Unit 7: Forces and Motion
Content Outline: Newton's Laws of Motion (7.4)

I. **Scientific Law**
   A. These are statements that are accepted as 100% true and accurate based upon all known laboratory investigations, by numerous people, getting the same out come every time. These *do not change* over time.
      For example, Gravity causes things to fall toward Earth.

II. **Scientific Theory**
   A. These are statements that are accepted as currently being true, because all know evidence tends to the claim. Theories *can change* over time as more evidence is obtained through experimentation and learned knowledge.

III. **Newton's 3 Laws of Motion**
   A. Newton's First Law of Motion (A.K.A. the **Law of Inertia)**
      1. This law states "An object at *rest* will remain at rest unless *acted upon* by an unbalanced *greater* force. An object in *motion* continues in motion with the *same speed* and in the *same direction* will remain in motion unless *acted upon* by an unbalanced *greater* force.
         This is why you should always wear your seat belt when in a car. If another car hits you while you are at rest, you will go "flying" to the other opposite side of the car. If you hit a car, you will be propelled forward as your body is in motion too, even you are seated. Where as if you ride over a stick, the stick will break, but the car keeps moving because the opposite force was not great enough to affect the force of the car.
   B. Newton's Second Law of Motion
      1. This law states " *Acceleration* is produced when a force acts on a mass. The *greater* the mass of an object the greater the amount of force needed to accelerate the object."
         a. In simple words, heavier items require more force to move them.
         b. This equation is: **Force = Mass x Acceleration ; F= m x a**
         How much force do you think it require you to exert to move your student desk? How much force would it require to move your larger, heavier teachers desk?
   C. Newton's Third Law of Motion
      1. This law states " For every action there is an *equal* and *opposite* reaction.
         A great example of this is a rocket launching. The earth is providing resistance to the rocket moving forward and the rocket is firing its massive engines *against* the earth to push it forward.