Name_____

Date _____ **Pd**____

Unit VII: Review

1. A Nerf dart (m = 5 g) is fired at a toy car (m = 500 g) at a velocity of 9.5 m/s. The dart bounces back and the car moves forward.
    a. What type of collision is this?

    b. What is the momentum of the dart before the collision?

    c. The velocity of the car following the collision is 0.10 m/s. What is the velocity of the dart following the collision?

You switch the dart to one with a suction cup. Now when you fire the dart it sticks to the car.

    d. What type of collision is this?

    e. What is the velocity of the car now?

2. A 2200 kg SUV traveling at 26 m/s can be stopped in 21 s by gently applying the brakes, in 5.5 s in a panic stop, or in 0.22 s if it hits a concrete wall. What average force is exerted on the SUV in each of these stops?

3. An astronaut is standing stationary outside the International Space Station. In order to maneuver back to ISS, she needs to expel gas from a canister.
   a. Explain how this will work using of conservation of momentum and Newton's laws.

   b. The astronaut has a mass of 80 kg, the canister has a mass of 2 kg. If 1 kg of gas is expelled at a velocity of 100 m/s, how fast will the astronaut travel?

4. Read each statement carefully. If the statement is incorrect, modify the statement so that it is true and explain your reasoning.

A bug hits a windshield during a collision. The force of the windshield on the bug is 40 N. The force of the bug on the windshield is less than 40 N.
There is no way to change the momentum of an object.
In an inelastic collision, the two objects bounce off of each other.
If you double the velocity of an object you will double the quadruple the momentum.
Elastic collisions typically exert less force on an object than a similar object in an inelastic collision.