

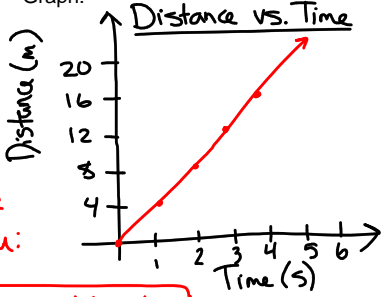
2.3 Velocity: Non-Uniform Motion

— Velocity constant (ie. cruise control)

Uniform Motion - an equal displacement in an equal time interval  
Non-uniform Motion - acceleration, velocity changing

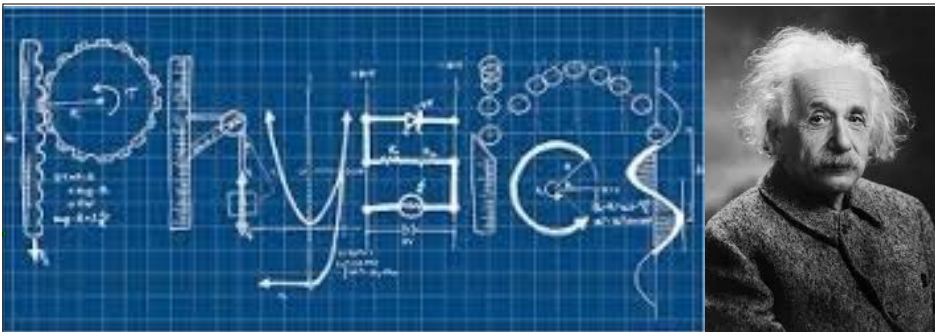
Ex.)	time(s)	distance(m)
	0	0
	1	4
	2	8
	3	12
	4	16

Graph: Distance vs. Time



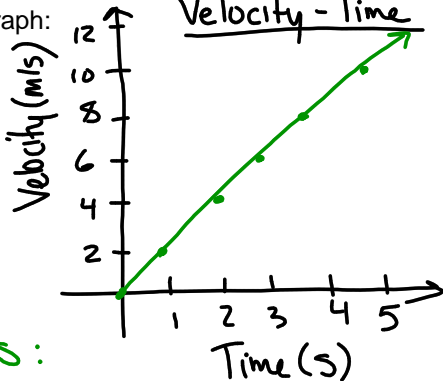
• linear on a distance time graph tells you:

Uniform Motion = Constant Velocity



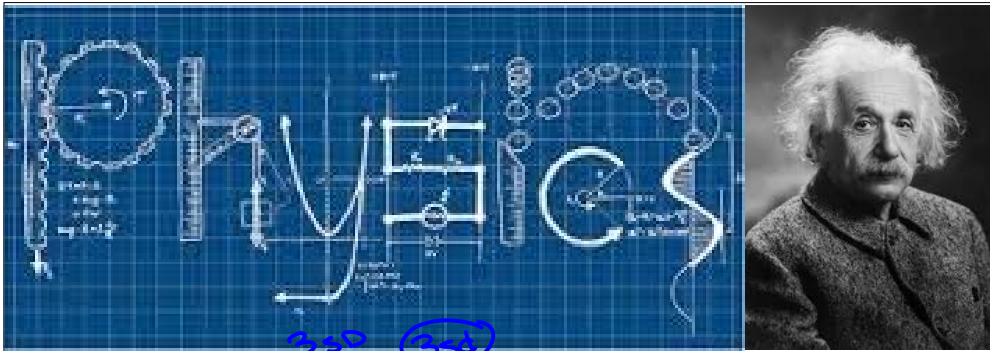
Ex.)	time(s)	velocity(m/s)
	0	0
	1	2
	2	4
	3	6
	4	8
	5	10

Graph: Velocity - Time



• linear/straight line on Velocity-Time tells us:

Non-Uniform Motion = acceleration



Ex.) An animal walks 100 m in 50.0 s. What is its average speed?

$$v = \frac{d}{t}$$

$d = 100\text{m}$   
 $t = 50.0\text{s}$   
 $v = ?$   
 list all variables

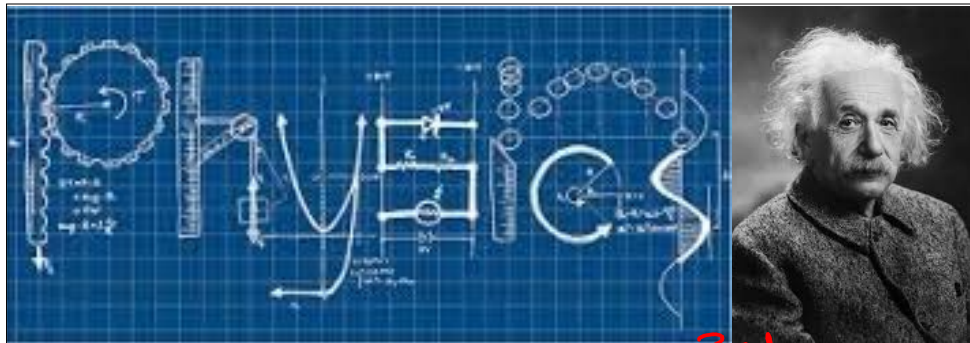
$\Delta v = \frac{\Delta d}{\Delta t}$   
 formula

$v = \frac{d}{t}$   
 $v = \frac{100\text{m}}{50.0\text{s}} = \boxed{2.00\text{ m/s}}$   
 substitute (with units) and solve

Think like a mathematician: The animals' rate of change (slope) is 2 m/s.

Think like a physicist: The animals average speed is 2.00 m/s.

$\Delta$  - delta : "change in"



Ex.) Bob drove from Edmonton to Calgary, a distance of 320 km. If he drives at a constant speed of 80 km/h, how long will it take him?

uniform motion

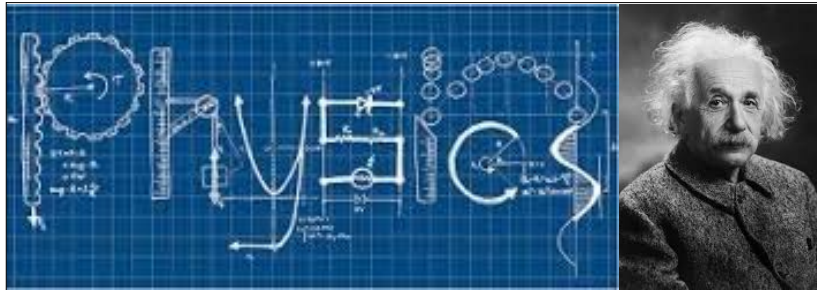
2sd

$d = 320\text{km}$   
 $v = 80\text{km/h}$   
 $t = ?$   
 list all variables

$v = \frac{d}{t}$   
 formula

$80\text{km/h} = \frac{320\text{km}}{t}$   
 substitute (with units) and solve

$t = \frac{320\text{ km}}{80\text{km/h}} = \boxed{t = 4.0\text{ h}}$



Ex.) Shelly walked at a constant speed of 2.00 m/s for 3.00 min. If she walked in a straight line, how far did she travel?



$v = 2.00 \text{ m/s}$ $t = 180 \text{ s}$ $d = ?$ list all variables	$v = \frac{d}{t}$ formula	$2.00 \text{ m/s} = \frac{d}{180 \text{ s}}$ $\times 180$ $d = 360 \text{ m}$ substitute (with units) and solve
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