DOWNLOAD PDF I. THE HISTORY OF PHILOSOPHY AND SCIENCE FROM ANCIENT TIMES TO THE PRESENT DAY.

Chapter 1 : history of science | Definition, Natural Philosophy, & Development of Science | calendrierdelasc

Western Philosophy - by which we usually mean everything apart from the Eastern Philosophy of China, India, Japan, Persia, etc - really began in Ancient Greece in about the 6th Century B.C. Thales of Miletus is usually considered the first proper philosopher, although he was just as concerned with natural philosophy (what we now call science) as with philosophy as we know it.

Today, though no longer driven by subsistence requirements, fitness remains paramount to health and well-being. This article will highlight historical events and influential individuals who have shaped the history of fitness beginning with primitive man up to the foundation of the modern fitness movement. Primitive man and fitness pre, B. C Primitive nomadic lifestyles required the continual task of hunting and gathering food for survival 1. Tribes commonly went on one- or two- day hunting journeys for food and water. Regular physical activity apart from that necessary for hunting and gathering was also a principal component of life. Following successful hunting and gathering excursions, celebration events included trips of six to 20 miles to neighboring tribes to visit friends and family, where dancing and cultural games could often last several hours. This Paleolithic pattern of subsistence pursuit and celebration, demanding a high level of fitness and consisting of various forms of physical activity, defined human life 2. The Neolithic Agricultural Revolution 10,, B. The Neolithic Agricultural Revolution marked the conclusion of primitive lifestyle and signified the dawn of civilization. This historic period was defined by important agricultural developments including animal and plant domestication, and the invention of the plow. These human advancements made it possible for hunting-gathering tribes to obtain vast amounts of food while remaining in the same area, thus transforming primitive man into an agrarian agriculture and farming society 3. This era in history symbolizes the beginning of a more sedentary lifestyle, as man began to alleviate some hardships of life while. Ancient civilizations - China and India B. China In China, the philosophical teachings of Confucius encouraged participation in regular physical activity 4. It was recognized that physical inactivity was associated with certain diseases referred to as organ malfunctions and internal stoppages, which sound similar to heart disease and diabetes were preventable with regular exercise for fitness. Consequently, Cong Fu gymnastics was developed to keep the body in good, working condition. Cong Fu exercise programs consisted of various stances and movements, characterized by separate foot positions and imitations of different animal fighting styles 5. In addition to Cong Fu gymnastics, other forms of physical activity existed throughout ancient China including archery, badminton, dancing, fencing, and wrestling. India In India, individual pursuit of fitness was discouraged as the religious beliefs of Buddhism and Hinduism emphasized spirituality and tended to neglect development of the body. Consequently, the importance of fitness within society in general was relatively low. However, an exercise program similar to Chinese Cong Fu gymnastics developed, while still conforming to religious beliefs, known as Yoga. Though its exact origin has yet to be identified, Yoga has existed for at least the past years. Translated, Yoga means union, and refers to one of the classic systems of Hindu philosophy that strives to bring together and personally develop the body, mind, and spirit. Yoga was originally developed by Hindu priests who lived frugal lifestyles characterized by discipline and meditation. Through observing and mimicking the movement and patterns of animals, priests hoped to achieve the same balance with nature that animals seemed to possess. This aspect of Yoga, known as Hatha Yoga, is the form with which Westerners are most familiar and is defined by a series of exercises in physical posture and breathing patterns 5. Bedsides balance with nature, ancient Indian philosophers recognized health benefits of Yoga including proper organ functioning and whole well-being. These health benefits have also been acknowledged in the modern-day United States, with an estimated 12 million individuals regularly participating in Yoga. The Near East B. Early political and military leaders within the civilizations of Assyria, Babylonia, Egypt, Palestine, Persia, and Syria, realizing the importance of fitness to the efficiency and performance of military forces, encouraged fitness throughout society 6. Perhaps the best example of a civilization utilizing fitness for political and

military purposes is the Persian Empire. Persian leaders demanded strict physical fitness from its people, which was accomplished through the implementation of rigid training programs. At the age of six, boys became property of the Empire and underwent training which included hunting, marching, riding, and javelin throwing. Fitness training to improve strength and stamina was not intended for health benefits, but rather to create more able soldiers to help expand the Empire 5. The Persian Empire during its height, with its policy and emphasis on high fitness, eventually encompassed all of the Near East. However, emphasis on fitness levels throughout the Persian civilization decreased as affluence and corruption entangled political and military leaders. The downfall and collapse of the Persian Empire occurred at a time when society could largely be characterized by an overall lack of fitness. Ancient Greek Civilization B. Athens Perhaps no other civilization has held fitness in such high regard as ancient Greece. The idealism of physical perfection was one that embodied ancient Greek civilization. The appreciation for beauty of the body and importance of health and fitness throughout society is one that is unparalleled in history. The Greeks believed development of the body was equally as important as development of the mind. Physical well-being was necessary for mental well-being, with the need for a strong, healthy body to harbor a sound mind. Many founding medical practitioners facilitated the growth of fitness throughout ancient Greece, including the likes of Herodicus, Hippocrates, and Galen 7. Gymnastics, along with music, was considered to be the most important classroom topic. A common saying in ancient Greek times was "exercise for the body and music for the soul 5 ". Gymnastics took place in palaestras, which were sites of physical education for young boys. The palaestra consisted of an indoor facility for gymnastics, in addition to an outdoor area for running, jumping, and wrestling. When adulthood was reached, typically between the ages of 14 and 16, the site for fitness training switched from palaestras to gymnasiums 8. Exercise in the palaestra and gymnasium was supervised by the paidotribe, who is similar to the modern fitness trainer. This idealistic fitness situation existed most strongly within Athens, which has been characterized as a democratic society most similar to the United States. However, the heightened interest in fitness within Spartan culture was primarily for military purposes. During this era, Greek states were frequently at war with each other. Fighting skills were highly correlated with physical fitness levels, making it imperative for individuals to maintain high fitness levels. Spartan society required males to enter special fitness programs at the age of six. This upbringing consisted of rigorous training programs that ensured all boys would grow into highly fit adult soldiers. Females were also required to maintain good physical condition for the purpose of being able to have strong offspring who could serve the state 9. The military-dominated culture of Sparta resulted in one of the most physically fit societies in the history of mankind. Roman Civilization B. The Roman Empire was the antithesis of the ancient Greek civilization with the overall physical fitness condition of the Roman civilization highest during its time of conquest and expansion. During this period, all Roman citizens between the ages of 17 and 60 were eligible for the military draft. Therefore, it was imperative for all citizens to maintain good physical condition and be prepared for service. Military training consisted of activities such as running, marching, jumping, and discus and javelin throwing This lifestyle resulted in strong, fit people who conquered nearly all of the Western World. However, the fitness levels of the general Roman population declined as individuals became enamored with wealth and entertainment, such as the gladiator battles. Materialistic acquisition and excess became higher priorities than physical condition. The lavish lifestyle and physical decay eventually took its toll as the Roman civilization fell to the physically superior Barbarian tribes from Northern Europe The Dark and Middle Ages The crumbling of the Roman Empire, which was conquered by Barbarians from Northern Europe, symbolized the beginning of a millennium of intellectual standstill. However, these occurrences were beneficial with respect to fitness. The barbaric tribes from Northern Europe possessed similar characteristics to primitive people. Their lifestyle consisted of hunting and gathering food, and tending to cattle Physical activity and fitness were prerequisites for survival. Therefore, despite the cultural setbacks that occurred with the fall of the Roman Empire, fitness experienced a revival during the Dark and Middle Ages. The Renaissance Following the Dark and Middle Ages, the rebirth of cultural learning from the ancient Greek and

Roman civilizations gave rise to the Renaissance. Accompanying this time period was a renewed interest in the human body. Once again, the ancient Greek ideals, which glorified the human body, gained widespread acceptance. Many individuals, including Martin Luther religious leader , John Locke philosopher , Vittorino da Feltra, John Comenius, and Richard Mulcaster physical educators maintained that high fitness levels enhanced intellectual learning 13, Civilizations that recognized the importance of fitness needed an avenue to convey this knowledge to their people. Therefore, fitness and physical education share a common bond. Physical education became the tool used to spread the value and benefits of fitness throughout society. School programs, primarily in ancient Greece, had previously recognized the necessity for curriculums involving physical education. The renewed appreciation for human life, which evolved during the Renaissance, created an environment which was ready for the widespread development of physical education throughout Europe. National Period in Europe Continental Europe underwent numerous cultural changes following the Renaissance. Fitness remained important and continued to follow trends initiated during the Renaissance. Physical education programs expanded within emerging nations of Europe. Intense feelings for nationalism and independence created the atmosphere for the first modern fitness movement, which came in the form of gymnastics programs. Gymnastics enjoyed immense popularity during this era, becoming especially prevalent in Germany, Denmark, Sweden, and Great Britain. Germany The growth of gymnastics in Germany can be primarily attributed to the work of two physical educators: Johann Guts Muths and Friedrich Jahn. Guts Muths is generally referred to as the "Grandfather of German Gymnastics. His lifetime works and achievements are found in two books - Gymnastics for the Young and Games. Friedrich Jahn earned the title of "Father of German Gymnastics" for his long-lived work. With its downfall to France, Germany was subsequently divided into separate states. He believed future susceptibility to foreign invasion could be prevented through physical development of the German people. Shortly thereafter, exercise facilities that housed apparatuses designed for running, jumping, balancing, climbing, and vaulting called Turnvereins developed throughout Germany 4. Sweden Per Henrik Ling developed and introduced his own gymnastics program to Sweden which consisted of three different areas: Ling, who had a strong medical background, recognized that exercise was necessary for all persons. He maintained that exercise programs should be devised based on individual differences.

Chapter 2 : History of Fitness

The History of science is the study of the development of science and scientific knowledge, including both the natural and social sciences. (The history of the arts and humanities is termed history of scholarship.).

Discoveries in modern science Not so long ago, water mills were a revolutionary invention used all over the world for the purpose of metal shaping, agriculture and most importantly, milling. To mill meant to grind, and that invariably meant to grind grain. This in turn led to production of edible food staple like beaten rice, cereals, pulses, flour and so on. Ever since its origination, water mill has seen a number of subsequent variations, which enabled people to use its milling features into different raw materials. These mills are still used in many parts of the rural world to serve similar purposes. This useful invention takes its roots of origination from the earliest known Perachora wheel, created way back in 3rd century BC Greece, most likely by the contemporary Greek engineer Philo of Byzantium. Earlier, the portions of the mechanical treatise on this particular water mill written by Philo himself were regarded to have Arab origination. But recent researches by British historian M. Lewis proved that water mill has an authentic ancient Greek origin. Odometer One of the most widely used instruments in present day, odometers measures the distance travelled by a vehicle such as bicycle or any other automobile. Even though, the modern odometers are digital, not so long ago they were more mechanical, slowly evolving into electro-mechanical with the rise of technology. This omnipresent instrument was also originated in the time of ancient Greece. Even though, an odometer was used for measuring distance, it was first described by Vitruvius around 27 BC, evidences point towards Archimedes of Syracuse as its inventor sometime around the first Punic war. Some historians also attribute its invention to Heron of Alexandria. Regardless of that, once invented, it was widely used in the late Hellenistic time and by Romans for indicating the distance travelled by a vehicle. It helped revolutionize the building of roads and travelling with it by accurately measuring distance and being able to carefully illustrate it with a milestone. Alarm clock One of the most commonly used gadget these days, an alarm clock also had its origin in ancient Greece. Yes, in due course of time and with the proper sophistication of technology, the alarm clock went through a number of changes from a mechanical alarm to the modern gadgets like cell phone, which come with inbuilt alarm. But the first of alarms used by ancient Greeks were nothing like today. They used to integrate mechanism to time the alarm which would sound off delicate water organs or pebbles into drums. The ancient Greek philosopher Plato â€" BC said to possess a large water clock with an unspecified alarm signal similar to the sound of a water organ; he used it at night, possibly for signaling the beginning of his lectures at dawn. Cartography Cartography is the study and practice of making maps. It has played an important role in travel and navigation since ancient times. Even though the earliest known evidences of cartography points towards the ancient Babylon in a time as early as the 9th century BC, the Greeks took, what they had at their disposal and brought cartography into new light and possibilities. Anaximander was one of the pioneer cartographers to create the map of the world. Born between BC, this map maker of the ancient world made important contributions to the sciences of astronomy and geography. A reputed cartographer, Anaximander presented the inhabited regions in his map of the world. The map appeared in tablet and featured Ionia in the center. The world map bounded on the east by the Caspian Sea. It stretched to the Pillars of Hercules in the west. Middle Europe borders the map in the North while Ethiopia and the Nile featured at the southern end of the map of Anaximander. Anaximander made immense contributions in the field of cartography and geography and his map of the world was indeed a marvelous achievement of that time. Olympics The modern Olympics are one of the greatest spectacle in sports of the modern age. But when Pierre de Coubertin, the founder of the international Olympic committee started the first modern Olympic in , he was extensively inspired by the ancient Olympics that used to be held in ancient Greece more than years ago. According to historical records, the first ancient Olympic Games can be traced back to BC. They were dedicated to the Olympian gods and were staged on the ancient plains of Olympia. The Isthmos game was

staged every two years at the Isthmus of Corinth. The Pythian games took place every four years near Delphi. The most famous games held at Olympia, South- West of Greece, which took place every four years. People from all over the Greek came to witness the spectacle. The victors were given olive leaf wreaths or crowns as a prize. Basis of Geometry Geometry with or without a doubt one of the oldest branches of mathematics, if not older than arithmetic itself. And its practical necessity demanded, use of various geometric techniques much before any recorded history. Yes, the Egyptians, Babylonians and Indus were among the first to incorporate and use many of such techniques but they were never interested in finding out the rules and axioms governing the geometry. The babylonians assumed value of Pi to be 3 and never challenged its accuracy. Then came the age of Greek geometry and changed the entire perception towards it. The Greeks insisted that geometric facts must be established by deductive reasoning, much like how it is done these days. Thales of Miletus, regarded as father of geometry,gave a number of axioms and rules that were true based on reasoning called mathematical truths in the 6th century BC. Then came the likes of Pythagoras, Euclid and Archimedes whose geometrical axioms and rules are still taught in schools today. There were many more Greek mathematicians and geometers, who contributed to the history of geometry, but these names are the true giants, the ones that developed geometry as we know it today. Earliest practice of medicine The ancient world did not fare too well when it came to cure diseases. Born in BC, Hippocrates was an ancient Greek physician of the Classical age and was considered one of the most outstanding figures in the history of medicine. He was referred as the father of western medicine in recognition of his lasting contributions to the field as the founder of the Hippocratic School of Medicine. The most famous of his supposed contributions is the Hippocratic Oath, which bears his name accordingly. It was this document that was first proposed as an ethical standard among doctors, when doing their work. It brings up important concepts, we still use today, such as doctor-patient confidentiality. Modern Philosophy Before the age of ancient Greece, the world did not see philosophy as we see it today. It was more shrouded with superstition and magic than it would be ever after. For instance, if the Nile would rise and flood, making the soil dark and fertile, the Egyptians would believe it happened because their pharaoh commanded the river to do so. But the Greeks approached philosophy from a different direction. They developed philosophy as a way of understanding the world around them, without resorting to religion, myth, or magic. In fact the early Greek philosophers were also scientists who observed and studied the known world, the earth, seas, and mountains here below, and the solar system, planetary motion, and astral phenomena, above. Their philosophy based on reasoning and observation of the known world played a pivotal role in the shaping of the western philosophical tradition. Philosophers like Socrates, Plato, Aristotle gave such influential philosophies that their studies were used to teach in the subsequent ages of Romans and other western cultures. Concept of democracy The idea of every citizen has an equal opportunity of having in turn a share in the government constitutes the concept of democracy. It is one of the widely used styles of governance in the modern world. And even more fascinating is the fact that democracy also had its origins in the ancient Greece. In fact the concept as well as implementation of democracy can be traced back from the present day to ancient classical Athens. Although there are evidences that democratic forms of government, in a broad sense, may have existed in several areas of the world well before the turn of the 5th century, it is generally believed that the concepts of democracy and constitution were created in one particular place and time â€” in Ancient Athens around BC. For this reason, Athens is regarded as the birthplace of democracy and was also considered as an important reference point of democracy. This transition from exploitation of aristocracy to a political system, where all the members of the society have an equal share of formal political power had a significant impact in the civilizations that came down the line. Discoveries in modern science It would be only fair to say that, given the evidences, the ancient Greeks had made some outstanding contributions in various branches of science. They made some astounding discoveries in the field of astronomy, biology and physics among others that broke contemporary stereotypes on those subject matters. The intellects in ancient Greece excelled in mathematics, physics and astronomy. Aristotle gave the idea of earth being a globe. He also classified animals and if often referred to as father of zoology. Theophrastus was

the first botanist, we know of in written history. The pythagoreans not only made the earliest of advances in philosophy and geometry, they also proposed the heliocentric hypothesis with the earth revolving around sun and not the other way around as believed at that time. This idea was so ahead in time that it was disregarded as blasphemy. The Greeks had so much so influence in the early concepts of science, that most symbols often used in physics and higher math equations are derived from the Greek alphabet.

Chapter 3 : Ancient Medicine - The History of Medicine

In ancient times, it was common for science to be merged with magic, religion, mysticism, and philosophy, since the limits of the scientific discipline were not fully understood. Babylonian Science Like in Egypt, priests encouraged much of the development of Babylonian science.

Presocratic Thought An analysis of Presocratic thought presents some difficulties. Even these purportedly verbatim words often come to us in quotation from other sources, so it is difficult, if not impossible, to attribute with certainty a definite position to any one thinker. Presocratic thought marks a decisive turn away from mythological accounts towards rational explanations of the cosmos. Indeed, some Presocratics openly criticize and ridicule traditional Greek mythology, while others simply explain the world and its causes in material terms. This is not to say that the Presocratics abandoned belief in gods or things sacred, but there is a definite turn away from attributing causes of material events to gods, and at times a refiguring of theology altogether. The foundation of Presocratic thought is the preference and esteem given to rational thought over mythologizing. This movement towards rationality and argumentation would pave the way for the course of Western thought. The Milesians Thales c. Aristotle offers some conjectures as to why Thales might have believed this Graham First, all things seem to derive nourishment from moisture. Next, heat seems to come from or carry with it some sort of moisture. Finally, the seeds of all things have a moist nature, and water is the source of growth for many moist and living things. Some assert that Thales held water to be a component of all things, but there is no evidence in the testimony for this interpretation. It is much more likely, rather, that Thales held water to be a primal source for all thingsâ€”perhaps the sine qua non of the world. Like Thales, Anaximander c. That he did not, like Thales, choose a typical element earth, air, water, or fire shows that his thinking had moved beyond sources of being that are more readily available to the senses. He might have thought that, since the other elements seem more or less to change into one another, there must be some source beyond all theseâ€”a kind of background upon or source from which all these changes happen. How it is that this separation took place is unclear, but we might presume that it happened via the natural force of the boundless. The universe, though, is a continual play of elements separating and combining. If our dates are approximately correct, Anaximenes c. However, the conceptual link between them is undeniable. Like Anaximander, Anaximenes thought that there was something boundless that underlies all other things. Unlike Anaximander, Anaximenes made this boundless thing something definiteâ€”air. For Anaximander, hot and cold separated off from the boundless, and these generated other natural phenomena Graham For Anaximenes, air itself becomes other natural phenomena through condensation and rarefaction. Rarefied air becomes fire. When it is condensed, it becomes water, and when it is condensed further, it becomes earth and other earthy things, like stones Graham This then gives rise to all other life forms. Furthermore, air itself is divine. Air, then, changes into the basic elements, and from these we get all other natural phenomena. Xenophanes of Colophon Xenophanes c. At the root of this poor depiction of the gods is the human tendency towards anthropomorphizing the gods. Indeed, Xenophanes famously proclaims that if other animals cattle, lions, and so forth were able to draw the gods, they would depict the gods with bodies like their own F Beyond this, all things come to be from earth F27 , not the gods, although it is unclear whence came the earth. The reasoning seems to be that God transcends all of our efforts to make him like us. If everyone paints different pictures of divinity, and many people do, then it is unlikely that God fits into any of those frames. Pythagoras and Pythagoreanism Ancient thought was left with such a strong presence and legacy of Pythagorean influence, and yet little is known with certainty about Pythagoras of Samos c. Many know Pythagoras for his eponymous theoremâ€”the square of the hypotenuse of a right triangle is equal to the sum of the squares of the adjacent sides. Whether Pythagoras himself invented the theorem, or whether he or someone else brought it back from Egypt, is unknown. He developed a following that continued long past his death, on down to Philolaus of Croton c. Whether or not the Pythagoreans followed a particular doctrine is up for debate, but it is

clear that, with Pythagoras and the Pythagoreans, a new way of thinking was born in ancient philosophy that had a significant impact on Platonic thought. The Pythagoreans believed in the transmigration of souls. The soul, for Pythagoras, finds its immortality by cycling through all living beings in a 3,year cycle, until it returns to a human being Graham Indeed, Xenophanes tells the story of Pythagoras walking by a puppy who was being beaten. What exactly the Pythagorean psychology entails for a Pythagorean lifestyle is unclear, but we pause to consider some of the typical characteristics reported of and by Pythagoreans. Plato and Aristotle tended to associate the holiness and wisdom of numberâ€"and along with this, harmony and musicâ€"with the Pythagoreans Graham Perhaps more basic than number, at least for Philolaus, are the concepts of the limited and unlimited. Nothing in the cosmos can be without limit F1 , including knowledge F4. Imagine if nothing were limited, but matter were just an enormous heap or morass. Next, suppose that you are somehow able to gain a perspective of this morass to do so, there must be some limit that gives you that perspective! Presumably, nothing at all could be known, at least not with any degree of precision, the most careful observation notwithstanding. Additionally, all known things have number, which functions as a limit of things insofar as each thing is a unity, or composed of a plurality of parts. Heraclitus Heraclitus of Ephesus c. His aphoristic style is rife with wordplay and conceptual ambiguities. Heraclitus saw reality as composed of contrariesâ€"a reality whose continual process of change is precisely what keeps it at rest. Fire plays a significant role in his picture of the cosmos. No God or man created the cosmos, but it always was, is, and will be fire. At times it seems as though fire, for Heraclitus, is a primary element from which all things come and to which they return. At others, his comments on fire could easily be seen metaphorically. Whether one travels up the road or down it, the road is the same road. This, according to Aristotle, supposedly drove Cratylus to the extreme of never saying anything for fear that the words would attempt to freeze a reality that is always fluid, and so, Cratylus merely pointed Graham So, the cosmos and all things that make it up are what they are through the tension and distention of time and becoming. The river is what it is by being what it is not. Fire, or the ever-burning cosmos, is at war with itself, and yet at peaceâ€"it is constantly wanting fuel to keep burning, and yet it burns and is satisfied. Parmenides and Zeno If it is true that for Heraclitus life thrives and even finds stillness in its continuous movement and change, then for Parmenides of Elea c. Parmenides was a pivotal figure in Presocratic thought, and one of the most influential of the Presocratics in determining the course of Western philosophy. According to McKirahan, Parmenides is the inventor of metaphysics â€"the inquiry into the nature of being or reality. While the tenets of his thought have their home in poetry, they are expressed with the force of logic. The Parmenidean logic of being thus sparked a long lineage of inquiry into the nature of being and thinking. Parmenides recorded his thought in the form of a poem. In it, there are two paths that mortals can takeâ€"the path of truth and the path of error. The first path is the path of being or what-is. The right way of thinking is to think of what-is, and the wrong way is to think both what-is and what-is-not. The latter is wrong, simply because non-being is not. In other words, there is no non-being, so properly speaking, it cannot be thoughtâ€"there is nothing there to think. It is only our long entrenched habits of sensation that mislead us into thinking down the wrong path of non-being. The world, and its appearance of change, thrusts itself upon our senses, and we erroneously believe that what we see, hear, touch, taste, and smell is the truth. But, if non-being is not, then change is impossible, for when anything changes, it moves from non-being to being. For example, for a being to grow tall, it must have at some point not been tall. Since non-being is not and cannot therefore be thought, we are deluded into believing that this sort of change actually happens. Similarly, what-is is one. If there were a plurality, there would be non-being, that is, this would not be that. Parmenides thus argues that we must trust in reason alone. In the Parmenidean tradition, we have Zeno c. Zeno seems to have composed a text wherein he claims to show the absurdity in accepting that there is a plurality of beings, and he also shows that motion is impossible. Zeno shows that if we attempt to count a plurality, we end up with an absurdity. If there were a plurality, then it would be neither more nor less than the number that it would have to be. Thus, there would be a finite number of things. On the other hand, if there were a plurality, then the number would be infinite because there is always something else between existing things,

and something else between those, and something else between those, ad infinitum. Thus, if there were a plurality of things, then that plurality would be both infinite and finite in number, which is absurd F4. The most enduring paradoxes are those concerned with motion. It is impossible for a body in motion to traverse, say, a distance of twenty feet. In order to do so, the body must first arrive at the halfway point, or ten feet. But in order to arrive there, the body in motion must travel five feet. But in order to arrive there, the body must travel two and a half feet, ad infinitum. Since, then, space is infinitely divisible, but we have only a finite time to traverse it, it cannot be done. Presumably, one could not even begin a journey at all. Achilles must first reach the place where the slow runner began. This means that the slow runner will already be a bit beyond where he began.

Chapter 4 : Ancient Rome - HISTORY

During the time period of 'Ancient History' starting roughly from into the present day. in the beginnings of Medieval philosophy. Science and.

Science as natural philosophy Precritical science Science, as it has been defined above, made its appearance before writing. It is necessary, therefore, to infer from archaeological remains what was the content of that science. From cave paintings and from apparently regular scratches on bone and reindeer horn, it is known that prehistoric humans were close observers of nature who carefully tracked the seasons and times of the year. About bce there was a sudden burst of activity that seems to have had clear scientific importance. Great Britain and northwestern Europe contain large stone structures from that era, the most famous of which is Stonehenge on the Salisbury Plain in England, that are remarkable from a scientific point of view. Not only do they reveal technical and social skills of a high orderâ€"it was no mean feat to move such enormous blocks of stone considerable distances and place them in positionâ€"but the basic conception of Stonehenge and the other megalithic structures also seems to combine religious and astronomical purposes. Their layouts suggest a degree of mathematical sophistication that was first suspected only in the midth century. Stonehenge is a circle, but some of the other megalithic structures are egg-shaped and, apparently, constructed on mathematical principles that require at least practical knowledge of the Pythagorean theorem that the square of the hypotenuse of a right triangle is equal to the sum of the squares of the other two sides. This theorem, or at least the Pythagorean numbers that can be generated by it, seems to have been known throughout Asia, the Middle East , and Neolithic Europe two millennia before the birth of Pythagoras. This combination of religion and astronomy was fundamental to the early history of science. It is found in Mesopotamia, Egypt, China although to a much lesser extent than elsewhere , Central America , and India. The spectacle of the heavens, with the clearly discernible order and regularity of most heavenly bodies highlighted by extraordinary events such as comets and novae and the peculiar motions of the planets, obviously was an irresistible intellectual puzzle to early humankind. In its search for order and regularity, the human mind could do no better than to seize upon the heavens as the paradigm of certain knowledge. Astronomy was to remain the queen of the sciences welded solidly to theology for the next 4, years. Science, in its mature form, developed only in the West. But it is instructive to survey the protoscience that appeared in other areas, especially in light of the fact that until quite recently this knowledge was often, as in China, far superior to Western science. China As has already been noted, astronomy seems everywhere to have been the first science to emerge. Its intimate relation to religion gave it a ritual dimension that then stimulated the growth of mathematics. Chinese savants , for example, early devised a calendar and methods of plotting the positions of stellar constellations. Since changes in the heavens presaged important changes on the Earth for the Chinese considered the universe to be a vast organism in which all elements were connected , astronomy and astrology were incorporated into the system of government from the very dawn of the Chinese state in the 2nd millennium bce. As the Chinese bureaucracy developed, an accurate calendar became absolutely necessary to the maintenance of legitimacy and order. The result was a system of astronomical observations and records unparalleled elsewhere, thanks to which there are, today, star catalogs and observations of eclipses and novae that go back for millennia. In other sciences too the overriding emphasis was on practicality, for the Chinese, almost alone among ancient peoples, did not fill the cosmos with gods and demons whose arbitrary wills determined events. Order was inherent and, therefore, expected. It was for humans to detect and describe this order and to profit from it. Chemistry or, rather, alchemy , medicine, geology , geography , and technology were all encouraged by the state and flourished. Practical knowledge of a high order permitted the Chinese to deal with practical problems for centuries on a level not attained in the West until the Renaissance. India Astronomy was studied in India for calendrical purposes to set the times for both practical and religious tasks. Primary emphasis was placed on solar and lunar motions, the fixed stars serving as a background against which these luminaries moved. Indian

mathematics seems to have been quite advanced, with particular sophistication in geometrical and algebraic techniques. This latter branch was undoubtedly stimulated by the flexibility of the Indian system of numeration that later was to come into the West as the Hindu-Arabic numerals. America Quite independently of China, India, and the other civilizations of Europe and Asia, the Maya of Central America, building upon older cultures , created a complex society in which astronomy and astrology played important roles. Determination of the calendar, again, had both practical and religious significance. Solar and lunar eclipses were important, as was the position of the bright planet Venus. No sophisticated mathematics are known to have been associated with this astronomy, but the Mayan calendar was both ingenious and the result of careful observation. The Middle East In the cradles of Western civilization in Egypt and Mesopotamia , there were two rather different situations. In Egypt there was an assumption of cosmic order guaranteed by a host of benevolent gods. Unlike China, whose rugged geography often produced disastrous floods, earthquakes, and violent storms that destroyed crops, Egypt was surpassingly placid and delightful. Egyptians found it difficult to believe that all ended with death. Enormous intellectual and physical labour, therefore, was devoted to preserving life after death. Both Egyptian theology and the pyramids are testaments to this preoccupation. All of the important questions were answered by religion, so the Egyptians did not concern themselves overmuch with speculations about the universe. None of this required much mathematics, and there was, consequently, little of any importance. Mesopotamia was more like China. The land was harsh and made habitable only by extensive damming and irrigation works. Storms, insects, floods, and invaders made life insecure. To create a stable society required both great technological skill, for the creation of hydraulic works, and the ability to hold off the forces of disruption. These latter were early identified with powerful and arbitrary gods who dominated Mesopotamian theology. The cities of the plain were centred on temples run by a priestly caste whose functions included the planning of major public works , like canals, dams, and irrigation systems, the allocation of the resources of the city to its members, and the averting of a divine wrath that could wipe everything out. Mathematics and astronomy thrived under these conditions. The number system, probably drawn from the system of weights and coinage, was based on 60 it was in ancient Mesopotamia that the system of degrees, minutes, and seconds developed and was adapted to a practical arithmetic. The heavens were the abode of the gods, and because heavenly phenomena were thought to presage terrestrial disasters, they were carefully observed and recorded. Out of these practices grew, first, a highly developed mathematics that went far beyond the requirements of daily business, and then, some centuries later, a descriptive astronomy that was the most sophisticated of the ancient world until the Greeks took it over and perfected it. Nothing is known of the motives of these early mathematicians for carrying their studies beyond the calculations of volumes of dirt to be removed from canals and the provisions necessary for work parties. It may have been simply intellectual playâ€”the role of playfulness in the history of science should not be underestimatedâ€”that led them onward to abstract algebra. There are texts from about bce that are remarkable for their mathematical suppleness. Babylonian mathematicians knew the Pythagorean relationship well and used it constantly. They could solve simple quadratic equations and could even solve problems in compound interest involving exponents. From about a millennium later there are texts that utilize these skills to provide a very elaborate mathematical description of astronomical phenomena. Although China and Mesopotamia provide examples of exact observation and precise description of nature, what is missing is explanation in the scientific mode. The Chinese assumed a cosmic order that was vaguely founded on the balance of opposite forces yinâ€”yang and the harmony of the five elements water, wood, metal, fire, and earth. Why this harmony obtained was not discussed. Similarly, the Egyptians found the world harmonious because the gods willed it so. For Babylonians and other Mesopotamian cultures, order existed only so long as all-powerful and capricious gods supported it. In all these societies, humans could describe nature and use it, but to understand it was the function of religion and magic, not reason. It was the Greeks who first sought to go beyond description and to arrive at reasonable explanations of natural phenomena that did not involve the arbitrary will of the gods. Gods might still play a role, as indeed they did for centuries to come, but even the gods were

subject to rational laws. The birth of natural philosophy There seems to be no good reason why the Hellenes, clustered in isolated city-states in a relatively poor and backward land, should have struck out into intellectual regions that were only dimly perceived, if at all, by the splendid civilizations of the Yangtze, Tigris and Euphrates, and Nile valleys. There were many differences between ancient Greece and the other civilizations, but perhaps the most significant was religion. What is striking about Greek religion , in contrast to the religions of Mesopotamia and Egypt, is its puerility. Greek religion did not. It was, in fact, little more than a collection of folk tales, more appropriate to the campfire than to the temple. Perhaps this was the result of the collapse of an earlier Greek civilization, the Mycenaean , toward the end of the 2nd millennium bce, when the Dark Age descended upon Greece and lasted for three centuries. All that was preserved were stories of gods and men, passed along by poets, that dimly reflected Mycenaean values and events. Such were the great poems of Homer , the Iliad and the Odyssey, in which heroes and gods mingled freely with one another. Indeed, they mingled too freely, for the gods appear in these tales as little more than immortal adolescents whose tricks and feats, when compared with the concerns of a Marduk or Jehovah, are infantile. There really was no Greek theology in the sense that theology provides a coherent and profound explanation of the workings of both the cosmos and the human heart. Hence, there were no easy answers to inquiring Greek minds. The result was that ample room was left for a more penetrating and ultimately more satisfying mode of inquiry. Thus were philosophy and its oldest offspring, science, born. The first natural philosopher, according to Hellenic tradition, was Thales of Miletus , who flourished in the 6th century bce. We know of him only through later accounts, for nothing he wrote has survived. He is supposed to have predicted a solar eclipse in bce and to have invented the formal study of geometry in his demonstration of the bisecting of a circle by its diameter. Most importantly, he tried to explain all observed natural phenomena in terms of the changes of a single substance, water, which can be seen to exist in solid, liquid, and gaseous states. What for Thales guaranteed the regularity and rationality of the world was the innate divinity in all things that directed them to their divinely appointed ends. From these ideas there emerged two characteristics of classical Greek science. The second was the conviction that this order was not that of a mechanical contrivance but that of an organism: This motion toward ends is called teleology and, with but few exceptions, it permeated Greek as well as much later science. Thales inadvertently made one other fundamental contribution to the development of natural science. By naming a specific substance as the basic element of all matter , Thales opened himself to criticism , which was not long in coming. His own disciple , Anaximander , was quick to argue that water could not be the basic substance. His argument was simple: Hence, if Thales were correct, the opposite of wet could not exist in a substance, and that would preclude all of the dry things that are observed in the world. Therefore, Thales was wrong. Here was the birth of the critical tradition that is fundamental to the advance of science. Various single substances were proposed and then rejected, ultimately in favour of a multiplicity of elements that could account for such opposite qualities as wet and dry, hot and cold. Two centuries after Thales, most natural philosophers accepted a doctrine of four elements: All bodies were made from these four. The presence of the elements only guaranteed the presence of their qualities in various proportions.

Chapter 5 : History of science - Wikipedia

A History of Money From Ancient Times to the Present Day GLYN DAVIES Published in co-operation with Julian Hodge Bank Limited UNIVERSITY OF WALES PRESS.

Ethnic Groups China, a large united multi-national state, is composed of 56 ethnic groups. Han Chinese account for The relationships between the different ethnic groups have been formed over many years. Distinct Language While hundreds of Chinese dialects are spoken across China, a minority language is not simply a dialect. Rather, it is a language with distinct grammatical and phonological differences from Chinese. Twenty-one ethnic minority groups have unique writing systems. Chinese Religion Confucianism, Taoism and Buddhism are the three major religions in China, although it is true to say that Confucianism is a school of philosophy rather than a religion. Buddhism in China Buddhism is the most important religion in China. During its development in China, it has a profound influence on traditional Chinese culture and thoughts, and has become one of the most important religions in China at that time. Three different forms of this religion evolved as it reached the centers of population at varying times and by different routes. The social and ethnic background in each location also affected the way in which each of these forms developed and eventually they became known as Han, Tibetan and Southern Buddhism. Over its long history, Buddhism has left an indelible impact on Chinese civilization. Many words and phrases have root in a Buddhist origin. This reveals in a sense the true attitude of the Chinese toward the utilitarian aspects of belief. Many people kowtow to whatever gods they encounter and will burn incense in any temple. In literature traces of Buddhism and Zen are obvious. Quite a few famous poets in Tang Dynasty like Bai Juyi were lay Buddhists but this did not prevent them from indulging in a little from time to time. It is not uncommon for the income of a temple to cover the expenses of a whole county or district. Taoism in China In the Chinese language the word tao means "way," indicating a way of thought or life. In about the 6th century BC, under the influence of ideas credited to a man named Lao-tzu, Taoism became "the way". Taoism began as a complex system of philosophical thought that could be indulged in by only a few individuals. In later centuries it emerged, perhaps under the influence of Buddhism, as a communal religion. It later evolved as a popular folk religion. Philosophical Taoism speaks of a permanent Tao in the way that some Western religions speak of God. The Tao is considered unnamed and unknowable, the essential unifying element of all that is. Everything is basically one despite the appearance of differences. Because all is one, matters of good and evil and of true or false, as well as differing opinions, can only arise when people lose sight of the oneness and think that their private beliefs are absolutely true. This can be likened to a person looking out a small window and thinking he sees the whole world, when all he sees is one small portion of it. Because all is one, life and death merge into each other as do the seasons of the year. They are not in opposition to one another but are only two aspects of a single reality. The life of the individual comes from the one and goes back into it. The goal of life for a Taoist is to cultivate a mystical relationship to the Tao. Adherents therefore avoid dispersing their energies through the pursuit of wealth, power, or knowledge. By shunning every earthly distraction, the Taoist is able to concentrate on life itself. Eventually the hope is to become immortal. He lived in Ancient China during the Zhou Dynasty. Confucius was a government official, and during his lifetime he lived from to B. Perhaps due to the turmoil and injustices he saw, he set himself to develop a new moral code based on respect, honesty, education, kindness and strong family bonds. His teachings later became the basis for religious and moral life throughout China. The Five Virtues of Confucius Confucius believed that a good government was the basis for a peaceful and happy society. And the basis for a good government was good officials. Once confined to the kitchens of the palace, the legendary Peking Duck is now served at thousands of restaurants around Beijing, as well as around the world. The origin of the Peking Duck dates back to the Ming Dynasty, about years ago. Cooks from all over China travelled to the capital Beijing to cook for the Emperor. It was a prestigious occupation as only the best chefs could enter the palace kitchens. A top cook was even able to reach the rank of a minister! It was in these

kitchens where dishes of exceptional quality such as the Peking Duck were first created and crafted to perfection by palace chefs. However, many of the recipes for such "foods of the Emperor" were later smuggled out of the kitchen and onto the streets of Beijing. With the eventual fall of the Ching dynasty in , court chefs who left the Forbidden City set up restaurants around Beijing and brought Peking Duck and other delicious dishes to the masses. For that, the hot pot is a delicious and hearty choice. Families or groups of friends sit around a table and eat from a steaming pot in the middle, cooking and drinking and chatting. They can also ladle up the broth from the pot and drink it. Undoubtedly, this way of eating is not only a figurative embodiment but a visual indication of the willingness to eat from the same pot and to share the same lot. This is the most highly prized merit of group consciousness. The hot pot is not only a cooking method; it also provides a way of eating. It is not only a dietary mode; it is also a cultural mode. As a dietary mode, the hot pot can be used by many people dining together, or by one person eating alone. Yet how few are those solitary diners to be found in a restaurant! This is not because the diner wants to economize, but because dining by oneself in front of a hot pot is devoid of interest and joy.

Chapter 6 : Influential & Major Events in the History of Ancient Greece

Ancient Greek Philosophy. From Thales, who is often considered the first Western philosopher, to the Stoics and Skeptics, ancient Greek philosophy opened the doors to a particular way of thinking that provided the roots for the Western intellectual tradition.

This is why various fur clothing products have been made in history of these lands. For example if you ask any tourist how was their time in Russia, one of the things they will certainly mention is the deep freeze. This is why Slavic people have mastered the ways to protect against the cold: Kuna is a animal belonging to Marten branch of animals and it was valuable because of its fur. Most trade was made with fur, so taking that name for their currency can reflect how important fur trading was in the old times. In early Russia fur was also used for everything, from paying goods to paying taxes. Each parish would secure a certain amount of fur hunters that would operate on its territory and furs would be gathered there in its treasury. With time the need for furs was getting larger so people started to hunt weasels, foxes, beavers and since XVI even wolves and polar bears. The most expensive ones were those of Polar bears, mostly because it was so difficult to obtain them. When merchants would evaluate furs that were brought to them by hunters a lot of things would be taken into account. For example, the season when the animal was killed is very important, if it was killed in beginning of the winter it would be the most highly priced. Also furs hair was well inspected, things like is it sufficient thick? In Novgorod area during the XIV century it was strictly forbidden to do summer hunting for fur-bearing animals, it was considered a waste as animals fur is worst during summer do to their shedding. Any deficiency in the hair was considered a defect, because of which the fur price would be significantly reduced, but the master-hunters could catch the animal so deftly that the wound marks do not leave any traces of damage on skins. For others fur had a unusual another role: The main thing is to believe that it helps: Fur in old times had a sky-high price, some say that during XIV-XVI centuries you could buy chickens or pounds of wheat for one fashionable healthy fur coat. It was such a successful trade that having a nice fur coat in those times was like having a BMW car today, in other words a matter of prestige. All these magnificent products were decorated by hand and kept within the family as a relic, inherited from knee to knee. However, average man was not that rich so usually average or poor people walked in sheep skin, especially common in mountainous populations of Serbia, Croatia, Bosnia and Slovakia. One of the most expansive furs besides the Polar bears was that of black and polar foxes. It was valued above all others, so Ukrainian traders were very focused on them and later would sell them on Lviv markets for sky-high prices. There was so much animals and fur, people would exchange few skins for just a good iron pot so as you can see the price and value of a fur also would vary on the location where it was sold. Some animals because of the blooming fur trade were even almost extinct, like the European bison in Poland and Belarus. This was a reason why countries started to place limits for hunters per year, to keep the animals numbers in somewhat healthy numbers but that was too late for bisons. In USSR fur was still one of the top three export products, how many of you have at least one fur product from Russia? Probably if you are European, you have at least one in your family. What do you think?

Chapter 7 : The Story of Mathematics - A History of Mathematical Thought from Ancient Times to the Mode

Their esoteric philosophical ideas on primitive natural science as well as the ethical application of their philosophical values in the society gave them a recognition that lives to this day. Here is the list of 10 most influential ancient Greek philosophers.

Norte Chico in the Andes The first civilization emerged in Sumer in the southern region of Mesopotamia now part of modern day Iraq. C, Sumerian city states had collectively formed civilization , with government, religion, diversity of labor and writing. Among the city states Ur was among the most significant. The Sumerian Renaissance also developed c. Egypt was a superpower at the time. East of Persia, was the Indus River Valley civilization which organized cities neatly on grid patterns. The beginning of the Shang dynasty emerged in China in this period, and there was evidence of a fully developed Chinese writing system. The Shang Dynasty is the first Chinese regime recognized by western scholars though Chinese historians insist that the Xia Dynasty preceded it. The Shang Dynasty practiced forced labor to complete public projects. There is evidence of massive ritual burial. Early Iron Age[edit] This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. July Learn how and when to remove this template message The Iron Age is the last principal period in the three-age system, preceded by the Bronze Age. Its date and context vary depending on the country or geographical region. The Iron Age over all was characterized by the prevalent smelting of iron with Ferrous metallurgy and the use of Carbon steel. Smelted iron proved more durable than earlier metals such as Copper or Bronze and allowed for more productive societies. The Iron Age took place at different times in different parts of the world, and comes to an end when a society began to maintain historical records. Around BC, the Trojan War was thought to have taken place. In Greece the Mycenae and Minona both disintegrated. A wave of Sea Peoples attacked many countries, only Egypt survived intact. Afterwards some entirely new successor civilizations arose in the Eastern Mediterranean. The Zhou dynasty was established in China shortly thereafter. During this Zhou era China embraced a feudal society of decentralized power. Iron Age China then dissolved into the warring states period where possibly millions of soldiers fought each other over feudal struggles. Pirak is an early iron-age site in Balochistan , Pakistan , going back to about BC. This period is believed to be the beginning of the Iron Age in India and the subcontinent. Around the same time came the Vedas , the oldest sacred texts for the Hindu Religion. In BC, the rise of Greek city-states began. In BC, the first recorded Olympic Games were held. In contrast to neighboring cultures the Greek City states did not become a single militaristic empire but competed with each other as separate polis. Widespread trade and communication between distinct regions in this period, including the rise of the Silk Road. This period saw the rise of philosophy and proselytizing religions. Philosophy, religion and science were diverse in the Hundred Schools of Thought producing thinkers such as Confucius , Lao Tzu and Mozi during the sixth century B. In these developments religious and philosophical figures were all searching for human meaning. Significant for the time was the Persian Achaemenid Empire. The Royal Road allowed for efficient trade and taxation. Greek culture, and technology spread through West and South Asia often synthesizing with local cultures. In South Asia, the Mauryan empire briefly annexed much of the Indian Subcontinent though short lived, its reign had the legacies of spreading Buddhism and providing an inspiration to later Indian states. As a result of empires, urbanization and literary spread to locations which had previously been at the periphery of civilization as known by the large empires. Upon the turn of the millennium the independence of tribal peoples and smaller kingdoms were threatened by more advanced states. Empires were not just remarkable for their territorial size but for their administration and the dissemination of culture and trade, in this way the influence of empires often extended far beyond their national boundaries. Trade routes expanded by land and sea and allowed for flow of goods between distant regions even in the absence of communication. Distant nations such as Imperial Rome and the Chinese Han Dynasty rarely communicated but a horde of Roman Coins have been discovered

in modern day Vietnam. Outside of civilization large geographic areas such as Siberia , Sub Saharan Africa and Australia remained sparsely populated. The New World hosted a variety of separate civilizations but its own trade networks were smaller due to the lack of draft animals and the wheel. Empires with their immense military strength remained fragile to civil wars, economic decline and a changing political environment internationally. In Persia regime change took place from Parthia to the more centralized Sassanian Empire. The land based Silk Road continued to deliver profits in trade but came under continual assault by nomads all on the northern frontiers of Euarasian nations. Safer sea routes began to gain preference in the early centuries AD Proselytizing religions began to replace polytheism and folk religions in many areas. Social change, political transformation as well as ecological events all contributed to the end of Ancient Times and the beginning of the Post Classical era in Eurasia roughly around the year

Chapter 8 : Top 10 inventions and discoveries of ancient Greece

Throughout history, people have committed crimes against each one another. In ancient times, the common response was one of revenge; the victim or the victim's family would exact what they felt to be an appropriate response to the crime committed against them.

Historically, it was regarded as the science of quantity, whether of magnitudes as in geometry or of numbers as in arithmetic or of the generalization of these two fields as in algebra. Some have seen it in terms as simple as a search for patterns. During the 19th Century, however, mathematics broadened to encompass mathematical or symbolic logic, and thus came to be regarded increasingly as the science of relations or of drawing necessary conclusions although some see even this as too restrictive. The discipline of mathematics now covers - in addition to the more or less standard fields of number theory, algebra, geometry, analysis calculus , mathematical logic and set theory, and more applied mathematics such as probability theory and statistics - a bewildering array of specialized areas and fields of study, including group theory, order theory, knot theory, sheaf theory, topology, differential geometry, fractal geometry, graph theory, functional analysis, complex analysis, singularity theory, catastrophe theory, chaos theory, measure theory, model theory, category theory, control theory, game theory, complexity theory and many more. The history of mathematics is nearly as old as humanity itself. Since antiquity, mathematics has been fundamental to advances in science, engineering, and philosophy. It has evolved from simple counting, measurement and calculation, and the systematic study of the shapes and motions of physical objects, through the application of abstraction, imagination and logic, to the broad, complex and often abstract discipline we know today. From the notched bones of early man to the mathematical advances brought about by settled agriculture in Mesopotamia and Egypt and the revolutionary developments of ancient Greece and its Hellenistic empire, the story of mathematics is a long and impressive one. The East carried on the baton, particularly China , India and the medieval Islamic empire , before the focus of mathematical innovation moved back to Europe in the late Middle Ages and Renaissance. Then, a whole new series of revolutionary developments occurred in 17th Century and 18th Century Europe, setting the stage for the increasing complexity and abstraction of 19th Century mathematics, and finally the audacious and sometimes devastating discoveries of the 20th Century. Follow the story as it unfolds in this series of linked sections, like the chapters of a book. Read the human stories behind the innovations, and how they made - and sometimes destroyed - the men and women who devoted their lives to This is not intended as a comprehensive and definitive guide to all of mathematics, but as an easy-to-use summary of the major mathematicians and the developments of mathematical thought over the centuries. It is not intended for mathematicians, but for the interested laity like myself. My intention is to introduce some of the major thinkers and some of the most important advances in mathematics, without getting too technical or getting bogged down in too much detail, either biographical or computational. Explanations of any mathematical concepts and theorems will be generally simplified, the emphasis being on clarity and perspective rather than exhaustive detail. It is beyond the scope is this study to discuss every single mathematician who has made significant contributions to the subject, just as it is impossible to describe all aspects of a discipline as huge in its scope as mathematics. The choice of what to include and exclude is my own personal one, so please forgive me if your favourite mathematician is not included or not dealt with in any detail. The main Story of Mathematics is supplemented by a List of Important Mathematicians and their achievements, and by an alphabetical Glossary of Mathematical Terms. You can also make use of the search facility at the top of each page to search for individual mathematicians, theorems, developments, periods in history, etc. Some of the many resources available for further study of both included and excluded elements are listed in the Sources section.

Chapter 9 : A Quick History of Philosophy - General - The Basics of Philosophy

The history of mathematics is nearly as old as humanity itself. Since antiquity, mathematics has been fundamental to advances in science, engineering, and philosophy.

Because much of genetics is based on quantitative data, mathematical techniques are used extensively in genetics. The laws of probability are applicable to crossbreeding and are used to predict frequencies of specific genetic constitutions in offspring. Geneticists also use statistical methods to determineâ€¦ Ancient mathematical sources It is important to be aware of the character of the sources for the study of the history of mathematics. The history of Mesopotamian and Egyptian mathematics is based on the extant original documents written by scribes. Although in the case of Egypt these documents are few, they are all of a type and leave little doubt that Egyptian mathematics was, on the whole, elementary and profoundly practical in its orientation. For Mesopotamian mathematics, on the other hand, there are a large number of clay tablets, which reveal mathematical achievements of a much higher order than those of the Egyptians. The tablets indicate that the Mesopotamians had a great deal of remarkable mathematical knowledge, although they offer no evidence that this knowledge was organized into a deductive system. Future research may reveal more about the early development of mathematics in Mesopotamia or about its influence on Greek mathematics, but it seems likely that this picture of Mesopotamian mathematics will stand. This stands in complete contrast to the situation described above for Egyptian and Babylonian documents. Although, in general outline, the present account of Greek mathematics is secure, in such important matters as the origin of the axiomatic method , the pre-Euclidean theory of ratios, and the discovery of the conic sections , historians have given competing accounts based on fragmentary texts, quotations of early writings culled from nonmathematical sources, and a considerable amount of conjecture. Many important treatises from the early period of Islamic mathematics have not survived or have survived only in Latin translations, so that there are still many unanswered questions about the relationship between early Islamic mathematics and the mathematics of Greece and India. In addition, the amount of surviving material from later centuries is so large in comparison with that which has been studied that it is not yet possible to offer any sure judgment of what later Islamic mathematics did not contain, and therefore it is not yet possible to evaluate with any assurance what was original in European mathematics from the 11th to the 15th century. In modern times the invention of printing has largely solved the problem of obtaining secure texts and has allowed historians of mathematics to concentrate their editorial efforts on the correspondence or the unpublished works of mathematicians. However, the exponential growth of mathematics means that, for the period from the 19th century on, historians are able to treat only the major figures in any detail. In addition, there is, as the period gets nearer the present, the problem of perspective. Mathematics, like any other human activity, has its fashions, and the nearer one is to a given period, the more likely these fashions will look like the wave of the future. For this reason, the present article makes no attempt to assess the most recent developments in the subject. Berggren Mathematics in ancient Mesopotamia Until the s it was commonly supposed that mathematics had its birth among the ancient Greeks. What was known of earlier traditions, such as the Egyptian as represented by the Rhind papyrus edited for the first time only in , offered at best a meagre precedent. This impression gave way to a very different view as historians succeeded in deciphering and interpreting the technical materials from ancient Mesopotamia. Existing specimens of mathematics represent all the major erasâ€”the Sumerian kingdoms of the 3rd millennium bce, the Akkadian and Babylonian regimes 2nd millennium , and the empires of the Assyrians early 1st millennium , Persians 6th through 4th century bce , and Greeks 3rd century bce to 1st century ce. The level of competence was already high as early as the Old Babylonian dynasty , the time of the lawgiver-king Hammurabi c. The application of mathematics to astronomy, however, flourished during the Persian and Seleucid Greek periods. The numeral system and arithmetic operations Unlike the Egyptians, the mathematicians of the Old Babylonian period went far beyond the immediate challenges of their official accounting duties. For example, they introduced a

versatile numeral system, which, like the modern system, exploited the notion of place value, and they developed computational methods that took advantage of this means of expressing numbers; they solved linear and quadratic problems by methods much like those now used in algebra ; their success with the study of what are now called Pythagorean number triples was a remarkable feat in number theory. The scribes who made such discoveries must have believed mathematics to be worthy of study in its own right, not just as a practical tool. The older Sumerian system of numerals followed an additive decimal base principle similar to that of the Egyptians. But the Old Babylonian system converted this into a place-value system with the base of 60 sexagesimal. The reasons for the choice of 60 are obscure, but one good mathematical reason might have been the existence of so many divisors 2, 3, 4, and 5, and some multiples of the base, which would have greatly facilitated the operation of division. For numbers from 1 to 59, the symbols for 1 and for 10 were combined in the simple additive manner e. But to express larger values, the Babylonians applied the concept of place value. For example, 60 was written as , 70 as , 80 as , and so on. In fact, could represent any power of The context determined which power was intended. By the 3rd century bce, the Babylonians appear to have developed a placeholder symbol that functioned as a zero , but its precise meaning and use is still uncertain. Furthermore, they had no mark to separate numbers into integral and fractional parts as with the modern decimal point. The four arithmetic operations were performed in the same way as in the modern decimal system, except that carrying occurred whenever a sum reached 60 rather than Multiplication was facilitated by means of tables; one typical tablet lists the multiples of a number by 1, 2, 3,â€¦, 19, 20, 30, 40, and To multiply two numbers several places long, the scribe first broke the problem down into several multiplications, each by a one-place number, and then looked up the value of each product in the appropriate tables. He found the answer to the problem by adding up these intermediate results. These tables also assisted in division, for the values that head them were all reciprocals of regular numbers. Regular numbers are those whose prime factors divide the base; the reciprocals of such numbers thus have only a finite number of places by contrast, the reciprocals of nonregular numbers produce an infinitely repeating numeral. In base 10, for example, only numbers with factors of 2 and 5 e. In base 60, only numbers with factors of 2, 3, and 5 are regular; for example, 6 and 54 are regular, so that their reciprocals 10 and 1 6 40 are finite. To divide a number by any regular number, then, one can consult the table of multiples for its reciprocal. An interesting tablet in the collection of Yale University shows a square with its diagonals. The scribe thus appears to have known an equivalent of the familiar long method of finding square roots. They also show that the Babylonians were aware of the relation between the hypotenuse and the two legs of a right triangle now commonly known as the Pythagorean theorem more than a thousand years before the Greeks used it. A type of problem that occurs frequently in the Babylonian tablets seeks the base and height of a rectangle, where their product and sum have specified values. In the same way, if the product and difference were given, the sum could be found. This procedure is equivalent to a solution of the general quadratic in one unknown. In some places, however, the Babylonian scribes solved quadratic problems in terms of a single unknown, just as would now be done by means of the quadratic formula. Although these Babylonian quadratic procedures have often been described as the earliest appearance of algebra , there are important distinctions. The scribes lacked an algebraic symbolism; although they must certainly have understood that their solution procedures were general, they always presented them in terms of particular cases, rather than as the working through of general formulas and identities. They thus lacked the means for presenting general derivations and proofs of their solution procedures. Their use of sequential procedures rather than formulas, however, is less likely to detract from an evaluation of their effort now that algorithmic methods much like theirs have become commonplace through the development of computers. If one selects values at random for two of the terms, the third will usually be irrational , but it is possible to find cases in which all three terms are integers: Such solutions are sometimes called Pythagorean triples. A tablet in the Columbia University Collection presents a list of 15 such triples decimal equivalents are shown in parentheses at the right; the gaps in the expressions for h, b, and d separate the place values in the sexagesimal numerals: The entries in the column for h have to be computed from the values for b and d, for they do not

appear on the tablet; but they must once have existed on a portion now missing. In the table the implied values p and q turn out to be regular numbers falling in the standard set of reciprocals, as mentioned earlier in connection with the multiplication tables. Scholars are still debating nuances of the construction and the intended use of this table, but no one questions the high level of expertise implied by it. Mathematical astronomy The sexagesimal method developed by the Babylonians has a far greater computational potential than what was actually needed for the older problem texts. With the development of mathematical astronomy in the Seleucid period, however, it became indispensable. Astronomers sought to predict future occurrences of important phenomena, such as lunar eclipses and critical points in planetary cycles conjunctions, oppositions, stationary points, and first and last visibility. The results were then organized into a table listing positions as far ahead as the scribe chose. Although the method is purely arithmetic, one can interpret it graphically: While observations extending over centuries are required for finding the necessary parameters e. Within a relatively short time perhaps a century or less , the elements of this system came into the hands of the Greeks. Although Hipparchus 2nd century bce favoured the geometric approach of his Greek predecessors, he took over parameters from the Mesopotamians and adopted their sexagesimal style of computation. Through the Greeks it passed to Arab scientists during the Middle Ages and thence to Europe, where it remained prominent in mathematical astronomy during the Renaissance and the early modern period. To this day it persists in the use of minutes and seconds to measure time and angles. Aspects of the Old Babylonian mathematics may have come to the Greeks even earlier, perhaps in the 5th century bce, the formative period of Greek geometry. There are a number of parallels that scholars have noted. Further, the Babylonian rule for estimating square roots was widely used in Greek geometric computations, and there may also have been some shared nuances of technical terminology. Although details of the timing and manner of such a transmission are obscure because of the absence of explicit documentation, it seems that Western mathematics, while stemming largely from the Greeks, is considerably indebted to the older Mesopotamians. Page 1 of 6.