

# MOTION & DESIGN GLOSSARY

## + 5<sup>th</sup> Grade Science +

1. Force – a push or pull
2. Motion – an object changing position over time
3. Friction – a force that resists motion between two touching surfaces; slows things down, produces heat; happens when any objects rub against each other
  - a. Example: Hands rubbing together, hammer hitting a nail
4. Gravity – a force that attracts all objects towards each other... the larger the object, the greater the gravitational force; on Earth, it keeps the air around us (and everything else) from drifting off into space.
5. Mass – how much matter an object contains (different from weight)
  - a. Mass is oftentimes measured by how much something weighs, but weight can change depending on where you are (such as on the moon where there is no gravity) while the mass stays the same.
6. Weight – force of gravity pulling down on an object
7. Momentum – force or speed of movement; mass in motion; describes how strong a moving object is (ex. a moving train has much more momentum than a moving soccer ball because it has more mass)
  - a. increasing mass or increasing speed of an object will increase the momentum!
8. Speed – how fast an object moves; distance over time; distance divided by time
  - a. Example: 25 miles/hour or 25 miles per hour or 25 mph
9. Acceleration – the increase of speed
10. Deceleration – the decrease of speed
11. Direction – the way force is applied determines the way an object moves
12. Velocity – the rate of motion in a specific direction; similar to speed, but velocity is a vector (a numerical value in a specific direction) and speed isn't;
  - a. Example: Speed and direction (ex: 25 miles per hour WEST)
13. Stationary – still; not moving; staying in the same place
14. Work – anything that requires energy, such as moving an object over a distance

15. Energy – the ability to do work; usable power	
16. Potential energy – stored energy a. Example: A ball positioned at the top of a ramp, waiting to go down.	17. Kinetic energy – energy of motion a. Examples: A ball going down a ramp; pushing a desk; water flowing from a waterfall, etc.

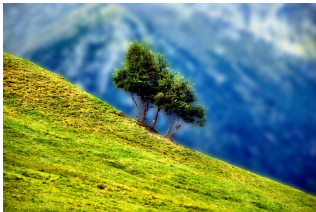
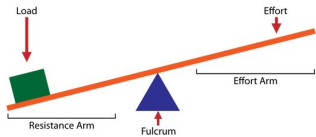
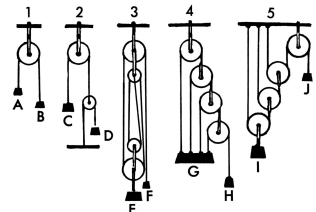
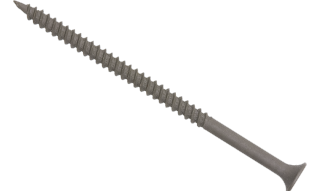
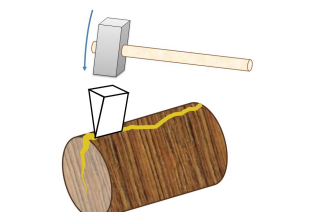

18. Inertia – the tendency of an object to stay in motion if it is already in motion or stay at rest if it is already at rest; the greater the mass of an object, the greater the inertia
- a. Example: A car suddenly stops and you are thrown forward. You will continue to move forward unless something stops you (like a seat belt).

Newton's Three Laws of Motion		
<p>19. Newton's First Law of Motion – the law of inertia; also known as "The Seat Belt Law"</p> <p>→ An object in motion will stay in motion with the same speed &amp; direction until a force acts upon it.</p> <p>→ An object at rest will stay at rest until a force acts upon it.</p> <p>→ If forces acting upon an object are balanced there will be no change in motion. (See "balanced force".)</p>	<p>20. Newton's Second Law of Motion – the law of balanced and unbalanced forces</p> <p>→ To increase acceleration, the mass has to decrease or force applied has to increase. Acceleration is always in the direction of the unbalanced force; it will move the way of the greatest force.</p> <p>→ Moving objects are influenced by unbalanced force while still objects have balanced force.</p> <p>→ Example: An empty shopping cart is easier to push than a full one because it requires less force to move. It is also easier to stop than a full one if control is lost of it.</p>	<p>21. Newton's Third Law of Motion – the law of equal &amp; opposite reactions (action &amp; reaction).</p> <p>→ For every action there is an equal and opposite reaction.</p> <p>→ When one object exerts a force on another (action), the second object exerts the same amount of force back on the first object (reaction force).</p> <p>→ Examples: 1) A bird pushes air down with its wings and the air pushes the bird upwards (equal and opposite reaction) allowing it to fly. 2) When sitting in a chair, your body pushes against the chair while the chair exerts equal force back. If the chair didn't have the same amount of force, it wouldn't be able to hold you.</p>

22. Resistance – force pushing against the motion of an object
23. Air resistance – also known as "drag"; the force of air pushing against an object causes it to slow it down

24. Balanced forces – forces are equal on both sides; no change in motion occurs when forces are balanced a. Example: Two cards leaning against each other and not falling over.	25. Unbalanced forces – forces acting on an object are not equal and it causes an object to move a. Example: When a winner is determined in Tug-0-War, it is because there is an unbalanced force.
---	---

26. Simple machine – an object used to make work easier by pushing or pulling

<h2>Simple Machines</h2>		
<p>27. Inclined plane – a ramp, slanted road, path up a hill, slide, etc.</p>	 <p><a href="http://www.alookthroughlens.com/weblog/archives/inclined_plane.jpg">http://www.alookthroughlens.com/weblog/archives/inclined_plane.jpg</a></p>	<p>Examples: Ramp Slanted Road Uphill Path Slide</p>
<p>28. Lever – a stiff bar that rests on a support called a “fulcrum” which lifts or moves loads (ex. bottle opener, crow bar, hammer)</p>	 <p><a href="http://upload.wikimedia.org/wikipedia/commons/d/d8/Lever_drawing.gif">http://upload.wikimedia.org/wikipedia/commons/d/d8/Lever_drawing.gif</a></p>	<p>Examples: See-saw Scissors Wheel Barrow Bent Arm Fishing Rod</p>
<p>29. Pulley – uses grooved wheels and a rope to lift/raise, lower, or move a load (ex. flag poles, close line, sailboat, blinds, crane)</p>	 <p><a href="http://upload.wikimedia.org/wikipedia/commons/7/75/Pulley_2_(PSF).png">http://upload.wikimedia.org/wikipedia/commons/7/75/Pulley_2_(PSF).png</a></p>	<p>Examples: Flag Poles Sailboat Blinds Crane</p>
<p>30. Screw – inclined plane wrapped around a pole; holds things together or lifts materials (ex. jar lids, light bulb, wrench)</p>	 <p><a href="http://upload.wikimedia.org/wikipedia/commons/8/85/Drywall_screw.png">http://upload.wikimedia.org/wikipedia/commons/8/85/Drywall_screw.png</a></p>	<p>Examples: Jar Lids Light Bulbs Spiral Staircases</p>
<p>31. Wedge – has at least one slanting side and ends in a sharp edge; used to push objects apart (ex. fork, axe, knife)</p>	 <p><a href="http://upload.wikimedia.org/wikipedia/commons/a/ae/Wood_splitting_wedge.PNG">http://upload.wikimedia.org/wikipedia/commons/a/ae/Wood_splitting_wedge.PNG</a></p>	<p>Examples: Knife Axe Teeth Forks Nails</p>
<p>32. Wheel and axle – a wheel with a rod, called an axle, through its center lifts or moves loads (ex. cars, roller skates, wagon, door knob, gears)</p>	 <p><a href="http://s0.geograph.org.uk/geophotos/01/23/40/1234093_dc377be7.jpg">http://s0.geograph.org.uk/geophotos/01/23/40/1234093_dc377be7.jpg</a></p>	<p>Examples: Cars Roller Skates Door Knobs Gears</p>

33. Propeller – two or more twisted blades that rotate around a central point

34. Valid – (adjective) when something is logical and fair (it makes sense).

35. Validity – (noun) when something is valid

- a. Example: She questioned the validity of that science experiment..

36. Variable – something in an experiment that can be controlled

37. Independent variable – the part the scientist (you!) changes in the experiment while everything else stays the same.	38. Dependent variable – the part that changes because of the independent variable (it depends on the independent variable)
39. Control – the part of an experiment that doesn't change at all (like the soil and rocks in the eco-columns)	

40. Matter – anything that has weight and takes up space as a solid, liquid, gas, or plasma.

41. Property – a special quality or characteristic

42. Physical Change – molecules are unchanged, but the size or state of matter has been changed (caused by motion, temperature, or pressure)

43. Chemical Change – molecules are changed and cannot be reversed unless there is another chemical reaction (gas forms, light or heat appears, or the color of the object changes).

44. Conduction – heat transfer through a solid object

- a. Examples: Touching a stove top and burning your hand; feeling hot sand on your feet.

45. Convection – heat transfer through liquids or gas; heat rises and cool temperatures fall.

- a. Examples: The top bunk is typically warmer than the bottom; the surface of a lake or pond will typically be warmer than the bottom.

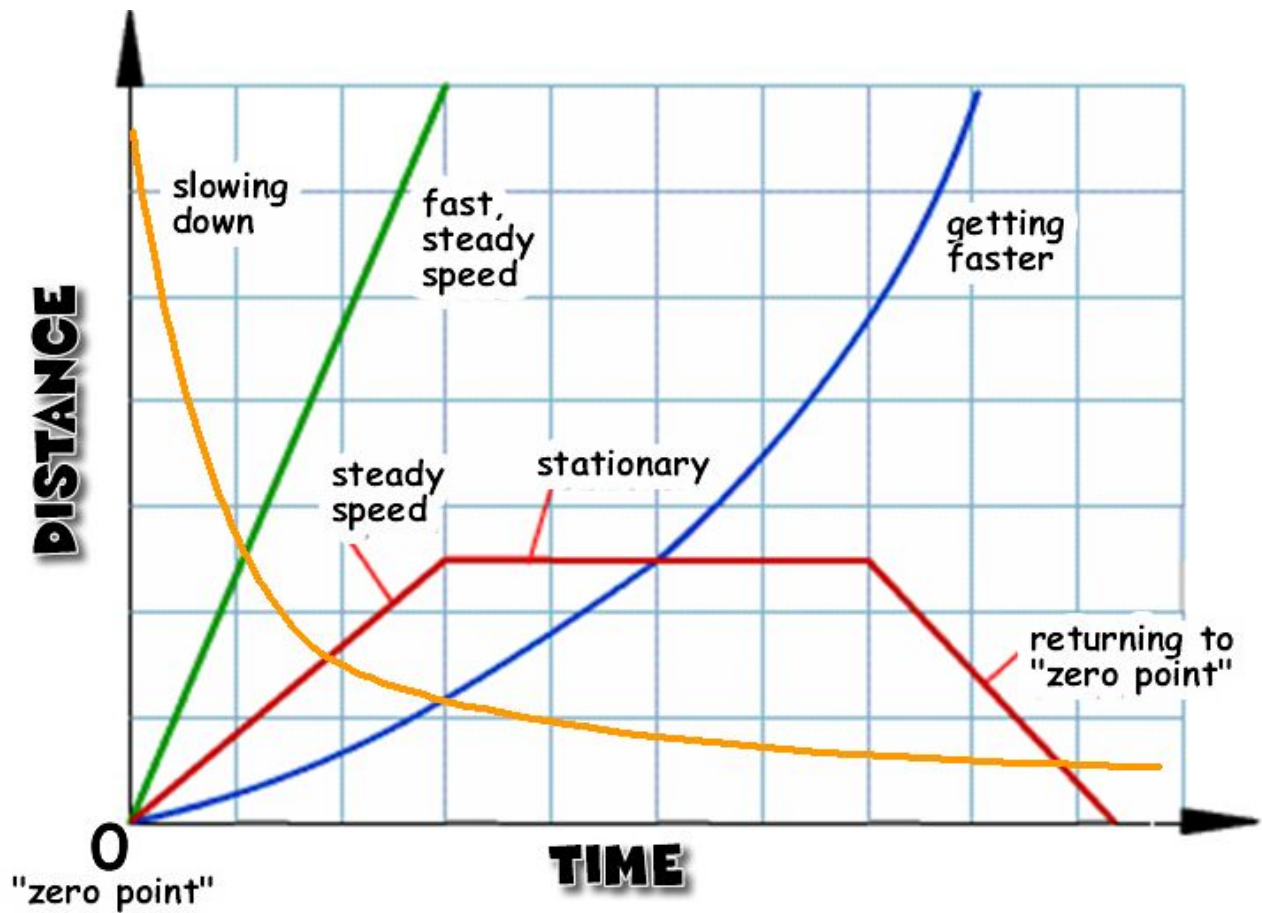
46. Radiation – heat transfer through electromagnetic waves that move through space.

47. Conductor – an object that allows heat to pass through it easily; opposite of insulator

48. Insulator – an object that inhibits (stops or slows) the flow of heat; opposite of conductor

49. Procedure – the step-by-step process of an experiment or investigation; should be written so clearly that another person could repeat the exact experiment or investigation by looking at the author's notes.

50. Distance-Time Graph – a graph that shows an object's distance and how much time has passed



<http://sebsphysics.blogspot.com/2015/06/12-plot-and-interpret-distance-time.html>

It's a straight line,  
It's a constant speed (x2)

It's a flat line,  
It's resting in peace (x2)

It's a curved line,  
Accelerating (x2)

It's about time,  
And distance: it's speed!

Vocabulary Sources:

- Dictionary.com
- Studyjams.scholastic.com
- Chem4kids.com
- Kids.net.au