

# Close Reading: Acceleration

Grade: 10  
Subject: Science 10  
Date: 2014

1 Acceleration is a vector.

True

False

2 Which statement best describe what the units of acceleration mean.

A Time must be squared to give acceleration

B An object's velocity in m/s changes each second.

C To obtain acceleration one must divide distance by time squared.

3 A car is heading east at 50 km/h. After 3 seconds the car is traveling at 20 km/h [E]. The direction of the car's velocity after the three seconds is \_\_\_\_\_.

A East

B West

4 A car is heading east at 50 km/h. After 3 seconds the car is traveling at 20 km/h [E]. The direction of the car's acceleration during the three seconds is \_\_\_\_\_.

A East

B West

5 If an object's instantaneous velocity is zero then its acceleration must also be zero.

True

False

6 An object can keep a constant speed and experience a non-zero acceleration.

True

False

7 An object can experience a non-zero acceleration and keep a constant velocity.

True

False



8 In which of the following situations is it possible to experience an acceleration and have an instantaneous velocity of zero? (select all that apply)

A A car traveling around a circular race track.

B A book sitting on a table.

C A ball thrown up in the air and caught on the way down.

D A woman on a roller coaster ride going through a loop.

E A mass bouncing up and down on a spring.

F A child on a merry-go-round.

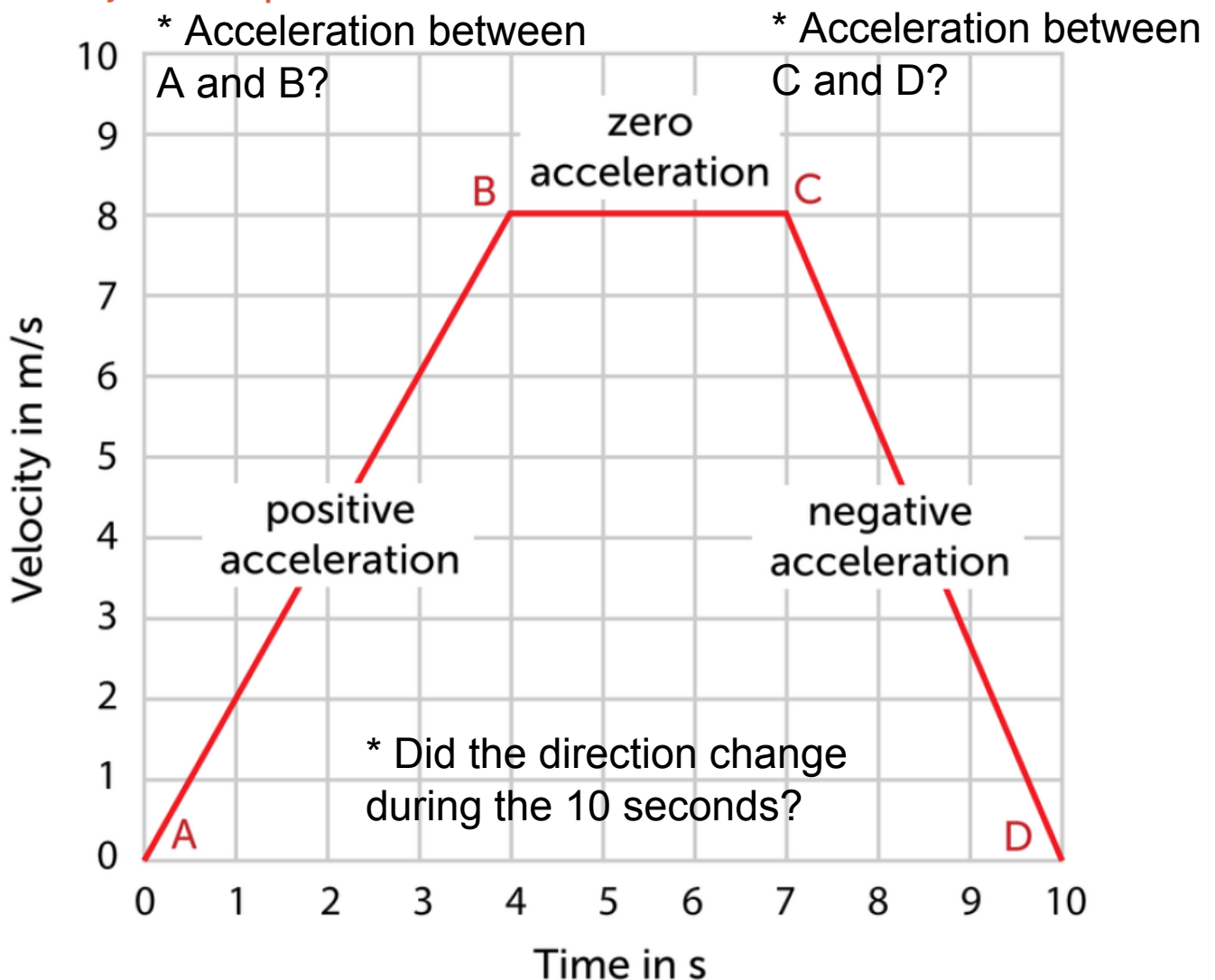
G A child on a swing.

## 12.3 Acceleration

### Defining Acceleration

Acceleration is a measure of the change in velocity of a moving object. It shows how quickly velocity changes. Acceleration may reflect a change in speed, a change in direction, or both. Because acceleration includes both a size (speed) and direction, it is a vector.

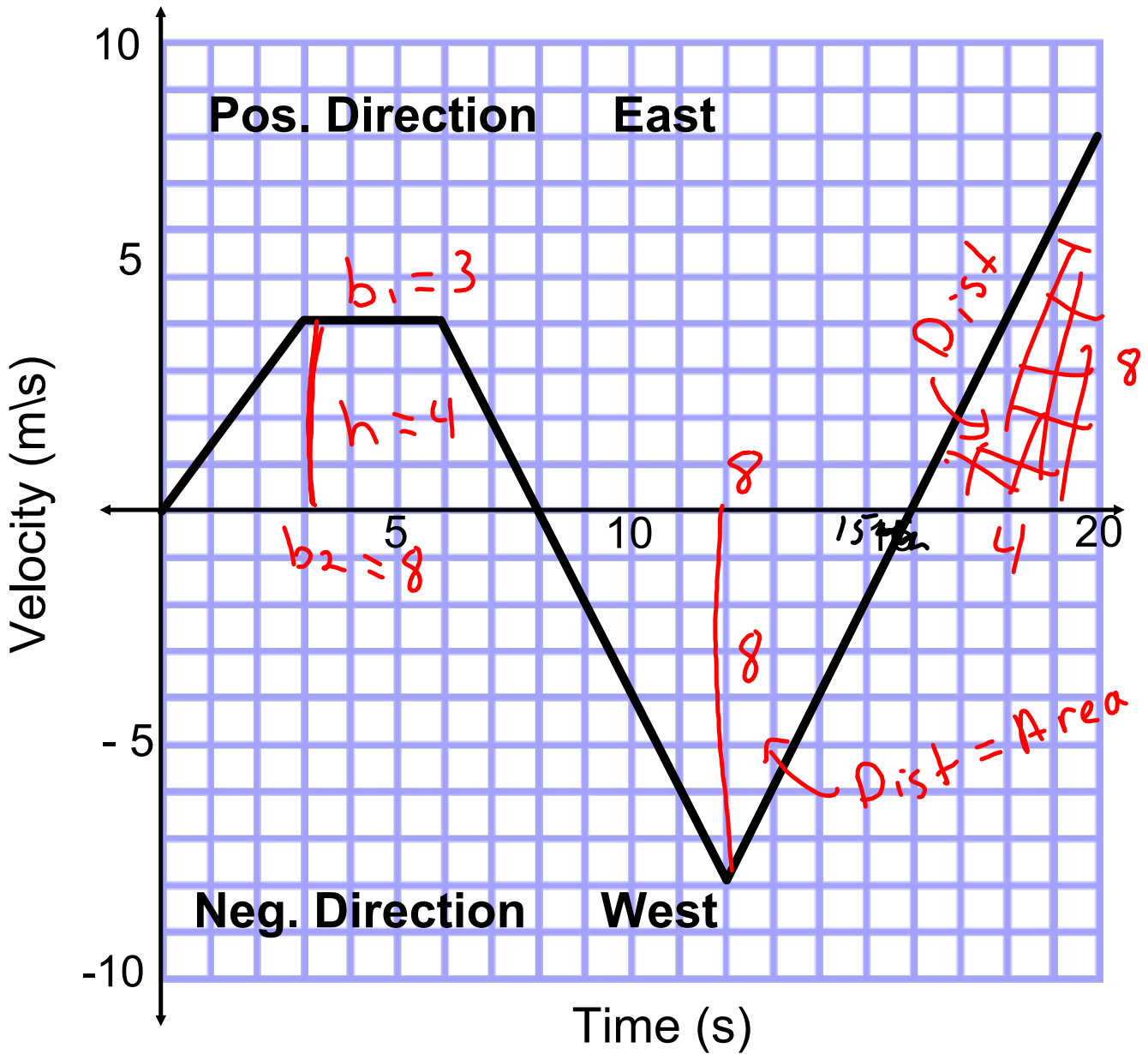
### Velocity-Time Graphs



\*\*Distance and position information can be found through the careful analysis of Velocity - Time Graphs. We calculate the area contained between the graph and time axis.\*\*

- The acceleration at any time is the slope of the line (change in velocity with time).
- The sign of the slope indicates the direction of the acceleration *not* the object.
- The time axis separates positive and negative (opposite) directions.
- The area contained on the top is distance traveled in the positive direction.
- The area contained on the bottom is the distance traveled in the negative direction.
- The sum of the areas is the total distance traveled.
- The difference of the areas (top - bottom) is the final position.
- When calculating areas always use positive numbers in the calculations
- Average velocity is the object's final position divided by the time.
- Average speed is the object's distance divided by the time.

### Analysis of a Velocity - Time Graph





## Attachments

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moving-man\_all.jar