

# Force & Motion

## Problems



How far does a bicycle travel at a speed of 15 m/s for 15 seconds?

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$$D = S \times T$$

$$D = 15\text{m/s} \times 15\text{s}$$

$$D = 225\text{m}$$

A swimmer swims 20 m in 40 s.  
What is the swimmer's average  
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$$S = D/T$$

$$S = 20\text{m}/40\text{s}$$

$$S = 0.5\text{m/s}$$

What is the average speed (mph) for a car journey of 120 miles that began at 09.30 and finished at 12.00 noon?

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$$S = D/T$$

$$D = 120$$

$$T = 2.5 \text{ hours (from 9:30 – 12:00)}$$

$$S = 120\text{m} / 2.5\text{h}$$

$$S = 48 \text{ mph}$$

A person is traveling at 20 m/s in a car when the car hits a tree. The person comes to a complete stop in 0.4 seconds. What was the person's acceleration?



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$$a = (0 \text{ m/s} - 20 \text{ m/s}) / 0.4 \text{ s} = -50 \text{ m/s}^2$$

You throw a ball to a friend. If the ball has a mass of  $0.15\text{kg}$  and it accelerates at  $20\text{m/s}^2$ , what force did you exert on the ball.

You throw a ball to a friend. If the ball has a mass of 0.15kg and it accelerates at 20m/s<sup>2</sup>, what force did you exert on the ball.

$$F = m \times a$$

$$F = 0.15 \times 20 = 3\text{N}$$

You throw a 0.5 kg ball with a force of 10N. What is the ball's acceleration?

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$$M = 0.5$$

$$F = 10 \text{ N}$$

Acceleration = a

$$A = F/m$$

$$10 \text{ N} / 0.5 \text{ kg} = 20\text{m/s}^2$$