Continuation of Answers

Answers continued from p. 410

5. Answers may vary, but they should state something similar to the following: Newton's second law shows that acceleration depends on both force and mass. A heavier object experiences a greater gravitational force than a lighter object (as you can see from the law of universal gravitation). But a heavier object is also harder to accelerate because it has more mass. The extra mass of the heavy object exactly compensates for the additional gravitational force. Since $F = ma$ (or $a = F/m$), if F is increased at the same rate as m, then a remains the same.

6. The force of gravity is inversely proportional to the square of distance. Since the distance is made twice as close, the force of gravity will be four times as great (the square of 2), or 4 million N.