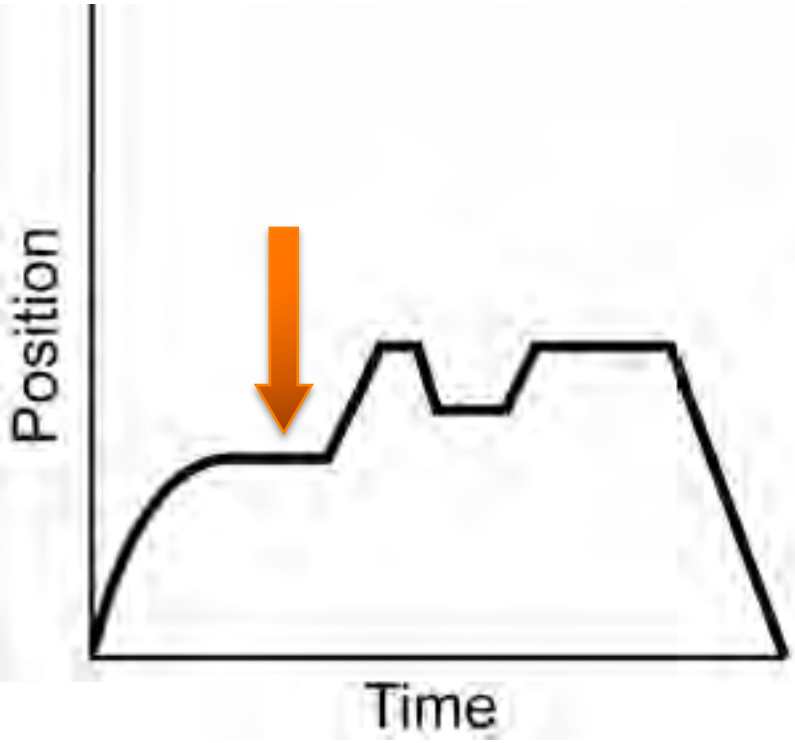
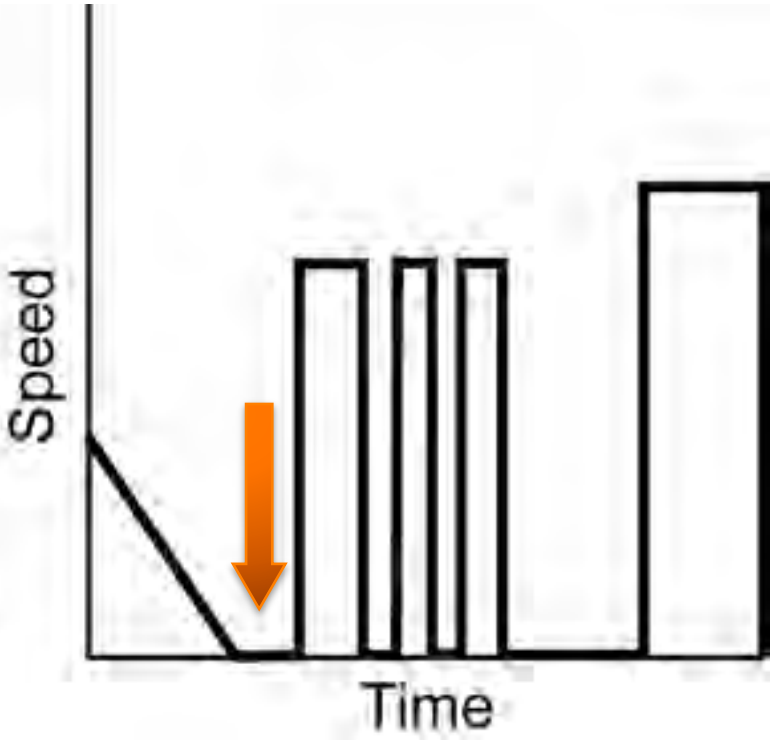
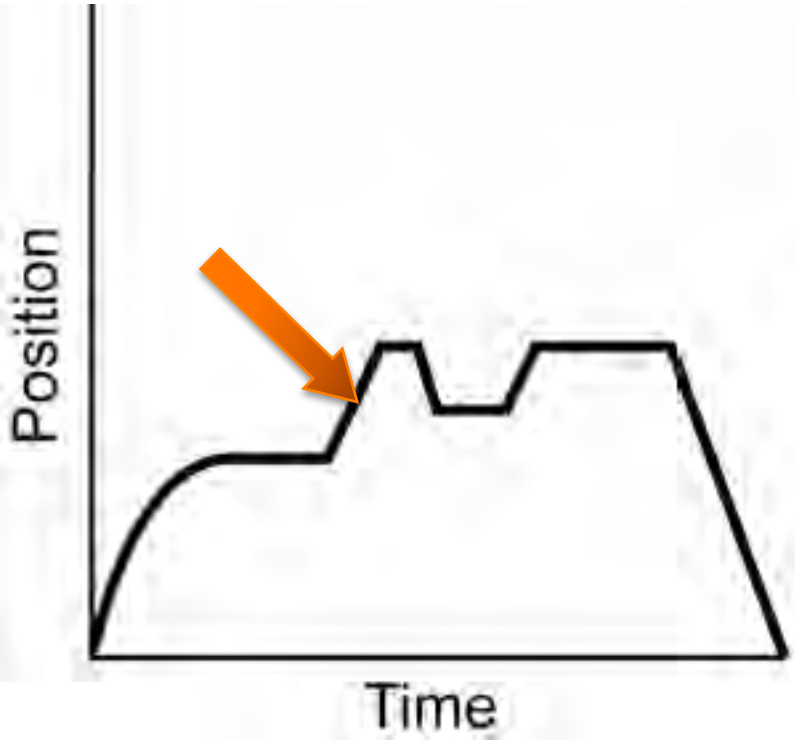
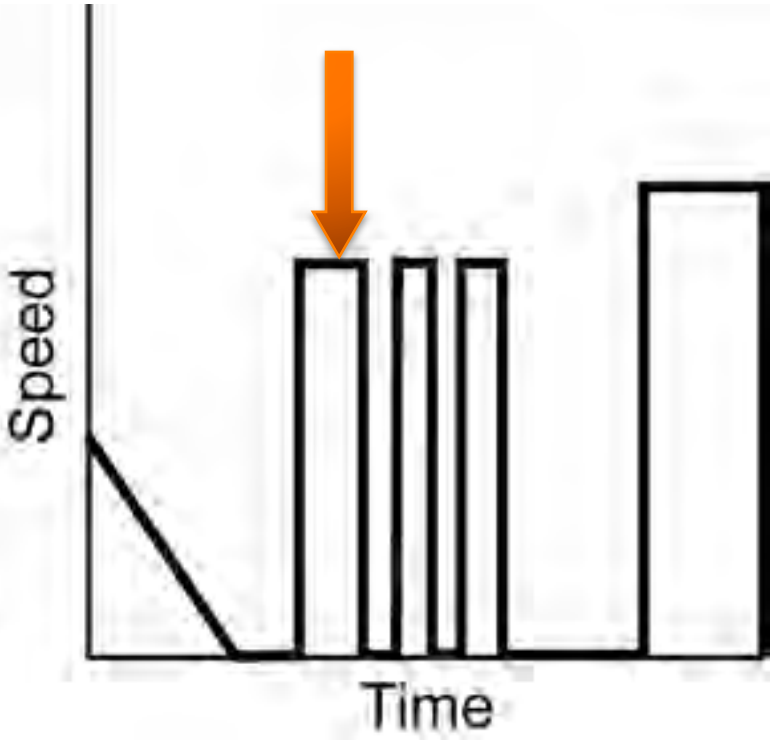




- What's happening?
  - A. going forward
  - B. going backward
  - C. stopped





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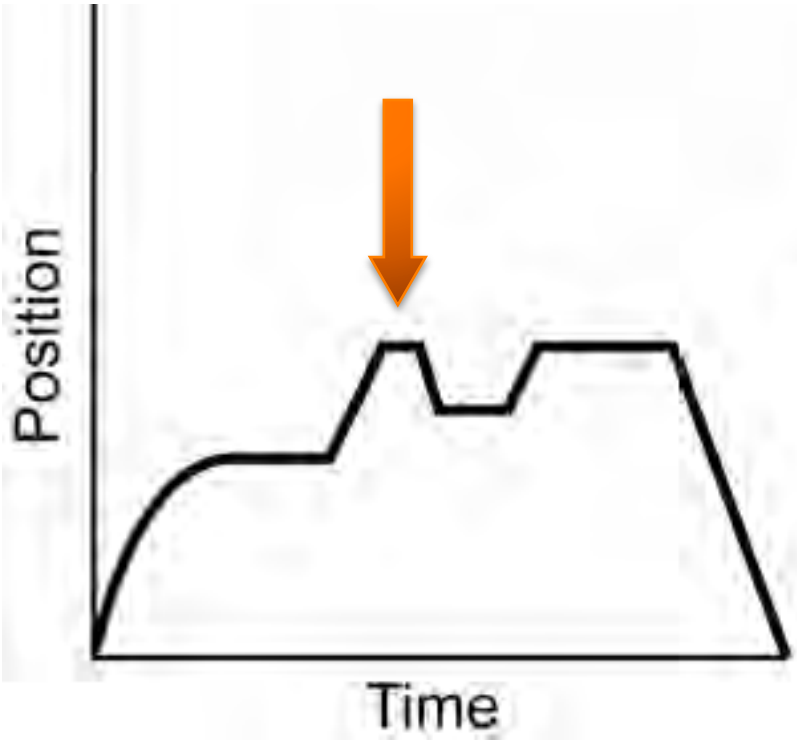

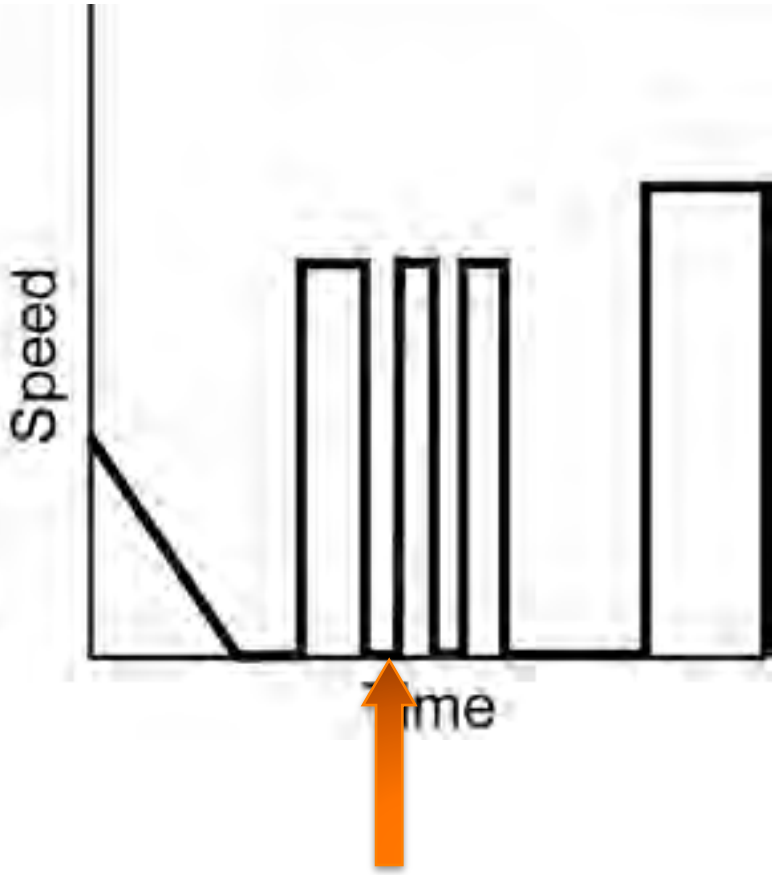

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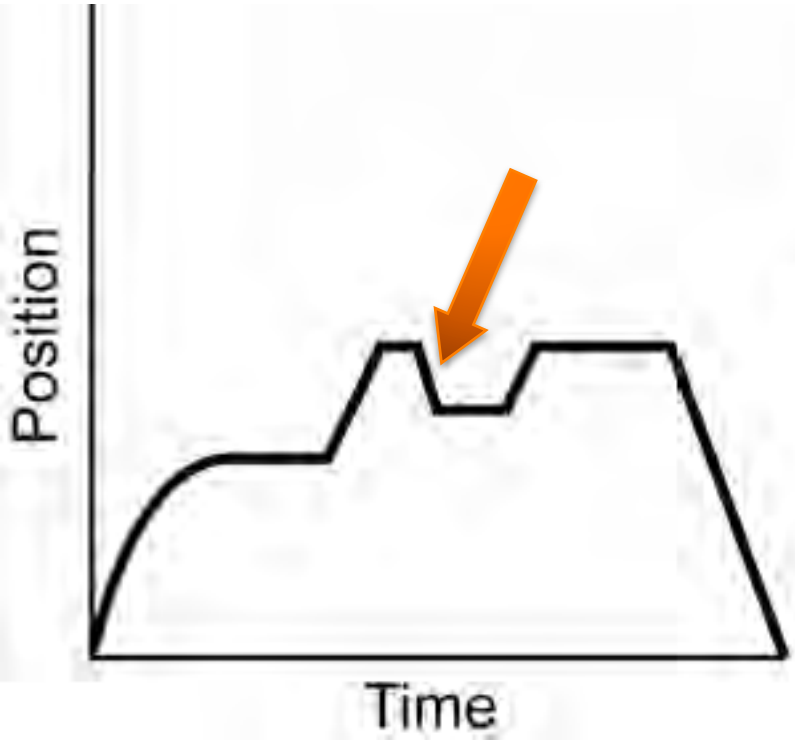

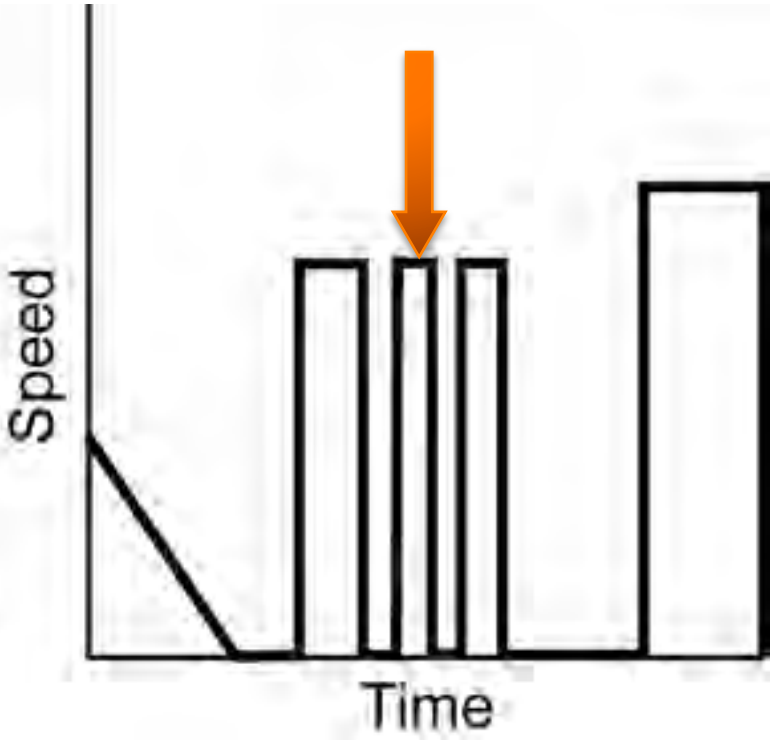

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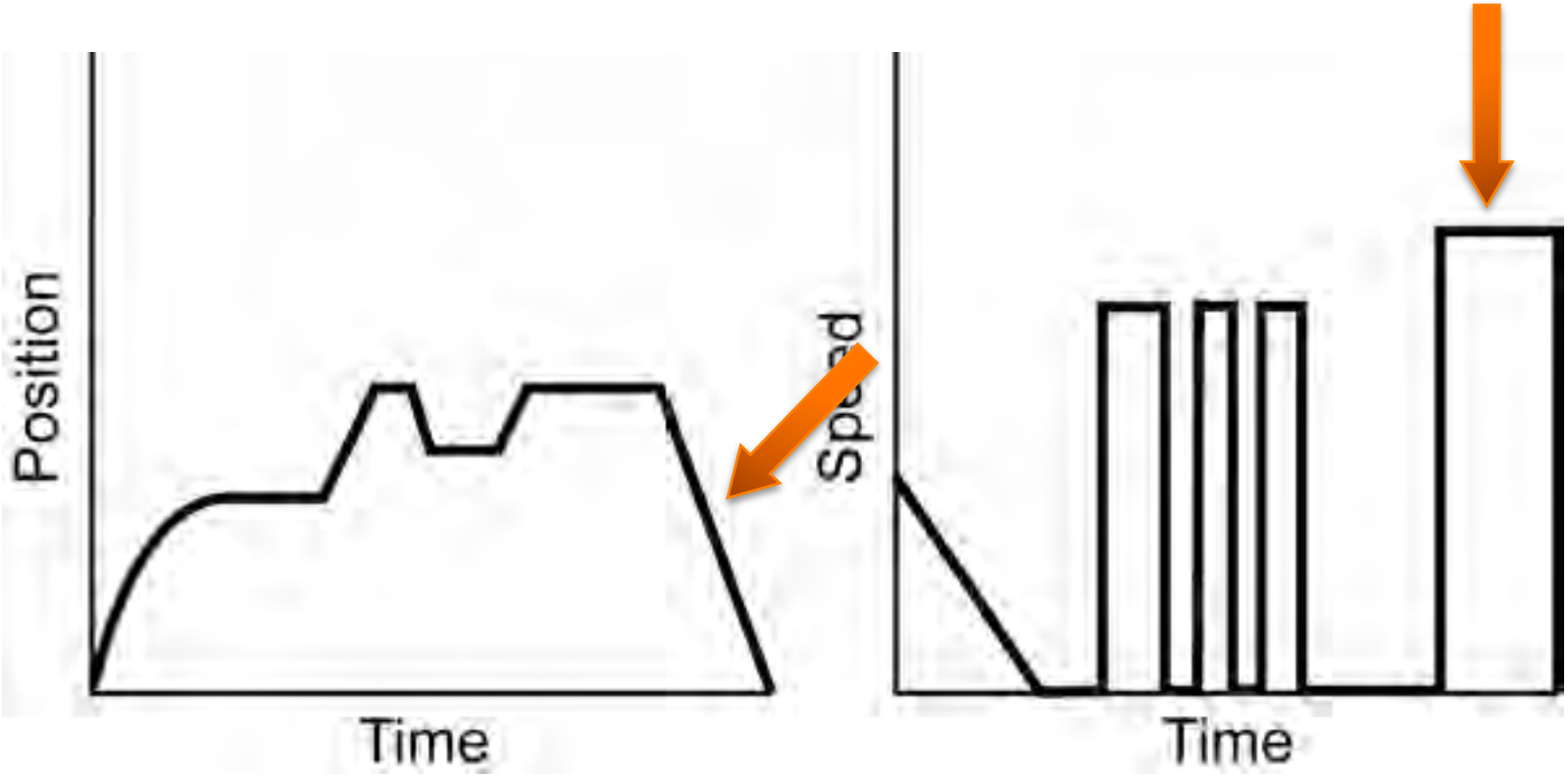

- Calculate the acceleration of a bus that goes from 10 m/s to 20 m/s in 5 seconds.

20 m/s – 10 m/s ÷ 5s = **2 m/s^2**

- Calculate the acceleration of a car that slows from 50 m/s to 30 m/s in 10 seconds.

30 m/s – 50 m/s ÷ 10s = **-2 m/s^2**