

Vocabulary: Fan Cart Physics



Vocabulary

- Acceleration – the change in velocity per unit time.
 - Acceleration is calculated by dividing the change in velocity by the elapsed time:
 $a = \Delta v / \Delta t$.
 - For example, if an object accelerates from 0 m/s to 10 m/s in 2 seconds, the acceleration is 5 m/s/s, or 5 m/s².
 - Acceleration is positive when the velocity is increasing and negative when the velocity is decreasing.
 - Because changes in direction are also considered changes in velocity, changing direction implies acceleration.
- Force – something that can cause a change in motion; a push or a pull.
 - When you push or pull an object, you exert a force on the object. Other examples of forces include gravity, the electrostatic force, and the strong and weak nuclear forces.
- Friction – a force that opposes motion.
 - Friction arises because of contact between the moving object and the materials it is moving over or through.
- Mass – the amount of matter in an object.
 - The SI unit of mass is the kilogram (kg).
 - Mass should not be confused with *weight*. Weight is a measure of the force of gravity on an object and is measured in newtons. Mass is a fundamental property of the object itself. If the object is moved from Earth to the Moon, its weight will decrease but its mass will stay the same.
- Newton – the SI unit of force.
 - One newton (1 N) is the force required to accelerate a 1-kg object 1 m/s².
 - The newton is named after Isaac Newton (1642–1727), who discovered the fundamental laws that relate force to motion.
- Newton's first law – an object will travel at a constant velocity unless acted upon by an unbalanced force.
 - For example, a meteor travelling through interstellar space will not speed up or slow down unless it is influenced by gravity or another force.
 - Newton's first law is also known as the law of *inertia*. Inertia is the resistance of an object to a change in its motion.

- Newton's second law – the force acting on an object is equal to the product of its mass and acceleration: $F = ma$.
 - The greater the force on an object, the greater its acceleration.
 - If you add mass to an object, it will accelerate less rapidly under a given force.
- Newton's third law – a force in one direction results in an equal force in the opposite direction.
 - To move to the right, a walking person must push the ground to the left.
 - If a fan pushes air to the left, the fan will be pushed to the right.
 - A rocket moves upward by accelerating air downward.
- Velocity – the speed and direction of a moving object.
 - Motion to the right is generally considered positive and motion to the left is generally negative.
 - The velocity of an object moving from left to right is usually positive.
 - The velocity of an object moving from right to left is usually negative.

