

Acceleration Lesson 3



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What is acceleration?



How do you graph acceleration?

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I. What is acceleration

A. Acceleration has a more precise definition in science than just the every day meaning of "the process of speeding up"

- * acceleration is the rate at which velocity changes
- * velocity = speed + direction
- * a change in velocity can involve speed, direction or both

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* In science, acceleration refers to increasing speed, decreasing speed, or changing direction



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B. Changing speed

Whenever an object's speed changes, the object accelerates

- * just as objects speed up, they can slow down

- deceleration or negative acceleration

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C. Changing Directions

Even an object traveling at a constant speed can be accelerating

- * acceleration can be a change in direction

- ex. a car on a gentle curve

- a car changing lanes

- runners rounding a curve on a track

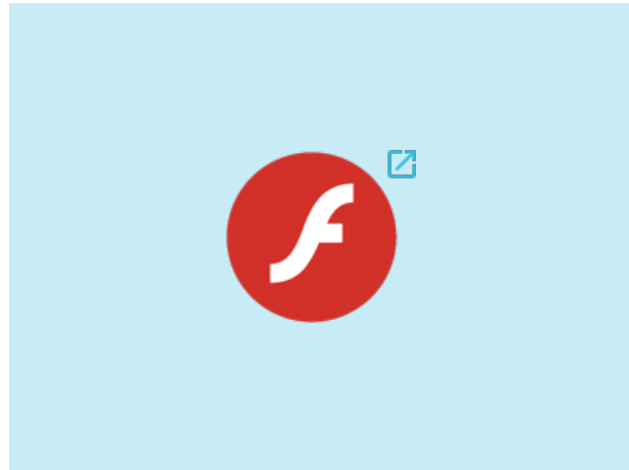
- softball changing direction when it's hit

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* many objects continuously change directions without changing speed

simplest example- circular path

- Ferris wheel or merry-go-round



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D. Calculating Acceleration

Acceleration is described as the rate at which velocity changes

*If an object is not changing direction, then you can describe acceleration as the rate at which speed changes.

$$\text{Acceleration} = \frac{\text{final speed} - \text{initial speed}}{\text{time}}$$

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SI unit for **acceleration is m/s^2**

because speed is measured in meters/sec

time is measured in seconds

so $m/s/s$ or m/s^2

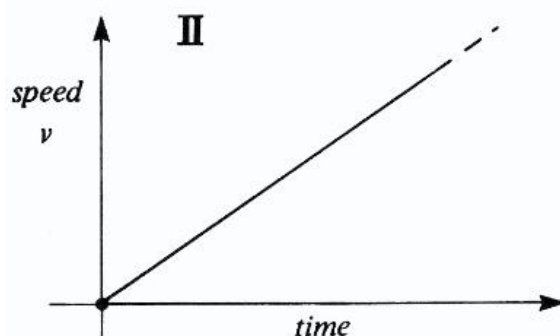
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II. How do you graph acceleration?

A. You can use both a speed vs. time graph and a distance vs. time graph to analyze the motion of a accelerating object

Acceleration is the slope of the line

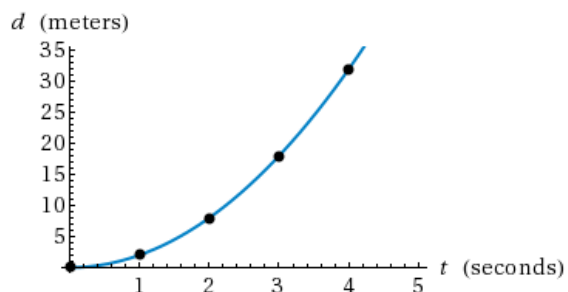
Speed vs. time



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Distance vs. time

each second traveled is a greater distance



slope increase on
a curved line =
acceleration

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