

Newton's Second Law of Motion

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

<http://www.physicsclassroom.com/Class/newtlaws/u2l3a.html>
<http://www.physicsclassroom.com/Class/newtlaws/u2l3b.html>

MOP Connection: Newton's Laws: sublevel 7

1. The acceleration of an object is _____ related to the net force exerted upon it and _____ related to the mass of the object. In equation form: $a = F_{\text{net}} / m$.
 - a. directly, inversely
 - b. inversely, directly
 - c. directly, directly
 - d. inversely, inversely

2. Use Newton's second law to predict the effect of an alteration in mass or net force upon the acceleration of an object.
 - a. An object is accelerating at a rate of 8 m/s^2 when it suddenly has the net force exerted upon increased by a factor of 2. The new acceleration will be _____ m/s^2 .
 - b. An object is accelerating at a rate of 8 m/s^2 when it suddenly has the net force exerted upon increased by a factor of 4. The new acceleration will be _____ m/s^2 .
 - c. An object is accelerating at a rate of 8 m/s^2 when it suddenly has the net force exerted upon decreased by a factor of 2. The new acceleration will be _____ m/s^2 .
 - d. An object is accelerating at a rate of 8 m/s^2 when it suddenly has its mass increased by a factor of 2. The new acceleration will be _____ m/s^2 .
 - e. An object is accelerating at a rate of 8 m/s^2 when it suddenly has its mass decreased by a factor of 4. The new acceleration will be _____ m/s^2 .
 - f. An object is accelerating at a rate of 8 m/s^2 when it suddenly has the net force exerted upon increased by a factor of 2 and its mass decreased by a factor of 4. The new acceleration will be _____ m/s^2 .
 - g. An object is accelerating at a rate of 8 m/s^2 when it suddenly has the net force exerted upon increased by a factor of 4 and its mass increased by a factor of 2. The new acceleration will be _____ m/s^2 .
 - h. An object is accelerating at a rate of 8 m/s^2 when it suddenly has the net force exerted upon increased by a factor of 3 and its mass decreased by a factor of 4. The new acceleration will be _____ m/s^2 .

3. These force diagrams depict the magnitudes and directions of the forces acting upon four objects. In each case, the down force is the force of gravity. Rank these objects in order of their acceleration, from largest to smallest: _____ > _____ > _____ > _____

