

## Glossary

**Ah-Ha Moment:** A moment of sudden inspiration that helps one solve a problem, create a new, novel idea, or spark an important realization.

**Atmospheric Pressure:** The force we feel standing on the surface of the earth due to the weight of air molecules in the atmosphere pushing down on us.

**Chemical Energy:** The innate energy stored within a fuel source that can be released when burned.

**Combustion:** A reaction where a fuel source is burned alongside a source of oxygen (an oxidizer) to produce exhaust as well as light, heat, and energy.

**Conic Section:** A shape created by taking the cross section of a cone, which results in four possible types of curves: circles, ellipses, hyperbolas, and parabolas.

**Cryogenic:** A term used to describe liquids (liquid fuels, for example), at extremely cold temperatures

**Dopants:** compounds added to solid-fuel mixtures in order to slow and control the rate of combustion.

**Escape Energy:** The amount of energy needed to escape out of a given gravitational well.

**Gradient:** An operation that takes in a multi-dimensional function and returns a vector field that points in the direction of steepest ascent for every point in the domain of that function.

**Gravitational Wells:** Pockets of negative potential energy created by massive objects that create the sensation we feel as the force of gravity.

**Momentum:** An objects mass times its velocity (mv), which also describes how difficult it is to stop something from moving.

**Newton's Second Law:**  $F = ma$  – Objects with more mass take more force to be accelerated forwards

**Newton's Third Law:** Every action has an equal and opposite reaction.

**Nozzle:** The back end of the rocket that allows exhaust to flow out and push against it to create the forward thrust.

**Nuclear Fission:** A process in which atoms themselves are split into smaller nuclei in order to release huge amounts of energy.

**Propulsive Landing:** A technology built in to many rockets that allows the first stage of the rocket to land back on earth after being discarded from the rocket in order to be useable.

**Specific Impulse:** A measure of the efficiency of rockets that describes how long a given rocket can maintain a baseline level of thrust.

**Solar Sail:** A large, thin, (usually) metal sheet attached to a spacecraft that lets sunlight bounce off of it in order to produce forward thrust

**Tensor:** A mathematical object that can be described by a 4d-matrix.

**Throttleable:** A rocket that is able to increase or decrease the amount of thrust it is able to provide by speeding up or slowing down combustion.

**Turbopump:** A device used in rocket engines that rotates at extremely high speeds in order to transport fuel and oxidizer into the combustion chamber.

