Physics
Force & Weight

Name:_____ Block:_____

Weight is the measure of gravity's pull on an object. To calculate weight, you multiply mass (kg) by gravity (m/s2). Recall that a 1kg x 1m/s2 = 1 kgm/s2 = 1 Newton (N). So, Fweight = mg. After solving for the mass, you can then work with Newton's 2nd Law (F=ma). Answer the questions below and SHOW ALL WORK.

1. What net force is required to accelerate a car at a rate of 2 m/s^2 if the car has a weight of 29,400 N?

   F=_____

   m=_____

   a=_____

2. A 98 N bowling ball would require what force to accelerate down an alleyway at a rate of 3 m/s^2?

   F=_____

   m=_____

   a=_____

3. Sally has a car that accelerates at 5 m/s^2. If the car weighs 2,480 N, how much force does the car produce?

   F=_____

   m=_____

   a=_____

4. What is the mass of a falling rock if it produces a force of 147 N?

   F=_____

   m=_____

   a=_____

5. What is the mass of a truck if it produces a force of 14,000 N while accelerating at a rate of 5 m/s^2?

   F=_____

   m=_____

   a=_____

6. What is the acceleration of softball if it weighs 4.9 N and hits the catcher's glove with a force of 25 N?

F=_____

m=_____

a=_____

7. Your car weighs 2100 N. If your car produces a force of 5000 N, how fast will it accelerate?

F=_____

m=_____

a=_____

8. Sally wants to accelerate even faster than in problem #3, so she removes 500 kg of mass from her car. How fast will her car now accelerate if it still produces 5000 N of force?

F=_____

m=_____

a=_____

9. Sally challenges you to a race. On the first turn you run off the course and your car strikes a large bale of hay. Your car still produces 5000 N of force, but now it accelerates at only 2 m/s^2. What is the mass of your car now that the bale of hay is stuck to it?

F=_____

m=_____

a=_____

10. Even though she is way ahead of you, Sally switches her car to run on nitrous oxide fuel. The nitrous oxide allows her car to develop 10,000 N of force. What is Sally's acceleration if her car weighs 2100 N?

F=_____

m=_____

a=_____