German organic chemist who analysed and synthesized many biologically important compounds. He was awarded the 1902 Nobel Prize for Chemistry for his work on the synthesis of sugars and purine compounds.

Fischer was born in Euskirchen, near Bonn, on 9 October 1852, the son of a merchant. After leaving school he acceded to his father's wishes and joined the family business, but later left and in 1871 entered the University of Bonn to study chemistry under Friedrich Kekulé von Stradonitz. The following year he went to Strasbourg and graduated from the university there in 1874 with a doctoral thesis which was supervised by Johann von Baeyer. He continued his studies at Munich where he became an unpaid lecturer in 1878 and a (paid) assistant professor in 1879. He then held professorships at Erlangen from 1882, Würzburg from 1885, and finally Berlin from 1892. Before his last move he married Agnes Gerlach. His wife died young but they had three sons, the eldest of whom, Hermann (see Hermann Fischer), also became a distinguished organic chemist; two sons were killed in World War I. Fischer suffered a serious bout of mercury poisoning (during a brief incursion into inorganic chemistry) and the equally serious effects of phenylhydrazine poisoning. He contracted cancer and this fact, coupled with the death of his sons, led him to commit suicide on 15 July 1919. Fischer's early research, carried out with his cousin Otto Fischer, concerned the dye rosaniline and similar compounds, which they showed have a structure related to that of triphenylmethane. In 1875 Fischer discovered phenylhydrazine, but it was not until 1884 that he found it formed bright yellow crystalline derivatives with carbohydrates, a key reaction in the study of sugars. The derivatives are known as osazones, and Fischer obtained the same osazone from three different sugars - glucose, fructose, and mannose - demonstrating that all three have the same structure in the part of their molecules unaffected by phenylhydrazine. He went on to determine the structures of the 12 possible stereoisomers of glucose, the important group of sugars known collectively as hexoses. The naming of carbohydrates is a complicated process based on the chemical origin (D or L) and optical activity (+ or −) of the compound. Fischer based his nomenclature on dextrorotatory (+) glyceraldehyde and called this the D series. It was only the advent of X-ray analysis that confirmed that Fischer's arbitrarily assigned configurations are correct.

From about 1882 he began working on a group of compounds that included uric acid and caffeine. Fischer realized that they were all related to a hitherto unknown substance, which he called purine. Over the next few years he synthesized about 130 related compounds, one of which was the first synthetic nucleotide, a biologically important phosphoric ester of a compound made from a purine-type molecule and a carbohydrate. These studies led to the synthesis of powerful hypnotic drugs derived from barbituric acids, including in 1903 5,5-diethyl barbituric acid, which became widely used as a sedative.

In 1885 experiments with phenylhydrazine led to what is known as Fischer's indole synthesis, in which he heated a phenylhydrazone with an acid catalyst to produce a derivative of indole. Indole itself cannot, however, be obtained by this method.
Fischer's investigations into the chemistry of proteins began in 1899. He synthesized the amino acids ornithine (1,4-diaminopentanoic acid) in 1901, serine (1-hydroxy-2-aminobutanoic acid) in 1902, and the sulphur-containing cystine in 1908. He then combined amino acids to form polypeptides, the largest of which - composed of 18 amino-acid residues - had a molecular mass of 1,213. Later work included a study of tannins, which he carried out with the assistance of his son Hermann.

Fischer was involved with many aspects and branches of organic chemistry. He was a man of considerable insight, as exemplified by his description of the action of enzymes as a lock-and-key mechanism in which the enzyme model fits exactly onto the molecule with which it reacts. But he did not consider himself to be a theoretician; he believed in, and used, the synthetic methods of the practical organic chemist.