

Topic Page: [graph](#)

Definition: **graph** from *Philip's Encyclopedia*

Diagram representing a relationship between numbers or quantities. Many graphs use the Cartesian coordinate system. Other forms include bar charts, where a series of figures is represented by lines of various lengths, and pie charts, in which quantities are represented by sectors of a circle.

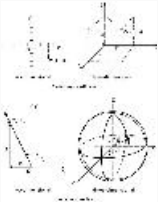


Image from:

[coordinate systems](#)
in *The Macmillan Encyclopedia*

Summary Article: **graph**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

Pictorial representation of numerical data, such as statistical data, or a method of showing the mathematical relationship between two or more variables by drawing a diagram.

There are often two axes, or reference lines, at right angles intersecting at the origin – the zero point, from which values of the variables (for example, distance and time for a moving object) are assigned along the axes. (The axes may not always intersect at the origin; if the data run from, for example, 500 to 1000 on each axis, then the point of intersection could be at (500,500) and this should be clearly labelled.) Pairs of simultaneous values (for example, the distance moved after a particular time) are plotted as points in the area between the axes, and the points then joined by a smooth curve to produce a graph. The horizontal axis is usually referred to as the *x*-axis, and the vertical axis as the *y*-axis. The 'controllable/flowing' quantity is usually plotted on the *x*-axis; this is often time.

Cartesian coordinates On a line graph values are plotted using coordinates, components used to define the position of a point by its perpendicular distance from a set of two or more axes, or reference lines. For a two-dimensional area defined by two axes at right angles, the coordinates of a point are given by its perpendicular distances from the *y*-axis and *x*-axis, written in the form (*x*,*y*). For example, a point P that lies three units from the *y*-axis and four units from the *x*-axis has Cartesian coordinates (3,4).

Straight-line graph This type of graph is produced by plotting the variables of a linear equation with the general form

$$y = mx + c$$

where *m* is the slope of the line represented by the equation and *c* is the *y*-intercept, or the value of *y* where the line crosses the *y*-axis in the Cartesian coordinate system.

Histogram Histograms are used in statistics, showing frequency of data, in which the horizontal axis details discrete units or class boundaries, and the vertical axis represents the frequency. Blocks are drawn such that their areas (rather than their height as in a bar chart) are proportional to the frequencies within a class or across several class boundaries. There are no spaces between blocks.

Applications Graphs have many practical applications in all disciplines, for example **distance–time graphs** are used to describe the motion of a body by illustrating the relationship between the distance that it travels and the time taken. Plotting distance (on the vertical axis) against time (on the horizontal

axis) produces a graph the gradient of which is the body's speed. If the gradient is constant (the graph is a straight line), the body has uniform or constant speed; if the gradient varies (the graph is curved), then so does the speed and the body may be said to be accelerating or decelerating.

speed–time graphs are used to describe the motion of a body by illustrating how its speed or velocity changes with time. The gradient of the graph gives the object's acceleration: if the gradient is zero (the graph is horizontal) then the body is moving with constant speed or uniform velocity; if the gradient is constant, the body is moving with uniform acceleration. The area under the graph gives the total distance travelled by the body.

Conversion graphs are used for changing values from one unit to another, for example from Celsius to Fahrenheit, with the two axes representing the different units.

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