

A review of selected ultra-simplified mechanics definitions.

1. Mechanics is the branch of physics which deals with the interrelations of force, matter, and motion.
2. Matter is any physical property having volume.
3. Mass is the amount of matter in an object.
4. Motion is a continuous change of position.
5. Moment of inertia is mass times radius squared.
6. Newton's first law, the law of inertia, states that a body at rest or in uniform straight-line motion will continue in that state until compelled to change by an external force.
7. Newton's second law of motion, the law of acceleration, states that acceleration is proportional to force and inversely proportional to mass.
8. Newton's third law of motion, the law of reaction, states that for every action there is an equal and opposite reaction.
9. Force is mass times acceleration,
10. Linear motion is straight-line movement from one point to another.
11. Velocity is rate of change of position in a given direction.
12. Angular motion is the turning movement of an object around an axis located within (inside) the object.
13. Momentum is mass times velocity.
14. Angular velocity is the angle through which a body turns in one second or revolutions per second.
15. Curvilinear motion is the turning movement of an object around an axis located outside the object.
16. Angular momentum is moment of inertia times angular velocity.
17. The law of conservation of angular momentum states that a turning body isolated from external forces will have a constant angular momentum.
18. Acceleration is rate of change of velocity.
19. Impulse is force multiplied by time.
20. Inertia is a body's resistance to change in motion.
21. Gravitation is the mutual force of attraction between bodies.
22. Angular impulse is torque multiplied by time.

23. The Archimedes principle specifies that a body in fluid is buoyed up by a force equal to the weight of the fluid it displaces.
24. An axis is a straight line about which a body rotates.
25. Angular acceleration is rate of change of angular velocity.
26. The center of gravity is the point in a body where force acts.
27. Centrifugal force is the force pulling outward during rotation.
28. A force couple is two parallel but opposite equal forces, not acting in the same line.
29. Energy is the capacity to do work.
30. Displacement is the straight-line distance and direction an object travels from one point to another.
31. Eccentric thrust is an off-center thrust.
32. Friction is the force between two bodies at their surface of contact which opposes their movement.
33. A lever is a rigid bar which pivots on a fulcrum.
34. Kinetic energy is the energy of an object by virtue of its motion.
35. Gravity is the force which causes objects to move vertically downward toward the center of the earth.
36. The arm of a force couple is the distance at right angles between the two parallel equal but opposite forces.
37. The axis of a rotating body on the ground is a straight line from the base of support through a body's center of gravity, about which all parts rotate in planes at right angles.
38. In a first class lever the fulcrum is located between the resistance force and the effort force.
39. In a second class lever the resistance force is located between the fulcrum and the effort force.
40. In a third class lever the effort force acts between the fulcrum and the resistance force.
41. The axis of a rotating body in the air is a straight line, fixed in direction, passing through an airborne body's center of gravity, about which all parts rotate until contact is regained with the ground.
42. The law of conservation of momentum states that when two or more objects collide, the total momentum before and after impact is the same.
43. The moment arm of a force is the perpendicular distance from the axis of rotation to the line of action (point of application) of a force.
44. The acceleration of a freely falling body is 32 feet per second per second, or 9.8 meters/sec/sec.

45. Negative acceleration means deceleration, or decreasing the velocity slower and slower.
46. A parabola is the regular curve followed by an object's center of gravity when projected into free air space.
47. Uniform motion is steady, constant motion with unchanging speed or velocity.
48. Torque is a force causing an object to rotate, or force times lever arm.
49. Speed is rate of change of position.
50. Power means rate of work, or work divided by time.
51. Potential energy is the energy of a body by virtue of its position.
52. Positive acceleration means increasing the velocity faster and faster,
53. A scalar quantity is any quantity which has magnitude only.
54. Radius of gyration means the perpendicular distance between the axis of rotation and the center of mass of a rotating body.
55. The turning moment of a force couple is one force of a force couple multiplied by its arm.
56. Work is force times distance in the direction of the force.
57. A horsepower is a unit equal to 550 foot-pounds of work per second,
58. Mechanical advantage is the ratio of output force to input force of a machine.
59. The magnitude of air resistance varies with the square of speed. If speed is doubled, air resistance becomes four times greater.
60. Centripetal force is the force pulling inward during rotation.
61. Weight is the force of attraction between an object and the earth.
62. The frontal cardinal anatomical plane is a vertical plane which divides the body into front and rear halves.
63. The horizontal cardinal anatomical plane is a horizontal plane which divides the body into upper and lower halves.
64. The sagittal cardinal anatomical plane is a vertical antero-posterior plane which divides the body into right and left halves.
65. A vector quantity is any quantity having both magnitude and direction.
66. Newton's first law of angular motion specifies that a body does not change its angular velocity unless acted upon by an external, unbalanced torque.
67. Newton's second law of angular motion specifies that an unbalanced torque about an axis produces angular acceleration proportional to torque and inversely proportional to moment of inertia.

68. Newton's third law of angular motion specifies that for every torque applied to one body, there is an equal and opposite torque applied to another body.

69. Balance or equilibrium exists when the resultant of all forces acting on a body is zero.

70. Parallelogram of force. When two forces are simultaneously applied to a point in a body, the resultant of these forces is always the diagonal of a parallelogram from that point.

71. A point is a zero-dimensional geometrical element which cannot be seen.

72. The sagittal axis of the body is an axis, parallel to the ground, which passes through the body from front to back, or antero-posterior axis.

73. The frontal axis of the body is an axis, parallel to the ground, passing through the body from side to side.

74. A horizontal or transverse axis is any axis which is parallel to the ground.

75. In uniformly accelerated motion, the velocity changes at a constant rate.

76. A vertical axis is any axis perpendicular to the ground.

77. Non-uniform motion is irregular, variable, inconsistent motion.

78. The elements of a lever are the fulcrum, effort arm, and resistance arm.

79. A line is a continuous series of points squeezed closely together which follow a straight path unless otherwise indicated.

80. A pendulum is a body suspended so as to swing freely under the action of gravity and momentum.

81. A plane is a flat surface such that a straight line joining any two points of the surface lies entirely in the surface.

82. A pulley is a simple machine used to change direction of a force or gain mechanical advantage.

83 A vector diagram is an illustration of a vector quantity with an arrow.

84. The axis of momentum is a straight line, fixed in direction, about which an airborne object has unchanging angular momentum.

85. The axis of a rotating body in the air and the axis of momentum are identical, except when turning movement originates in the air. When turning movement originates in the air, the body will rotate about an **AXIS OF DISPLACEMENT** (A term coined by G.H.G. Dyson in **MECHANICS OF ATHLETICS**).

86. Nutation is the motion of a principal axis in a conical fashion around the axis of momentum. It is the result of an eccentric impulse which causes the body to rotate about two or more of its principal axes simultaneously.

87. Precession is the motion of the axis of momentum when constantly caused to change its direction by the action of a force couple. Precession may also be defined as the change in direction of the axis of a rotating body caused by the action of a torque.