

Topic Page: [Acceleration \(Mechanics\)](#)

Definition: **acceleration** from *Dictionary of Energy*

Physics. the rate of change in velocity with respect to time.

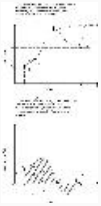


Image from: [calculus in The Macmillan Encyclopedia](#)

Summary Article: **acceleration**
From *The Columbia Encyclopedia*

change in the velocity of a body with respect to time. Since velocity is a vector quantity, involving both magnitude and direction, acceleration is also a vector. In order to produce an acceleration, a force must be applied to the body. The magnitude of the force F must be directly proportional to both the mass of the body m and the desired acceleration a , according to Newton's second law of motion, $F=ma$. The exact nature of the acceleration produced depends on the relative directions of the original velocity and the force. A force acting in the same direction as the velocity changes only the speed of the body. An appropriate force acting always at right angles to the velocity changes the direction of the velocity but not the speed. An example of such an accelerating force is the gravitational force exerted by a planet on a satellite moving in a circular orbit. A force may also act in the opposite direction from the original velocity. In this case the speed of the body is decreased. Such an acceleration is often referred to as a deceleration. If the acceleration is constant, as for a body falling near the earth, the following formulas may be used to compute the acceleration a of a body from knowledge of the elapsed time t , the distance s through which the body moves in that time, the initial velocity v_i , and the final velocity v_f :

$$a=(v_f^2-v_i^2)/2s$$

$$a=2(s-v_it)/t^2$$

$$a=(v_f-v_i)/t$$

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acceleration. (2018). In P. Lagasse, & Columbia University, *The Columbia encyclopedia* (8th ed.). New York, NY: Columbia University Press. Retrieved from <https://search.credoreference.com/content/topic/acceleration>



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