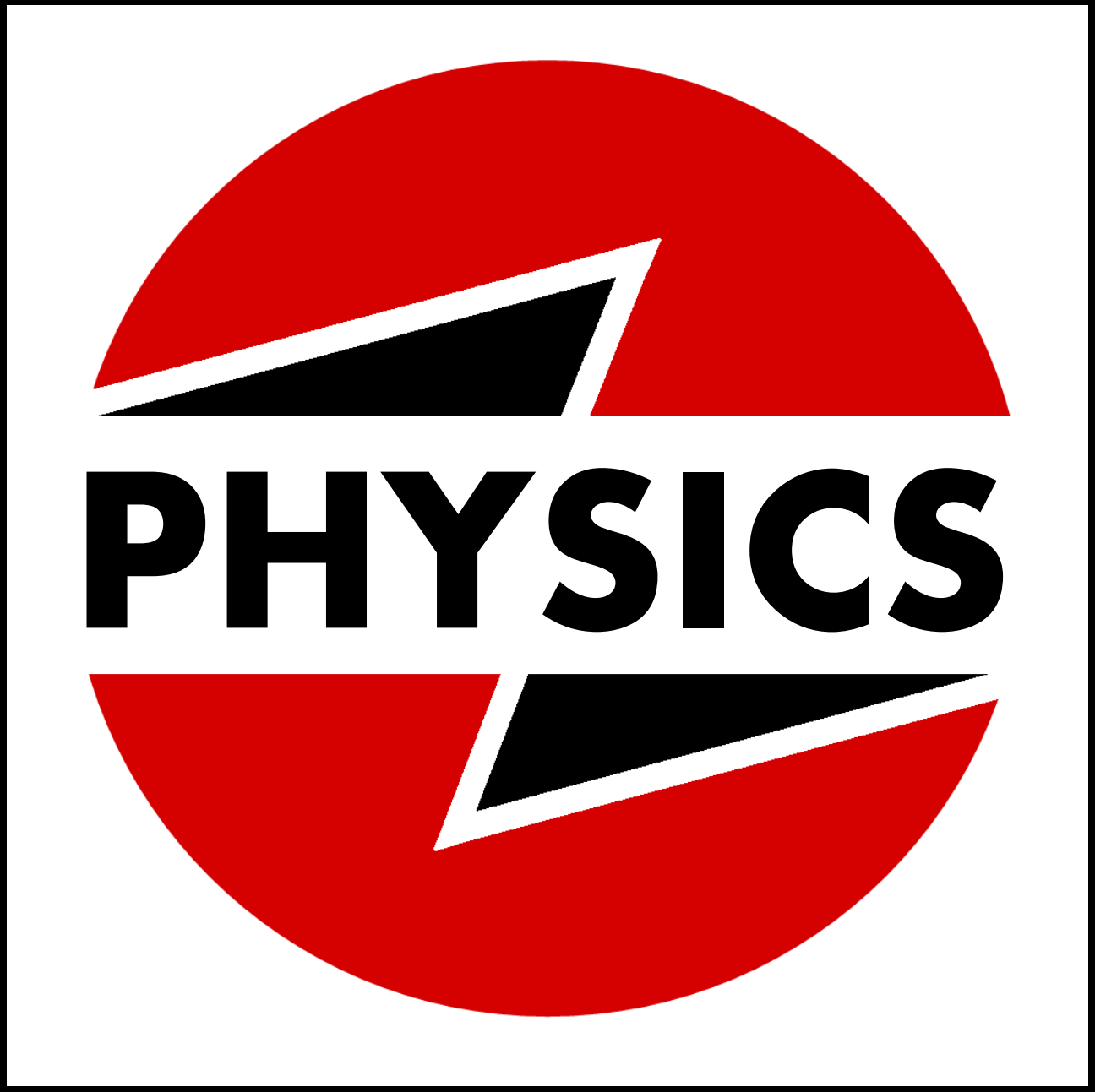
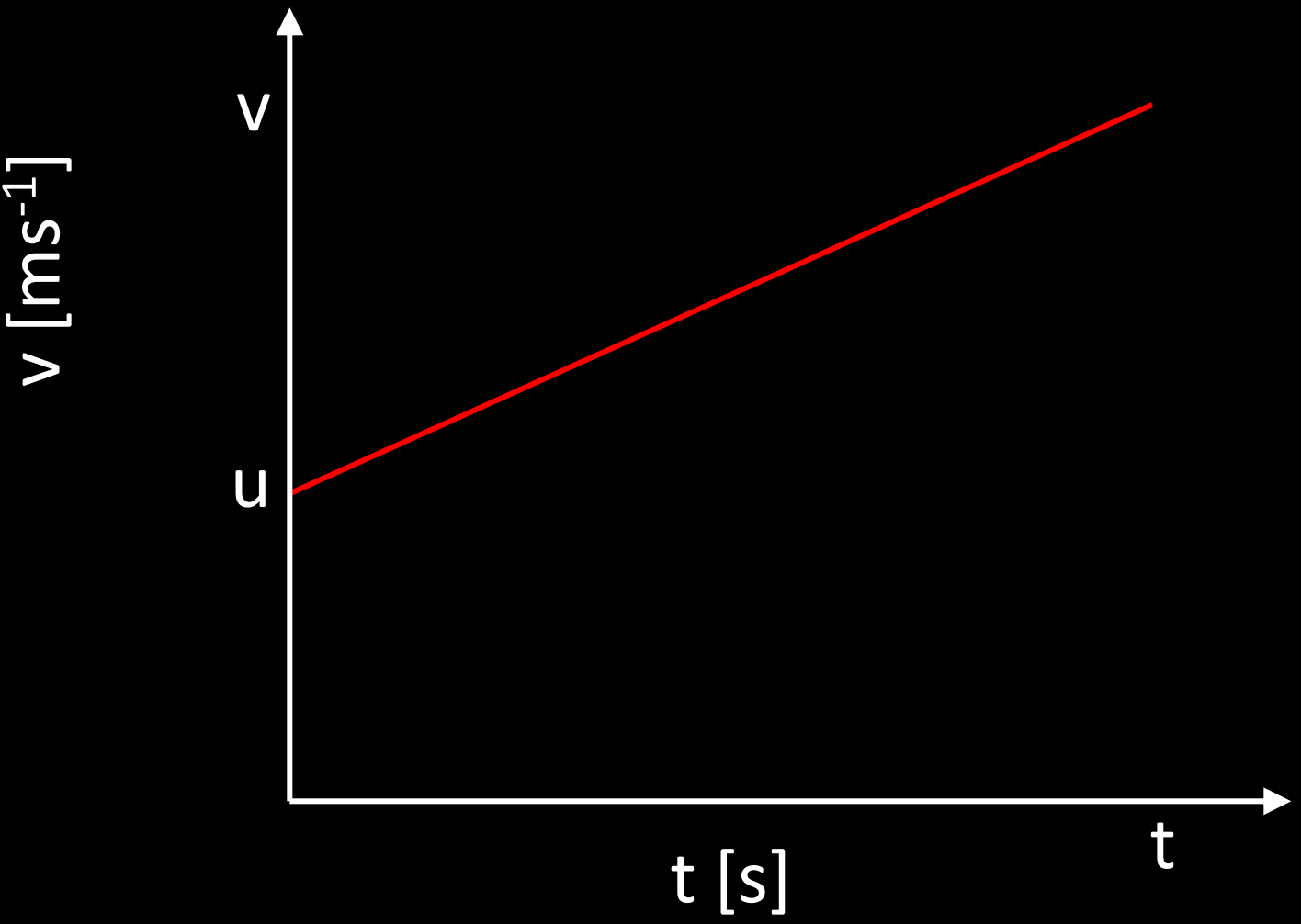
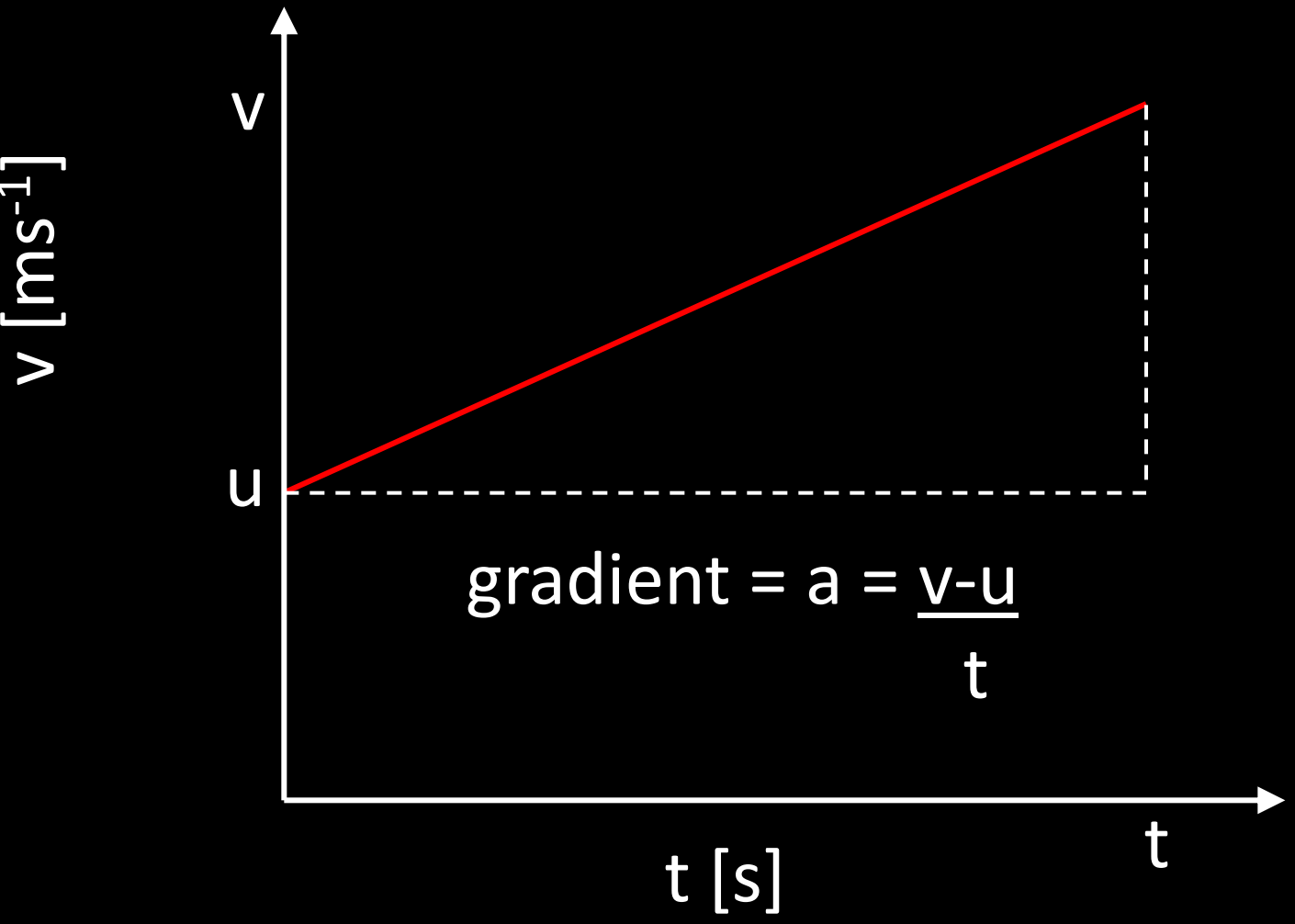

PHYSICS

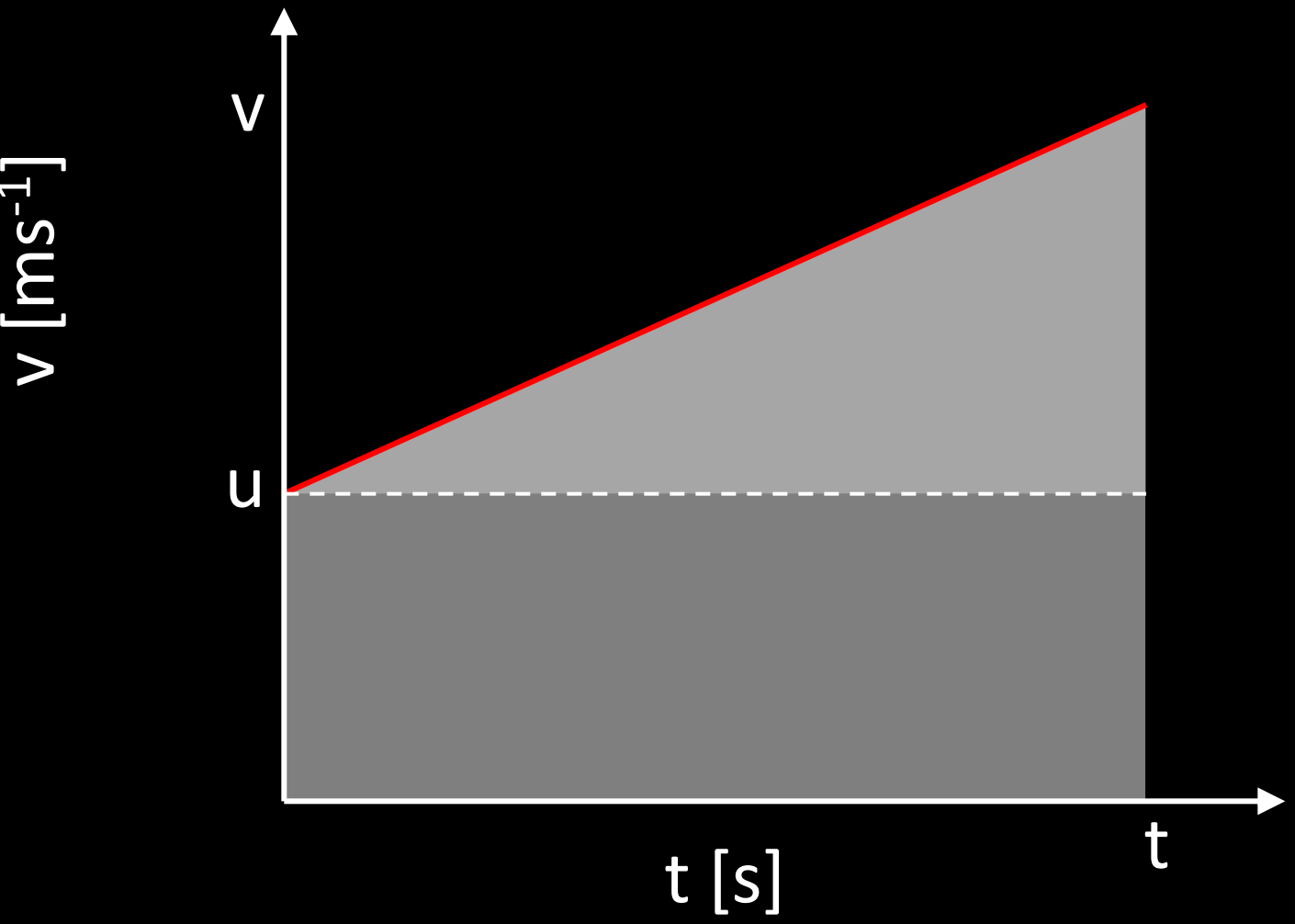
s u v a t

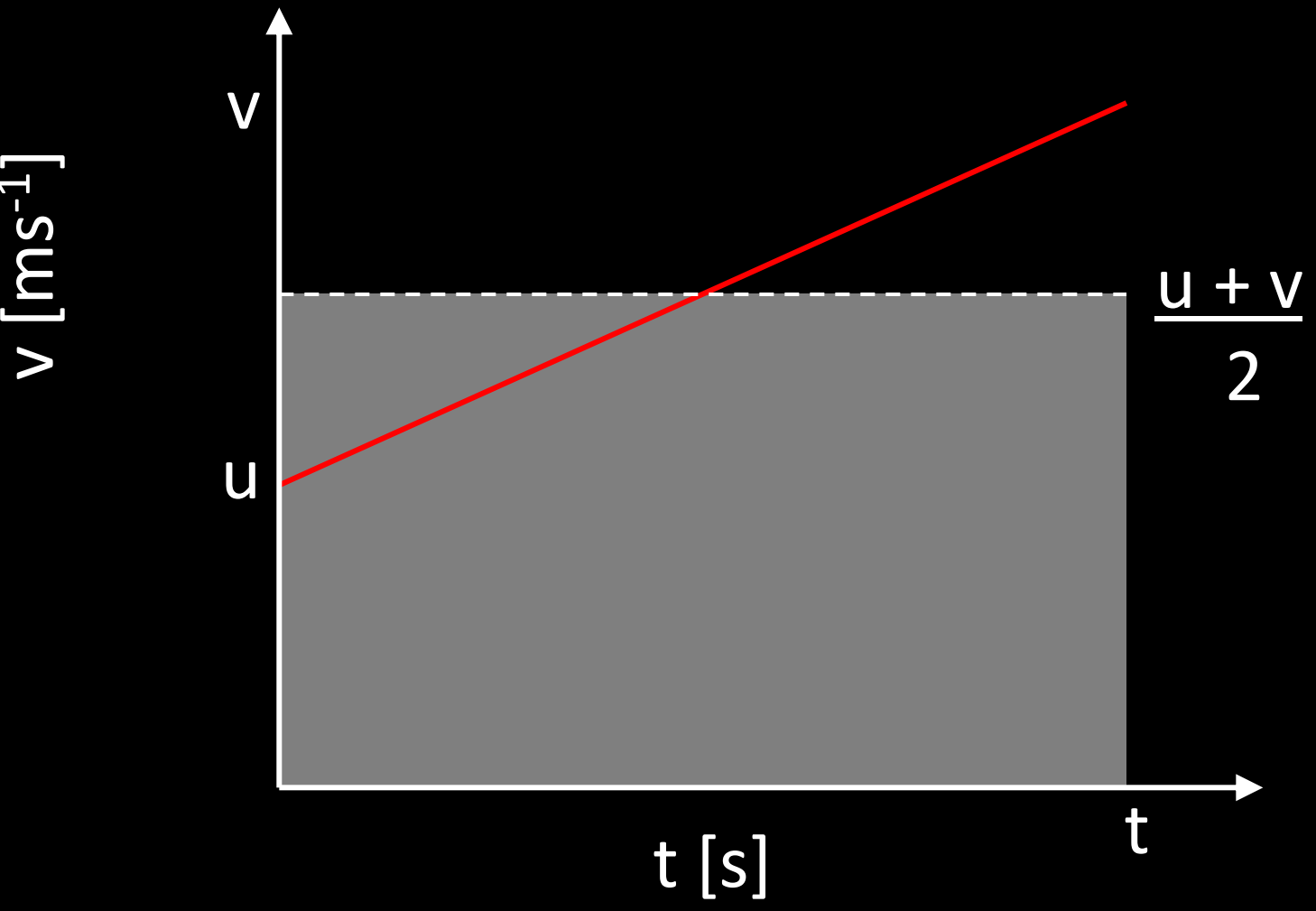

v
v [ms-1]
u
t [s]
t



$$v = u + at$$

(1)


v
v [ms-1]
u
t
t [s]



$$s = \frac{(u + v)}{2} \times t$$

2

Rearrange Eq (1) to make ‘v’ the subject

Substitute ‘v’ into Eq (2) giving ‘s’ in terms of ‘u’, ‘a’ and ‘t’

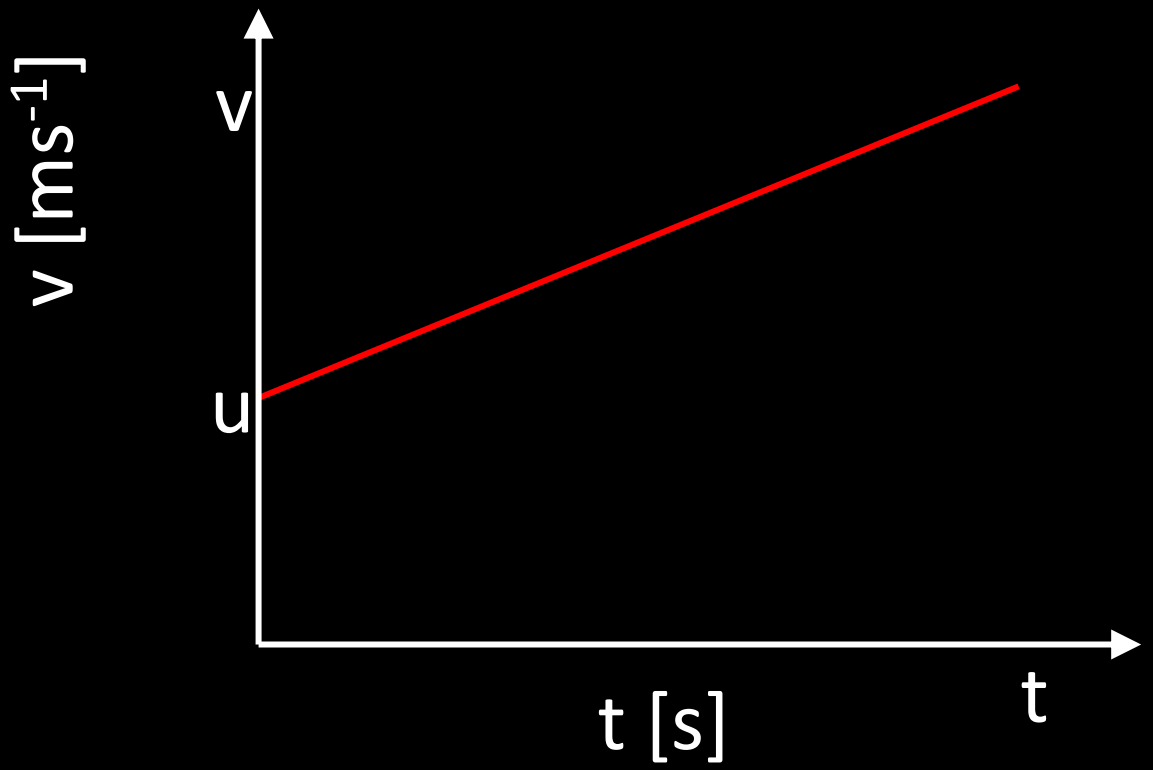
$$s = ut + \tfrac{1}{2}at^2$$

Rearrange Eq (1) to make ‘t’ the subject

Substitute ‘t’ into Eq (2) giving ‘s’ in terms of ‘u’, ‘a’ and ‘v’

Rearrange this to now make ‘v^2’ the subject

$$v^2 = u^2 + 2as$$



Can you derive all these from this graph?

$v = u + at$

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

$s = \frac{(u + v)}{2} \times t$

$v^2 = u^2 + 2as$

Ticker timer

- Frequency of 50Hz, therefore Time period of _____ s
- Drop mass off bench, attached to tape
- Measure distance between dots
- Work out velocity
- Record your results in a table
- Plot a graph to calculate acceleration

Group work

Explain how experiments carried out by Galileo overturned Aristotle's ideas of motion.

Projectile Motion

Objective

- Use the suvat equations to calculate the motion of an object that is moving with horizontal and vertical components of velocity.

What to do....

- Draw a diagram if possible.
- List any assumptions made (e.g. air resistance negligible)
- Split motion into its vertical and horizontal components.
- Write down what you do know for s,u,v,a and t for each component (‘t’ often the same for both)
- Solve equation, giving the answer to an appropriate number of significant figures.
- Sit back and relax.

A student, after impressing their friends with their drinking prowess, decides they may be feeling a bit queasy. After going outside to ‘get some air’ they feel a bit better. Then, while standing upright and facing forwards, the drink returns. If the cider/WKD/Stella initially leaves at 5 ms^{-1} horizontally....

- What assumptions and estimations will you make?
- How long does it take to hit the ground?
- How far does it go?
- What is the velocity when it hits the ground (size and direction)?
- When do they next decide to drink alcohol again?