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Portra Images / Getty Images Chemistry is a logical science that you can teach yourself if you learn some key concepts. You can study these concepts in any order, but it's best to start with the basics since many concepts build on each other. For example, you'll want to begin learning about units, conversion, and how atoms and molecules interact. Then you can progress to studying more complex chemistry concepts. Below are some chemistry basics that you'll want to master before you dive more into the science. While it's completely possible to learn chemistry online, supplementing your textbook study with lab experience is always more fruitful—so find yourself a good chemistry kit and get started! It's possible to learn the basic concepts of chemistry online.Chemistry concepts should be studied in a logical order because concepts build upon each other. Jumping into the middle of the science can lead to confusion.While it's fine to learn chemistry principles online, be aware that the lab component is an important part of the science. It's a good idea to supplement textbook learning with experiments using a chemistry kit. Introduction to Chemistry: Learn about what chemistry is, what chemists do, and why you would want to study this science. Units & Measurements: Get a handle on the metric system and the common units used in chemistry. The Scientific Method: Scientists, including chemists, are systematic about the way they study the world. Find out how to use the scientific method to collect data and design experiments. The Elements: Elements are basic building blocks of matter. Learn what an element is and get facts for them. The Periodic Table: The periodic table is a way elements can be organized based on their similar properties. Find out what that table is, how it was designed, and how you can use it to make your study of chemistry much easier. Atoms and Ions: Atoms are single units of an element. Ions can be made up of one or more types of elements and carry an electrical charge. Learn about the parts of an atom and how to identify the different types of ions. Molecules, Compounds, & Moles: Atoms can be joined together to make molecules and compounds. A mole is a useful way of measuring an amount of atoms or larger components of matter. Define these terms and learn how to perform calculations to express quantities. Chemical Formulas: Atoms and ions don't bond together randomly. Find out how to predict how many of one type of atom or ion will combine with others. Learn to name compounds. Chemical Reactions & Equations: Just as atoms and ions combine in very specific ways, molecules and compounds react with each other in definite quantities. Learn how to tell whether or not a reaction can occur and what the products of a reaction will be. Write balanced chemical equations to describe reactions. Chemical Bonds: The atoms in a molecule or compound are attracted and repelled with respect to each other in ways that determine the types of bonds they can form. Thermochemistry: Chemistry is the study of both matter and energy. Once you learn to balance the atoms and charge in a chemical reaction, you can examine the energy of the reaction as well. Electronic Structure: Electrons are found in regions around the nucleus of an atom. Learning about the structure of the electron shell or electron cloud is important for understanding how atoms and ions will form bonds. Molecular Structure: Once you understand the types of bonds that can be formed between components in a substance, you can begin to predict and understand how molecules are formed and the shapes they take. Valence shell electron pair repulsion (VSEPR) theory helps chemists understand molecular structure. Liquids & Gases: Liquids and gases are phases of matter with properties distinctly different from the solid form. Collectively, liquids and gases are termed fluids. The study of fluids and how they interact is important for understanding the properties of matter and predicting the ways in which that matter can react. Rates of Reaction: Several factors affect how quickly and completely a reaction proceeds. Learn about these factors and how to calculate the speed at which a reaction can occur. Acids & Bases: There are several ways to define acids and bases. One way is to look at hydrogen ion concentration. No matter which method you choose, these categories of chemicals participate in some very important reactions. Learn about acids, bases, and pH. Oxidation & Reduction: Oxidation and reduction reactions go hand in hand, which is why they are also called redox reactions. Acids and bases may be thought of as reactions involving hydrogen or protons, while redox reactions tend to be concerned with electron gain and loss. Nuclear Reactions: Most chemical reactions involve exchanges of electrons or atoms. Nuclear reactions are concerned with what happens inside the nucleus of an atom. This includes radioactive decay, fission, and fusion. Man has been exposed to changing surroundings ever since he came into existence. He has been quite interested in learning about his surroundings and studying and explaining the things that are happening around him. He has conducted experiments and observations to gather information as a result of his interest. Through the decades, it has also been in charge of many people's research endeavours around the globe. Systematizing and organising the knowledge acquired in this way was absolutely necessary for the good of humanity. Science is the name given to this knowledge. So, systematised knowledge that humans have acquired through observations and experimentation may be referred to as science. Due to its vast expansion and variety of subjects, science has been further divided into many branches. One of the most significant fields of science is chemistry. Chemistry can be summed up as the area of science that studies matter, including its properties, composition, and the changes that occur to it as a result of various activities. Several branches of chemistry have been created based on the specialised disciplines of research. Table of Content IntroductionBranches of ChemistryExamples in Daily LifeFree Study MaterialCBSE Chemistry ResourcesFAQs What is Chemistry? Chemistry is a subdiscipline of science that deals with the study of matter and the substances that constitute it. It also deals with the properties of these substances and the reactions undergone by them to form new substances. Chemistry primarily focuses on atoms, ions, and molecules which, in turn, make up elements and compounds. These chemical species tend to interact with each other through chemical bonds. It is important to note that the interactions between matter and energy are also studied in the field of chemistry. The study of elements and compounds' properties, compositions, and structures, as well as how they can change and the energy that is released or absorbed during such changes, is the subject matter of the science known as chemistry. Learn more on Interactive Periodic Table 'Science' can be defined as the systematic study of the natural universe, its structure, and everything it encompasses. Due to the immensity of the natural universe, science has been divided into several disciplines that deal with certain aspects of the universe. The three primary subcategories of science under which these disciplines can be grouped are: The Formal Sciences: Involves the study of the language disciplines that concern formal systems. Examples of scientific disciplines that fall under this category include logic and mathematics. Can be thought of as the "language of science". The Natural Sciences: Involves the study of natural phenomena through experiments and observations. Chemistry, physics, and biology fall under this category of science. The Social Sciences: Involves the study of human societies and the relationships between the humans that dwell in these societies. Examples of scientific disciplines that fall under this category include psychology, sociology, and economics. When the relationships between the major branches of science are considered, chemistry is found to lie close to the centre (as illustrated below). Thus, chemistry can be viewed as a central science whose roots bore into several other subdisciplines of science. Branches of Chemistry The five primary branches of chemistry are physical chemistry, organic chemistry, inorganic chemistry, analytical chemistry, and biochemistry. Follow the buttons provided below to learn more about each individual branch. Organic Chemistry Inorganic Chemistry Physical Chemistry Biochemistry Analytical Chemistry Chemistry Reactions Apart from these primary branches, there exist several specialized fields of chemistry that deal with cross-disciplinary matters. Some such examples include medicinal chemistry, neurochemistry, materials chemistry, nuclear chemistry, environmental chemistry, polymer chemistry, and thermochemistry. Examples of Chemistry in Our Daily Lives Chemical reactions are constantly taking place around us. The human body facilitates thousands of chemical reactions every day. From the digestion of food to the movement of muscles – all bodily actions involve chemical reactions. A few other examples of chemistry in the day-to-day lives of humans are listed below. The process of photosynthesis that enables plants to convert water, sunlight, and carbon dioxide into glucose and oxygen is a chemical reaction. This process is the foundation upon which the entire food chain is built. Soaps and detergents used for hygiene work use a chemical process known as emulsification. Furthermore, they are produced using a chemical process known as saponification. Even the sunscreen used by humans to protect themselves from the harmful UV-A and UV-B radiation of the sun is based on chemistry. These lotions and creams consist of a combination of inorganic and organic compounds that either filter or block the incoming ultraviolet radiation. Follow the link to learn more about the importance of chemistry in everyday life. Free Chemistry Study Material The BYJU'S chemistry section hosts over 1500 chemistry articles for students to use as free study resources. Links to each of these articles have been sorted under their parent concepts and can be found in the collapsible tables provided below. Chemistry Resources for CBSE Students The periodic table of chemical elements, often called the periodic table, organizes all discovered chemical elements in rows (called periods) and columns (called groups) according to increasing atomic number. In 1869, Russian chemist Dmitri Mendeleev created the framework that became the modern periodic table, leaving gaps for elements that were yet to be discovered. "Sulphuric acid" is called the king of acids and "Nitric acid" is called the Queen of acids. Boyle's Law tells us that the volume of gas increases as the pressure decreases. Charles' Law tells us that the volume of gas increases as the temperature increases. And Avogadro's Law tell us that the volume of gas increases as the amount of gas increases. "Sulphuric acid" is called the king of acids and "Nitric acid" is called the Queen of acids. There are changes all around us like sugar dissolves in water, the lake freezes in winter etc. Some changes are what scientists call chemical changes and some are not. A chemical change takes place when new substances are made that are different from the substances that we started with. Yes Cooking eggs, for instance, is an example of a chemical change; the egg white and egg yolk change from liquid to solid. The heat makes the proteins in the egg hardens. Aqua Regia is the King's Water, this is because it is strong enough to dissolve gold – the king of metals. It is prepared by mixing three parts of hydrochloric acid with one part nitric acid but in olden days it is prepared to mix and distill salts. For example, we can mix two parts niter with one part Sal. Ammoniac and distill at a high temperature to form Aqua Regia. "Sulphuric acid" is called the king of acids and "Nitric acid" is called the Queen of acids. Chemistry is the science that studies atoms and molecules along with their properties. All matter is composed of atoms and molecules. There are 5 main branches of chemistry are Organic chemistry Inorganic chemistry Physical chemistry Biochemistry Analytical chemistry Organic chemistry is simply the study of carbon compounds. Organic chemistry is important because it is life studies and all life-related chemical reactions. Organic chemistry initially involves the study of compounds that could be obtained from living organisms. Approximately 7 million different organic compounds are known present while there are only 1.5 million known inorganic compounds. This large number of organic compounds arise from the unique property of carbon. Blue vitriol is also known as blue copperas. The word blue vitriol has a strict and definite meaning. It means sulphate of copper with the chemical formula $CuSO4.5H2O$. The chemical name for blue vitriol is Copper (II) Sulphate Pentahydrate. This salt occurs in the form of rhomboidal prisms of a deep blue colour, having an exceedingly harsh and styptic taste. Similarly, "Green Vitriol" refers to Ferrous Sulphate. Put your understanding of this concept to test by answering a few MCQs. Click 'Start Quiz' to begin! Select the correct answer and click on the "Finish" buttonCheck your score and answers at the end of the quiz Visit BYJU'S for all Chemistry related queries and study materials 0 out of 0 arewrong 0 out of 0 are correct 0 out of 0 are Unattempted View Quiz Answers and Analysis The periodic table of elements is widely used in the field of Chemistry to look up chemical elements as they are arranged in a manner that displays periodic trends in the chemical properties of the elements. However, the Periodic table generally displays only the symbol of the element and not its entire name. Most of the symbols are similar to the name of the element but some symbols of elements have Latin roots. An example for this is silver which is denoted by Ag from its Latin name "Argentum". Another such example would be the symbol 'Fe' which is used to denote Iron and can be traced to the Latin word for iron, "Ferrum". It could prove difficult for a beginner in chemistry to learn the names of all the elements in the periodic table because these symbols do not always correspond to the English names of the elements. Practise more on Interactive Periodic Table A list of 118 elements and their symbols and atomic numbers is provided below: 118 Elements and Their Symbols and Atomic Numbers Recommended Videos Periodic Table in 60 seconds The list of 118 Elements and their symbols and atomic numbers will prove useful to beginners in chemistry. To learn more about how elements are classified in the periodic table, visit BYJU'S. Related Topics Also, check ⇒ Chemistry Concept Questions and Answers The atomic number of an atom is equivalent to the total number of electrons present in a neutral atom or the total number of protons present in the nucleus of an atom.An element is a substance that can not be decomposed into simpler substances by ordinary chemical processes. It is the fundamental unit of the matter.There is a total of 118 elements present in the modern periodic table.A chemical symbol is a notation of one or two letters denoting a chemical element. Example: The symbol of chlorine is Cl.The first letter is always capitalised for writing the chemical symbol of an element, while the second letter is small.Chemical symbols play a crucial role in easing the writing. It is universal, i.e. identical throughout the world.The chemical symbol of sodium metal is Na.Helium is the smallest atom with a radius of 31 pm, while the caesium is the largest atom with a radius of 298 pm.Yes, there is an isotope of the hydrogen atom, protium, which has no neutron.The chemical symbol of gold metal is Au. Put your understanding of this concept to test by answering a few MCQs. Click 'Start Quiz' to begin! Select the correct answer and click on the "Finish" buttonCheck your score and answers at the end of the quiz Visit BYJU'S for all Chemistry related queries and study materials 0 out of 0 arewrong 0 out of 0 are correct 0 out of 0 are Unattempted View Quiz Answers and Analysis A mole is simply a unit of measurement. It's one of the seven base units in the International System of Units (SI). New units are invented when existing units are inadequate. For example, chemical reactions often take place at levels where using grams wouldn't make sense, yet using absolute numbers of atoms, molecules, or ions would be confusing, too. So, scientists invented the mole to bridge the gap between exceptionally small and exceptionally large numbers. Here's a look at what a mole is, why we use moles, and how to convert between moles and grams. The mole is an SI unit used to measure the amount of any substance. The abbreviation for mole is mol. One mole is exactly 6.02214076×10^{23} particles. The "particles" could be something small, like electrons or atoms, or something large, like elephants or stars. Like all units, a mole has to be defined or based on something reproducible. The present definition of the mole is defined, but it used to be based on the number of atoms in a sample of the isotope carbon-12. Today, a mole is Avogadro's number of particles, which is exactly 6.02214076×10^{23}. For all practical purposes, the mass of one mole of a compound in grams is approximately equal to the mass of one molecule of the compound in daltons. Originally, a mole was the quantity of anything that has the same number of particles found in 12.000 grams of carbon-12. That number of particles is Avogadro's number, which is roughly $6.02\text{x}10^{23}$. A mole of carbon atoms is $6.02\text{x}10^{23}$ carbon atoms. A mole of chemistry teachers is $6.02\text{x}10^{23}$ chemistry teachers. It's a lot easier to write the word 'mole' than to write '$6.02\text{x}10^{23}$' anytime you want to refer to a large number of things. That's why this particular unit was invented. Why don't we simply stick with units like grams (and nanograms and kilograms, etc.)? The answer is that moles give us a consistent method to convert between atoms or molecules and grams. It's simply a convenient unit to use when performing calculations. You may not find it too convenient when you're first learning how to use it, but once you become familiar with it, a mole will be as normal a unit as, say, a dozen or a byte. Converting moles of a substance into grams is one of the most common chemistry calculations. When you balance equations, you'll use the mole ratio between reactants and reagents. To do this conversion, all you need is a periodic table or another list of atomic masses. Example: How many grams of carbon dioxide is 0.2 moles of CO2? Look up the atomic masses of carbon and oxygen. This is the number of grams per mole of atoms. Carbon (C) has 12.01 grams per mole.Oxygen (O) has 16.00 grams per mole. One molecule of carbon dioxide contains 1 carbon atom and 2 oxygen atoms, so: number of grams per mole $CO2 = 12.01 + [2 \times 16.00]$number of grams per mole $CO2 = 12.01 + 32.00$number of grams per mole $CO2 = 44.01$ gram/mole Simply multiply this number of grams per mole times the number of moles you have to get the final answer: grams in 0.2 moles of $CO2 = 0.2$ moles x 44.01 grams/molegrams in 0.2 moles of $CO2 = 8.80$ grams It's good practice to make certain units cancel out to give you the one you need. In the case above, the moles canceled out of the calculation, leaving you with grams. You can also convert grams to moles. Andreas, Birk; et al. (2011). "Determination of the Avogadro Constant by Counting the Atoms in a 28Si Crystal". Physical Review Letters. 106 (3): 30801. doi:10.1103/PhysRevLett.106.030801de Bièvre, Paul; Peiser, H. Steffen (1992). "'Atomic Weight' — The Name, Its History, Definition, and Units". Pure and Applied Chemistry. 64 (10): 1535–43. doi:10.1351/pac199264101535Himmelblau, David (1996). Basic Principles and Calculations in Chemical Engineering (6 ed.). ISBN 978-0-13-305798-0.International Bureau of Weights and Measures (2006). The International System of Units (SI) (8th ed.). ISBN 92-822-2213-6.Yunus A. Çengel; Boles, Michael A. (2002). Thermodynamics: An Engineering Approach (8th ed.). TN: McGraw Hill. ISBN 9780073398174. Chemistry explains things like cooking, cleaning, and how medicines work in our bodies.Chemistry is important in solving environmental problems and helps decide how to clean up our surroundings.Studying chemistry is vital for careers like doctor, pharmacist, and environmental scientist because it involves all sciences. What is the importance of chemistry and why would you want to learn about it? Chemistry is the study of matter and its interactions with other matter and energy. Here's a look at the importance of chemistry and why you should study it. Chemistry has a reputation for being a complicated and boring science, but for the most part, that reputation is undeserved. Fireworks and explosions are based on chemistry, so it's definitely not a boring science. If you take classes in chemistry, you'll apply math and logic, which can make studying chemistry a challenge if you are weak in those areas. However, anyone can understand the basics of how things work, and that's the study of chemistry. In a nutshell, the importance of chemistry is that it explains the world around you. Cooking: Chemistry explains how food changes as you cook it, how it rots, how to preserve food, how your body uses the food you eat, and how ingredients interact to make food. Cleaning: Part of the importance of chemistry is it explains how cleaning works. You use chemistry to help decide what cleaner is best for dishes, laundry, yourself, and your home. You use chemistry when you use bleaches and disinfectants, even ordinary soap and water. How do they work? That's chemistry. Medicine: You need to understand basic chemistry so you can understand how vitamins, supplements, and drugs can help or harm you. Part of the importance of chemistry lies in developing and testing new medical treatments and medicines. Environmental Issues: Chemistry is at the heart of environmental issues. What makes one chemical a nutrient and another chemical a pollutant? How can you clean up the environment? What processes can produce the things you need without harming the environment? We humans are all chemists. We use chemicals every day and perform chemical reactions without thinking much about them. Chemistry is important because everything you do is chemistry! Even your body is made of chemicals. Chemical reactions occur when you breathe, eat, or just sit there reading. All matter is made of chemicals, so the importance of chemistry is that it's the study of everything. Everyone can and should understand basic chemistry, but it may be important for you to take a course in chemistry or even make a career out of it. It's important to understand chemistry if you are studying any of the sciences because all of the sciences involve matter and the interactions between types of matter. Students wanting to become doctors, nurses, physicists, nutritionists, geologists, pharmacists, and (of course) chemists all study chemistry. You might want to make a career out of chemistry because chemistry-related jobs are plentiful and high-paying. The importance of chemistry won't be diminished over time, so it will remain a promising career path. Chemistry happens in the world around you, not just in a lab. Matter interacts to form new products through a process called a chemical reaction or chemical change. Every time you cook or clean, it's chemistry in action. Your body lives and grows thanks to chemical reactions. There are reactions when you take medications, light a match, and draw a breath. These examples of chemical reactions from everyday life are a small sampling of the hundreds of thousands of reactions you experience as you go about your day. Chemical reactions are common in daily life, but you may not recognize them.Look for signs of a reaction. Chemical reactions often involve color changes, temperature changes, gas production, or precipitant formation.Simple examples of everyday reactions include digestion, combustion, and cooking. A chemical change, often called a chemical reaction, occurs when substances transform into new and distinct substances. Essentially, it involves the rearrangement of atoms. Generally, chemical changes can be identified by temperature changes, light emission, bubble formation, precipitate formation, color changes, and odor release. These effects signify a change in composition, but they may not always be immediately apparent. Usually, chemical changes are permanent, so they cannot be undone. Conversely, physical changes do not create new substances and can be reversed. Understanding these distinctions is fundamental to the study of chemistry. Frank Krahmer / Getty Images Plants apply a chemical reaction called photosynthesis to convert carbon dioxide and water into food (glucose) and oxygen. It's one of the most common everyday chemical reactions and also one of the most important because this is how plants produce food for themselves (and animals) and convert carbon dioxide into oxygen. The equation for the reaction is: $6\ CO2 + 6\ H2O + \text{light} \rightarrow C6H12O6 + 6\ O2$ Kateryna Kon/Science Photo Library / Getty Images Aerobic cellular respiration is the opposite process of photosynthesis in that energy molecules are combined with the oxygen we breathe to release the energy needed by our cells plus carbon dioxide and water. Energy used by cells is chemical energy in the form of ATP, or adenosine triphosphate. Here is the overall equation for aerobic cellular respiration: $C6H12O6 + 6O2 \rightarrow 6CO2 + 6H2O + \text{energy (36 ATPs)}$ Tastyart Ltd Rob White / Getty Images Anaerobic respiration is a set of chemical reactions that allows cells to gain energy from complex molecules without oxygen. Your muscle cells perform anaerobic respiration whenever you exhaust the oxygen being delivered to them, such as during intense or prolonged exercise. Anaerobic respiration by yeast and bacteria is harnessed for fermentation to produce ethanol, carbon dioxide, and other chemicals that make cheese, wine, beer, yogurt, bread, and many other common products. The overall chemical equation for one form of anaerobic respiration is: $C6H12O6 \rightarrow 2C2H5OH + 2CO2 + \text{energy}$ WIN-Initiative / Getty Images Every time you strike a match, burn a candle, build a fire, or light a grill, you see the combustion reaction. Combustion combines energetic molecules with oxygen to produce carbon dioxide and water. For example, the equation for the combustion reaction of propane, found in gas grills and some fireplaces, is: $C3H8 + 5O2 \rightarrow 4H2O + 3CO2 + \text{energy}$ Alex Dowden/EyeEm / Getty Images Over time, iron develops a red, flaky coating called rust. This is an example of an oxidation reaction. Other everyday examples include the formation of verdigris on copper and the tarnishing of silver. Here is the chemical equation for the rusting of iron: $Fe + O2 + H2O \rightarrow Fe2O3.\ XH2O$ Peter Dazeley/Photographer's Choice / Getty Images Thousands of chemical reactions take place during digestion. As soon as you put food in your mouth, an enzyme in your saliva called amylase starts to break down sugars and other carbohydrates into simpler forms your body can absorb. Hydrochloric acid in your stomach reacts with food to further break it down, while enzymes cleave proteins and fats so they can be absorbed into your bloodstream through the walls of the intestines. Lumina Imaging / Getty Images Whenever you combine an acid (e.g., vinegar, lemon juice, sulfuric acid, or muriatic acid) with a base (e.g., baking soda, soap, ammonia, or acetone), you are performing an acid-base reaction. These reactions neutralize the acid and base to yield salt and water. Sodium chloride isn't the only salt that can be formed. For example, here is the chemical equation for an acid-base reaction that produces potassium chloride, a common table salt substitute: $HCl + KOH \rightarrow KCl + H2O$ JGI/Jamie Grill / Getty Images Soaps and detergents clean by way of chemical reactions. Soap emulsifies grime, which means oily stains bind to the soap so they can be lifted away with water. Detergents act as surfactants, lowering the surface tension of water so it can interact with oils, isolate them, and rinse them away. Dina Belenko Photography / Getty Images Cooking uses heat to cause chemical changes in food. For example, when you hard boil an egg, the hydrogen sulfide produced by heating the egg white can react with iron from the egg yolk to form a grayish-green ring around the yolk. When you brown meat or baked goods, the Maillard reaction between amino acids and sugars produces a brown color and a desirable flavor. Chemical reactions are everywhere, and in a way, chemistry really makes up everything. From the emotions you feel to peculiar questions such as, "Can bottled water go bad?" Here are some examples of chemistry in everyday life. General chemistry is the study of matter, energy, and the interactions between the two. The main chemistry topics include acids and bases, atomic structure, the periodic table, chemical bonds, and chemical reactions. Anchalee Phanmaha / Getty Images Acids, bases, and pH are concepts that apply to aqueous solutions (solutions in water). pH refers to the hydrogen ion concentration, or the ability of a species to donate/accept protons or electrons. Acids and bases reflect the relative availability of hydrogen ions or proton/electron donors or acceptors. Acid-base reactions are extremely important in living cells and industrial processes. Hero Images / Getty Images Atoms are composed of protons, neutrons, and electrons. Protons and neutrons form the nucleus of each atom, with electrons moving around this core. The study of atomic structure involves understanding the composition of atoms, isotopes, and ions. Dragan Smiljkovic / Getty Images Electrochemistry is a chemistry topic that's primarily concerned with oxidation-reduction reactions or redox reactions. These reactions produce ions and may be harnessed to produce electrodes and batteries. Electrochemistry is used to predict whether a reaction will occur and in which direction electrons will flow. Chemistry is a science that relies on experimentation, which often involves taking measurements and performing calculations based on those measurements. It is important to be familiar with the units of measurement and the various ways of converting between different units. Thermochemistry is the general chemistry topic that relates to thermodynamics. It is sometimes called physical chemistry. Thermochemistry involves the concepts of entropy, enthalpy, Gibbs free energy, standard state conditions, and energy diagrams. It also includes the study of temperature, calorimetry, endothermic reactions, and exothermic reactions. SDI Productions / Getty Images Atoms and molecules join together through ionic and covalent bonding. Related chemistry topics include electronegativity, oxidation numbers, and Lewis electron dot structure. STEVE HORRELL / SPL / Getty Images The periodic table is a systematic way of organizing the chemical elements. The elements exhibit periodic properties that can be used to predict their characteristics, including the likelihood that they will form compounds and participate in chemical reactions. Witthaya Prasongsin / Getty Images It is important to learn how to balance chemical equations and how different factors affect the rate and yield of chemical reactions. An important part of general chemistry is learning about different types of solutions and mixtures and how to calculate concentrations. This category includes topics such as colloids, suspensions, and dilutions. There are many branches of chemistry or chemistry disciplines. The five main branches are organic chemistry, inorganic chemistry, analytical chemistry, physical chemistry, and biochemistry. Traditionally, the five main branches of chemistry are organic chemistry, inorganic chemistry, analytical chemistry, physical chemistry, and biochemistry. However, sometimes biochemistry is considered a subdiscipline of organic chemistry. The branches of chemistry overlap those of physics and biology. There is also some overlap with engineering. Within each major discipline, there are many subdivisions. Chemistry, like physics and biology, is a natural science. In fact, there is considerable overlap between chemistry and these other disciplines. Chemistry is a science that studies matter. This includes atoms, compounds, chemical reactions, and chemical bonds. Chemists explore the properties of matter, its structure, and how it interacts with other matter. Organic Chemistry: Organic chemistry is the study of carbon and its compounds. It is the study of the chemistry of life and reactions occurring in living organisms. An organic chemistry student might study organic reactions, the structure and properties of organic molecules, polymers, drugs, or fuels. Inorganic Chemistry: Inorganic chemistry is the study of compounds not covered by organic chemistry. It is the study of inorganic compounds or compounds that don't contain a C-H bond. A few inorganic compounds do contain carbon, but most contain metals. Topics of interest to inorganic chemists include ionic compounds, organometallic compounds, minerals, cluster compounds, and solid-state compounds. Analytical Chemistry: Analytical chemistry is the study of the chemistry of matter and the development of tools to measure the properties of matter. Analytical chemistry includes quantitative and qualitative analysis, separations, extractions, distillation, spectrometry and spectroscopy, chromatography, and electrophoresis. Analytical chemists develop standards, chemical methods, and instrumental methods. Physical Chemistry: Physical chemistry is the branch of chemistry that applies physics to the study of chemistry, which commonly includes the applications of thermodynamics and quantum mechanics to chemistry. Biochemistry: Biochemistry is the study of chemical processes that occur inside living organisms. Examples of key molecules include proteins, nucleic acids, carbohydrates, lipids, drugs, and neurotransmitters. Sometimes this discipline is considered a subdiscipline of organic chemistry. Biochemistry is closely related to molecular biology, cell biology, and genetics. There are other ways chemistry can be divided into categories. Depending on who you ask, other disciplines might be included as a main branch of chemistry. Other examples of branches of chemistry include: Astrochemistry: Astrochemistry examines the abundance of elements and compounds in the universe, their reactions to each other, and the interaction between radiation and matter. Chemical Kinetics: Chemical kinetics (or simply "kinetics") studies the rates of chemical reactions and processes and the factors that affect them. Electrochemistry: Electrochemistry examines the movement of charge in chemical systems. Often, electrons are the charge carriers, but the discipline also investigates the behavior of ions and protons. Green Chemistry: Green chemistry looks at ways of minimizing the environmental impact of chemical processes. This includes remediation as well as ways of improving processes to make them more eco-friendly. Geochemistry: Geochemistry examines the nature and properties of geological materials and processes. Nuclear Chemistry: While most forms of chemistry mainly deal with interactions between electrons in atoms and molecules, nuclear chemistry explores the reactions between protons, neutrons, and subatomic particles. Polymer Chemistry: Polymer chemistry deals with the synthesis and properties of macromolecules and polymers. Quantum Chemistry: Quantum chemistry applies quantum mechanics to model and explore chemical systems. Radiochemistry: Radiochemistry explores the nature of radioisotopes, the effects of radiation on matter, and the synthesis of radioactive elements and compounds. Theoretical Chemistry: Theoretical chemistry is the branch of chemistry that applies mathematics, physics, and computer programming to answer chemistry questions. Greenwood, Norman N.; Earnshaw, Alan (1997). Chemistry of the Elements (2nd ed.). Butterworth-Heinemann. ISBN 978-0-08-037941-8.Laidler, Keith (1993). The World of Physical Chemistry. Oxford: Oxford University Press. ISBN 0-19-855919-4.Skoog, Douglas A.; Holler, F. James; Crouch, Stanley R. (2007). Principles of Instrumental Analysis. Belmont, CA: Brooks/Cole, Thomson. ISBN 978-0-495-01201-6.Sørensen, Torben Smith (1999). Surface Chemistry and Electrochemistry of Membranes. CRC Press. ISBN 0-8247-1922-0.Streitwieser, Andrew; Heathcock, Clayton H.; Kosower, Edward M. (2017). Introduction to Organic Chemistry. New Delhi: Medtech. ISBN 978-93-85998-89-8. Store and/or access information on a device. Use limited data to select advertising. Create profiles for personalised advertising. Use profiles to select personalised advertising. Create profiles to personalise content. Use profiles to select personalised content. Measure advertising performance. Measure content performance. Understand audiences through statistics or combinations of data from different sources. Develop and improve services. Use limited data to select content.