Study Guide #1 - Newton's Laws and Forces Quiz

Physical Science and Technology

Instructions: Answer all problems on a separate piece of paper. Show the Five Steps where indicated.

Multiple Choice (you do not need to show your work; simply write the letter of the correct answer)

1. The net force needed to accelerate an object is calculated by:
   a. dividing mass by acceleration
   b. dividing mass by velocity
   c. multiplying mass by acceleration
   d. multiplying mass by velocity

2. How much force would it take to accelerate a car with a mass of 500 kg at a rate of 15 m/s/s?
   a. 0.03 N
   b. 500 N
   c. 7500 N
   d. 33.333 N

3. A force is:
   a. A push
   b. A pull
   c. Something that can cause acceleration
   d. All of the above

4. The units for force are:
   a. Newtons
   b. m/s/s
   c. kg
   d. All of the above

5. When I drive my car, my foot pushes on the gas pedal. According to Newton's Third Law, what also must be happening?
   a. The car is speeding up
   b. The gas pedal pushes on my foot
   c. Gasoline flows into the engine
   d. My leg pushes on my foot

6. If you know an object's mass and the force used to push it, you can find the acceleration of the object using the following formula:
   a. acceleration = mass x force
   b. acceleration = mass ÷ force
   c. acceleration = force ÷ mass
   d. acceleration = mass + force

7. According to Newton's First Law, it takes an unbalanced force to:
   a. speed an object up
   b. slow an object down
   c. change an object's direction
   d. All of the above

1. Annie is standing on top of a train that is travelling at 7 km/sec. The train hits a cow and comes to a complete stop. There is no gravity or friction in Annie's world. According to Newton's 1st Law, what happens to Annie?

2. Luke is using a cattle prod to push on Han's nose. What, according to Newton's Third Law, must also be happening?

3. A carnivorous giraffe throws a fuzzy bunny straight up in the air in a location where there **is no gravity**. Explain what happens to the fuzzy bunny by using Newton's 1st Law.

4. Oprah is using her hands to hold Madonna in the air above her head. Madonna is not moving. Madonna is standing on Oprah's hands. Draw a free-body diagram for Oprah.

5. How much unbalanced force would it take to accelerate Evel Knievel at a rate of 7.6 m/s^2 if Evel has a mass of 58 kg? Please show the Five Steps.

6. How much mass does Jake the snake have if it takes 269.3 N of unbalanced force to accelerate him at 8.883 m/s^2? Please show the Five Steps.

7. What would the acceleration of Tom the turtle be if he has a mass of 65 kg and he is being dragged behind a truck with a net force of 329 N? Please show the Five Steps.