

The conservation of energy is a fundamental principle in physics, stating that energy cannot be created or destroyed, only converted from one form to another. Enzymes are biological catalysts that speed up chemical reactions in living organisms by lowering the activation energy required for the reaction to occur. The strong nuclear force is one of the four fundamental forces of nature, responsible for holding the protons and neutrons together in the atomic nucleus. In computer science, an algorithm is a step-by-step procedure for solving a problem or accomplishing a task, often expressed in a specific programming language.

Photosynthesis is the process by which plants and other organisms convert light energy into chemical energy, producing glucose from carbon dioxide and water. The second law of thermodynamics states that the total entropy of an isolated system always increases over time, leading to a state of maximum disorder. Ionic bonding occurs when there is a transfer of electrons from one atom to another, resulting in the formation of positively and negatively charged ions that attract each other. Object-oriented programming (OOP) is a paradigm that organizes software design around objects, which are instances of classes that encapsulate data and behavior.

The cell membrane is a selectively permeable barrier that controls the movement of substances in and out of the cell, maintaining homeostasis. Quantum mechanics is a branch of physics that describes the behavior of matter and energy at the atomic and subatomic levels, using wave functions and probability distributions. Covalent bonding involves the sharing of electrons between atoms, forming strong and stable bonds that hold molecules together. Data structures are fundamental building blocks in computer science, used to organize and store data efficiently for various applications, such as arrays, linked lists, stacks, and queues.

The theory of evolution by natural selection, proposed by Charles Darwin, explains how species change over time through the inheritance of beneficial traits that increase their fitness in a given environment. The Doppler effect is the change in frequency or wavelength of a wave as observed by a receiver when the source and receiver are in relative motion. Acids are substances that donate hydrogen ions ( $H^+$ ) in aqueous solutions, while bases are substances that accept hydrogen ions, forming hydroxide ions ( $OH^-$ ). Computational complexity theory is the study of the resources, such as time and space, required to solve problems using algorithms, classifying problems into complexity classes like P, NP, and NP-complete.

DNA (deoxyribonucleic acid) is the genetic material that carries the instructions for the development, functioning, and reproduction of all known living organisms. Newton's laws of motion describe the relationship between forces and the motion of objects, forming the foundation of classical mechanics. Chemical equilibrium is a dynamic state in which the forward and reverse reactions proceed at the same rate, resulting in no net change in the concentrations of reactants and products. Artificial intelligence (AI) is a field of computer science that focuses on creating intelligent machines that can perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation.

The endocrine system is a network of glands that secrete hormones directly into the bloodstream, regulating various physiological processes such as growth, metabolism, and reproduction. The electromagnetic spectrum is the range of all possible frequencies of electromagnetic radiation, including radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays. Electrochemistry is the study of chemical reactions that involve the transfer of electrons, often in the context of redox reactions and electrochemical cells. Machine learning is a subset of AI that involves the development of algorithms and statistical models that enable computer systems to learn and improve their performance on a specific task without being explicitly programmed.

Mitosis is the process of cell division in which a parent cell divides into two genetically identical daughter cells, ensuring the continuity of life. The uncertainty principle, formulated by Werner Heisenberg, states that the more precisely the position of a particle is determined, the less precisely its momentum can be known, and vice versa. Organic chemistry is the study of carbon-based compounds, including hydrocarbons, alcohols, carboxylic acids, and many other classes of molecules essential to life. Databases are organized collections of structured data that can be easily accessed, managed, and updated, playing a crucial role in many computer applications and information systems.

Meiosis is a type of cell division that produces four genetically diverse haploid cells, which is essential for sexual reproduction and maintaining genetic diversity in populations. The Standard Model is a theory in particle physics that describes the fundamental building blocks of matter (quarks and leptons) and the interactions between them, mediated by force-carrying particles called bosons. Thermodynamics is the branch of physics that deals with heat, work, and the interconversion of energy, based on the laws of thermodynamics. Computer networking is the practice of connecting computing devices together to share resources, exchange data, and communicate with each other, forming the basis of the internet and other communication networks.

The immune system is a complex network of cells, tissues, and organs that work together to defend the body against infectious agents and other harmful substances. The general theory of relativity, developed by Albert Einstein, describes gravity as a curvature of spacetime caused by the presence of mass and energy. Stoichiometry is the quantitative study of the relationships between reactants and products in chemical reactions, based on the law of conservation of mass. Cryptography is the practice of secure communication in the presence of adversaries, using techniques like encryption, decryption, and digital signatures to protect sensitive information from unauthorized access or tampering.

The nervous system is a highly organized network of cells that transmits signals between different parts of the body, enabling communication, coordination, and response to stimuli. The Higgs boson is an elementary particle predicted by the Standard Model, responsible for giving other particles their mass through interactions with the Higgs field. Stereochemistry is the study of the three-dimensional arrangement of atoms in molecules, which can have a significant impact on their chemical and biological properties. Software engineering is the systematic

application of engineering principles to the design, development, testing, and maintenance of software systems, focusing on the processes, methodologies, and tools used to create reliable and efficient software.

Photosynthesis and cellular respiration are complementary processes in the carbon cycle, with photosynthesis converting carbon dioxide into organic compounds and cellular respiration breaking down those compounds to release energy and carbon dioxide. The wave-particle duality is a fundamental concept in quantum mechanics, stating that particles can exhibit both wave-like and particle-like properties, depending on the experimental conditions. Nuclear chemistry is the study of the properties and reactions of atomic nuclei, including radioactivity, nuclear fission, and nuclear fusion. Parallel computing is a type of computation in which many calculations or processes are carried out simultaneously, exploiting the inherent parallelism in many computational problems to improve performance and efficiency.

The circulatory system is a network of blood vessels and the heart that transports oxygen, nutrients, and other essential substances throughout the body, while also removing waste products. The first law of thermodynamics, also known as the law of conservation of energy, states that energy can neither be created nor destroyed, only converted from one form to another. Kinetics is the study of the rates and mechanisms of chemical reactions, taking into account factors such as temperature, concentration, and the presence of catalysts. Computer vision is an interdisciplinary field that deals with enabling computers to interpret and understand visual information from the world, using techniques from image processing, pattern recognition, and machine learning.

Genetics is the study of heredity and the variation of inherited characteristics, based on the principles of Mendelian inheritance and the molecular structure of DNA. The photoelectric effect is a phenomenon in which electrons are emitted from a material when it absorbs light of a sufficiently high frequency, providing evidence for the particle nature of light. Coordination chemistry involves the study of compounds containing a central metal atom or ion surrounded by ligands, which can influence the properties and reactivity of the metal center. Natural language processing (NLP) is a branch of AI that focuses on the interaction between computers and human language, aiming to enable computers to understand, interpret, and generate human language in a meaningful way.

The digestive system is a series of organs that work together to break down food into nutrients that can be absorbed and used by the body for growth, repair, and energy production. The Pauli exclusion principle states that no two identical fermions (particles with half-integer spin) can occupy the same quantum state simultaneously, which has important consequences for the structure of atoms and the behavior of matter. Isomers are compounds with the same molecular formula but different structural arrangements of atoms, which can lead to distinct physical and chemical properties. Cybersecurity is the practice of protecting computer systems, networks, and sensitive information from digital attacks, unauthorized access, and data breaches, ensuring the confidentiality, integrity, and availability of information assets.