

Newton's Second Law

Read from **Lesson 3** of the Newton's Laws chapter at **The Physics Classroom**:

<http://www.physicsclassroom.com/Class/newtlaws/u2l3c.html>
<http://www.physicsclassroom.com/Class/newtlaws/u2l3d.html>

MOP Connection: Newton's Laws: sublevels 8 and 9

Free-body diagrams are shown for a variety of physical situations. Use Newton's second law of motion ($\Sigma F = m \cdot a$) to fill in all blanks.

a.

$F_{air} = 0.10 \text{ N}$
 $F_{grav} = 0.10 \text{ N}$

$m = \underline{\hspace{2cm}} \text{ kg}$
 $a = \underline{\hspace{2cm}} \text{ m/s/s}$
 $\Sigma F = \underline{\hspace{2cm}} \text{ N}$

b.

$F_{air} = \underline{\hspace{2cm}}$
 $F_{grav} = \underline{\hspace{2cm}}$

$m = 10000 \text{ kg}$
 $a = 8.0 \text{ m/s/s, down}$
 $\Sigma F = \underline{\hspace{2cm}}$

c.

$F_{air} = \underline{\hspace{2cm}}$
 $F_{grav} = \underline{\hspace{2cm}}$

$m = 800 \text{ kg}$
 $a = 6.0 \text{ m/s/s, up}$
 $\Sigma F = \underline{\hspace{2cm}}$

d.

$F_{norm} = 10\,000 \text{ N}$
 $F_{frict} = 9000 \text{ N}$
 $F_{grav} = 10\,000 \text{ N}$

$m = \underline{\hspace{2cm}} \text{ kg}$
 $a = \underline{\hspace{2cm}} \text{ m/s/s}$
 $\Sigma F = \underline{\hspace{2cm}} \text{ N}$

e.

$F_{norm} = \underline{\hspace{2cm}}$
 $F_{app} = \underline{\hspace{2cm}}$
 $F_{grav} = \underline{\hspace{2cm}}$

$m = 0.500 \text{ kg}$
 $a = \underline{\hspace{2cm}}$
 $\Sigma F = 124 \text{ N, right}$

f.

$F_{norm} = 9000 \text{ N}$
 $F_{app} = \underline{\hspace{2cm}}$
 $F_{grav} = 9000 \text{ N}$

$m = \underline{\hspace{2cm}}$
 $a = 1.50 \text{ m/s/s, right}$
 $\Sigma F = \underline{\hspace{2cm}}$

g.

$F_{norm} = \underline{\hspace{2cm}} \text{ N}$
 $F_{app} = \underline{\hspace{2cm}} \text{ N}$
 $F_{grav} = \underline{\hspace{2cm}} \text{ N}$

$m = 15.0 \text{ kg}$
 $a = 0.50 \text{ m/s/s, right}$
 $\Sigma F = \underline{\hspace{2cm}}$

h.

$F_{norm} = 600 \text{ N}$
 $F_{frict} = 100 \text{ N}$
 $F_{grav} = 600 \text{ N}$

$m = \underline{\hspace{2cm}} \text{ kg}$
 $a = \underline{\hspace{2cm}} \text{ m/s/s}$
 $\Sigma F = \underline{\hspace{2cm}} \text{ N}$

i.

$F_{norm} = \underline{\hspace{2cm}}$
 $F_{frict} = \underline{\hspace{2cm}}$
 $F_{app} = 14000 \text{ N}$
 $F_{grav} = \underline{\hspace{2cm}}$

$m = 2000 \text{ kg}$
 $a = 2.0 \text{ m/s/s, right}$
 $\Sigma F = \underline{\hspace{2cm}}$