

Newton's 2nd Law and Acceleration

SPH4C

Remember that if the net force is not zero, the object will be accelerated in the direction of the net force:

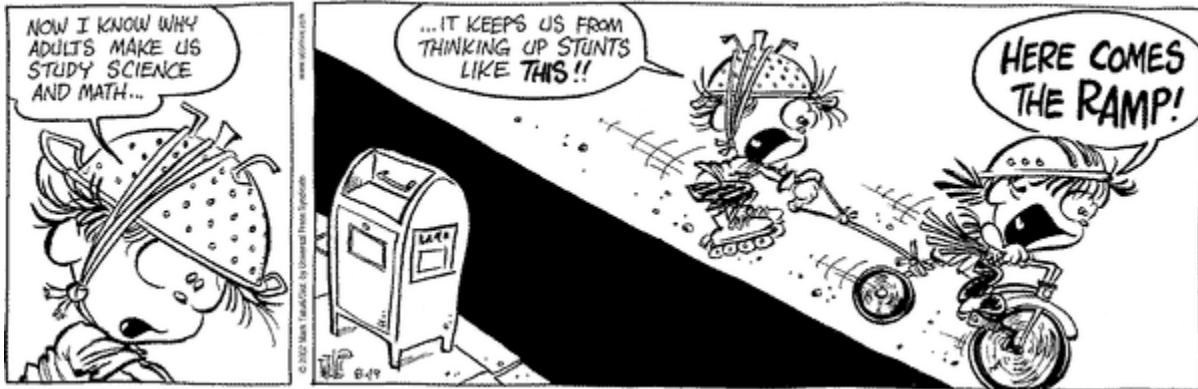
$$a = \frac{F_{net}}{m} \quad \text{or} \quad F_{net} = m a$$

Example 1: A weightlifter lifts a 165-kg weight by exerting a force of 1.8 kN [up]. The force of gravity on the object is 1.6 kN [down]. Draw a FBD of the weight. What is the net force on the weight?

What is the acceleration of the weight?

Example 2: A car is travelling at 25 m/s [fwd] when the driver slams on the brakes and stops the car in 3.0 s. Calculate (a) the acceleration of the car

and (b) the net force needed to cause that acceleration if the mass is 1200 kg.



More Practice

Match the motion on the left to the forces causing that motion on the right (some choices may be used more than once).

- | | |
|---|---|
| _____ A book is dropped off the edge of a table. | A. the net force is zero |
| _____ A book is resting on a level table. | B. the net force is in the same direction as the motion |
| _____ A book is being pushed across a level table at constant velocity. | C. the net force is opposite the direction of motion |
| _____ A book is sliding across a level table and slowing down. | |
| _____ A book is sliding down an inclined table and speeding up. | |

A skydiver of mass 65 kg is falling at terminal velocity when she opens her parachute, which exerts a force of 750 N [up] to slow her fall.

(a) Draw a FBD and calculate the net force on the skydiver.

(b) What is the acceleration of the skydiver?