Nov 12, 2019

Begin Motion Chp 9: Distance and Speed

Warm-Up

When glass breaks, the cracks move at speed of more than _____ km/h

What is the physics of motion all about?

- It is part of the everyday world. We learn to walk, run and drive without understanding the physics behind it.

- We will be describing, explaining, and predicting motion in this unit.

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Speed, Distance, Time

Distance (*d*) is the amount of space between two objects or points.

The common unit of distance is the metre (m) it can also be represented as cm,mm,km etc

Time - is the duration between two events

Is measured in seconds (s) , minutes (min) or hours (h)

Could also be measured in days, weeks or years.

What is the relationship between Distance and Time?

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Speed is the relationship between distance and time

Speed = $\frac{\text{distance}}{\text{Time}} = \frac{d}{t}$

represented as km/h , m/s etc

There are various ways we can describe speed

Instantanous Speed
Constant Speed
Average Speed

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Instantaneous Speed

is the speed at which an object is travelling at a particular instant.

i.e. if a car is stopped at a stop light its instantaneous speed is 0km/h
when a car passed a truck its speed was 100km/h at that specific point in time.

Constant Speed

if instantaneous speed remains the same over a period of time we say the car is travelling at a constant speed.

the average speed of an object is the same as its instantaneous speed if that object has a constant speed.

Average Speed (v_{av})

it is the total distance (d) divided by the total time (t) of the trip.

Formula : $v = \frac{\Delta d}{\Delta t} = \frac{d_2 - d_1}{t_2 - t_1}$

use $d_2 - d_1$ or $t_2 - t_1$ when you have more than one distance or more than one time

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Example 1: Jenny skates to school a distance of 4.5km. Her journey takes 0.62 h. What is her average speed during the trip?

Step 1 :
Write down what you know on the left side with symbols and values
As well write what you want to find.

$v =$
$d = 4.5\text{km}$
$t = 0.62\text{h}$

Step 2 :Determine if you need to convert units. If so convert into matching units

Step 3: Use the formula to solve

$$v = \frac{d}{t} = \frac{4.5\text{km}}{0.62\text{h}} = 7.26\text{km/h}$$

Step 4: Write a Sentence

Jenny's average speed was 7.26 km/h.

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Example 2:
Josh is trying to find his average speed when riding his bike. He travels a distance of 45 km and it takes him 139 min, including slowing down for climbing hills. What is his average speed in km/h?

Step 1 :
Write down what you know on the left side with symbols and values. As well write what you want to find.

$v =$
$d = 45\text{km}$
$t = 139\text{min}$

Step 2 :Determine if you need to convert units. If so convert into matching units

$139\text{min} \times \frac{1\text{h}}{60\text{min}} = 2.32\text{h}$

Step 3: Use the formula to solve

$v = \frac{d}{t} = \frac{45\text{km}}{2.32\text{h}} = 19.40\text{km/h}$

Step 4: Write a Sentence

Josh's average speed was 19.40 km/h.

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