**Science Reviewer**

**Newtons First Law of Motion**

* **Inertia –** From Galileo’s initial idea, Isaac Newton developed the concept of Inertia which states:*“An object at rest remains at rest and that an object in constant motion remains to be in that state of motion unless acted upon by an external force.”*
* Objects do not accelerate on their own; instead, a net external force acts on them to oppose the tendency of resistance to that the objects with accelerate.
* Inertia is a property that is possessed by any material that has mass. The more massive an object is, the more inertia it has.
* Mass is commonly interchanged with weight but they are two different quantities
* **Mass**: Amount of matter an object contains. And uses kilograms (kg) as a unit of measurement. (International System or SI Unit is used.)
* **Weight**: Amount of gravitational force than an object experiences. And uses newton (N) as a unit of measurement. (International System or SI Unit is used.)
* On Earth, mass and weight are directly proportional to each other. If the mass of an object is doubled, it’s weight will also be doubled. If its mass is halved, it’s weight will also be halved. But does not mean they are the same.

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| **Equation:** | **Other Information**:   * If the pull of gravity changes, but its mass does not. |
| **Equation Simplified:** |  |

* Mass remains to be constant for any object regardless of location, but weight changes depending on gravity.

**Newtons First Law (ADHD Version)**:

* Newton's first law, the law of inertia, states that a stationary object remains to be at rest or an object moving at constant velocity continues to be moving at constant speed and direction unless imposed by an external force that gives a net unbalanced force.
* Mass is a measure of inertia. The greater the mass of an object, the greater it resists changes in its state of motion.
* Weight is the product of mass and acceleration due to gravity.

**Newtons Second Law of Motion**

* **Acceleration** -*“The direction of the net force and acceleration are the same, and both are directly related, while acceleration and mass are inversely related.”*
* **Net Force**: The sum of all forces acting on an object.
* When a net force acts on an object, the object Newtons Second Law, or the law of acceleration, investigates the relationship between force and mass in the object’s acceleration.
* Acceleration is directly proportional to net force, and both should have the same direction; and is inversely proportional to inertia or the mass.

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| **Equation:** |  |
| **Equation Simplified:** |  |

**The Following Concepts are Derived from Equation Simplified:**

* When the forces are balanced, the net force is zero; hence, acceleration is also zero. On the other hand, a nonzero net force causes acceleration.
* The direction of the net force is the same as the direction of the acceleration. Since the net force causes the acceleration, wherever the net force points, that is where the change in velocity follows. If the direction of the net force is in the same direction as motion, then the object accelerates. The acceleration decreases if the net force is opposite the direction of motion.
* The amount of net force is directly proportional to the acceleration. This means that the higher the net force acting on an object, the more it accelerates. Acceleration is the effect of the net force.
* The more massive an object is, the more it resists changes in motion. Thus, more mass means lower acceleration. The amount of matter an object contains can significantly influence the tendency of that object to change its course of motion.
* Rearranging the variables, you get:
* The units used are as follows:

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| **Net Force:** | **Mass:** | **Accelaration:** |
| * Kilogram meter per second squared (kg m/s2) * Newton (N) | * Kilogram (kg) | * Meter per second squared (m/s2) |

**Newtons Second Law of Motion: (ADHD Version):**

* The second law, the law of acceleration, describes the result of the presence of net force on an object, which is acceleration. The direction of the net force and acceleration are the same, and both are directly proportional. The second law is mathematically expressed as
* A free-body diagram (FBD) is used to draw, using accurate scaling, all the forces acting on the object.
* Forces in an FBD include weight, normal force, tension force, applied force, and frictional force. For a constant acceleration system, the second law expression is used to expand the equation, which is used in the analysis.

**Newtons Third Law of Motion:**

* **Interaction or Action** - *“For every action, there is an equal and opposite reaction.”*
* **Action Force**: A pair of forces.
* **Reaction Force**: Is present in interacting objects.
* When two objects interact, the first object exerts a force (action force) on the second object. Similarly, the second object also applies a force that is equal in magnitude but in the opposite direction (reaction force).

**Examples of Action-Reaction Pairs:**

* A rocket pushing on the gas: gas pushing on the rocket.
* Tires pushing on the ground, ground pushing on the tires.
* Gloves pushing on the face, face pushing on the gloves.
* A bird hitting the windshield of a car, windshield hitting the bird.

**Newtons Third Law of Motion (ADHD Version):**

* The law of interaction stats that for every action force, there is an equal and opposite reaction force.
* The action-reaction forces are parts of a single interaction.