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Simple Force Problems – Newton's First and Second Laws

1. State Newton's First law. Describe **2 situations** that would demonstrate this law.

2. State Newton's Second Law. Describe **1 situation** that would demonstrate this law.
3. A 0.025 kg bullet is shot out of a 0.45 m rifle barrel. The force on the bullet is 3600 N. What is the muzzle speed (the speed that the bullet leaves the gun barrel) of the bullet?

4. A 0.012 kg bullet travelling at 230 m/s enters a block of clay. The bullet is stopped in a distance of 0.32 m. What force was applied to the bullet by the clay?

5. A 36000 kg cement truck accelerates from rest to a speed of 28 m/s in a time of 18.7 s.
a. What is the acceleration of the truck?

b. What is the net force that causes this acceleration?

6. An F-1 race car has a mass of only 850 kg. It is able to generate a total force of 8500 N against a frictional force of 1100 N.

a. What is the acceleration of this F-1 car?

b. How far starting from rest will this car travel in 3.2 s?

c. What would the speed of this car be at 3.2 s?

7. Repeat #6 a – c for an ordinary car of mass 2300 kg and able to generate only 5500 N of force against the 1100 N of frictional Force.

