**The theory of probability**

Probability theory, a branch of mathematics concerned with the analysis of random phenomena. The outcome of a random event cannot be determined before it occurs, but it may be any one of several possible outcomes. The actual outcome is considered to be determined by chance.

Probabilistic thinking plays an important role in most fields of scientific research. This role is central in disciplines engaged in large-scale data collection and interpretation. A probabilistic model formulates relationships among the observables – relationships that are not supposed to hold exactly for each observation but still give a description of the fundamental tendencies governing their behavior.

Probability theory is often considered to be a mathematical subject, with a well-developed and involved literature concerning the probabilistic behavior of various systems but it is also a philosophical subject – where the focus is the exact meaning of the concept of probability and the ways in which it relates to the fundamental aspects of our reasoning.

The most generally adopted view of probability is that it is a numerical characteristic of observations or experiments that may be performed repeatedly. This numerical value influences the relative frequencies of the possible outcomes. The larger the number of repetitions, the closer one may expect the observed relative frequency of an outcome to be to its probability.

Scientists can use probability theory to obtain information about things that would be too complex to deal with, like statistical mechanics. Also, scientists discovered (in the 20th century) that atoms, and everything that we know, obeys something called quantum mechanics, which uses lots of probability theory.