**Vocabulary: Fan Cart Physics**



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* Acceleration – the change in velocity per unit time.
	+ Acceleration is calculated by dividing the change in velocity by the elapsed time: *a* = ∆*v* / ∆*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.