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SANTA ROSA CAMPUS
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INSTRUCTIONAL MATERIALS FOR SCIENCE TECHNOLOGY AND SOCIETY (GEED 10083)

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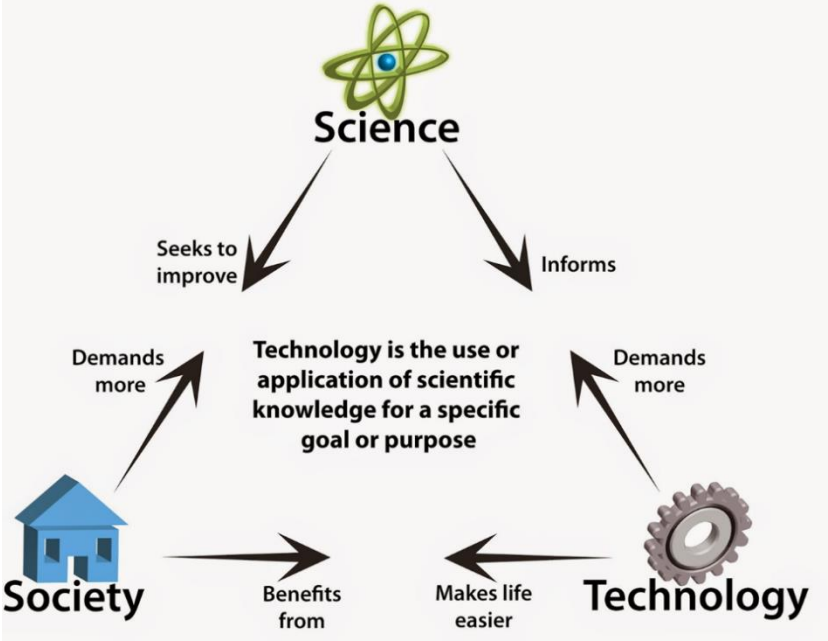
UNIT I – GENERAL CONCEPTS AND SCIENCE TECHNOLOGY AND SOCIETY HISTORICAL DEVELOPMENTS

OVERVIEW:

Throughout the history, science has brought changes in all aspects of life. From a very simple way of life of the ancient humans to our more complicated and fast paced way of living. Curiosity is innate to man, the result leads to upgrade of knowledge, thus progress in science. Application of scientific knowledge, that is TECHNOLOGY, help satisfy human needs and improve not only the living standards, but also the condition of the environment.

Technology is always influenced by the socio-political, behavioral and economic changes in the society. It often dictates the type of technology to be developed that is suitable to the demands and needs of the people.



http://tech21stworld.blogspot.com/2014/08/science-technology-and-society.html

LEARNING OBJECTIVES:

After the successful completion of this unit, you should be able to:

1. Discuss the interactions between science and technology and society through history;
2. Discuss how scientific and technological developments affect society and the environment;
3. Identify the paradigm shifts in history.
4. Articulate ways by which society is transformed by science and technology;
5. Recognize the contributions of different cradles of civilizations to science and technology.
6. Discuss the role of science and technology in Philippine nation-building
7. Evaluate government policies pertaining to science and technology in terms of their contributions to nation building;
8. Identify actual science and technology policies of the government and appraise their impact on the development of the Filipino nation.

COURSE MATERIALS:

Lesson 1 – Historical Antecedents in which Social Considerations Changed the Course of Science and Technology

a. In the World: Ancient, Middle and Modern Ages

Definition of terms:

SCIENCE. According to oxford dictionary, Science is the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment.

TECHNOLOGY. Is the application of knowledge for practical ends.(dictionary .com)

SOCIETY. A society or a human society is a group of people involved with each other through persistent relations, or a large social grouping, sharing the same geographical or social territory, typically subject to the same political authority and domain cultural expectations. (siencedaily.com)

PARADIGM SHIFT. In science, it is a change in the basic idea or concept usually caused by new discovery/ies that no longer conforms the old concept. This change/s can also be influenced by the social, political, cultural, economic and other factors.

Sir Isaac Newton once said: "*If I have seen further than others, It is by standing on the shoulders of giants*."

What do you think Newton has seen?
Who do you think Newton refers to as giants?

Scientific discoveries from the ancient times had laid the foundation that our modern day scientists used as patterns for the new discoveries. Scientist owe their achievements from the works of their older counter parts.

Watch: Stephen Colbert Interview Neil De Grasse Tyson at Montclair Kimberley Academy. Jan 29, 2010.
Retrieved from: https://www.youtube.com/watch?v=YXh9RQCvxmg&t=174s

How will you answer the question: Is it better to know or not to know?

Science and Technology during the ANCIENT TIMES

From the beginning of time man explored his surroundings and develop ways to improve life. The discovery of fire led the caveman to have a protection from the cold environment and wild animals, they also used fire for lighting, social gathering, communication and others. From simple stone tools for hunting, they developed more efficient weapons. From being hunters and gatherers, they learned to cultivate plants and catch fish. Accumulation of experiences turned to knowledge and the transfer of knowledge result to a better and more convenient way of life. Through time, civilizations and empires were born, more scientific developments were evident like written and spoken language, architecture, engineering, astronomy, mathematics, medicine, and a lot more. Civil wars, external pressure, and natural disasters caused fall of civilizations and

changed the course of science and technology. The fall of the Roman Empire marks the end of the ancient times and start of the Middle Ages.

Watch: History Explored Around the World
Retrieved from: https://www.youtube.com/watch?v=wX6J0Gd2EC8

The MIDDLE AGES

Medieval ages or "Dark Ages" are also terms used to describe the middle ages. Period between 450 A.D. to around 1450 A.D. was referred as dark ages because the condition after the fall of the Roman Empire left the people without leaders who look after them. In the early Medieval period economy is based on feudal system, education is out of hand thus many people depend on mysticism, irrational and superstitious beliefs. The bubonic plague struck Europe and Asia in the mid-1300s, leaving more than 30 million people dead. Technological developments were also limited. Mechanical clock, magnetic compass, lenses with spectacle, gunpowder and cannon, distillation and alcohol, were developed during this time. In the field of medicine in Europe, herbs were widely used, diagnosis of was limited to inspection of urine, therapy was through prayer, charms, faith healing and the likes. Then, in the later part of the middle ages, medical schools were organized. Printing press was developed using movable metal-type printer invented by Johannes Guttenberg, this started the mass production of written works which enable the people to get informed, and the birth of industrial revolution.

Readings: Science and Technology and Society in the middle Ages
https://prezi.com/oaiak1m7i5do/science-technology-and-society-in-the-middle-ages/
Watch: 1001 Inventions and the Library of Secrets
Retrieved from: https://www.youtube.com/watch?v=JZDe9DCx7Wk

MODERN AGES

The early modern ages known as The "Renaissance," a French word meaning the "rebirth." Marks the development of Printing revolution started around 1518 to 1524 when the spread of printing press facilitated the wide circulation of information and ideas. This opened up an entirely new way of conveying fresh information to the ordinary people, leading to divergent answers to queries thus re-birth of sciences. To name some revolutionary discoveries were Nicolas Copernicus' "Heliocentric Theory;" Isaac Newton's "Universal Law of Gravity;" Galileo Galilei's discovery of the telescope, motion, Inertia and many others;
The invention steam engine by James Watt, the first mechanical loom by Edmund Cartwright and other machines started the first industrial revolution. It changed the way thing are done, production became fast and cheaper, requiring less of the man power and use of hand tool. People were classified as industrialist, those who owns the factories, and the workers. This Industrial revolution also caused changes to the environment, the use of machines powered by steam or coal cause pollution.

READINGS:
The Rise of the Modern Science: When and Why? Retrieved from:
https://www.blackwellpublishing.co.uk/content/BPL_Images/Content_store/Sample_chapter/9780631236306/001.pdf
WATCH:
Industrial Revolution Inventions Timeline 1712-1942.
Retrieved from: https://www.youtube.com/watch?v=LbAOseDs3KY

b. Historical Antecedents in which Social Considerations Changed the Course of Science and Technology in the Philippines

Pre-Spanish Period

– Based on archeological findings modern man from Asian mainland came over and reached Batangas and Palawan about 48,000 B.C. Subsequently they reached and formed settlement in some islands in like Sulu, Davao, Zamboanga, Samar, and Negros. They made simple tools and weapons from stones and later developed sawing and polishing stones

– Around 3,000 B.C. they were able to produce ornaments of shells, soon they learned to produce copper, bronze, iron and gold metal tools.

– They also learned to weave cotton, make glass ornaments and cultivate rice and dike fields of terraced in the mountainous regions

– Filipinos were already aware of medicinal and therapeutic properties of plants and the methods of extracting medicine from herbs.

– They had an alphabet, number system, a weighing and measuring system

– They also learned to build boats for trading purposes

Spanish Colonial Period

– Spanish introduced formal education, established colleges and universities (UST)

– Construction of government buildings, bridges and roads

– Study of MEDICINE was given priority, Biology was given focus

– Development of hospitals (San Juan Lazaro Hospital was founded in 1578)

– Gov. Jose Basco y Vargas in 1780 encouraged research in Agriculture and industry, cultivation of indigo, cotton, cinnamon, rice, hemp, tobacco, sugar and silk industry

– Jesuits promoted meteorological studies founding Manila observatory at the Ateneo Municipal de Manila in 1865

American Period and Post Commonwealth

– Bureau of Government Laboratories was established which dealt with the study of tropical diseases and laboratory projects.

– Bureau of Government Laboratories was replaced by Institute of Science. In 1958, Pres. Carlos P. Garcia signed the Science Act of 1958.

Marcos Era and the Martial Law

– During the Martial Law, Pres. Marcos enacted many laws promoting science and technology

– Philippine Science community was established in Taguig, the Philippine Atomic Energy Commission explored and uses atomic energy for economic development, sent scientist abroad to study nuclear science and technology

– He also created National Grains Authority, PAGASA, PNOC, NAST, IRRI, Bureau of Plant Industry, Health Science Centers, etc.

The Fifth Republic

– During the Corazon Aquino presidency, The National Science and Technology Authority was replaced by the Department of Science and Technology

– S&T's role in economic recovery and sustained economic growth was highlighted

– RA 6655 of the Free Public Secondary Education Act of 1988 include "Science for the Masses Program"

Fidel V. Ramos Presidency

– In 1998, Pres. Fidel Ramos built Science High School in Visayas and Mindanao which promote advanced S&T curriculum for kids

– Magna Carta for Science and Technology Personnel or RA No. 8439, Inventors and Inventions incentives Act (RA 7459, S&T Scholarship Law in 1994, The Intellectual Property Code was enacted during Ramos' term

Pres. Joseph Estrada Presidency

– Two major legislations was signed; Philippine Clean Air Act of 1999 (RA 8794) and the Electronic Commerce Act of 2000 (RA 8792)

Pres. Gloria Arroyo Presidency

– S&T was dubbed as the "Golden Age." Numerous laws and projects pushed to increase the country's economic level and termed 'FILIPINOVATION"

– Biofuels Act or RA 9367 was signed

Pres. Benigno Simeon C. Aquino III Presidency

– Conferred four new scientist for their contributions in the scientific field
Academician Gavoni Trono for his extensive studies on seaweed species
Acd. Ramon Barba on micro propagation of important crops
Acd. Edgardo Gomez on conservation of coral reefs

SOME FILIPINO INVENTORS AND INVENTIONS

1600 – Yoyo used by the natives as a combat weapon against Spaniards (1920, Pedro Flores patented and put up yoyo manufacturing Co. in the US)
1930's – Banana Catsup (Maria Orosa Ylagan)
1941 – Medical Incubator (Dr. Fe Del Mundo)
1940's – Patis or Fish Sauce (Ruperta David also known as Aling Tentay)
1949 – Erythromycin (Dr. Abelardo Aguilar)
1955 – Video Phone (Gregorio Zara)
1966 – Isolated Rice Breeds (DR. Rodolfo Aquino)
1969 – Lunar Rover (Edwardo San Juan)
1972 – 16 Bit Computer Microchip (Diosdado Banatao)
1974 – Sing-A-Long System (Roberto de Rosario)
1996 – Alco Diesel (Rudy Lantano Sr.)
2000 – Mole Remover (Rolando Dela Cruz)
2005 – Anti-cancer cream for Basal Skin Carcinoma (Rolando Dela Cruz)

WATCH:
Historical Background of Science and Technology in the Philippines
https://www.youtube.com/watch?v=_XOAWhHgPas
Filipino Inventors who changed the world of technology
https://www.youtube.com/watch?v=hZlR6B8_ezI

ACTIVITIES/ASSESSMENT:

1. In a particular society where you belong, how did science influence technology for the betterment of your society? How did the needs in your society demand improvement in technology through application of science?

2. Identify a specific society in which application of science and technology created a change in the society from the ancient times to the medieval and the modern ages.

3. In your opinion, during whose leadership has the greatest contribution in the improvement of science and technology in the Philippines? Explain your answer.