Physics 200 (Stapleton) Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Notes: Introduction to Newton’s Laws

Newton’s 3 Laws of Motion:

* 1st Law: Law of Inertia. Objects in motion…
* 2nd Law: F=ma
* 3rd Law: Action/reaction

**Net force (Fnet):**



What is the net force that is acting on the box to the right?

**Newton’s 1st Law:**

* The usual version: Objects in motion remain in motion in a straight line and at a constant speed, and objects at rest stay at rest, unless they are acted upon by an outside (or unbalanced) force.
* Another version: If an object is experiencing a net force, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If it’s not, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Newton's 1st Law is called the "Law of Inertia." Inertia is:

What kinds of objects have the most inertia?

**Newton's 2nd Law:** Fnet = ma

**Mass**:

**The unit we will use for mass is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is abbreviated \_\_\_\_\_\_\_\_\_**

**Force**:

**The unit we will use for force is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is abbreviated \_\_\_\_\_\_\_\_\_**

Consider a child pushing a toy car. The net force applied to the car equals the mass of the car multiplied by the car’s acceleration. Starting with an ordinary F = ma, show what would happen to the sizes of F, m, and a if…

* The car’s mass is increased, but the applied force is kept the same.
* The car’s mass is decreased, but the applied force is kept the same.
* The car has the same mass, but it accelerates faster.
* The car has the same mass, but less force is applied to the car.

**Newton’s 3rd Law:**

State Newton’s 3rd Law of Motion:

Describe some examples of action/reaction pairs demonstrating Newton’s 3rd Law.

* Walking Rightward:
* Car driving leftward:
* Helicopter flying upward:
* Gun shooting bullet rightward:

In the case of a gun and a bullet, what is equal and opposite, and what is not? Explain.