**Ancient Age**

* **Science**- latin word scientia meaning knowledge, knowing how the world works
* **Earliest civilization** were born **along rivers** **to provide water to irrigate cops and regulate floods**

**Mesopotamia- between two rivers (Tigris-Euphrates)**

* The first recorded civilizations of the world existed
* Parts of present-day **Iraq, Iran, Syria, Kuwait, and Turkey.**
* **Sumerian, Babylonian, and Assyrian civilizations-** civilization that flourished in Mesopotamia

**Sumerian Civilization -** modern day Iraq. Known for building **walled city-states**.

* **Earliest known civilization in Mesopotamia**
* Known for being the **first astronomers.**
* **Black-headed people –** people on Sumerian
* **Land of Black-headed people** – land of Sumerian
* **Cunieform –** earliest system of writing. Wedge-shaped scripts pressed into clay tablets.
* **Sailboats -** allowed them to travel by sea to trade goods with other neighboring civilizations. **Planks of wood and sails made of cloth.**
* **Wheel** - first used by the Sumerians for pottery in 3500 BC and later for transportation in chariots in 3200 BC.

**Babylonian Civilization**

* Center of Mesopotamian civilization
* derived from **bav-il** **or bav-ilim** meaning **"Gates of the Gods.“**
* **TOWER OF BABEL -** a structure that the Babylonians wanted to build "with its tops in the heavens" to make a name for themselves.
* **Robert Johann Koldewey** - famous for his in-depth excavation of the ancient city of Babylon in modern-day Iraq.
* **Hanging Gardens of Babylon** were one of the Seven Wonders of the World. Derived from the Greek word **“kremastós”** means **overhanging**
* **The Marvel of Mankind –** grand palace that build along side hanging Gardens of Babylon
* **Sundial** - the earliest type of timekeeping device.
* Inventions: **Primitive Plow, Chariot, Ancient Babylonian Zodiac**

**Africa -** continent with a rich and complex history.

* Agricluture: **Sugarcane, Cotton, Coffee, Palm Oil, Sorghum, African Plow, Winnowing Basket, African Hoe**
* Africans were among the **first to develop iron smelting technology**
* Metallurgy: **Carbon Steel, Arrows, Knives, Bow, Axes**
* Engineering: **Pyramid of Giza, Sphinx, temples, tombs, Noria Water Wheel, Blast Furnace,** **Ships of the Swahili people (Dhows)**
* Textile: **Raffia Cloth –** to intricate patterns to make clothing, mats, baskets, and other items

**Bogolanfini -** a type of mudcloth that often used to make clothing, bags, and other accessories

* Medicine: **Djeka Plant –** use as anesthethia

**Rooibos Plant –** for diarrhea and colic

**Quinine Bark -** the dried bark of the cinchona tree

**Ancient Egypt -** most famous civilization along **Nile River**

* Egypt was known as ***Kemet* – “Black Land”.**
* **Shadoof** - an irrigation tool composed of a pole and bucket used to lift water.
* **The Great Sphinx of Giza**
* **Pyramid -**  served as tombs for king and queens of Egypt.
* **Mummification**- practice to preserve the body to be recognized by the soul.
* **Djoser** - pharaoh of the third dynasty of the old Kingdom, built the first Step Pyramid in Saqqara
* **Imhotep** – designed the first Step Pyramid in Saqqara, and his architect and physician. He write texts describing more than 200 diseases and their treatments.
* Great Pyramid: **The Great Pyramid of Khufu, The Great Pyramid of Khafre and the Great Pyramid of Menkaure**

**Indus Valley Civilization**- located in present-day Pakistan and Northwest India.

* largest of the four urban civilizations of Egypt, Mesopotamia, South Asia, and China.
* **Indus River and the Ghaggar-Hakra River** – two rivers between indus Valley. The major ruvers in india
* Invention: **Seal carving, Metallutgy, carnelian Products**
* **Water System**
* **Drainage System** – first sanitary engineering
* Harappans were among the first to develop a system of **standardized weights and measures** called **cubic weights and cooper balance.**
* **Indus script** - is the earliest form of writing known in the Indian subcontinent.

**Ancient China –** oldest and long lasting civilization of the world.

* **China** derived from the Sanskrit **Cina** from the name of the **Qin Dynasty** pronounces **Chin**
* **First to record astronomical phenomena such as solar eclipse**
* **Crub Nebula -**  the guest star that China witness at 1054 BC
* **Abacus** – counting device not only for counting but also for basic complex mathematical operations
* **Acupuncture –** practice of relieving pain, healing illness by inserting metal needles at precise points in the skin and tissue
* **Ancient Paper** - inventiongreatly affected they way China recorded its history
* **Movable Printing Press** – the production of printed works flourished around the world
* **Porcelain** – types of ceramic clay pottery used to craft vases
* **Silk** – produced by silkworms that feed on mulberry leaves
* **Sericulture –** the cultivation and production of silk
* **Silkroad –** network trade routes that connected different countries
* **Gun powder –** creations of Chinese Taoist alchemist who mixed sulfur, charcoal, and potassium nitrate

**Aegean Civilization –** so called **Greek Dark Ages.**

* Country in Southeastern Europe **aka Hellas or Ellada**
* Greek Philosophy: **Plato, Aristotle, Socrates, Pythagoras, Thales of Miletus, Hippocrates**
* **Plato, Aristotle, Socrates –** questioned the human existence and how the world came to be
* **Pythagoras –** known for the Pythagorean Theorem which is used to measure distance and space
* **Thales of Miletus – first Western philosopher and mathematician popular for his precise prediction of the solar eclipse**
* **Hippocrates –** The father of Westerm Medicine
* **Perachora Wheel –** invention contributed to the invention of the creation of water mills
* **Aqueducts** – constructed for water management in Samos and Athens

**Ancient Rome –** small town near tiber

* **Augutus Ceasar –** emperor of the Ancient Rome
* **Galen –** first to derscribe and diagnose symptoms of different diseases

**Invention: Rectal Spectrum, Bone Levers, Cupping Vessels**

* **Roman Concrete** – use in construction of roads, building and aqueducts
* **Appius Cladius Caecus** - built **first roman Aqueduct** called **Aqua Appia**
* **Colossuem –** largest amphitheater ever built
* **Pantheom –** former Roman temple
* **Ballista –** used by romans to penetrate enemy frontiers
* **Greek Fire -** combustible weapon capable of propelling bombs at the opponent

**Mesoamerica** – historical region and cultural area in North America

**Olmec Civilizations -**  earliest known Mesoamerican civilizations that was established

* **Codices** – maya text written on the tree bark that contain records of Maya ritual
* **Dresden Codex** – contains accurate prediction of solar eclipses, celestial writing
* **The long Count** – calendar that measured days by cycles or sets
* **Maya Calendar** – used for agricultural and religious activities
* **Nahuatl** – used pictographs as their writing system of writing and their language

**Inca Civilizations –** aka Inca Empire. **Largest Mesoamerica civilization**

* Known as great and innovative engineers
* **Quechua – inca’s official language**
* **Quipo – set of strings used for recording information such as tax record, census records, calendar information**

**Middles Ages** – ***period of backwardness***

* **Dark Ages -** means this age has no progress
* **Byzantium (later renamed Constantinople in the 4th century) -** the capital that remained.
* **Emperor Justinian**- leader of Byzantine Empire who reclaimed land from Germanic tribes, marking a period seen as the Roman Empire's restoration.
* **Notable weapons**: Greek Fire, Handheld Trebuchet, Tidal Mill
* **Tidal Mill** – earliest tide mill was found in Northern Ireland
* **Islamic Empire** - one of history's largest, spanning from the mid-7th to the mid-13th century.
* **Quran**
* **Papermaking technology** - became globalized **further enhanced the process by using starch instead of mulberry bark,** reflecting a shift towards **pen-based writing**.
* **The House of Wisdom in 8th-century Baghdad,** established under the **Abbasid Caliphs**.
* **Al-Magest**, - by Ptolemy describing an Earth-centered universe, was among the first works translated into Arabic
* **Alhazen** - pioneered modern optics. **Father of Modern Optics.**
* **Avicenna** - a physician and philosopher who authored **The Canon of Medicine**
* **The Canon of Medicine -** groundbreaking encyclopedia was the first to detail human eye anatomy
* **Al Zahrawi**- often known as the "Father of Surgery,"
* **Muhammad ibn Musa al-Khwarizmi –** develop algebra in his book **The Compendious Book on Calculation by Completion and Balancing**
* **Al-Biruni** - also proposed the theory of Earth's rotation and conducted precise specific gravity calculations
* **Jabir ibn Hayyan-** recognized as the "Father of Chemistry”

**Medieval Europe**

* **Charles the Great, also known as Charlemagne**- established the Carolingian Empire, ushering in the Carolingian Renaissance
* **Vikings**- warrior skills and navigation prowess
* **Viking axe** - common weapon and tool, with the Dane Axe being a two-handed battle weapon
* **Magnetic compass** - utilized the Sun for sea navigation
* **Three-field system** - This system divided land into three plots for seasonal crops
* **Roger Bacon** - contributed to the development of the scientific method, detailed in his book **Opus Majus.**
* **Alchemy** - transform base metals into noble ones like gold, blending material and spiritual perspectives.
* **University of Paris and Oxford University(1096) –** university develop that show intellectual progress
* **Nicholas Oresme -** formulated the mean speed theorem
* **John Buridan -** proposed the concept of "impetus" to explain a moving body's persistence in motion
* Innovations: **Spectacles, Windmills, Magnets (for compasses), and Spinning wheels**

**Modern Ages**

* **RENAISSANCE (**french word means Rebirth) - marking the transition from the middle age to modernity.
* **Johnnes Gutenbergs -** invented the printing press around 1440 became pivotal to the development of mass media.
* **Dante -** Father of Italian Poetry for his magnus opus The Devine Comedy
* **Francesco Petrarca –** The father of humanism
* **Leonardo da Vinci -** painter, sculpture, scientist
* **Michelangelo –** italian painter, created the School of Athens and The Sistine Madonna
* **Raphael –** famous for his work Sistine Chapel in Vatican
* **Nicolaus Copernicus –** proponent of heliocentric theory, a belief that the earth is the center of the universe
* **Galileo Galilei –** Italian astronomer who proved that Copernicus theory is true
* **Isaac Newton –** eradicated all doubts of heliocentric validity
* **Fuel from coal -** used during this period due to demand for mass production, lessening the use of animal and man power
* **Iron and steel** – use to invented of the blast furnace
* **Blast furnace** - type of metallurgical furnace that can liquifies to creates materials.
* **Textile Industry**: Cotton, Silk, Fabrics, Tapestries
* **Agricultural techniques**: Sheep Farming and Scythe for cutting both crops and grass.
* **Bridgewater Canal, England** - canals for inland transport also began during this period
* The introduction of the **wheel barrow and wooden tracks** led to the development of railway transportation.

**Industrial Revolution -** began in the 18th century , a period characterized by the shift from agricultural process to urbanized and industrial process

* **Arnold Toynbee** – popularized the term Industrial Revolution
* **England** – first country to be revolutionized
* **Factor system** - was implemented to increase the production level of the yield.
* **Tobern Bergman** -a Swedish metallurgist, discovered the important role of carbon in steelin 1750.
* **Henry Bessemer and William Kelly** -improved the methods of manifacturing steel from iron.
* **Robert Mushet -** discovered an alloy of iron that combined carbon and manganese with the formed iron
* **JOHN KAY** - invented the flying shuttle to increase the output for yarn.
* **JAMES HARGREAVES( 1764)** – created the spinning jenny, also called **Saxon Wheel**. It is a machine that is able to spin more than one spindle at a time.
* **Richard Arkwright** - patented a textile machine powered by water and not by hand called the water frame in 1769
* **Samuel Crompton** - invented the spinning mule, which combines the features of the spinning jenny and water frame.
* **Power loom** for spinning and weaving was created by Edmund Cartwright in 1787 to increase the production of cotton from plantations in England.
* **Cotton gin-** invented by Eli Whitney to multiplied the amount of cotton that could be cleaned, which increased the production of cotton for textiles.
* **Thomas Saint -** a cabinet maker, submitted a patent for a mechanized sewing machine in 1790
* **Barthelemy Thimonnier -** a French tailor, invented the chain stitch machine in 1829.
* **Steam Engine** by Thomas Newcomen
* **Denis Papin –** invented pressure cooker
* **John Calley –** develop an engine based piston
* **Watt’s Steam Engine -** James Watt, the inventor of engine that needed a power without consuming too much fuel.
* **Matthew Boulton -** industrialist, became interested and watt partnered in invention of steam engine that continued developed to became important in powering ships and trains.
* **LOCOMOTIVE** - an first engine or rail transport vehicle was developed by RICHARD TRAVITHICK named New Castle.
* **FATHER OF RAILWAYS** - effective locomotive engine or rail transport vihecle was developed by **GEOROGE STEPHENSON** **called BLUCHER**
* **1825-** stephenson and his brother developed locomotion No.1 that can manage to go 12 miles per hour and stephenson built a rocket could go 30 miles per hour .
* **1840**- development of locomotives led to an era of railway construction in Europe and United States
* **Robert Fulton -** utilized steam engine from boulton and watt used to developed the River Steamboat in 1807 called Clermont.
* **CHARLES-AUGUSTIN DE COULOMB -** made noteworthy progress in the field of physical science and he studies on electrodynamics later on culminated into the Coulomb‘s Law .
* **JOSEPH PRIESTLEY**- he discovered oxygen gas by collecting colorless gas from heated mercury in 1774 and later on this colorless gas was named oxygen by French scientist ANTONIE LAVOISIER.
* **James Clerk Maxwell**- had managed to formulate a theory on electromagnetic radiation which poses that light
* **George Johnstone Stoney**- proposed the theory that electrons have fundamental quantities of electricity.
* **William Crookes** – discovered cathode rays
* **Eugen Goldstein** - discovered the positive particles called protons from a tube filled with hydrogen gas.
* **William Roentgen** – discovered X-rays while doing research on cathode rays in 1895
* **J. J. Thomson** – discovered electron when he placed Crookes' tube within a magnetic field in 1897
* **Henri Becquerel** - discovered radioactivity, which was later on expounded by Marie Curie and Pierre Curie.
* **Marie Curie** - discovered the radioactive elements in uranium, thorium, radium, and polonium from late 19th century until the early 20th century.
* **Alexander Graham Bell** - filed a patent for the telephone because of his success in developing a means to exchange messages in real time through electric current.
* **Carolus Linnaeus** - dubbed as the "Father of Taxonomy," developed a system of naming organisms called the binomial nomenclature.
* **James Hutton** - proposed that there are still gradual mechanisms on Earth that explain the variability of fossils.
* **Georges Cuvier -** a pioneer in the field of Paleontology, the study of fossils, proposed the Theory of Catastrophism in 1813
* **Charles Lyell** - propoesd the priciple of uniformitarianism based on Hutton’s theory.
* **Jean-Baptiste de Lamarck** - proposed the theory of Theory of Iheritance Acquired Characteristics.
* **Charles Darwin** - published his work explaining the variability of living organisms entitled On the Origin of Species by Means of Natural Selection
* **Gregor Mendel** - known as the "Father of Genetics. Published work on The Origin of Species

**20th Century**

* **Max Planck –** modern physics advanced with the discovery of quantum theory in 1990
* **Albert Einstein-** **Theory of  Relativity** which was established in 1905. Explained the phenomenon ***photoelectric effect*** where electrons are released from materials when hit by light.
* **Erwin Schodinger-** an equation of *quantum mechanics* was proposed by Erwin Schrödinger , that enabled scientists to develop semiconductors and automatic power
* **Robert Goddard –** he launch the first successful rocket at farm near Auburn Massachusetts
* **James Chadwick-** he discovered the ***neutron*** in the nucleus of an atom.
* **Aswald Avery -** discovered that genes and chromosomes are carried by DNA cells in 1994
* **Francis Crick** and **James Watson -**proposed the double helix model of the **deoxyribonucleic acid** of the DNA in 1953
* **Alexander Fleming** - discovered *penicillin*, a drug against bacterial infections caused by staphylococciand steptococci.
* **Howard Florey and Ernst Chain** -developed the first antibiotic that could be mass produced on 1945
* **Niels Jerne -** expounded the ***antibody-formation process***that states that the body has its own antibodies that could fight antigens.
* **Jonas Salk** developed the first polio vaccine
* **Albert Sabin** improved Salk's work and produced ***oral polio vaccine***.
* **Luc Montagnier** and **Robert Gallo –** discovered the *human immunodeficiency virus (HIV)* on 1983
* **Dolly -** first cloning in animals, through a sheep
* **Orville** and **Wilbur Wright-** launch the first manned engine-powered aircraft flight in 1903
* **Henry Ford** - In terms of land transportation, the first production model was launched in 1908
* **Sputnik** – the first artificial satellite that launched in 1957
* **Apollo 11 –** space ship Apollo 11
* **Charles Babbage -** he invent of the computer from the early systems of calculation in 1812
* **Claude E. Shannon -** He is the Father of Information Theory
* **Shannon-Weaver Model of Communication: Information source 🡪 Transmitter 🡪 Channel (🡨Noise Source) 🡪 Reciever 🡪Destination**
* System begins with the information source that produce a message to be communicated
* The **Channel** is a medium used to transmit the message to the receiver
* **Transactional Model -** this involves both the sender and the receiver as communicators who exchange messages
* **Interactive Model -** Similar to transactional model but it is often in the context of studying new media such as the internet.
* **Pulse-Code Modulation -** A binary and digital way of transmitting analog-type data.
* **Alec H. Reeves** (a British engineer) -adapted this for voice communication
* **SIGSALY** - Developed by Bell Laboratories. A secure speech system during World War II
* **Alan Turing -** Developed Universal Turing Machine (UTM) a first computing machine.
* Father of the Modern Computer.
* **Konrad Zuse** - Devised the world’s first programmable computer between 1936 – 1938
* **Z3** that Konrad’s created was the first Turing-complete digital computer, which became operational in 1941
* **Atanasoff-Berry Computer -** Developed by John V. Atanosoff and Clifford Berry
* A machine that can solve for variables one at a time until an entire system of equations is solved.
* **Perry Crawford -** Described his thesis “Automatic Control by Arithmetic Operations” that a magnetic drum could be used to store electronic digital information.
* **Magnetic Drum Memory System -** Developed by Engineering Research Associates (ERA) using parts of captured German Magnetophones
* Was used by US Navy to decipher encryptions. Later on, this became **computers in US Military universities in both the US and the UK.**
* **Harvard Mark 1** - General-purpose electromechanical computer. Devised by **Howard Aiken and built by IBM in 1944**
* **Manchester Baby Computer -** A Small-Scale Experimental Machine (SSEM)
* Spearheaded by English engineer Fredric “Freddie” Calland Williams in 1946 and English mathematician and computer scientist Tom Kilburn in 1947
* **Fairchild Semiconductors -** William Shockley and his team of engineers were the first to commercially mass-produced transistors but in 1957, his team (“traitorous eight”) create and founded this company
* This is now known today as **Silicon Valley**, a center of digital and technological research and development
* **604 Electronic Calculating Punch -** Created by International Business Machines Corporation (IBM) in 1948
* Capable of performing basic mathematical operations hundred times faster than previous IBM machines
* **Integrated Circuit** - Created by engineer Jack Kilby
* He integrate a resistors, capacitors, and transistors into a single unit
* Current IC serve as the “brain” of computers and cellular phones
* **IBM Stretch Computer -** First IBM supercomputer
* Intel and Fairchild were the first to produce 8-bit microprocessors on a commercial level
* **Floppy Disk** - Designed by IBM
* An reliable and inexpensive system for loading instructions onto mainframes.
* Apple II is the most popular floppy disk in 1977
* **Compact Disk** – Is a device that could record and replay sounds without any physical contact between parts
* **James Russell’s** invention of a system that can record digital information on an optical transparent foil lit using a high-power halogen lamp in 1970
* **Sony** and **Philips** in 1980s licensed this invention
* **Advance Research Projects Agency Network -** Also knows as ARPANET which created in 1969
* A packet switching network grouped data into parts or “packets”
* They manage to connect computer networks across the United States, Europe, and Australia until it was decommissioned in 1990.
* **Internet -** Replaced the ARPANET after its decommissioned
* Collection and interconnection between numerous networks around the globe
* **World Wide Web (WWW)** - Was created in 1989 by Tim Berners-Lee
* Simply “web” which linked CERN computers into a single network that allowed for the quick transfer and sharing information
* **HyperText Markup Language (HTML)** – Standard language used to create websites and applications
* **Uniform Resource Identifier/Uniform Resource Locator (URI/URL)** – Address of a webpage
* **HyperText Trasfer Protocol (HTTP**) – defies how information is formatted and distributed on servers and browsers
* **WorldWideWeb.app** – is the first web page editor created by Berners-Lee
* **Internet Protocol -** To identify each individual device connected to the internet
* It reveals the device’s location and identifies the host
* Present Technologies:
* Emails
* Instant messaging
* Video calls
* Blogs
* Online forums
* Social networks
* Online shopping
* Artificial Intelligence
* Video games