

Physics Worksheet  
Topic : Kinematic Equations  
MYP 4

Equations of motion ( Kinematic Equations):

$$v = u + at$$

$$s = ut + \frac{1}{2} at^2$$

$$v^2 - u^2 = 2as$$

Other equations :

$$\text{average velocity ( } v_{\text{avg}} \text{ )} = (u + v) / 2$$

$$\text{distance travelled during acceleration, } s = v_{\text{avg}} \times t$$

1. A car starts from rest and accelerates uniformly for 8.0 s. It reaches a final speed of  $16 \text{ m s}^{-1}$ .
  - a What is the acceleration of the car?
  - b What is the average velocity of the car?
  - c Calculate the distance travelled by the car.
  
2. A new model Volvo car can start from rest and travels 400 m in 16 s.
  - a What is its average acceleration during this time?
  - b Calculate the final speed of the car.
  - c How fast is this final speed in  $\text{km h}^{-1}$ ?
  
3. A space-rocket is launched and accelerates uniformly from rest to  $160 \text{ m s}^{-1}$  in 4.5 s.
  - a Calculate the acceleration of the rocket.
  - b How far does the rocket travel in this time?
  - c What is the final speed of the rocket in  $\text{km h}^{-1}$ ?
  
4. A cyclist, whilst overtaking another bike, increases his speed uniformly from  $4.2 \text{ m s}^{-1}$  to  $6.3 \text{ m s}^{-1}$  over a time interval of 5.3 s.
  - a Calculate the acceleration of the cyclist during this time.
  - b How far does the cyclist travel whilst overtaking?
  - c What is the average speed of the cyclist during this time?