Glossary

Acceleration
The rate at which an object's velocity changes; $a = \Delta v / \Delta t$.

Acceleration due to gravity
The downward acceleration of an object due to the gravitational attraction between the object and the Earth or other large body.

Aerodynamics
The way the shape of an object affects the flow of air over, around or under it.

Airfoil
A wing-like device on a race car that creates downforce as the air flows over it.

Air resistance
The force created by air when it pushes back against an object's motion; air resistance on a car is also called drag.

Artifact
A man-made object representing a specific time or culture.

Bernoulli's principle
Air moving faster over the longer path on a wing causes a decrease in pressure, resulting in a force in the direction of the decrease in pressure.

Centripetal force
A force toward the center that makes an object move in a circle rather than in a straight line.

Conversion
Changing from one set of units to another, such as from miles per hour to meters per second.

Displacement
The distance and the direction that an object moves from the origin.

Distance
The change of position from one point to another.

Downforce
An aerodynamic force on a car that pushes it downward, resulting in better traction.

Electrical energy
Energy derived from electricity.

Force
Any push or pull.

Frame of reference
The coordinate system for specifying the precise location of the point or frame to which motion is compared.

Friction
The opposing force between two objects that are in contact with and moving against each other.

Gravity
The natural pull of the Earth on an object.

Ground effects
The effects from aerodynamic designs on the underside of a race car, which create a vacuum.

Inertia
An object's tendency to resist any changes in motion.

Joule
The unit of measurement for energy; 1 joule = 1 kilogram-meter^2/second^2.

Kinetic energy
Energy of motion. Kinetic energy = ½ mass * velocity^2, or $KE = \frac{1}{2} m v^2$.

Mass
The amount of matter in an object.

Momentum
The combined mass and velocity of an object. Momentum = mass * velocity, or $p = m * v$.

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Glossary Continued

Potential energy
Energy due to position; stored energy, or the ability to do work.

Power
Rate of doing work, or work divided by time.

Pressure
Force divided by area.

Relative motion
The comparison of the movement of one object with the movement of another object.

Roll bar
A heavy metal tube or bar wrapped over the driver in race cars; the roll bar prevents the roof from crushing the driver during a rollover.

Safety features
In an automobile, things that make the car safer or that make racing safer.

Speed
The distance an object travels divided by the time it takes to travel the distance.

Thermal energy
Heat energy.

Trade-off
A term that describes how an improvement made in one area might decrease effectiveness in another area.

Velocity
The speed of an object, including its direction. Velocity = change in distance over time, or $v = \Delta d / \Delta t$.

Venturi effect
The effect produced by narrowing a passage of air as the air travels, causing an increase in the speed of the air, a drop in pressure and a force in the direction of the air passage.

Watt
A measurement of power. One watt is 1 joule of work per 1 second.

Weight
The force of gravity pulling on an object; weight equals mass times the acceleration due to gravity.

Work
The force on an object times the distance through which the object moves as the work is converted to either potential energy or kinetic energy.