

## Motion During Free Fall and Terminal Velocity

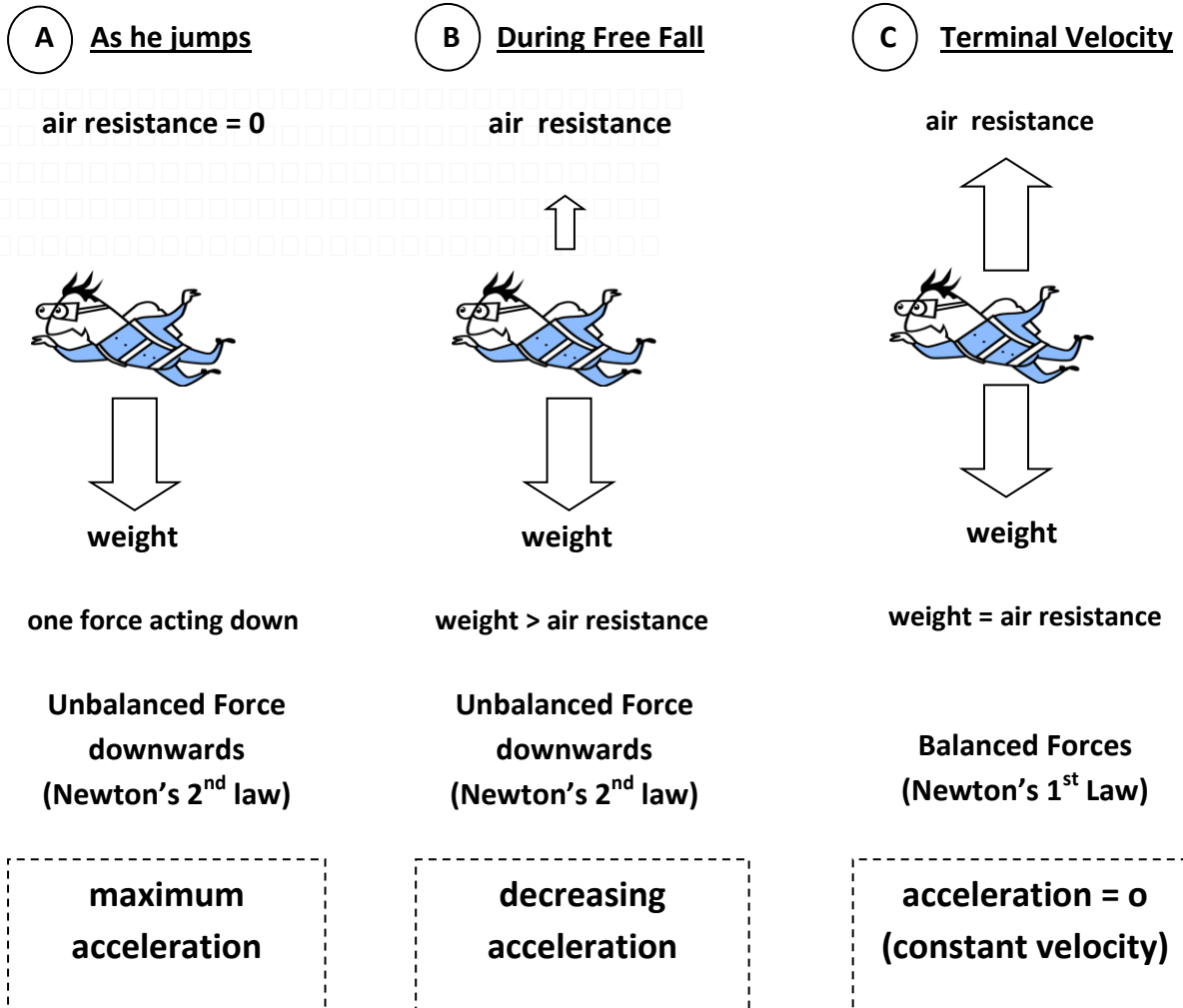
**Free fall** is the term used when an object is being acted upon only by the force of gravity (weight).

However, free fall will cause the object to accelerate and from the section Introduction to Friction, it states that:

**air resistance will increase as an object accelerates**

so we have to look at air resistance as well as weight to study motion during free fall.

**Example: If we consider a sky diver jumping out of an aeroplane**

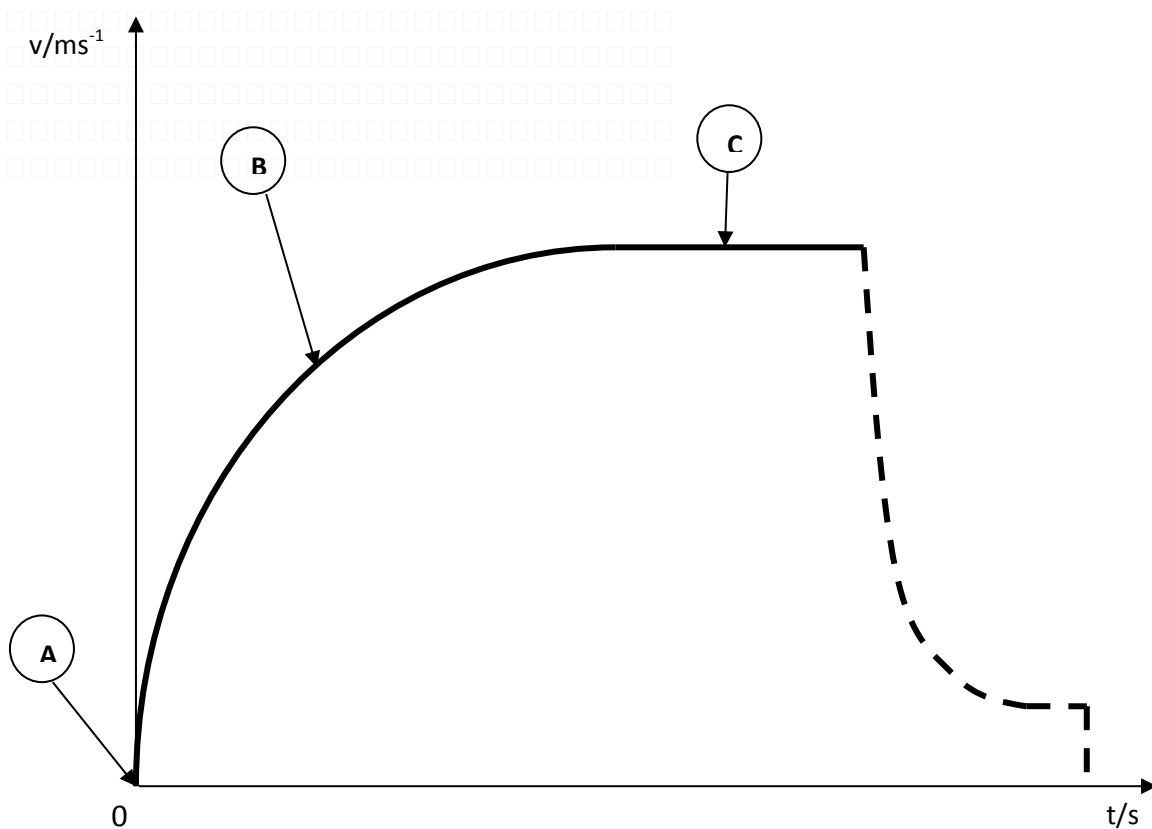


As the skydiver accelerates downwards, air resistance increases upwards until the value of air resistance = the skydiver's weight. This results in the two forces having the same value acting in opposite directions. According to Newton's 1<sup>st</sup> Law of Motion the skydiver will now travel at a constant velocity. This velocity is known as **Terminal Velocity**.

N5

### Motion During Free Fall and Terminal Velocity (ctd)

The motion of the skydiver in the example is best illustrated in a velocity – time graph. Refer to the previous page to fully understand what happens at points A, B and C.



What do you think has happened to cause the motion represented by the dotted lines?  
(Hint: How does the sky diver land on the ground safely?)