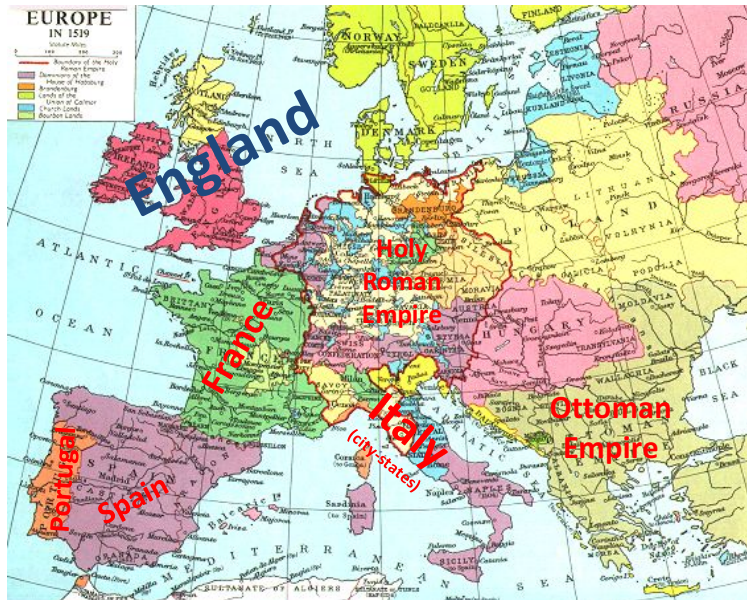


## The Early Modern Period (1453-1700)

- Geography



- France, most powerful monarchy, dominant country in Europe> most populated country
- Spain, another powerful monarchy
- Portugal
- England
- Holy Roman Empire
- Ottoman Empire
- Italy, city-states, cultural movement renaissance started in the north of Italy, not political united> most heavenly populated citted
- And the date?
  - What happened in 1453?
    - The Turkish Ottomans took the city of Constantinople
  - What happened in 1492
    - Christopher Columbus discovery of America
  - What will happen in 1789?
    - The French Revolution
- Philosophy, Culture, Art, Architecture
  - The Italian Renaissance (1350-1550)
    - Intellectual and artistic current
    - Movement that spread to all parts of Europe
    - School of Athens -Raphael
      - Tribute to Antiquity
      - Plato and Aristotle walking side by side
    - A powerful intellectual and cultural movement ignites in Italy and sweeps Europe throughout the Early-Modern period
    - Why does it start in Italy

- Wealthiest part of Europe
- Banking started there
- Closer contact of Antiquity > Ruins of Roman Empire
- Monasteries where they keep books from the Roman period
- More urban than the rest of Europe > Most cities
- The birth of banking and capitalism
  - Banks of Florence funded the Vatican
  - Jews did banking since their religion didn't forbid them from doing banking
  - Wealthy families in search of prestige (Medici, Borgias)
    - Patronage of the arts > fight for prestige
    - Families would hire artists
    - Best artists to decorate their house to show their prestige
    - Family name very rich
- Renaissance philosophy (humanism)
  - Renaissance philosophy is all about the rediscovery Greek and Roman philosophy
  - Focusing on Plato, Socrates, Aristotle
  - Changed and adopted differently in different countries
  - Francesco Petrarch (1304-1374)
    - Fascinated by classical past of Italy
    - Ultimate scholar of the Roman history
    - Great poet
    - Belief in imminence of a brilliant era
    - A new kind of education?
      - Studia humanitates. What is this?
        - Latin for Science humaine
        - Stop studying theology, but rather the great accomplishment of humans
        - Should study philosophy, psychology, geography, history
        - Becoming a good speaker > Rhetoric
        - Become persuasive
      - True birth of humanism
  - Marsilio Ficino and Pico della Mirandola
    - Master and apprentice, both leave marks as eminent philosopher in the period
    - Marsilio studied studia humanitates
    - Philosophers in their own right
    - They go beyond medieval theology and discuss worldly philosophy like the Greeks and Romans
    - Ficino brought back Plato into modern times
    - They describe Plato as a divinely inspired precursor to Christ, a kind of prophet in his own right
    - Mankind, the crucial link between God and the material world (Pico argued this)
      - Man is part of the material world, but we are endowed with a soul (part of God)> we have access to the world of abstract and ideas
      - Humans at the centre of all scientific inquiry
    - Pico wrote an essay about every single topic discussed in universities
    - Pico felt like he can argue with every single specialist and come back on top
- A "New Era" The Rinascimento
  - Self conscious of being in a new era
  - Name given by the people living in the period
  - Implying that Humans were dead during Middle Ages

- A term coined by Italian sculptor, architect, and art historian Giorgio Vasari
- It is also around this time that the notion of “Middle Age” is invented
- The birth of political science
  - Academic study of political power
  - Many Italian philosophers of the Renaissance period debate what should be the ideal form of government
    - Remember the context of Italian politics
    - Most debate around Roman Republic vs Plato’s Republic
      - City of Venice used the Roman Republic system in the city
      - Plato’s Republic > Philosopher kings (Dictatorship of the good)
  - Along comes Niccolò Machiavelli (1469-1527)
    - Bureaucrat of ruling families of Florence
    - Provided council
    - His perception of political matters
    - The prince (1513) > the ruler
    - Peace, Security, Prosperity (three things a ruler most value)
    - The ends justify the means > any means necessarily to get these points
      - Not needless cruelty
    - Extremely influential
    - A lot agreed and a lot disagreed
    - Read widely to this day
- Christian Humanism
  - Not everyone abandoned religion, many kept the ideal of Christian theology philosophy
  - The progressive diffusion of Renaissance ideas
    - An effort to reconcile Renaissance ideas with Christian medieval theology
    - The appeal of strengthening and modernizing Christian culture through Classical thought
      - A lot of people realized that Christianity was running out of touch with the people
      - Intellectuals took the opportunity to modernize Christian
  - Erasmus of Rotterdam
    - The translation of the Bible
      - He argued for the translation of the Bible in vernacular languages
      - Latin was the only acceptable language the Bible should be written in
      - It shouldn’t be only the Church officials to be in charge of interpreting the Bible
  - Western classics+ early Christianity
    - He tried to blend Western Greek classics and the main points of early Christianity (origins of his message)
  - Philosophy of Christ
    - Shouldn’t blindly follow religion
    - What is Jesus’ message? Forgiveness, love
  - A precursor of the Reformation?
    - Reformation also centred around the origins of Jesus
    - His ideals
- Culture and art
  - Art serves a cultural and economic purpose
    - Art serves as a mean of social distinction
    - Increase their image, their prestige through art
  - As in M-A, it also serves a religious purpose
  - Still, Renaissance art marks the birth of our perception of the “Great Artist”

- In the middle ages we don't know of individual artist > value the individuals
- Trying to bring back the glory of the past
- Michaelangelo
  - Painted the ceiling of Sistine Chapel > religious art
  - He was also a great sculpture
    - La Pieta inspired by Hellenistic Greece
  - The David
    - Classical Greek style
- Leonardo Da Vinci
  - Mona Lisa
  - The Last Supper
  - Inventor > money for his invention
    - Came up with the design of the bicycle
- Sandro Botticelli
  - The Birth of Venus
- Raphael Sanzio
  - School of Athens
- Architecture
  - Like in other realms, Renaissance architecture attempts to break away completely from medieval influences, mark back to glorious Antiquity
  - Gothic was a pejorative term created in Renaissance to qualify Middle Age Architecture
  - Built buildings like Antique Greece
    - St Peters Basilica
  - Private residences are made to look like Roman villas
  - Most famous off all is the dome of Florence
    - Wealthiest Italian city states
    - Birth place of capitalism
    - Still don't understand how they were able to big that massive dome with the techniques of that time
- **Religion**
  - The Reformation
    - What is it?
      - "The Reformation was a religious, political and intellectual movement during the 16th century that culminated in an irreversible split within Christianity between Catholics, led by the pope in Rome, and Protestants, who rejected papal authority"
      - Distinction between Catholics and Protestants (they had lots of denomination)
  - Central elements of this reform
    - Holy scripture vs tradition and interpretation
      - We don't care about how people debated the Bible
      - Only care about the holy scripture > everyone is in titled to their own interpretation
    - Salvation achieved through God's grace alone
      - Protestant: If you begged God and loved him enough you can buy your salvation
      - Catholicism: Buy your salvation > give money to the church
  - What is denomination?
    - Within Protestantism there is many branches
      - Presbyterians, Huguenots, Anglicans, United Church
  - In what context did the reform emerge?
    - A wide range of grievances ( a lot of people had a lot of anger towards Christianity)

- Towards indulgences> can either pray for your forgiveness or pay to be absolve > the richer you are the more likely you will go to heaven > against the Bible's teaching> perversion of the Christian church
- Towards clergy (immorality, ignorance, absenteeism, pluralism)> Workers of the church (priest, etc.)> Priests had concubines, pedophilia> not respect vows of celibacy>
  - Simony: To buy a church position > Not appointed a position > Priests didn't have the proper training to be a priests> to collect more money
  - Absenteeism> priest had many churches so they couldn't be very present in all
- Towards papacy (Especially the Borgias and Medici)
  - People would take this position for political reasons
  - Advance their personal agenda> to get rich> highly immoral
  - Medici spent a lot of arts
  - Borgias was a crime family
- Anger towards highly centralized clergy, disconnected from actual Christian people (humans)
  - Humanistic movement that focused more and more on individuals was directly opposing to Christianity
- Educated humanists, such as Erasmus, call for theological reforms
- Enormous impact of the printing press
  - Print pamphlet, posters > easier to share ideals
- Martin Luther (1483-1546)
  - Young German priest and theologian from Wittenberg
  - 95 theses (Solda Fide, Sola Scriptura, the "Priesthood of all believers")
    - Complained about different points
    - Only faith, only scripture
    - Was a called to a presentation, the goal was not create a reform
  - Intellectual who taught theology
  - Rome's response
    - Deep consequences
    - Martin Luther was excommunicated
    - He was pissed and continued his reform
- Henry VIII (1491-1527)
  - King of England, wants annulment of marriage to Catherine of Aragon, Rome refuses (political reasons)
    - Catherine couldn't give him a male heir
    - Blamed her for not getting him a male heir
    - Spain was against this divorced and had a bigger influence on the papacy
    - The pope refused the annulment for political reason
  - 1534 Act of Supremacy
    - From now on Henry is the Pope> from that point on they control religion in England
  - "Anglicanism" is born
    - Head is the king of England
    - Will take points from the reform
    - Political notion over religious one
    - Pope worshippers were traders> persecution of Christians
  - Becomes political weapon
  - Persecution of Catholics
- Other reforms
  - Huldrych Zwingli (Switzerland)

- Jean Calvin (France)
- Anabaptists (Amish, Hutterites, Mennonites, etc) > Radical reformers
- The Counter-Reformation (or Catholic Reformation)
  - Pope Paul III (Medici) hopes that Vatican can become heart of the Reformation, rather than chief opponent
  - Wanted to lead the reform movement
  - He was forward thinking
  - Council of Trent (1545-1563), calls for spiritual renewal
    - Address problems with clerical immorality, simony, ignorance, etc
    - New focus on education: a seminary for each dioceses > to train priests (to know latin and give good masses)
    - Foundation of new religious orders (Ursulines, Jesuits, Suspensions, etc)
      - Education, colonization
      - Priests, monks debated solutions
- Political and military history
- Early European exploration
  - The Afroeurasian trade network of the Middle Ages
    - The centre of world trade
    - Africa(slaves, gold), Indonesian(pepper, dyes, spices), Arabia/Persia (coffee, spices) China/Japan (porcelain, tea, sugar, silk), India/Sri Lanka (Fabrics, dyes, spices)
    - European was the weakest link since they didn't have anything the rest of the world wanted
    - The "Silk Road"
      - High demand from nobility in Europe
      - Marco Polo (merchant from Venice)
    - Chinese exploration in the 15th century
      - Zheng He, chinese explorer
        - World's first naval explorer
        - Went at least to the island of Madagascar
        - Chinese had a bigger boat
  - The fall of Constantinople (1453)
    - By the Turkish Ottomans
    - Humongous empire
    - Defeated during WW1
    - European lose their access to Asia
    - Scare that Islam is pushing into Western Europe
    - Europe "blocked off" from Afroeurasian trade network.
  - Four key motivations for sea travel and exploration
    - 1. Economic: Desire for eastern luxury products, and search for precious metals to engage in this trade (gold, silver)
    - 2. Religious: Missionary fervor. Crusades and Reconquista over, new outlets for glory for God needed
      - Need new people to convert
      - Wanted to convert the pagans in Africa and America
    - 3. Cultural: The "zeitgeist" of the Renaissance period. A spirit of curiosity, of discovery. Popularity of printed travel journals.
      - Books about the travels of the explorers
    - 4. Political: Rivalry between European monarchies, in their search for riches and glory, favour of God, etc

- Portugal, Spain, Great Britain, France were on the Atlantic ocean with a large centralized monarchy
- Advances in shipbuilding
  - Shipbuilding
    - From small galleys (easy to tip over, small[small cargo space], bad sails for strong winds)( not well adapted to go on open ocean) to caravels and galleons
    - Portuguese first to invent the Caravel (high edges)
  - Cartography and navigation
    - Ptolemy's Geographia
      - First world Atlas
    - The compass (invented in China)
    - The Astrolabe
      - Measures latitude based on the stars (North star)
      - Knowing where you are on a north/south axes
    - Sternpost rudder (Ship much more stable and control direction you are going in with much more precision)
  - Mostly foreign inventions
- Portuguese exploration
  - Why Portugal?
    - A remote nation Europe, a remote continent!
    - Isolated> need to explored
    - Western most part of Europe
    - Always interested in sailor
    - Three major reasons:
      - An ocean-based economy, age-old contact with the sea, knowledge and expertise seafaring.
      - Portuguese monarchy wealthy and in contact with antique knowledge thanks to Reconquista
      - Isolated from Europe because of Spain> needed to sail around Spain to gain access to Europe
    - Significant geographic advantage> ocean current that pushes them towards Africa and Central America
  - Henry the Navigator (1394-1460)
    - Patron of navigation
    - Convinced the king to spend on exploration
    - Brains of the operation
      - Commanded and oversaw first voyages
    - Provided support for the study of geography and for voyages of exploration
    - 1415 conquest of Ceuta
      - Marks a date that a European power conquered a part of the world not in Europe during the Early Modern Period
    - Settlements in the Azores, the Madeiras and the Canary Island
      - Created cities and trading posts
    - Commercial settlements in Arguin, North Africa
    - Efforts pay off
  - Exploration after Henry the Navigator
    - Bartholomew Diaz discovers the Cape of Good Hope (1487) (southern tip of Africa)
      - Discovered a way to go to the Indian Ocean by avoiding the Ottomans
    - Vasco de Gama reaches Calicut (1498)

- Went around Africa to go to India
  - Solve the problem of the Ottoman empire
  - Made a trip every year
- Lisbon becomes European port of entry for Eastern luxury goods
  - Golden Age of Portugal
- Spanish Exploration
  - Christopher Columbus (1451-1506)
    - Controversial figure in history
      - First person to land in America
      - Treated the natives horribly> beginning of the end for the native societies
    - Embodiment of Genoese ambition (Italian> Genoa)
      - Genoese intense competition with Venice (silk road)
        - Genoa didn't have money to pay for massive exploration so he went to Spain
      - Already knew the earth was round
      - He thought the world was small
      - He thought if he sailed West he would land in China
    - Deeply religious man
      - Thought he was given a divine mission
    - Daring and risky plan
      - Was not very popular
    - Spain gave him two old ships
  - On October 12th 1492, Columbus and his crew, on the verge of mutiny and starvation, land in the Bahamas
    - "Indians" with golden jewelry
      - Guessed that they had vast quantity of gold
    - Disappointed to see not advanced natives (Chinese were known to be advanced)
    - Brought back natives to Asia to show that he had succeeded
    - Never realized in his lifetime that he didn't reach India
    - Subsequent subjugation of natives on Hispaniola and creation of Spanish colony, the birth the Spanish Empire
      - None of his colonies have succeeded
  - The Treaty of Tordesillas (1494)
    - Proclamation by the Pope about where the Portuguese and the Spanish can colonize
      - One half of the world belongs to Spain and the other half belongs to Portuguese
      - The line cut a part of the South America and Portuguese realized that so they were allowed to colonize present day Brazil
  - Continued search for a westward passage to Asia
    - When people realized the new World was not Asia, continued to try to find a passage to Asia
    - Ferdinand Magellan (1480-1521)
      - Travelled around the world
        - When around America from the South and then sailed the Pacific Ocean (realized the Pacific Ocean is humongous 3x wider than Atlantic Ocean)
        - Proved that Erastothene's was right all along
        - Magellan murdered by Philipinno natives
        - Italian
    - The subjugation of the powerful Mexica Empire (Azthec)
      - Hernan Cortés (1485-1547)
        - First colony were in the islands of Cuba/Haïti



- Hernan sailed from Cuba to the mainland to meet this native empire that was apparently very advanced
- He managed to successfully to conquer the Aztec colony with only a few hundred man (He had technology that the Aztecs didn't (horses, gun powder))
- Capital was built on an artificial island> absolutely breathtaking village
  - Advanced but were at a disadvantage against the European
  - European brought diseases which created a rampage> natives didn't have the antibodies to fight them
  - Half of the people in the capital had died by the time the European reached them because of disease
  - In a couple years 98% of the population of Mexica disappeared
- The Subjugation of the powerful Inca Empire
  - Francisco Pizarro (1475-1541)
    - Conquering> not a peaceful relation
    - Kidnapped the king and demanded ransom
    - Once they received the ransom still killed the king
    - Enslaved the people
  - Advanced civilization
    - Were able to perform brain surgery
- English Exploration
  - Initially, English prey on Portuguese and Spanish (Pirates)
    - England would hire people too capture Portuguese and Spanish ships > stealing
  - After the reformation, they didn't feel like they needed to respect the words of the Pope
    - Broke the Tordsillas treaty
  - The "Lost Colony", Roanoke 1585
    - They settled that colony and they left
      - When he came back everyone disappeared
      - Wrote Croatan on the trees
        - Neighbouring native tribe
        - They didn't find any proof
        - Mystery
    - North Carolina
- Private Colonization
  - Colony of Virginia (Jamestown 1607)
  - Founded by a company (company of Virginia)
    - To turn a profit
    - Cash Crops (Tobacco)
    - Plantation based colony
    - Relied heavily on slave labour
- Religious Colonization
  - Colony of Plymouth (1620)
    - New England
      - People felt persecuted in England for their religious beliefs so decided to go to the colonies to escape persecution
      - Small communities of Protestants families
      - Origins of Thanksgiving
      - Tried to convert the natives
      - Colony of Massachusetts
      - Territory (New England) divided in religious purposes

- Colony of Massachusetts (1630)
- The “Thirteen Colonies”
  - Each had their own laws
- French exploration
  - Jacques Cartier’s voyages (1534-1542)
    - Sailed more north than Spanish
    - Looking for a path to Asia
    - Plant a cross in Gaspésie
    - Second voyage was lower in the St-Lawrence river, but the rapids stopped him
  - No Gold or access to Asia so French lost interest
  - Not colonization, just exploration
  - Samuel de Champlain and l’Abitation
    - Small settlement > foundation of Québec city
      - Used to commence trade with natives
  - Ville Marie, 1642
    - Originally only purpose was to convert people
  - Slow development, Caribbean more important
    - Caribbean had sugar and rum which was much more profitable to France
- The Columbian Exchange
  - A widespread, irreversible, and ultimately global transfer of plants, animals, diseases, populations, ideas, etc between the “Old World” and the “New World” from colonial era to the modern world.
    - Loss of biological diversity
  - Tomatoes come from the New World
  - Darkest element: diseases present in the Old World brought to the New World (bubonic plague, smallpox, malaria)
    - Only genocide in the New World and the Old World did not bring diseases back
      - New World were more hygienic, didn’t domesticate animals (plagues comes from animal diseases that jumped onto humans)
- The Atlantic Slave Trade
  - Slavery, a pillar of Western history
  - Africans brought from their land against their will to work in plantations in America
  - Chained to the ground in slave ship
  - African slaves and the sugar industry
    - Labour intensive plants to turn a profit
      - Cheap African labour to turn a profit
  - Far more slave immigrants than colonists!
    - Between 1518-1800
      - 10 million African slaves left Africa to the New World (8.5 million actually survived the voyage)
      - 2.5 million European colonists
  - History of African slaves more than history of colonists
  - Primary source of population
  - Largest number ended up in the Caribbean and South America (Bresil)
  - The development of “racial theory”
    - A regrettable intellectual legacy of the slave trade
    - Before they were seen inferior just like all foreigners
    - Trying to justify African slave trade by the idea that their skin colour makes them inferior

- “Inferior race”
  - Try to feel like they are doing them a service since Africans are less intelligent
- **Science and Technology (EXAM TEACHER LIKES THIS!!!!)**
  - The printing press (with movable-type)
    - Perhaps the single most impactful, significant intention in the history of mankind!
    - Print worlds onto paper with movable blocks
    - Credited to Johannes Gutenberg (1398 -1468), a brilliant blacksmith from Mainz, Germany
    - Actually less of an “invention” and more of a brilliant combination of existing technologies
      - Idea of printing was already present since the Minoans and in China
      - Also combines technology of the wine press
      - Blacksmith in Europe had stamps with letters on them for years and years
      - Gutenberg had the idea to combine everything and smother blocks with ink and press them on paper
  - Why now?
    - A HUGE market for cheap standardized books!
      - Development of primary schools
      - Development of universities
      - Desire for widely available uniform information in various fields (think law, medicine, business, etc)
    - People wanted books > only place to get them in the library of monasteries
      - Books really precious and not open to the public
    - Wanted uniform books, since sometimes when monks would transcribe they would make mistake
  - The “printing revolution”
    - Hundreds of printing workshops open up everywhere in Europe within decades
    - At the end of the century common for relatively rich people to have hundreds of books
    - Books become far more uniform
    - Books are more reliable since they know the books are all the same
    - Ideas and opinion can spread very quickly
      - Circulate around the continent
      - Common for books and ideas to spread
      - Ex: 95 thesis of Martin Luther
    - Transnational identities based on ideas
      - People communicating through ideals
      - People with same ideas could communicate easier
      - Easier to exchange ideals
    - A strong incentive to learn how to read
    - A bridge between oral and written culture
      - A lot of cultural stories were always told orally
      - Common child stories weren’t deemed important enough to be written
    - A democratization of knowledge
      - Made available to the masses
      - Not exclusive to monks anymore
      - Everyone could buy reference books
    - One step closer to a global human hive mind?
      - Thinking alike, insinc
      - Spread new ideals faster
      - Connection of human brains on a larger scale
  - The scientific revolution

- “A concept used by historians to describe the emergence of modern science in Europe during the Early-Modern period, when developments mostly in fields of mathematics, physics, astronomy, biology, and chemistry profoundly changed the way society viewed the natural world and human’s place in it”
- In a way, and with all due respect, we can view it as the gradual rejection of the “Aristotelian” worldview for a new one based on better observation, and better scientific techniques.
- 5 major causes of the Scientific Revolution
  - Printing press
    - Up to date information
    - Scientific journals
    - Quick printing of the results of scientist that can be shared and debated
    - Share information quickly
  - Increased contact with Muslim knowledge
    - Kept contact with teaching of Antiquity
    - Much more advanced in terms of science
  - Progress of university
    - Place for intellectuals to debate ideas
    - Natural philosophy
    - Famous lecturers
  - The Renaissance
    - Spirit of discovery and curiosity
    - Intellectual achievement
  - Voyages of exploration and ocean travel (optics)
    - Demand for better navigation techniques and tools
    - Better and better telescope to better see the land latter pointed towards the sky and creation of microscope
- Today we will specifically explore the advances in astronomy during the Scientific revolution, as a case study for the entire period...why?
  - Very efficiently portrays the challenge of Aristotelian certainties of the past
  - Really interesting
  - Since Middle Ages , all scholarly study of the working of the physical world (cosmos, plants, animals, biology, geology) is bunched together in the vast and formless discipline known as “Natural philosophy”
  - Aristotle was the absolute truth
    - Within this discipline, the antique works of Aristotle, as modified and improved upon since classical times, are held as elementary truth, beyond question, absolute.
      - In terms of astronomy, Aristotle believed that the Earth was a perfect sphere lying in the middle of the Cosmos, with all other celestial bodies, including the firmament, rotating around it in a perfect concentric circles
      - In the Hellenistic era, Ptolemy improved this model of Aristotle by adding epicycle to account for the “backwards” motion of the planets and stars
    - The Aristotelian (Ptolemaic) cosmos was widely accepted as true for two main reasons
      - It made good intellectual sense! Don’t feel the world moving
      - It puts Earth at the center if the universe, which is highly reassuring, and convenient for theological purposes
      - Aristotle said so
  - Nicolaus Copernicus (1473-1573), a devout Christian, is dissatisfied with Ptolemy’s model

- Ptolemy's model was complicated to use and often inaccurate and more importantly does not reflect the glory of God's presumably perfect creation of the universe
- Came up with the Heliocentric model
  - Mathematics point to heliocentric model of the universe!
- However, this groundbreaking theory has dramatic and deeply unsettling implications!
  - Puts humans and the church no longer in the middle
  - Is the Earth just another planet among many?
  - Is there other humans on other planets?
  - What is the extent of God's creation?
  - Can the Bible be wrong?
  - If the stars and planets don't revolve around the earth, it would stand to reason that they are immeasurably far away > stars are so far away that it doesn't matter where we are, we can see them
    - Implies that the universe is humongous
    - The universe would therefore be staggering huge
  - Can mathematics (impure science) be used to contradict natural philosophy, technology?
    - Mathematics seen as black magic
- The Copernican hypothesis (heliocentric) is widely rejected, but cast serious and reasonable doubt
  - For decades, Copernican hypothesis remains in academic shadows as an intellectual "oddity"
  - However, two astronomical phenomenon occur in late 16th century that rocks the foundations of Aristotelian cosmology (Aristotle= the sky is unchanging)
    - In 1572, the appearance of "Tycho's star", a brand new star which appears in the night sky
      - Supernova > exploded star
    - In 1577, the "Great Comet of 1577" flies through Aristotle's "crystal spheres"
    - Disproved Aristotle > if he is wrong about this, what else is he wrong about
    - These two astronomic events offer indisputable evidence, clearly visible to all, that Aristotle's ideas cannot continue to be followed unquestioningly
- Tycho Brahe (1540-1601), first European astronomer to spot and scientifically describe these two phenomenon
  - Danish
  - Becomes a bit of a superstar scientist
  - Named "official imperial astronomer" by the Holy Roman Emperor Rudolph II, who funds Europe's best observatory in Prague for Brahe's research
  - Brahe collects astounding collection of sketches, data on planetary motion, and other observations
    - Collect a lot data of planets visible at that time
    - "Tychonic system", erroneous, but shows openness to new ideas by scientific community
      - Sun revolves around the earth, but other planets revolve around the sun
- Johannes Kepler (1571-1630)
  - Avid believer of the Copernic hypothesis
  - Tycho Brahe's lowly lad assistant, Johannes Kepler, would eventually far surpass the accomplishments of his masters
    - Didn't get along very well since they both had different beliefs of the universe
  - Apply mathematics to Brahe's observations

- Kepler is an avid believer of the Copernican hypothesis, and has a turbulent relationship with his master, with whom he profoundly disagrees on this matter
- Kepler is partly blind, so relies on Brahe's observations, but he is also a gifted mathematician!
- By studying Brahe's observations for years, he devises three laws of planetary motion, which lay the foundations of modern astronomy, physics, and mathematics
- Kepler's three laws of planetary motion (NOT ON EXAM)
  - The orbit of a planet is an ellipse with the Sun at one of the two foci (not perfect circles)
    - Not a perfect circle as previously believed
  - A line segment joining a planet and the Sun sweeps out equal areas during equal intervals of time
    - Planets don't revolve at the same speed
    - Fast when close to the sun, slow when far away
    - Another way of saying that planets orbit accelerate when closer to the sun during its orbit
  - The square of the orbital period of a planet is proportional to the cube of the semi-major axis of its orbit
    - In essence, establishes a relationship between size of orbit and time of full orbit
- Galileo Galilei (1564-1642)
  - While Kepler was revolutionizing astronomy in Prague, Galileo was working on motion physics on his Italian lab
    - Physics in a worldly point of view, physics on objects
    - In his own way, disproving the erroneous physics of Aristotle
  - Developed the experimental method
    - Formulate an hypothesis
  - His science is valuable, but his greatest contribution to western science is the experimental method
    - Controlled, repeatable experiments to reveal what actually happens as opposed to simply arguing on theological and "logical" grounds what should happen.
  - Galileo becomes deeply interested in astronomy through a correspondence with Johannes Kepler, who convinces him that the Copernican hypothesis was correct
  - Galileo then writes Dialogue Concerning the Two Chief System (in 1632), in defence of Copernicus
  - Charged as a heretic, forced to recant
    - He was closed to the papacy
  - "E pur si muove!"
    - And yet it moves
    - The planets still moves even if he recounted
    - Belief whatever you want but the facts are still there
- Slowly, but surely the entire scientific community comes to accept the Copernican hypothesis
- Still, many questions remain
- How can we reconcile the motion of the planets and the laws of physics as seen here on earth?
- One of the greatest minds in human history would rise to this challenge. Who?
- Sir Isaac Newton

- Philosophiae Naturalis Principia Mathematica (1687), also known as Newton's Principia is often described as the most important book in the history of modern science!
- Newton's law of universal gravitation: (NOT ON EXAM): "Every body in the universe exerts attraction on every other body in the universe according to a precise mathematical relationship, according to which the force of attraction is proportional to the quantity of matter (mass) and inversely proportional to the square of the distance between them"
- The Principia lays the foundation for classical mechanics, all while explaining the motion of planets, of projectiles, the trajectory of comets, the movement of tides, and many other phenomena with one simple equation
- To expose the precision of this theory, Newton flat out invents new branch of mathematics: calculus
- There is not more room, scientifically speaking, for the Ptolemaic cosmos or for Aristotelian laws of motion!
- Dominant model of physics until discovery of General Relativity nearly 300 years later!
- Legacy in Western societies
  - In essence, that is what we have been discussing over the last 3-4 classes
  - In terms of philosophy? Intellectualism?
  - In terms of art and culture?
  - In terms of colonial legacy?
  - In terms of technology and science?
  - In terms of religion?

## Late Modern Period (1700-1914)

- Geography
  - Italy is divided among city states
  - Ottoman empire
  - France: most influential, most populated,
- Philosophy
  - Enlightenment (17th&18th centuries)
    - Intellectual current
    - Le siècle des Lumières (1700's), the Enlightenment can be summarily defined as "The influential intellectual and cultural movement of the late 17th and 18th centuries that introduced a new worldview based on the use of reason, the scientific method, and the idea of progress"
  - There basis principles of Enlightenment philosophy
    - 1. Nothing should be accepted as true based on faith or holy scripture alone. Everything should be submitted to rationalism



- 2.The scientific method is capable of discovering the laws of human societies as well as those of nature
- 3.Through scientific inquiry,it is possible for humans to create better societies for themselves
- Human progress! The arrival of a new era
  - We can now use science to better ourselves
  - Constant progression
- Three basic causes of the Enlightenment:
  - 1. Exploration: leads to Europeans being confronted to a new cultures, ideas, beliefs, etc
    - Make people question what they know
  - 2. Scientific revolution: Shake the foundations of religious truth and objectivity
    - Learned that what Aristotle said was not all true
  - 3. Religious wars: In the wake of the Reformation, Europe in the 16th and the 17th centuries is wracked by constant, bloody, useless religious wars which solve nothing
    - 30 year wars (divided Holy Roman Empire)
    - Huguenots vs Catholics
    - Intellectuals fed up by these wars
- Pierre Bayle (1647-1706)
  - French Huguenot, fled to Holland to avoid persecution
  - The *Historical and Critical Dictionary* 1697
    - Best seller
    - List important people in the history of religion
    - “Religious beliefs, throughout history, have been extremely varied and very often mistaken, and nothing in the realm of religion can be prove beyond all doubt”
      - We shouldn’t fight over religion since there was so many religions



- Supported religious neutrality
- John Locke (1632-1704)
  - English philosopher and physician
  - *Two Treatises of Government* (1689)
    - Work of political philosophy that eloquently refutes the divine and patriarchal nature of monarchy, arguing instead for “rule by consent of the people” and the existence of “natural rights”
    - Against absolute monarchy
    - Refute the divine and patriarchal nature of monarchy
    - Rule by consent of the people
    - Hints at the existent of natural rights (human rights)
  - *An Essay understanding human understanding* (1690)
    - In essence, argues that the human mind is a blank slate and it is sensory experience that shapes its understanding of the world, and the society in which it lives.
    - Human mind blank slate
    - And through their sensory experience our understanding of the world is shaped
    - Education is fundamental
  - Many other great works on society, the human mind, politics, etc
- Baron de Montesquieu (1689-1755)
  - French Noble, travels Europe, confronted to many political system, becomes father of French Enlightenment
  - Wanted people to be aware of the Constitutional monarchy
  - Letter persanes “Persian letters” (1721)
    - Political satire
    - Humorous exploration of European society
  - *Considerations on the Causes of the Greatness of the Romans and their Decline* (1743)
    - Discuss values of Roman Republic
    - As a way to comment on common European society
    - Elaborate work of history, studies Roman history and decline with special focus on political institutions and dynamics
  - *The Spirit of the Laws*
    - Historical overview of laws
    - All different law systems throughout history
    - One of the most influential works of political philosophy in human history, explores the principle of **division of powers**
    - At the origins of American democracy
    - No now should have all the power
    - Major influence on American Constitution and liberal democracy
- Jean-Jacques Rousseau (1712-1778)
  - “Discours sur l’origine et les fondements de l’inégalité parmi les hommes” (1755)
    - Trying to explain why some people are very very rich and some are very very poor
    - The “natural state”, inequality since invention of property
    - Intuition of cave men
    - He believed that when they started being sedentary, property got created and this is the birth of inequality
    - Still a very present concern today!
  - “The Social Contract” (1762)
    - Further explores notions developed by others, namely John Locke, about the necessary “contract” between rulers and their subjects

- If the government does not respect the social contract we can kick them out of office
- Subject give up part of their individual liberties for peace, prosperity, and security
- Consent to being ruled
- Gov protects the rights of the people
  - People give up power
- Gov abuse power
  - People have the moral right to overthrow him
- If such contract is broken, then Revolution becomes justified
- “L’encyclopédie” (edited 1751-1772)
  - Created by the “encyclopédistes”, Denis Diderot, Jean d’Alembert and their collaborators
  - Collection of books that store all human knowledge on all topics
  - Basic factual information
  - Wealthy intellectuals over a period of 2 decades who brought up to date all knowledge
  - Massive collection of human knowledge (28 volumes, 150 collaborators, tons of illustrations, thousands of entries..)
  - Beyond democratizing knowledge, this document also compiled the philosophical knowledge of its time, including many controversial “revolutionary” ideas
- Could we consider Wikipedia to be spiritual successor?
- All this is of course but a sneak peak in the enormous building intellectual production of this era. We could explore so many more authors, current of ideas, artistic influence, etc!
  - France: Voltaire, Lavoisier
  - England: Mary Wollstonecraft, Edward Gibbons
  - Scotland: Adam Smith, David Hume
  - Germany: Moses Mendelssohn, Leibniz
  - Portugal: Antonio, Nunes
  - United States: Thomas Jefferson, John Adam, Benjamin Franklin
  - Italy: Maria Pagano, Cesare Beccaria
- Political and military history
  - The French Revolution (1789-1815)
    - France was the dominant power (absolute monarchy)
  - As you can imagine, Late Modern European history is extremely dense, important, and interesting, but we will focus on perhaps the most significant political event in all of Modern history
  - Absolute Monarchy (until 1789)
    - Essential since Charlemagne, French monarchs have ruled by “divine right”
      - Since Charlemagne was crowned by the pope
    - In the 17th and the 18th century, France is the purest example of “Absolutism”
      - What the king says is law
  - Louis XIV, the Sun King (1643-1715)
    - Longest reigning monarch in European history (72 years)
    - An era dominated by France, a France dominated by L14
    - Why Sun king?
      - Empire on which the sun never sets
      - Heliocentrism
        - He is the centre of the universe
        - Everything turns around him
  - Palais de Versaille
    - Outside of the city
    - Feared the plebeians (mobs of the common people)

- Ridiculously luxurious
- Example of absolute monarch
- Another defining aspect of L14's reign is the intense militarization of France and almost constant state of warfare
  - Outfit for each position
  - Mightiest and well founded
  - Birth of national army
  - Not very profitable territorial gain
  - These wars did not profit France tremendously (some territorial gains in Europe, but colonial losses)
  - Colonial regressions
- However, these endless wars were extremely expensive and resulted in ever increasing taxes
  - Endless tax increases plus ever-increasing national debt during L14's reign set the foundations of the economic crisis that would bloom after his death
  - Debt started during Louis 14 and continued with the next kings
- The years between L14's death and the Revolution (1715-1789) are some of the most intense, turbulent years of French history!
  - The years of Enlightenment philosophy, Scientific Revolution, absolutism increasingly challenged
  - Louis 15 (1715- 1774) [ le bien aimé] and 16 (1774-1793)
    - Continued to borrow money and spend a lot
  - The American Revolution (1775-1783)
    - Inspired by Enlightenment ideas
    - Based on the French ideals created during the Enlightenment
    - Inspired the French
    - Supported by King Louis 16
      - They hated the British so they supported the American
    - Tremendous impact in France
      - Inspired French revolutionary thinker
  - Terrible financial situation
    - Interest payment: 50% of budget
    - Maintenance of military: 25%
    - Expenses of Versailles: 6%
      - Food, bals
    - Everything else: under 20%
  - Common folk crushed under tax burden, have nothing to show for it
    - Intense taxes for barely any services
  - Facing imminent bankruptcy, Louis 16 forced to call Estates General
    - Temporary parlement
    - Represented the three major estates of society (clergy, nobility, everywhere else)
      - Considered to be equal partners
    - Emergency council
  - Third estate, based on Enlightenment ideas, makes a power grab
    - Legislative power
  - The National Assembly
    - The third Estate
    - Country based on modern ideals
    - People who sat on the left wanted to abolish monarchy

- People who sat on the right were more conservative
- People with similar ideals sit together
- Enormous pressure to recognize their supremacy
- Write a Constitution
  - King refused to sign it
- Intense pressure on L16 to recognize Constitution, he tries everything to avoid it
- While these political events unfold, the common people of France faced starvation and poverty
  - Horrible harvest > starvation
  - General inflation > food prices went up
  - Terrible unemployment
- July 14th 1789: the storming of the Bastille
  - Bourgeoisie ( not part of the nobility) riled up the masses to take power
  - Prison controlled by the king in downtown Paris
  - People freed the people in the prison
  - Bastille was also an armory so they got controlled on arms
  - They took over the city of Paris
  - Forced the king to sign the Constitution
- The French Constitutional Monarchy (1789-1793)
  - L16 forced to sign the Constitution
    - King does not have absolute power anymore
    - Can't control everything as he please
    - Power shared by king and representatives
  - Political power will now be shared between the king and the National Assembly, which represents the 3rd estate
  - Privileges of the nobility abolished
    - They had to pay taxes
    - Cant carry weapons
  - Privileges of the clergy abolished
    - Pay taxes
    - Land own by the National Assembly
  - Sovereignty transferred from the king to the nation
    - French people make him king not king
  - Declaration of the rights of man and of the citizen
    - Fundamental human rights
    - Human rights
  - Terrified, thousands of nobles flee France with all of their belongings (the émigrés)
    - Trying to save what they have
  - In June 1791, L16 himself attempts to flee as well
    - Spotted by a border guard who recognized the king because of his profile on paper money!
    - L16 arrested, kingship suspended
  - Shocked, a coalition of European powers led by Austria and Prussia threatens to reinstate L16
    - Revolutionary government declares preemptive war!
    - People felt that the revolution went too far
    - The government (French revolutionary government) didn't take kindly to these threats so they declared war on Austria and Prussia

- Suspected of treason, and due to the pressure of radical Jacobins led by Maximilien Robespierre, Louis 16 and Marie Antoinette guillotined on January 21 1793
  - Head chopped off
  - “The King must die so that France must live!”
    - Robespierre
  - French revolution lost a lot of sympathy
  - Needless cruelty
- This marks the end of the French monarchy, the birth of the French Republic
- Often referred to as the “Second Revolution”, when the revolution became violent and radical
- The French Republic (1793-1799)
  - Government with no king > just elected representative
    - Not democracy> not everyone could vote
  - No hereditary power
  - At war with basically all of Europe, facing internal dissent from counter-revolutionaries, revolutionary government led by Robespierre seems destined to be crushed
  - Against all odds, French Republic would meet success on all fronts, mainly for three reasons, all of which have major historical consequences:
    - 1.Introduction of emergency wartime economy
      - Control the economy
      - Early form of extreme socialism, economic planning
      - Like so many other aspects of the Revolution, this tactic would become common in future (Hitler, Stalin)
      - Economy shifted to help the war practice
    - 2.The reign of terror
      - Mass execution of all suspected “enemies of the state”
      - Extreme violence throughout France, a real bloodbath
      - Done publicly to set an example
      - “Guillotine revolution”
        - Guillotine played an important part in this movement
      - Wartime propaganda, revolutionary songs and art, etc
        - Marseillaise
    - 3. The invention of modern nationalism
      - Fight for the nation and not the king
      - Most decisive factor, and completely new from historical perspective, and a hallmark of all totalitarian regimes
        - A common goal, a society united by language, ethnicity, history, culture, tradition, philosophical beliefs,etc
  - Total victory, thanks to these elements
    - However, France not out of the woods just yet!
  - After victory,Robespierre loosens economic control, but maintains reign of terror
    - Countless men and women sent to guillotine
  - Frustration grows, until Robespierre himself is sent to the Guillotine on July 28th 1794
  - The Directory (1794-1799)
    - 5 leaders instead of one
    - Very corrupt
  - Napoleon’s Coup d’État (1799)
- The French Empire (1799-1815)
  - Napoléon Bonaparte (1769-1821)

- Corsica “Not quite french”
- Part of a family of nobles
- Made his name through the military
- At war with Italian city states
- Officer of an artillery unit
- Young military prodigy
- Climbed the ranks of the army
- Was a general
- A member of the small Corsican nobility, Napoleon is a true military prodigy
- Rapidly becomes a national hero, picks up on France’s desire for a strong leadership
- Used the army to do a Coup d’État
  - Army walking into the parliament and kicking out the government
  - Take power through military force
  - Gained favour of the people
- Upon his Coup d’état, is named First Consul of the Republic
  - later known as emperor of France
  - Roman terminology very strong
  - Eagle symbol of Roman legions, France did the same
    - French used the symbol of the eagle
    - Roman imagery (symbol of imperial power)
- Like Augustus two millennia prior, Napoleon preserved the appearance of a Republic but took all the relevant powers to himself
- Wars of conquest
  - Initially, Napoleon presents himself as a defender of the Revolution, someone who will bring back order
  - Becomes one of the greatest conquerors in history
    - He commanded his army
    - The “Napoleonic Wars” (1803-1815)
    - In only about 15 years, basically all of Europe comes under his control! “Le Grand Empire”
      - Allies: pay tribute to Napoleon
    - Proclaimed Emperor of France
  - Napoleon sees himself no longer as emperor of France, but emperor of Europe
  - Bonaparte family rules basically all of Europe
  - Napoleon presents himself as liberator, someone who brings Revolution and Enlightenment, crushes monarchy
    - In reality, he is more akin to a conquering tyrant, who crushes and opposition and rules in absolute manner
  - Considered himself an enlightenment leader
  - Defeated in Russia
    - Army much too powerful and Napoleon was too cocky
    - No way to survive the winter since Napoleon moved everything away from Moscow
    - Napoleon’s army starved and died of cold
- Consequences of Napoleonic wars
  - The spread of modern nationalism
  - The spread of modern liberalism
  - The British empire becomes world’s premier power
    - Thanks to Napoleon’s defeat

- The collapse of the Spanish Empire and subsequent independence of Latin American nations
- The start of centralization in Italy and Germany
- The modernization of warfare techniques
- 1815: Congress of Vienna
- Towards World War 1?

## MAPS

