The units here would be her speed units (m/s) per time unit (s), i.e. m s^{-2} or m/s^2. You can say that her speed decreased by 0.2 m/s every second, or her speed changed by –0.2 m/s every second. The negative sign tells you that it is a deceleration.

Prac 1 p. 152

Fig 5.2.2 A multiple-exposure photograph shows different stages in a motion. The spacing between each image gives some idea of speed. Increasing spacing shows acceleration.

Calculating speed

Let's say a rocket launches with an acceleration of 50 m/s^2. It started at rest, but 50 m/s is added to its speed every second that passes.

Its speed will then follow the pattern shown in Figure 5.2.3.

If the rocket was already moving at, say, 500 m/s, then the speeds would be those shown in the figure with another 500 m/s added to them.

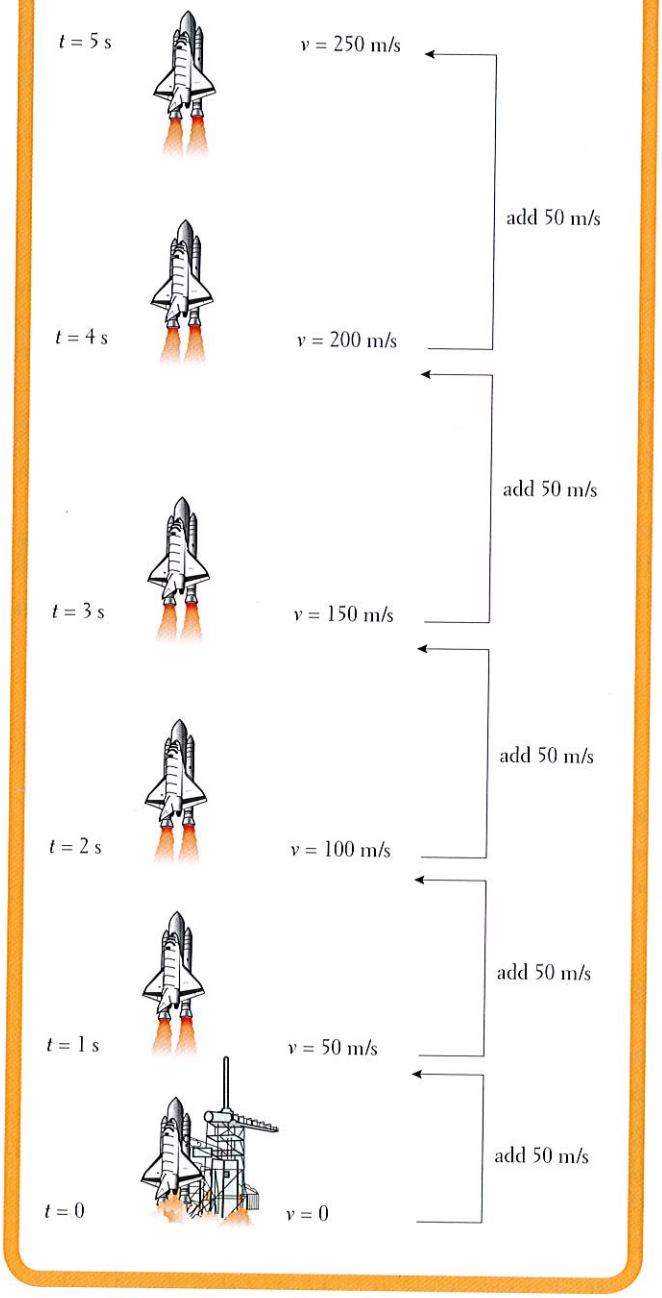
You can write this as:

final speed = starting speed + acceleration × time taken

or $v = u + at$

If a = 50 m/s^2, then 50 m/s is added every second.

Fig 5.2.3



Acceleration and graphs

High acceleration is a rapid increase in speed. The speed–time graph would be a steeper one than if you accelerated at a lesser rate; that is, the slope or gradient of a speed–time graph gives us the rate of acceleration (see Figure 5.2.4).