

Motion and Design

Vocabulary Term	Meaning/Definition
acceleration *	rate of increase of speed or velocity (example: accelerator pedal on a car)
air resistance (drag)	force of air pushing against the motion of an object
balanced force	an object remains in place, no movement occurs
control	part of an experiment that does not change, serves as the standard to compare other observations
direction	the way the force is applied determines this way an object moves
distance *	how far an object travels
energy	ability to do work
energy, kinetic	energy of motion (moving ball going down a ramp)
energy, potential	stored energy (ball positioned at the top of the ramp)
fair test	changing only one variable and keeping the other conditions the same
force *	any push or pull on an object
friction *	force that resists motion between two touching surfaces, slows things down and can also produce heat, acts in the opposite direction of the force
gravity, gravitational force	force that brings objects toward earth
inertia *	the tendency of an object to resist a change in motion or keep doing what it is doing Note: the greater the mass of an object, the greater the inertia
laws of motion *	three rules, formulated by Isaac Newton, that describe how objects move in relation to the forces acting on them
machine	used to make work easier
mass *	how much matter an object contains Note: Mass is the amount of material in an object while <i>weight</i> is the amount of force gravity exerts on an object's mass. For example, people <i>weigh</i> ½ as much on the moon as they <i>weigh</i> on earth, but their mass is the same.
model *	a representation in miniature/smaller form
momentum *	force or speed of movement; mass in motion, example: a moving train has much more than a moving soccer ball Note: momentum = mass of an object x velocity

	(increasing the mass or speed increases the momentum)
motion *	an object changing position over time; change in position is measured by the relationship of distance and time
Newton's 1st law of motion * INERTIA	<p><i>*An object tends to stay at rest and an object tends to stay in motion with the same speed and in the same direction unless acted on by an unbalanced force.</i></p> <p>* Objects tend to keep doing what they are doing.</p> <p>* If the forces acting upon an object are balanced, the acceleration of that object will be zero (no motion).</p> <p>*also known as the "law of inertia"</p>
Newton's 2nd law of motion * ACCELERATION	<p><i>* It takes more force to accelerate a more massive object.</i></p> <p>* Acceleration is always in the direction of the unbalanced force.</p> <p>*If you want something to accelerate faster, you need to decrease its mass.</p> <p>* Acceleration of an object depends upon two variables—the net force acting upon the object and the mass of the object.</p> <p>* Force = mass x acceleration or $F = ma$</p>
Newton's 3rd law of motion * ACTION AND REACTION	<p><i>* For every action, there is an equal and opposite reaction.</i></p> <p>*Explains why forces act in pairs.</p> <p>* When one object exerts a force on a second object, the second object exerts the same amount of force back on the first object (but in the opposite direction).</p> <p>* Equal forces acting in opposite directions create a net force of zero.</p> <p>* Action and reaction forces are equal forces acting in opposite directions. The reason they can't cancel each other out is because they are acting on different objects.</p>
recursive	consequential steps
resistance	force pushing against the motion of an object
speed (rate) *	a comparison of distance and time; distance divided by time (or d/t), example: 25 mph
technical drawing *	a diagram that shows top, side, and front views
technological design *	using engineering ideas to create a model
tension *	the act of stretching or straining (kit example: hot tight the rubber bands are when wound around the axle)
test *	to determine if an idea works

unbalanced force	motion occurs; the movement goes in the direction of the greater force (example: winning a tug-of-war game)
validity	conducting a fair test
variable	something in an experiment that can be changed
velocity *	speed with direction (ex.: 45 mph northwest)
weight	force of gravity pulling down on an object
work	moving an object over a distance