Chapter 1 : Chapter 1: The Nature of Science

Check out our video on "Introduction to Science" We see a lot of events happening around us everyday. There has to be a logical explanation for every one of those. right?

I NQUIRY Fundamentally, the various scientific disciplines are alike in their reliance on evidence, the use of hypothesis and theories, the kinds of logic used, and much more. Nevertheless, scientists differ greatly from one another in what phenomena they investigate and in how they go about their work; in the reliance they place on historical data or on experimental findings and on qualitative or quantitative methods; in their recourse to fundamental principles; and in how much they draw on the findings of other sciences. Still, the exchange of techniques, information, and concepts goes on all the time among scientists, and there are common understandings among them about what constitutes an investigation that is scientifically valid. Scientific inquiry is not easily described apart from the context of particular investigations. There simply is no fixed set of steps that scientists always follow, no one path that leads them unerringly to scientific knowledge. There are, however, certain features of science that give it a distinctive character as a mode of inquiry. Although those features are especially characteristic of the work of professional scientists, everyone can exercise them in thinking scientifically about many matters of interest in everyday life. Science Demands Evidence Sooner or later, the validity of scientific claims is settled by referring to observations of phenomena. Hence, scientists concentrate on getting accurate data. Such evidence is obtained by observations and measurements taken in situations that range from natural settings such as a forest to completely contrived ones such as the laboratory. To make their observations, scientists use their own senses, instruments such as microscopes that enhance those senses, and instruments that tap characteristics quite different from what humans can sense such as magnetic fields. In some circumstances, scientists can control conditions deliberately and precisely to obtain their evidence. They may, for example, control the temperature, change the concentration of chemicals, or choose which organisms mate with which others. By varying just one condition at a time, they can hope to identify its exclusive effects on what happens, uncomplicated by changes in other conditions. Often, however, control of conditions may be impractical as in studying stars , or unethical as in studying people , or likely to distort the natural phenomena as in studying wild animals in captivity. In such cases, observations have to be made over a sufficiently wide range of naturally occurring conditions to infer what the influence of various factors might be. Because of this reliance on evidence, great value is placed on the development of better instruments and techniques of observation, and the findings of any one investigator or group are usually checked by others. But they tend to agree about the principles of logical reasoning that connect evidence and assumptions with conclusions. Scientists do not work only with data and well-developed theories. Often, they have only tentative hypotheses about the way things may be. Such hypotheses are widely used in science for choosing what data to pay attention to and what additional data to seek, and for guiding the interpretation of data. In fact, the process of formulating and testing hypotheses is one of the core activities of scientists. To be useful, a hypothesis should suggest what evidence would support it and what evidence would refute it. A hypothesis that cannot in principle be put to the test of evidence may be interesting, but it is not likely to be scientifically useful. The use of logic and the close examination of evidence are necessary but not usually sufficient for the advancement of science. Scientific concepts do not emerge automatically from data or from any amount of analysis alone. Inventing hypotheses or theories to imagine how the world works and then figuring out how they can be put to the test of reality is as creative as writing poetry, composing music, or designing skyscrapers. Sometimes discoveries in science are made unexpectedly, even by accident. But knowledge and creative insight are usually required to recognize the meaning of the unexpected. Aspects of data that have been ignored by one scientist may lead to new discoveries by another. Science Explains and Predicts Scientists strive to make sense of observations of phenomena by constructing explanations for them that use, or are consistent with, currently accepted scientific principles. The credibility of scientific theories often comes from their ability to show relationships among phenomena that previously seemed unrelated. The theory of moving continents, for example, has grown in credibility as it has shown relationships among such diverse phenomena as earthquakes, volcanoes, the match between types of fossils on different continents, the shapes of continents, and the contours of the ocean floors. The essence of science is validation by observation. But it is not enough for scientific theories to fit only the observations that are already known. Theories should also fit additional observations that were not used in formulating the theories in the first place; that is, theories should have predictive power. Demonstrating the predictive power of a theory does not necessarily require the prediction of events in the future. The predictions may be about evidence from the past that has not yet been found or studied. A theory about the origins of human beings, for example, can be tested by new discoveries of human-like fossil remains. This approach is clearly necessary for reconstructing the events in the history of the earth or of the life forms on it. It is also necessary for the study of processes that usually occur very slowly, such as the building of mountains or the aging of stars. Stars, for example, evolve more slowly than we can usually observe. Theories of the evolution of stars, however, may predict unsuspected relationships between features of starlight that can then be sought in existing collections of data about stars. Scientists Try to Identify and Avoid Bias When faced with a claim that something is true, scientists respond by asking what evidence supports it. But scientific evidence can be biased in how the data are interpreted, in the recording or reporting of the data, or even in the choice of what data to consider in the first place. Bias attributable to the investigator, the sample, the method, or the instrument may not be completely avoidable in every instance, but scientists want to know the possible sources of bias and how bias is likely to influence evidence. Scientists want, and are expected, to be as alert to possible bias in their own work as in that of other scientists, although such objectivity is not always achieved. One safeguard against undetected bias in an area of study is to have many different investigators or groups of investigators working in it. Science Is Not Authoritarian It is appropriate in science, as elsewhere, to turn to knowledgeable sources of information and opinion, usually people who specialize in relevant disciplines. But esteemed authorities have been wrong many times in the history of science. In the long run, no scientist, however famous or highly placed, is empowered to decide for other scientists what is true, for none are believed by other scientists to have special access to the truth. There are no preestablished conclusions that scientists must reach on the basis of their investigations. In the short run, new ideas that do not mesh well with mainstream ideas may encounter vigorous criticism, and scientists investigating such ideas may have difficulty obtaining support for their research. Indeed, challenges to new ideas are the legitimate business of science in building valid knowledge. Even the most prestigious scientists have occasionally refused to accept new theories despite there being enough accumulated evidence to convince others. In the long run, however, theories are judged by their results: When someone comes up with a new or improved version that explains more phenomena or answers more important questions than the previous version, the new one eventually takes its place.

Chapter 2 : Basic research - Wikipedia

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History of science Science in a broad sense existed before the modern era and in many historical civilizations. In particular, it was the type of knowledge which people can communicate to each other and share. For example, knowledge about the working of natural things was gathered long before recorded history and led to the development of complex abstract thought. This is shown by the construction of complex calendars, techniques for making poisonous plants edible, public works at national scale, such as those which harnessed the floodplain of the Yangtse with reservoirs, [25] dams, and dikes, and buildings such as the Pyramids. However, no consistent conscious distinction was made between knowledge of such things, which are true in every community, and other types of communal knowledge, such as mythologies and legal systems. It is thought that early experimentation with heating and mixing of substances over time developed into alchemy. Early cultures Main article: History of science in early cultures Clay models of animal livers dating between the nineteenth and eighteenth centuries BCE, found in the royal palace in Mari, Syria Neither the words nor the concepts "science" and "nature" were part of the conceptual landscape in the ancient near east. Nature philosophy In the classical world, there is no real ancient analog of a modern scientist. Instead, well-educated, usually upper-class, and almost universally male individuals performed various investigations into nature whenever they could afford the time. For this reason, it is claimed these men were the first philosophers in the strict sense, and also the first people to clearly distinguish "nature" and "convention. They were mainly speculators or theorists , particularly interested in astronomy. This was a reaction to the Sophist emphasis on rhetoric. The Socratic method searches for general, commonly held truths that shape beliefs and scrutinizes them to determine their consistency with other beliefs. Socrates was later, in the words of his Apology, accused of corrupting the youth of Athens because he did "not believe in the gods the state believes in, but in other new spiritual beings". Socrates refuted these claims, [43] but was sentenced to death. Motion and change is described as the actualization of potentials already in things, according to what types of things they are. In his physics, the Sun goes around the Earth, and many things have it as part of their nature that they are for humans. Each thing has a formal cause , a final cause , and a role in a cosmic order with an unmoved mover. The Socratics also insisted that philosophy should be used to consider the practical question of the best way to live for a human being a study Aristotle divided into ethics and political philosophy. Aristotle maintained that man knows a thing scientifically "when he possesses a conviction arrived at in a certain way, and when the first principles on which that conviction rests are known to him with certainty". During late antiquity, in the Byzantine empire many Greek classical texts were preserved. Many Syriac translations were done by groups such as the Nestorians and Monophysites. Medieval science postulated a ventricle of the brain as the location for our common sense , [53]: Byzantine science , Science in the medieval Islamic world , and European science in the Middle Ages Because of the collapse of the Western Roman Empire due to the Migration Period an intellectual decline took place in the western part of Europe in the s. In contrast, the Byzantine Empire resisted the attacks from the barbarians, and preserved and improved upon the learning. However, the general fields of science or " natural philosophy " as it was called and much of the general knowledge from the ancient world remained preserved through the works of the early Latin encyclopedists like Isidore of Seville. In the Byzantine empire , many Greek classical texts were preserved. Al-Kindi â€” was the first of the Muslim Peripatetic philosophers, and is known for his efforts to introduce Greek and Hellenistic philosophy to the Arab world. In addition, classical Greek texts started to be translated from Arabic and Greek into Latin, giving a higher level of scientific discussion in Western Europe. Demand for Latin translations grew for example, from the Toledo School of Translators ; western Europeans began collecting texts written not only in Latin, but also Latin translations from Greek, Arabic, and Hebrew. The influx of ancient texts caused the Renaissance of the 12th century and the flourishing of a synthesis of Catholicism and Aristotelianism known as Scholasticism in western Europe , which became a new geographic center of science. An experiment in this period would be understood as a careful process of observing, describing, and classifying. Renaissance and early modern science Astronomy became more accurate after Tycho Brahe devised his scientific instruments for measuring angles between two celestial bodies , before the invention of the telescope. Scholars slowly came to realize that the universe itself might well be devoid of both purpose and ethical imperatives. The development from a physics infused with goals, ethics, and spirit, toward a physics where these elements do not play an integral role, took centuries. This allowed the theoretical possibility of vacuum and motion in a vacuum. A direct result was the emergence of the science of dynamics. New developments in optics played a role in the inception of the Renaissance , both by challenging long-held metaphysical ideas on perception, as well as by contributing to the improvement and development of technology such as the camera obscura and the telescope. Before what we now know as the Renaissance started, Roger Bacon , Vitello , and John Peckham each built up a scholastic ontology upon a causal chain beginning with sensation, perception, and finally apperception of the individual and universal forms of Aristotle. He found that all the light from a single point of the scene was imaged at a single point at the back of the glass sphere. The optical chain ends on the retina at the back of the eye. Kepler did not reject Aristotelian metaphysics, and described his work as a search for the Harmony of the Spheres. Galileo Galilei , regarded as the father of modern science. Descartes emphasized individual thought and argued that mathematics rather than geometry should be used in order to study nature. Bacon emphasized the importance of experiment over contemplation. Bacon further questioned the Aristotelian concepts of formal cause and final cause, and promoted the idea that science should study the laws of "simple" natures, such as heat, rather than assuming that there is any specific nature, or " formal cause ", of each complex type of thing. This new science began to see itself as describing " laws of nature ". This updated approach to studies in nature was seen as mechanistic. Bacon also argued that science should aim for the first time at practical inventions for the improvement of all human life. Age of Enlightenment Main article: Age of Enlightenment Isaac Newton , shown here in a portrait, made seminal contributions to classical mechanics , gravity , and optics. Newton shares credit with Gottfried Leibniz for the development of calculus. As a precursor to the Age of Enlightenment , Isaac Newton and Gottfried Wilhelm Leibniz succeeded in developing a new physics, now referred to as classical mechanics , which could be confirmed by experiment and explained using mathematics. Leibniz also incorporated terms from Aristotelian physics , but now being used in a new non-teleological way, for example, " energy " and " potential " modern versions of Aristotelian " energeia and potentia ". This implied a shift in the view of objects: Where Aristotle had noted that objects have certain innate goals that can be actualized, objects were now regarded as devoid of innate goals. In the style of Francis Bacon, Leibniz assumed that different types of things all work according to the same general laws of nature, with no special formal or final causes for each type of thing. Societies and academies were also the backbone of the maturation of the scientific profession. Another important development was the popularization of science among an increasingly literate population. Some historians have marked the 18th century as a drab period in the history of science ; [79] however, the century saw significant advancements in the practice of medicine , mathematics , and physics ; the development of biological taxonomy ; a new understanding of magnetism and electricity ; and the maturation of chemistry as a discipline, which established the foundations of modern chemistry. In this respect, the lessons of history and the social structures built upon it could be discarded. The nineteenth century is a particularly important period in the history of science since during this era many distinguishing characteristics of contemporary modern science began to take shape such as: Combustion and chemical reactions were studied by Michael Faraday and reported in his lectures before the Royal Institution: The Chemical History of a Candle , Both John Herschel and William Whewell systematized methodology: His theory of natural selection provided a natural explanation of how species originated, but this only gained wide acceptance a century later. The laws of conservation of energy , conservation of momentum and conservation of mass suggested a highly stable universe where there could be little loss of resources. With the advent of the steam engine and the industrial revolution , there was, however, an increased understanding that all forms of energy as defined by Newton were not equally useful; they did not have the same energy quality. This realization led to the development of the laws of thermodynamics , in which the cumulative energy quality of the universe is seen as constantly declining: The phenomena that would allow the deconstruction of the atom were discovered in the last decade of the 19th century: In the next year came the discovery of the first subatomic particle, the electron.

Chapter 4 : Basic Science Practice Questions and Answers - Increase your score!

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Then do the BRS questions and Michigan anatomy questions. Biochem- read the last review page of each chapter of lippo and memorize every diagram. Read BRS as well. Then go do BRS questions and pre-test questions which are very similar to Dr. No reason to get below a B in the course and 64 shelf. Oh and last, open your 1st page in first aid of the biochem section pg92 and there is a whole page of diagram of biochem metabolism Take 10 minutes of everyday and write this thing down on paper until you can write it without having to look at first aid. This is very important! I think you can get above a 58 on shelf just by knowing this page alone. L loves to ask detailed questions about this stuff as well. Just read the book and try and do Kaplan questions for the final. This course was one of 2 Cs I got in basic sciences. Dont memorize but try and understand the concepts. Then go and do pre-test questions. Course isnt as hard as everyone makes it. The key is to do lots of questions and apply the info you read. He is a smart kid so his notes should be more than enough. G is a really good prof as well. Micro-Get "Microcards" by Sanjiv Harpavat and memorize these suckers. Make it a point to go over at least 30 cards a day. Also know the trees on the front of these cards cold. In order to get above a 64 on shelf you need to know that for alot of lab stuff, for example: Papillomavirus is icosahedral, non-enveloped, double strand circular, papovaviridae family. Shelf loves to ask whether a virus ids double, single strand? You should start this process the first week of school and do it till the course ends. As a matter of fact, since attendance was required for micro, thats all I did when I went to class I would write out these trees. BRS is really good also. Then last, skim through the slides for extra info that may not be in the book. Class isnt as hard as everyone makes it out to be. Just read BRS and skim over Goljan rapid review. Then make sure and go do the path slides on webpath, then do the webpath questions twice. Webpath should be your bible. Also, go over all the pics in robbins. Immuno- BRS and first aid. I took this course during block and got a C so I cant really give good advice on the course. You need it for the step so might as well get them by 4th. They are the best practice for 4th and you will not get below a B in any 4th semi course if you do these questions during 4th. Path 2-Go over Dr. K slides and webpath. BRS is really good! They are awesome and great for review. If you want an A in the course, you need to get the cards. K knows his path and you can trust his slides. It also doesnt hurt to do robbins questions. Oh yeah, and go over all the pics and diagrams in robbins. Also rapid review Goljan. Path is the backbone of medicine so there is never "too many" books to read. ICM- I heard Dr. F is in charge of ICM now Anyways, those lange flashcards are money for ICM. Also, go over first aid organs which is the 2nd half of the book. Pre-test pathophysio are pretty good questions also. First aid also has two other books called first aid questions and first aid cases. M for ICM used to take questions straight out of the first aid cases book and put them on our exams. He loved this book. You must get these two books. Pharm- Get pharm mnemonics flash cards. They will make your life alot easier. I thought they are really well written. You need flashcards for pharm! Its an alright book. A little light, but is enough to make above 80s on his exams BRS questions are pretty good too. The most important thing that helped me rock the courses was not reading the material 10 times. I think thats a big waste of time. Reda the material once, then take 15 minutes the next day and skim over it and your done reading! The only way to apply the info is to do practice questions till your eyes bleed. Its all about the explanation! You always have to ask yourself: Break down your thought process and see why you got it wrong. When I say concept, I mean the pathophysiology of the disease. Step and shelf questions are tertiary questions Every student I knew who got above a 3. I cannot stress this enough!! Take 3 hrs and read first aid for that particular course and spend most of your time doing questions. I never got below a 64 on a shelf. I used to see students reading the slides and going over first aid 10 times You already read the material during the course, dont bother going back. Last, there is a website called medstudent. It has links for every subject in med school. Some of these sites are priceless! Peace Last edited by Agraphia; at

Chapter 5 : Science - Wikipedia

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Developmental disorder of the portobiliary system characterized histologically by defective remodeling of the ductal plate, abnormal branching of the intrahepatic portal veins, and progressive fibrosis of the portal tracts; heredity: Cholestasis Cholestatic liver disease and disruption of proper bile secretion leads to liver damage, inflammation, and fibrosis. Mechanistically, hepatic accumulation of bile compounds consisting of salts and strong detergents causes unspecific cellular damage and initiation of a cascade of inflammatory and fibrogenic events in the liver. Moreover, direct mechanical obstruction of the bile flow from the liver into the duodenum, termed extrahepatic cholestasis, caused by neoplastic invasion of the biliary tree e. Alcohol An overwhelming number of patients with excessive alcohol consumption and alcoholic hepatitis present with marked fibrosis In alcoholic liver disease, the fibrogenic response in the liver after the uptake of alcohol is driven by acetaldehyde. Hepatitis virus infection Infections with hepatitis B or C viruses are a global health problem associated with significant mortality and account for more than 1. Both infections are characterized by persistent hepatic inflammation, representing an important driver in establishing fibrosis and cirrhosis. Antiviral treatment strategies and the general introduction of effective hepatitis B vaccination have reduced the burden of hepatitis B 25 , while the introduction of direct antiviral agents against hepatitis C virus offers the option to cure the disease worldwide Drugs Drug-induced liver injury DILI is one of the leading causes of acute liver failure in the Western world, with paracetamol acetaminophen [APAP] being the commonest causative drug followed by antimicrobials The pattern of DILI-related hepatotoxicity is classified as hepatocellular, cholestatic, or mixed type. DILI can, in rare cases, also result in fibrosis or other patterns of chronic injury such as nodular regenerative hyperplasia, vanishing bile duct syndrome, or even cirrhosis The overwhelming immune reaction promotes progressive destruction of the parenchyma, further inflammation, loss of hepatic function, and fibrosis Based on the type of autoantibodies generated, three types of autoimmune hepatitis are historically classified. Serum from type 2 AIH patients contains antibodies directed against microsomes of liver and kidney, and serum from type 3 AIH patients typically contains auto-antibodies directed against soluble liver antigen In PBC, more than 60 auto-antibodies were identified from which the presence of anti-mitochondrial antibodies is pathognomonic, while anti-nuclear antibodies are found in approximately half of patients Likewise, in PSC patients, a large variety of auto-antibodies were detected which react with epitopes present in the mitochondria or nuclei of biliary or colonic epithelial cells, neutrophil granules, or ubiquitously expressed compounds However, the exact pathogenesis of PSC is largely obscure, and the disease is characterized by progressive fibrotic fibers around bile ducts, recurrent episodes of bacterial cholangitis, and a high risk for malignant transformation The diagnosis of AIH and its overlap variants are based on an integrated analysis of symptoms, clinical findings, biochemical tests, serologic features, and liver histology Nutrition and metabolic diseases Over-nutrition, obesity, and its multiple metabolic sequelae, including type 2 diabetes mellitus, heart and blood vessel diseases, and fatty liver disease, are advancing worldwide, especially in the Western countries. Insulin resistance and hepatic fat deposition accompanied by steatosis, lipotoxicity, endoplasmic reticulum stress, parenchymal injury, and death are triggering hepatic inflammation, HSC activation, and progressive fibrogenesis Recent evidence further suggests that diets enriched in sugar are also key in the pathogenesis of non-alcoholic fatty liver disease NAFLD and non-alcoholic steatohepatitis NASH by impacting gut microbiota and triggering hepatic fat accumulation due to the stimulation of lipogenesis and impairment of fat oxidation 41 , Contrarily, several bioactive food components such as caffeine, vitamins, curcumin, silymarin, resveratrol, quercetin, epigallocatechingallate, and many others are known to protect against hepatic fibrosis 43 , Recently, the gut microbiota has been considered as a key modulator of host metabolism. The gut microbiota not only facilitates the harvesting of nutrients and energy from ingested food but also is essential in the production of numerous metabolites necessary for proper host metabolism, including bile acids, which regulate diverse metabolic pathways in the host 5. Gut microbiota The integrity of the intestinal barrier is highly crucial to the function of the gutâ€"liver axis. A leaky gut and a pathological translocation of bacteria or bacterial components resulting from quantitative or qualitative changes in the gut microbiota dysbiosis lead to the activation of resident liver macrophages i. Kupffer cells releasing pro-inflammatory cytokines and stimulation of matrix synthesis by HSCs through Toll-like receptors Changes in the gut microbiome detected in non-invasive, stool-based tests were recently shown to be clinically useful to diagnose metabolic diseases and advanced fibrosis in patients with NAFLD In addition, there is a correlation among gut microbiota composition, alcohol, and ROS formation see above. Venous obstruction Obstruction of the portal venous flow can result from intrahepatic or extrahepatic portal vein thrombosis or portal cavernoma. General risk factors for portal vein thrombosis are reduced portal flow velocity, hypercoagulable tendency, vascular damage, and malignant vascular invasion Hepatic venous outflow obstruction typically provokes sinusoidal congestion and parenchymal cell necrosis mostly in perivenular areas of hepatic acini, which may lead to the formation of bridging fibrosis between adjacent central veins The disease is complex and the obstruction might occur in the small veins in the liver veno-occlusive disease or in the draining liver veins Budd-Chiari syndrome or is the result of increased pressure in the sublobular branches of hepatic veins due to chronic heart failure congestive hepatopathy. When not properly treated, chronic obstruction leads to ischemic necrosis, subsequent collagen accumulation, and regional vein wall remodeling. Parasites The most important parasitic diseases associated with liver fibrosis are schistosomiasis and echinococcosis. Hydatid cysts arising from Echinococcus granulosus or Echinococcus multilocularis and granulomas formed around trapped eggs during infection with Schistosoma mansoni and Schistosoma japonicum give rise to fibrosis around the trapped parasitic invader component resulting from host immune responses Experimental studies have shown that hepatic hydatidosis due to E. Cryptogenic and congenital liver disease Typically, cryptogenic development of hepatic fibrosis and cirrhosis occurs in mid to late adulthood as a result of inherited disorders. In some cases, mutations in certain cytokeratin proteins keratin 18 and keratin 8 are associated with the pathogenesis of cryptogenic and congenital liver disease. In this regard, conserved amino acids located at the junctures between individual structural motifs within keratins are most effective in producing hepatic fibrosis and cirrhosis by interfering with the normal reorganization of keratin filaments Other reports suggested cryptogenic liver disease as a consequence of unidentified mutation within ABC transporters involved in limiting intestinal absorption and promoting biliary excretion of sterols, such as the ABCG5 Sterolin-1 and ABCG8 Sterolin-2 genes Existing and emerging therapies for hepatic fibrosis There are a large number of sound clinical practice guidelines and recommendations for the treatment of patients with hepatic fibrosis, according to the different types of liver diseases. In addition to these standardized guidelines, complementary and alternative therapies, herbal products, vitamins, or other dietary supplements are widely applied in patients suffering from chronic liver disease Figure 3. In the following, we will briefly sum up the current treatment regimens and the pathogenic basis of anti-fibrotic properties of specific treatments in hepatic fibrosis based on either experimental data or, in selected cases, clinical evidence. Selected strategies for treatment of hepatic fibrosis according to disease etiology.

Chapter 6 : Basic Science Advice Thread - Page 6 | American University of Antigua (AUA)

Answer Key. 1. C Community Communities are usually named after a dominant feature such as characteristic plant species, e.g., pine. 2. A Carrying capacity An area's carrying capacity is the maximum number of animals of a given species that area can support during the harshest part of the year.

Chapter 7 : Preparing Chemical Solutions

Basic Science. All scientific research conducted at medical schools and teaching hospitals ultimately aims to improve health and ability. Basic science researchâ€"often called fundamental or bench researchâ€"provides the foundation of knowledge for the applied science that follows.

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Chapter 8 : Level of Evidence - Basic Science - Orthobullets

the basic science can be even said as detailed science because it tells you the most detail one. And as you ask what is basic then it is the science of complication you see, the the science you learn in childhood is not basic but advanced science which is being formulated by assumsions of basic science which can and even altered many times.

Chapter 9 : Acids, Bases, & the pH Scale

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