I'm not a robot

What is a Reporting Limit in a Laboratory Report?

When a laboratory doesnt detect a specific chemical in your sample, it doesnt necessarily mean the substance is absent. Rather, it could mean that the concentration of the chemical is below the sensitivity threshold of the laboratorys instruments. This is where the concept of reporting limits comes into play. The reporting limit is the smallest concentration of an analyte that a laboratory can reliably report.Key Definitions and StandardsVarious agencies have developed specific terms and definitions related to reporting limits to ensure precision and clarity. Heres how they differ:EPAs Method Detection Limit (MDL):Defined as approximately three times the standard deviation of results around the true analyte concentration, the MDL represents the lowest detectable concentration, though not necessarily quantifiable.Example: A lab tests for formaldehyde in the air. Clean air is spiked to 10 ppm for quality control, with test results of 12, 8, 5, 10, 13, 7, and 8 ppm, yielding a mean of 2.8 ppm. Thus, the MDL is about 10 ppm. Any results close to the MDL carry an error margin of 50%, highlighting that low-concentration results should be interpreted carefully.NIOSHs Limit of Detection (LOD):The LOD is often applied to analyte loads on filters or tubes and represents the lowest level that can be reliably detected.Example: For THC on a PTFE filter, an analysis shows Less Than LOD with an LOD of 0.5 g/filter, indicating that the amount of THC is below the reliable detection threshold.NIOSHs Limit of Quantification (LOQ):Defined as 3 times the LOD, the LOQ is the minimum concentration that can be measured with 30% accuracy.Practical Meaning: The LOQ provides an assurance of measurement reliability at low levels, giving clients confidence in precise results for concentrations at or above this level.AIHA-LAPs Reporting Limit (RL):Defined as the LOD multiplied by a safety factor, the RL is chosen to account for day-to-day variations in instrument sensitivity. For example, asbestos in linoleum may have an LOD of 0.4%, while in joint compounds, its 0.1%. To comply with Ontario Asbestos Regulation, LCS Laboratory Inc. has established a reporting limit of 0.5% to ensure consistency and reliability.In Summary:The relationship among these terms can be summarized as: LOD < RL LOQWhy Reporting Limits Matter for Your Testing NeedsLCS Laboratory Inc. is accredited by AIHA-LAP, specializing in Indoor Air Quality and Asbestos testing. Our expertise ensures high sensitivity in all tests, backed by quality standards that clients can trust. Whether youre assessing air quality or testing for hazardous substances, understanding the reporting limits of your analysis is key for accurate interpretation.If you need further insights or have questions about our testing capabilities, feel free to contact us to discuss your project requirements. The lowest signal or quantity observable with sufficient confidence above the background"LOD" redirects here. For the company listed as LOQ on the London Stock Exchange, see Lo-Q. For the airport in Botswana with IATA code LOQ, see Lobatse Airport.The limit of detection (LOD or LoD) is the lowest signal, or the lowest corresponding quantity to be determined (or extracted) from the signal, that can be observed with a sufficient degree of confidence or statistical significance. However, the exact threshold (level of decision) used to decide when a signal significantly emerges above the continuously fluctuating background noise remains arbitrary and is a matter of policy and often of debate among scientists, statisticians and regulators depending on the stakes in different fields.In analytical chemistry, the detection limit, the lower limit of detection, also termed LOD for limit of detection or analytical sensitivity (not to be confused with statistical sensitivity), is the lowest quantity of a substance that can be distinguished from the absence of that substance (a blank value) with a stated confidence level (generally 99%).[1][2][3] The detection limit is estimated from the mean of the blank, the standard deviation of the blank, the slope (analytical sensitivity) of the calibration plot and a defined confidence factor (e.g. 3.2 being the most accepted value for this arbitrary value).[4] Another consideration that affects the detection limit is the adequacy and the accuracy of the model used to predict concentration from the raw analytical signal.[5]As a typical example, from a calibration plot following a linear equation taken here as the simplest possible model: $f(x) = a \cdot x + b$ {\displaystyle f(x)=a\cdot x+b} where, f (x) {\displaystyle f(x)} corresponds to the signal measured (e.g. voltage, luminescence, energy, etc.), "b" the value in which the straight line cuts the ordinates axis, "a" the sensitivity of the system (i.e., the slope of the line, or the function relating the measured signal to the quantity to be determined) and "x" the value of the quantity (e.g. temperature, concentration, pH, etc.) to be determined from the signal f (x) {\displaystyle f(x)} ,[6] the LOD for "x" is calculated as the "x" value in which f (x) {\displaystyle f(x)} equals to the average value of blanks "y" plus "t" times its standard deviation "s" (or, if zero, the standard deviation corresponding to the lowest value measured) where "t" is the chosen confidence value (e.g. for a confidence of 95% it can be considered t = 3.2, determined from the limit of blank).[4]Thus, in this didactic example: LOD for x = (f (x) b) a = (y + 3.2 s b) a {\displaystyle {\text{LOD for }}x={\frac {\left(f(x)-b\right)}{a}}={\frac {\left(y+3.2s-b\right)}{a}}} There are a number of concepts derived from the detection limit that are commonly used. These include the instrument detection limit (IDL), the method detection limit (MDL), the practical quantitation limit (PQL), and the limit of quantitation (LOQ). Even when the same terminology is used, there can be differences in the LOD according to nuances of what definition is used and what type of noise contributes to the measurement and calibration.[7]The figure below illustrates the relationship between the blank, the limit of detection (LOD), and the limit of quantitation (LOQ) by showing the probability density function for normally distributed measurements at the blank, at the LOD defined as 3 standard deviation of the blank, and at the LOQ defined as 10 standard deviation of the blank. (The identical shifted along Abscissa of these two functions is problematic.) For a signal at the LOD, the alpha error (probability of false positive) is small (0.26%). However, for a signal at the limit of detection (LOD), the likelihood of a false negative is 50% for a sample that has a concentration at the LOD (red line). This means a sample could contain an impurity at the LOD, but there is a 50% chance that a measurement would give a result less than the LOD. At the LOQ (blue line), there is minimal chance of a false negative. Illustration of the concept of detection limit and quantitation limit by showing the theoretical normal distributions associated with blank, detection limit (LOD), and quantitation limit (LOQ) level samples.Most analytical instruments produce a signal even when a blank (matrix without analyte) is analyzed. This signal is referred to as the noise level. The instrument detection limit (IDL) is the analyte concentration that is required to produce a signal greater than three times the standard deviation of the noise level. This may be practically measured by analyzing 8 or more standards at the estimated IDL then calculating the standard deviation from the measured concentrations of those standards.The detection limit (according to IUPAC) is the smallest concentration, or the smallest absolute amount, of analyte that has a signal statistically significantly larger than the signal arising from the repeated measurements of a reagent blank.Mathematically, the analyte's signal at the detection limit (S d l {\displaystyle S_{dl}}) is given by: S d l = S r e a g + 3 r e a g {\displaystyle S_{dl}=S_{reag}+3\sigma _{reag}} where, S r e a g {\displaystyle S_{reag}} is the mean value of the signal for a reagent blank measured multiple times, and r e a g {\displaystyle \sigma _{reag}} is the known standard deviation for the reagent blank's signal.Other approaches for defining the detection limit have also been developed. In atomic absorption spectrometry usually the detection limit is determined for a certain element by analyzing a diluted solution of this element and recording the corresponding absorbance at a given wavelength. The measurement is repeated 10 times. The 3 of the recorded absorbance signal can be considered as the detection limit for the specific element under the experimental conditions: selected wavelength, type of flame or graphite oven, chemical matrix, presence of interfering substances, instrument... Often there is more to the analytical method that just performing a reaction or submitting the analyte to direct analysis. Many analytical methods developed in the laboratory, especially these involving the use of a delicate scientific instrument, require a sample preparation, or a pretreatment of the samples prior to being analysed. For example, it might be necessary to heat a sample that is to be analyzed for a particular metal with the addition of acid first (digestion process). The sample may also be diluted or concentrated prior to analysis by means of a given instrument. Additional steps in an analysis method add additional opportunities for errors. Since detection limits are defined in terms of errors, this will naturally increase the measured detection limit. This "global" detection limit (including all the steps of the analysis method) is called the method detection limit (MDL). The practical way for determining the MDL is to analyze seven samples of concentration near the expected limit of detection. The standard deviation is then determined. The one-sided Student's t-distribution is determined and multiplied versus the determined standard deviation. For seven samples (with six degrees of freedom) the t value for a 99% confidence level is 3.14. Rather than performing the complete analysis of seven identical samples, if the Instrument Detection Limit is known, the MDL may be estimated by multiplying the Instrument Detection Limit, by the dilution prior to analyzing the sample solution with the instrument. This estimation, however, ignores any uncertainty that arises from performing the sample preparation and will therefore probably underestimate the true MDL.The issue of limit of detection, or limit of quantification, is encountered in all scientific disciplines. This explains the variety of definitions and the diversity of jurisdiction specific solutions developed to address preferences. In the simplest cases as in nuclear and chemical measurements, definitions and approaches have probably received the clearer and the simplest solutions. In biochemical tests and in biological experiments depending on many more intricate factors, the situation involving false positive and false negative responses is more delicate to handle. In many other disciplines such as geochemistry, seismology, astronomy, dendrochronology, climatology, life sciences in general, and in many other fields impossible to enumerate extensively, the problem is wider and deals with signal extraction out of a background of noise. It involves complex statistical analysis procedures and therefore it also depends on the models used,[5] the hypotheses and the simplifications or approximations to be made to handle and manage uncertainties. When the data resolution is poor and different signals overlap, different deconvolution procedures are applied to extract parameters. The use of different phenomenological, mathematical and statistical models may also complicate the exact mathematical definition of limit of detection and how it is calculated. This explains why it is not easy to come to a general consensus, if any, about the precise mathematical definition of the expression of limit of detection. However, one thing is clear: it always requires a sufficient number of data (or accumulated data) and a rigorous statistical analysis to render better signification statistically.The limit of quantification (LoQ, or LOQ) is the lowest value of a signal (or concentration, activity, response...) that can be quantified with acceptable precision and accuracy.The LoQ is the limit at which the difference between two distinct signals / values can be discerned with a reasonable certainty, i.e., when the signal is statistically different from the background. The LoQ may be drastically different between laboratories, so another detection limit is commonly used that is referred to as the Practical Quantification Limit (PQL).Background noise Sound other than the sound being monitored (primary sound)Background radiation Measure of ionizing radiation in the environmentElectronic noise Random fluctuation in an electrical signalNoise (spectral phenomenon) Types of noiseChemometrics Science of extracting information from chemical systems by data-driven meansGamma spectroscopy#Calibration and background radiation Quantitative study of the energy spectra of gamma-ray sourcesMalmquist bias Sampling bias in astronomyp-value Function of the observed sample resultsMisuse of p-values Misinterpretation of statistical significanceStatistical significance Concept in inferential statistics^ IUPAC, Compendium of Chemical Terminology, 2nd ed. (the "Gold Book") (1997). Online corrected version: (2006) "detection limit". doi:10.1351/goldbook.L03540^ MacDougall D, Crummett WB, etal. (1980). "Guidelines for Data Acquisition and Data Quality Evaluation in Environmental Chemistry". Analytical Chemistry. 52 (14): 2242249. doi:10.1021/ac50064a004.^ Saah AJ, Hoover DR (1998). "[Sensitivity and specificity revisited: significance of the terms in analytic and diagnostic language]". Ann Dermatol Venereol. 125 (4): 2914. PMID 9747274.^ a b Armbruster DA, Pry T (August 2008). "Limit of blank, limit of detection and limit of quantitation". The Clinical Biochemist. Reviews. 29 (Suppl 1): S49 S52. PMC 2556583. PMID 18852857.^ a b "R: "Detection" limit for each model". search.r-project.org. Retrieved 2022-01-04.^ Quesada-Gonzlez D, Stefani C, Gonzlez I, de la Escosura-Muiz A, Domingo N, Mutj P, Merkoi A (September 2019). "Signal enhancement on gold nanoparticle-based lateral flow tests using colorimetric nanofibers". Biosensors & Bioelectronics. 141: 111407. doi:10.1016/j.bios.2019.111407. hdl:10261/201014. PMID 31207571. S2CID 190531742.^ Long, Gary L.; Winefordner, J. D. (1983), "Limit of detection: a closer look at the IUPAC definition", Anal. Chem., 55 (7): 712A 724A. doi:10.1021/ac00258a724Altshuler B, Pasternack B (1963-03-01). "Statistical measures of the lower limit of detection of a radioactivity counter". Health Physics. 9 (3): 293298. doi:10.1097/00004032-196303000-00005. ISSN 0017-9078. PMID 14004764. Retrieved 2022-01-03.Currie LA (1968). "Limits for qualitative detection and quantitative determination. Application to radiochemistry". Analytical Chemistry. 40 (3): 586593. doi:10.1021/ac60259a007. ISSN 0003-2700.Long GL, Winefordner JD (1983). "Limit of detection. A closer look at the IUPAC definition". Analytical Chemistry. 55 (7): 712A 724A. doi:10.1021/ac00258a001. ISSN 0003-2700.Armbruster DA, Pry T (August 2008). "Limit of blank, limit of detection and limit of quantitation". The Clinical Biochemist. Reviews. 29 (Suppl 1): S49 S52. PMC 2556583. PMID 18852857.European Commission. Joint Research Centre. (2016). Guidance document on the estimation of LOD and LOQ for measurements in the field of contaminants in feed and food. Luxembourg: Publications Office. doi:10.2787/8931. ISBN 9789279617683. Retrieved 2022-01-03."IDN 32645 Chemical analysis Decision limit, detection limit and determination limit under repeatability conditions Terms, methods, evaluation. Technical standard. Deutsches Institut fr Normung. Berlin (DIN 32645-2008-11) | Via Engineering360" (in German). Published by Beuth Verlag, a subsidiary of the DIN Group. doi:10.31030/1465413. Retrieved 2022-01-03. {{cite journal}}: Cite journal requires |journal= (help)Evans WC (21 February 2019). "Limit of Detection Interactive Java applet to illustrate some basic ideas of the limit of detection problem". GeoZebra. Retrieved 2022-01-04.Garrett RG (2013-11-01). "The 'rgr' package for the R Open Source statistical computing and graphics environment a tool to support geochemical data interpretation". Geochemistry: Exploration, Environment, Analysis. 13 (4): 355378. Bibcode:2013GEEA...13..355G. doi:10.1144/geochem2011-106. ISSN 1467-7873. S2CID 129059022. Retrieved 2022-01-04."R: "Detection" limit for each model". search.r-project.org. Retrieved 2022-01-04."Deutsches Institut fr Normung. R: Calibration data from DIN 32645 (Package evaluation Version 0.5.1)". search.r-project.org. Retrieved 2022-01-04.Downloads of articles (a.o. harmonization of concepts by ISO and IUPAC and an extensive list of references Archived 2009-04-21 at the Wayback MachineRetrieved from " limit and reporting limit are both important concepts in analytical chemistry. The detection limit refers to the lowest concentration of a substance that can be reliably detected by an analytical method, while the reporting limit is the lowest concentration that can be accurately quantified and reported. In other words, the detection limit is the point at which a signal can be distinguished from background noise, while the reporting limit is the point at which the measurement is precise enough to be reported with confidence. Both limits are crucial for ensuring the accuracy and reliability of analytical results. When it comes to analytical chemistry, two important concepts that are often confused are the Detection Limit (DL) and Reporting Limit (RL). Both of these limits play a crucial role in determining the sensitivity and accuracy of analytical methods. In this article, we will explore the differences between these two limits and discuss their respective attributes.DefinitionThe Detection Limit (DL) is defined as the lowest concentration of an analyte that can be reliably detected but not necessarily quantified. It is typically determined by the signal-to-noise ratio of the analytical method. On the other hand, the Reporting Limit (RL) is the lowest concentration of an analyte that can be quantified with a certain degree of confidence. It is usually higher than the Detection Limit and is determined by factors such as instrument precision and method validation.SensitivityOne of the key differences between the Detection Limit and Reporting Limit is their sensitivity. The Detection Limit is more sensitive than the Reporting Limit because it is the lowest concentration that can be detected, even if it cannot be accurately quantified. In contrast, the Reporting Limit is less sensitive because it is the lowest concentration that can be quantified with a certain level of confidence. This difference in sensitivity is important when determining the limits of detection for a given analytical method.AccuracyAnother important attribute to consider when comparing the Detection Limit and Reporting Limit is accuracy. The Detection Limit may not always be accurate because it is the lowest concentration that can be detected, regardless of whether it can be quantified accurately. On the other hand, the Reporting Limit is more accurate because it is the lowest concentration that can be quantified with a certain degree of confidence. This difference in accuracy is crucial when interpreting analytical results and making decisions based on those results.Regulatory RequirementsBoth the Detection Limit and Reporting Limit play a significant role in meeting regulatory requirements for analytical methods. Regulatory agencies often require that analytical methods have a specified Reporting Limit to ensure the accuracy and reliability of the results. The Reporting Limit is used to determine whether the concentration of an analyte exceeds a certain threshold, which may have regulatory implications. In contrast, the Detection Limit is more of a technical parameter that is used to evaluate the sensitivity of an analytical method.Practical ConsiderationsWhen it comes to practical considerations, the Detection Limit and Reporting Limit have different implications for laboratory operations. The Detection Limit is often used to evaluate the performance of an analytical method and to compare different methods in terms of sensitivity. In contrast, the Reporting Limit is used to determine whether the results of an analysis are reliable and can be reported with confidence. Both limits are important for ensuring the quality of analytical data and for meeting the requirements of regulatory agencies.ConclusionIn conclusion, the Detection Limit and Reporting Limit are two important concepts in analytical chemistry that have distinct attributes. While the Detection Limit is the lowest concentration that can be reliably detected, the Reporting Limit is the lowest concentration that can be quantified with a certain degree of confidence. Understanding the differences between these two limits is crucial for ensuring the accuracy and reliability of analytical results. By considering the sensitivity, accuracy, regulatory requirements, and practical implications of both limits, analysts can make informed decisions about the performance of their analytical methods. Comparisons may contain inaccurate information about people, places, or facts. Please report any issues.LCS Laboratory Inc. is dedicated to providing laboratory analysis. Our team of experts are committed to providing laboratory support informed decision-making. True to our credo of openness and transparency, we offer a curated collection of essential documents tailored to meet your needs:Comprehensive Price List: Explore the most complete and up-to-date list of laboratory tests along with their current prices. Whether youre budgeting for routine analysis or planning a large-scale project, this resource ensures clarity and predictability.Request Forms: Download blank request forms to complete and submit alongside your samples. These forms streamline the submission process, helping us provide accurate and timely results.Instrument Operation Manuals: Access detailed manufacturer instructions for the rental instruments available at LCS Laboratory. These manuals ensure proper usage and optimal performance of the equipment you rely on.Sampling Manuals: Developed in-house by LCS Laboratory, these manuals break down complex air sampling techniques into clear, actionable steps. They serve as an invaluable guide for those navigating intricate sampling protocols.We welcome your questions and suggestions. Feel free to email us to learn more or provide feedbackyour input helps us serve you better. the free encyclopedia that anyone can edit.117,185 active editors 7,002,038 articles in EnglishThe English-language Wikipedia is the oldest and largest of the many editions of Wikipedia. Its contributors for creating more than seven million articles! Learn how you can take part in the encyclopedia's continued improvement.Logo of Namco LimitedNamco Limited was a Japanese multinational video game and entertainment company founded in 1955 by Masaya Nakamura which operated video arcades, amusement parks, produced video games, films, toys, and arcade cabinets. In the 1960s, it manufactured electro-mechanical arcade games such as the 1965 game Periscope. It entered the video game industry after acquiring the Japanese division of Atari in 1974, distributing games such as Breakout and Gee Bee. Among Namco's first major hits was the fixed shooter Galaxian in 1979 and Pac-Man in 1980. During the golden age of arcade video games in the early 1980s, Namco released titles such as Galaga, Xevious, and Pole Position. Namco entered the home market in 1984 with conversions of its arcade games. Namco produced several multi-million-selling game franchises, such as Pac-Man, Galaxian, Tekken, Tales, Ridge Racer, Ace Combat, and Taiko no Tatsujin. In 2006, Namco merged with Bandai to form Bandai Namco Holdings. (Fullarticle...)Recently featured: The Boat Race 2018Radar, Gun Laying, Mk.I and Mk.IIAndrea NavageroArchiveBy emailMore featured articlesAbout Skybjugus aquaticus... that the swamp rabbit (pictured) is both territorial and a good swimmer?... that no other month in a calendar year starts with the same day of the week as June?... that the Lady Carbisdale led an unsuccessful takeover bid for Sheffield United F.C. and, after a gender transition, was interviewed to become its chief executive?... that the first version of the Amtrak Susquehanna River Bridge was heavily damaged by a tornado during construction?... that medicine that Sjahriar Rasad was accused of being involved in a conspiracy to assassinate Indonesian President Sukarno?... that the U.S. Supreme Court is currently deciding whether the family who lived in a house wrongly raided by the FBI may sue the government?... that Romanian sports shooter Petre Cimigiu demanded the elimination of a pension gap between Olympic and non-Olympic champions, such as himself?... that the novel Looking Glass Girl was launched at Coventry Central Library to highlight the threat of 17 libraries in the city closing?... that John P. Morris won a strike by hiding pigeons in his house to win the city by hiding pigeons in his... that John P. Morris won a strike by hiding pigeons in... that the age of 87.In sumo, nosato Daiki is promoted to yokozuna.In association football, Liverpool win the Premier League title.In motor racing, lex Palou wins the Indianapolis 500.In basketball, the Oklahoma City Thunder win the NBA Finals.Fenerbahe winning the Final Four PlayoffOngoing: Gaza warM23 campaignRussian invasion of UkrainetimelineSudanese civil wartimelineRecent deaths: Harrison Ruffin TylerPhil RobertsonMary K. GaillardPeter DavidAlan YentobGerry ConnollyNominate an article1 Wreckage of American Airlines Flight 14201676 Scanian War: The Swedish warship Kronan, one of the largest ships in the world at the time, sank at the Battle of land with the loss of around 800 men.1857 The Revolution of the Ganhadores, the first general strike in Brazil, began in Salvador, Bahia.1974 In an informal crisis in set references Archived 2009-04-21 at the Wayback MachineRetrieved from " limit and reporting limit are both important concepts by reforms to the Spanish constitution were introduced in the parliament of Singapore.1999 On landing at Little Rock National Airport in the U.S. state of Arkansas, American Airlines Flight 1420 overran the runway and crashed (wreckage pictured), resulting in 11 deaths.Kitahatake ChikafusaPopes Gregory XIII(d.2021)More anniversaries: May 31June 1June 2ArchiveBy emailList of days of the yearAboutDrosera capensis, commonly known as the Cape sundew, is a perennial rosette-forming carnivorous plant in the family Droseraceae. It is endemic to the Western Cape and Eastern Cape provinces of South Africa. As in all sundews, the leaves are covered in stalked, mucilage-secreting glands (or 'tentacles') that attract, trap, and digest arthropod prey. When prey is captured, the tentacles bend toward the center of the leaf in contact with the prey. This time-lapse video shows a D.capensis leaf curling up around a Mediterranean fruit fly over a period of approximately six hours.Video credit: Scott SchillerRecently featured: Cucumis metuliferusIgnace TonenAustralian white ibisArchiveMore featured picturesCommunity portal The central hub for editors, with resources, links, tasks, and announcements.Village pump Forum for discussions about Wikipedia itself, including policies and technical issues.Site news Sources of news about Wikipedia and the broader Wikimedia movement.Teahouse Ask basic questions about using or editing Wikipedia.Help desk Ask questions about using or editing Wikipedia.Reference desk Ask research questions about encyclopedic topics.Content portals A unique way to navigate the encyclopedia.Wikipedia is written by volunteer editors and hosted by the Wikimedia Foundation, a non-profit organization that also hosts a range of other volunteer projects:CommonsFree media repository MediaWikiWiki software development Meta-WikiWikimedia project coordination WikibooksFree textbooks and manuals WikidataFree knowledge base WikinewsFree-content news WikiquoteCollection of quotations WikisourceFree-content library WikispeciesDirectory of species WikiversityFree learning tools WikivoyageFree travel guide WiktionaryDictionary and thesaurusThis Wikipedia is written in English. Many other Wikipedias are available; some of the largest are listed below.1,000,000+ articles DeutschEspaolFranaisItalianoNederlandsPolskiPortuguSvenskaTing Vit 250,000+ articles Bahasa IndonesiaBahasa MelayuBn-lm-gCatalentinaDanskEestiEsperantoEuskaraMagyarNorsk bokmlRomnSimple EnglishSloveninaSrpskiSrpskohrvatskiSuomiTrkeOzbekcha 50,000+ articles AsturianuAzrbaycancaBân-lâm-gúFryskGaeilgeGalegoHrvatskiKurdLatvieuLietuviNorsk nynorskShqipSlovenina kesksurk mnsrp/Retrieved from " 2This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.Find sources:"1676"news newspapers books scholar JSTOR (September 2017) (Learn how and when to remove this message)Calendar yearYearsMillennium2ndmillenniumCenturies16thcentury17thcentury18thcenturyDecades1650s1660s1670s1680s1690sYears1673167416751676167716781679168016811682Year1676 in various calendarsGregorian calendar1676MDCLXXVIAb urbe condita2429Armenian calendar1125Assyrian calendar6426Balinese saka calendar15971598Bengali calendar10821083Berber calendar2626English Regnal year27Cha.228Cha.2Buddhist calendar2220Burmese calendar1038Byzantine calendar71847185Chinese calendar (WoodRabbit)4373 or 4166to (FireDragon)4374 or 4167Coptic calendar13921393Discordian calendar2842Ethiopian calendar16681669Hebrew calendar53654537Hindu calendars- Vikram Samvat17321733- Shaka Samvat15971598- Kali Yuga47764777Holocene calendar11676Igbo calendar6766771Iranian calendar10541055Islamic calendar10861087Japanese calendarEnp4(lavanese calendar15981599Julian calendarGregorian minus 10 daysKorean calendar4009Minguo calendar236 before ROC236Nanakshahi calendar208Thai solar calendar22182219Tibetan calendar(female Wood-Rabbit)1802 or 1421 or 649to(male Fire-Dragon)1803 or 1422 or 650August 17: Sweden defeats Denmark-Norway in Battle of Halmstad.1676 (MDCLXXVI) was a leap year starting on Wednesday of the Gregorian calendar and a leap year starting on Saturday of the Julian calendar, the 1676th year of the Common Era (CE) and Anno Domini (AD) designations, the 676th year of the 2ndmillennium, the 76th year of the 17thcentury, and the 7th year of the 1670s decade. As of the start of 1676, the Gregorian calendar was 10 days ahead of the Julian calendar, which remained in localized use until 1923. Calendar year December 4: Battle of LundJanuary 29 Feodor III becomes Tsar of Russia.January 31 Universidad de San Carlos de Guatemala, the oldest institution of higher education in Central America, is founded.[1]January Six months into King Philip's War, Metacomet (King Philip), leader of the Wampanoag tribe known as the Wampanoag, travels westward to the Mohawk nation, seeking an alliance with the Mohawks against the English colonists of New England; his efforts in creating such an alliance are a failure.February 10 After the Nipmuc tribe attacks Massachusetts, colonist Mary Rowlandson is taken captive, and lives with the Indians until May.February 14 Metacomet and his Wampanoags attack Northampton, Massachusetts; meanwhile, the Massachusetts Council debates whether a wall should be erected around Boston.February 23 While the Massachusetts Council debates whether to execute the Christian Indians they had exiled to Deer Island on October 13, 1675, a coalition of Indians led by Metacomet attacks colonial settlements just 16km (9.9mi) outside of Boston.March 29 Providence, Rhode Island is attacked and destroyed by Native Americans.April 2 Chief Canonchet of the Narragansett people is captured by mercenaries of the Pequot, Mohegan and Niantic nations who have been hired by English settlers. He is offered a chance to live if he makes peace with the English, refuses, and is executed the next day in Stonington, Connecticut.April 12 Richard Raynsford becomes the new Lord Chief Justice of England and Wales.April 21 Sudbury Fight: The village of Sudbury, Massachusetts is attacked by Metacom's Wampanoag Confederation as two Indians attack in the last major battles of King Philip's War. Captain Samuel Wadsworth and 28 of his men are killed in the defense of the town.April 22 The Battle of Augusta is fought in the Mediterranean Sea off the coast of Sicily during the Franco-Dutch War. The French Navy and the combined Dutch Republic and Spanish forces each lose over 500 men.May 2 Mary Rowlandson is ransomed from captivity by Native Americans by a cashier payment of 20.May 19 Peskeomskut Massacre: Battle of Turner's Falls Captain William Turner leads a raid at first light on an encampment consisting mainly of women and children. An estimated 300-400 lives are taken in less than half an hour, first from gunshot directly into the sleeping tents, then by sword and by drowning as the victims try to flee. This incident happens on the west bank of the Connecticut River, just above the falls known as Turner's Falls in Gill, Massachusetts.May 26 A fire destroys the town hall and 624 houses in Southwark, London.[2]May 31 The Massachusetts Council finally decides to move the Christian Indians from Deer Island to Cambridge, Massachusetts (approximate date).June 1 Scanian War: Battle of land A combined fleet of the Dutch Republic and DenmarkNorway decisively defeats the Swedish Navy, which loses its flagship Kronan.June 12 The Indian coalition attacks Hadley, Massachusetts, but is repelled by Connecticut troops.June 19 Massachusetts issues a declaration of amnesty to any Indian who surrenders.June Bacon's Rebellion begins in the Virginia Colony. On July 30, Nathaniel Bacon and his followers issue the Declaration of the People of Virginia.July 2 Major John Talcott and his troops begin sweeping Connecticut and Rhode Island, capturing large numbers of Native Americans from Algonquian tribes and exporting them out of the English colonies as slaves.July 4 Captain Benjamin Church and his soldiers begin sweeping Plymouth Colony, for any remaining Wampanoag tribesmen.July 11 The Wampanoags attack Taunton, Massachusetts, but are repelled by colonists.July 17 In France, Madame de Brinvilliers is executed for poisoning her father and brothers. The case also scares King Louis XIV into starting a series of investigations about possible poisonings and witchcraft (later called the Affair of the Poisons).July 27 Nearly 200 Wampanoag tribesmen surrender to the English colonists in Boston.July 30 Virginia colonist Nathaniel Bacon and his makeshift army issue a Declaration of the People of Virginia, instigating Bacon's Rebellion against the rule of Governor William Berkeley.August 2 Captain Benjamin Church captures Metacomet's wife and son.August 12 King Philip (Metacomet), chief of the Wampanoags that had waged a war throughout New England that bore his name, is killed by an Indian named Alderman, a soldier led by Captain Benjamin Church.August 17 Battle of Halmstad (fought at Fyllebro): Sweden gains a decisive victory over DenmarkNorway.August 28 The Irish Bandon of 1676 is shipped from Dublin, to relieve Boston in the Massachusetts Bay Colony.September 19The Russo-Turkish War (16761681) begins, with Russo-Ukrainian troops forcing pro-Ottoman Hetman Ivan Samoylovych to surrender Chyhyryn.Bacon's Rebellion: Jamestown is burned to the ground by the forces of Nathaniel Bacon.September 21 Pope Innocent XI succeeds Pope Clement X, as the 240th Pope of the Roman Catholic Church.October 13 Battle of Gegodog: Trunajaya defeats the Mataram Sultanate.October 17 The Treaty of urawno is signed, between the Ottoman (Turkish) Empire and PolishLithuanian Commonwealth.November 16 A prison is founded on Nantucket Island, in the English colony of Massachusetts.November 27 A fire in Boston, Massachusetts, is accidentally set by a careless and sleepy apprentice, who drops a lighted candle, or leaves it too near some combustible substance; this is the largest fire known at this time in the district. The Rev. Increase Mathers church, dwelling and a portion of his personal library are destroyed.[3]December 4 Scanian War Battle of Lund: Sweden defeats the forces of Denmark.December 7 Ole Rmer makes the first quantitative measurements of the speed of light.December 21 Sands baronets created in the Baronetage of Ireland.[4]Emperor Yohannes I of Ethiopia decrees that Muslims must live separately from Christians throughout his realm.Anton van Leeuwenhoek discovers microorganisms.An bo Lantdag (assembly) marks its first Florence to begin work on the Molucca peninsula.David 1601: Safavid dynasty reunifies Iran and rules until 1736. Safavids depict defeats the Ethiopian Empire Armada and Kingdom of Cochin under Joo da Nova and Zamorin of Kozhikode's navy marks the beginning of Portuguese conflicts in the Indian Ocean.1502: First reported of Portuguese in the Indian Ocean.1502: First Battle of Cannanore between the Third Portuguese Armada and Kingdom of Cochin under Joo da Nova and Zamorin of Kozhikode's navy marks the beginning of Portuguese conflicts in the Indian Ocean.1502: First reported of Portuguese African slaves in the New World1502: The Crimean Khanate sacks Sarai in the Golden Horde, ending its existence.1503: Spain defeats France at the Battle of Cerignola. Considered to be the first battle in history won by gunpowder small arms.1503: Leonardo da Vinci begins painting the Mona Lisa and completes it three years later.1503: Nostradamus is born on either December 14 or December 21.1504: A period of drought, with famine in all of Spain.1504: Death of Isabella I of Castile; Joanna of Castile becomes the Queen.1504: Foundation of the Sultanate of Sennar by Amara Dunqas, in what is modern Sudan.1505: Zhengde Emperor ascends the throne of Ming dynasty.1505: Martin Luther's reaction of Assyrians: Monastery at Erfurt, Germany, on 17 July and begins his journey to originating the Reformation.1505: Sultan Trenggono becomes the first Muslim kingdom in Java, called Demak, in Indonesia. Old Tano population.[6]1507: Afonso de Albuquerque conquered Hormuz and Muscat, among other bases in the Persian Gulf, taking control of the region at the entrance of the Gulf.1508: The Christian-Islamic power struggle in Europe and West Asia spills over into the Indian Ocean as Battle of Chaul during the PortugueseMamluk War15081512: League of Cambrai wages war against the Republic of Venice.Michelangelo paints the Sistine Chapel ceiling.1509: The effort of joint fleet of the Sultan of Gujarat, the Mamlk Burji Sultanate of Egypt, and the Zamorin of Calicut with support of the Republic of Venice and the Ottoman Empire in Battle of Diu marks the beginning of Portuguese dominance of the Spice trade and the Indian Ocean.1509: The Battle of Diu ends Ottoman and Mamluk power in the Indian Ocean.1509: Katharine of Aragon marries Henry VIII of England.1509: A devastates the native Tano population.[6]1507: Afonso de Albuquerque conquered Hormuz and Muscat, among other bases in the Persian Gulf, taking control of the region at the entrance of the Gulf.1510: Portuguese captures Goa.Commentariolus, and proclaims the Sun the center of the Solar System.1512: The southern part (historical core) of the Kingdom of Navarre is invaded by Castile and Aragon.1512: Qutb Shahi dynasty, founded by Quli Qutb Mulk, rules Golconda Sultanate until 1687.1512: The first Portuguese exploratory expedition sent eastward from Malacca (in present-day Malaysia) to search for the 'Spice Islands' (Maluku) led by Francisco Serro. Serro is shipwrecked but struggles on to Hitu (northern Ambon) and wins the favour of the local rulers.[9]1513: Machiavelli writes The Prince, a treatise about political philosophy.1513: The Portuguese reach the Moluccas, the original "Spice Islands".1513: Vasco Nez de Balboa, in service of Spain arrives at the Pacific Ocean (which he called Mar del Sur) across the Isthmus of Panama. He was the first European to do so.1514: The Battle of Orsha halts Muscovy's expansion into Eastern Europe.1514: Dona rebellion (peasant revolt) in Hungary.Martin Luther initiated the Reformation with his Ninety-five Theses in 1517.1514: The Battle of Chaldiran, the Ottoman Empire wrests Eastern Anatolia from the Safavids after the death of Louis XII.1515: The Ottoman Empire conquers the last beyliks of Anatolia, the Dulkadirs and the Ramadanids.15161517: The Ottomans conquer the Mamluks in the Ottoman-Mamluk War, bringing Egypt, Arabia, and the Levant under their control.Leo X was Pope from 1513 to his death in 1521.1517: The Sweating sickness epidemic in Tudor England.[10][11]1517: The Reformation begins when Martin Luther posts his Ninety-five Theses in Saxony.1518: The Treaty of London was a non-aggression pact between the major European nations. The signatories were Burgundy, France, England, the Holy Roman Empire, the Netherlands, the Papal States and Spain, all of whom agreed not to attack one another and to come to the aid of any that were under attack.1518: Mir Chakar Khan Rind becomes Baluchistan and settles in Punjab.1518: Leo Africanus, also known as al-Hasan ibn Muhammad al-Wazzan al-Fasi, an Andalusian Berber diplomat who is best known for his book Descrittione dellAfrica (Description of Africa), is captured by Spanish pirates; he is taken to Rome and presented to Pope Leo X.1518: The dancing plague of 1518 begins in Strasbourg, lasting for about one month.1519: Leonardo da Vinci dies of natural causes on May 2 Europe at the time of the accession of Charles V in 15191519: Wang Yangming, the Chinese philosopher and governor of Jiangxi province, describes his intent to use the firepower of the fo-lang-ji, a breech-loading Portuguese culverin, in order to suppress the rebellion of Prince Zhu Chenhao.1519: Barbary pirates led by Hayreddin Barbarossa, a Turk appointed to ruling position in Algiers by the Ottoman Empire, raid Provence and Toulon in southern France.1519: Death of Emperor Maximilian; Charles I of Austria, Spain, and the Low Countries becomes Holy Roman Emperor Charles V, Holy Roman Emperor (ruled until 1556).1519: Hernn Corts leads the Spanish conquest of the Aztec Empire and founded Mexico City in 15191521.Ferdinand Magellan led the first expedition that circumnavigated the globe in 15191522.1520:1506: The reign of Suleiman the Magnificent marks the zenith of the Ottoman Empire.After fortifications at Tuen Mun, the Portuguese attempt to invade Ming dynasty China, but are expelled by Chinese naval forces.1521: Disease perhaps brought by Ferdinand Magellan. He was later killed in the Battle of Mactan in central Philippines in the same year.1521: Jiajing Emperor ascends the throne of Ming dynasty, China.1521: November, Ferdinand Magellan's expedition reaches Maluku (in present-day Indonesia) and after trade with Ternate returns to Europe with a load of cloves.1521: The Ottomans defeated Belgrade.1522: Rhodes falls to the Ottomans of Suleiman the Magnificent.[11]Sack of Rome of 1527 by Charles V's forces (painting by Johannes Lingelbach)1522: August, Luso-Sundanese Treaty signed between Portugal and Sunda Kingdom granted Portuguese permit to build fortress in Sunda Kelapa.1523: Sweden gains independence from the Kalmar Union.1523: The Cacao bean is introduced to Spain by Hernn Corts15241525: German Peasants' War in the Holy Roman Empire.1524: Giovanni da Verrazzano is the first European to explore the Atlantic coast of North America between South Carolina and Newfoundland.1524: Ismail I, the founder of Safavid dynasty, dies and Tahmasp I becomes king.Gun-wielding Ottoman Janissaries and defending Knights of Saint John at the siege of Rhodes in 1522, from an Ottoman manuscript1525: Timurid Empire forces under Babur defeat the Lodi dynasty at the First Battle of Panipat, end of the Delhi Sultanate.1525: German and Spanish forces defeat France at the Battle of Pavia, Francis I of France is captured.1525: The Ottomans defeat the Kingdom of Hungary at the Battle of Mohcs.1526: The Mughals later defeat the Lodi dynasty and Mughal Emperor Humayun. Sher Shah Suri decisively defeats Humayun in the Battle of Bilgram (May 17, 1540).1541: Pedro de Valdivia founds Santiago in Chile.1541: An Algerian military campaign by Charles V of Spain (Habsburg) is unsuccessful.1541: Amazon River is encountered and explored by Francisco de Orellana.1541: Capture of Buda and the absorption of the major part of Hungary by the Ottoman Empire.1541: Sahib I Giray of Crimea invades Russia.1542: The Italian War of 15421546 War resumes between Francis I of France and Emperor Charles V. This time Henry

VIII is allied with the Emperor, while James V of Scotland and Sultan Suleiman I are allied with the French.1542: Akbar The Great is born in the Rajput Umarkot Fort1542: Spanish explorer Ruy Lpez de Villalobos named the island of Samar and Leyte Las Islas Filipinas honoring Philip II of Spain and became the official name of the archipelago.1543: Ethiopian/Portuguese troops defeat the Adal army led by Imam Ahmad Gurey at the Battle of Wayna Daga; Imam Ahmad Gurey is killed at this battle.1543: Copernicus publishes his theory that the Earth and the other planets revolve around the Sun1543: The Nanban trade period begins after Portuguese traders make contact with Japan.1544: The French defeat an ImperialSpanish army at the Battle of Ceresole.Scenes of everyday life in Ming China, by Qiu Ying1544: Battle of the Shirts in Scotland. The Frasers and Macdonalds of Clan Ranald fight over a disputed chiefship; reportedly, 5 Frasers and 8 Macdonalds survive.1545: Songhai forces sack the Malian capital of Niani1545: The Council of Trent meets for the first time in Trent (in northern Italy).1546: Michelangelo Buonarroti is made chief architect of St. Peter's Basilica.1546: Francis Xavier works among the peoples of Ambon, Ternate and Morotai (Moro) laying the foundations for a permanent mission. (to 1547)1547: Henry VIII dies in the Palace of Whitehall on 28 January at the age of 55.1547: Francis I dies in the Chteau de Rambouillet on 31 March at the age of 52.1547: Edward VI becomes King of England and Ireland on 28 January and is crowned on 20 February at the age of 9.1547: Emperor Charles V decisively dismantles the Schmalkaldic League at the Battle of Mhlberg.1547: Grand Prince Ivan the Terrible is crowned tsar of (All) Russia, thenceforth becoming the first Russian tsar.1548: Battle of Uedahara: Firearms are used for the first time on the battlefield in Japan, and Takeda Shingen is defeated by Murakami Yoshikiyo.1548: Askia Daoud, who reigned from 1548 to 1583, establishes public libraries in Timbuktu (in present-day Mali).1548: The Ming dynasty government of China issues a decree banning all foreign trade and closes down all seaports along the coast; these Hai jin laws came during the Wokou wars with Japanese pirates.1549: Tom de Sousa establishes Salvador in Bahia, north-east of Brazil.1549: Arya Penangsang with the support of his teacher, Sunan Kudus, avenges the death of Raden Kikin by sending an envoy named Rangkud to kill Sunan Prawoto by Keris Kyai Satan Kober (in present-day Indonesia).The Islamic gunpowder empires: Mughal Army artillerymen during the reign of Jalaluddin Akbar1550: The architect Mimar Sinan builds the Sleymaniye Mosque in Istanbul.1550: Mongols led by Altan Khan invade China and besiege Beijing.15501551: Valladolid debate concerning the human rights of the Indigenous people of the Americas.1551: Fifth outbreak of sweating sickness in England. John Caius of Shrewsbury writes the first full contemporary account of the symptoms of the disease.1551: North African pirates enslave the entire population of the Maltese island Gozo, between 5,000 and 6,000, sending them to Libya.1552: Russia conquers the Khanate of Kazan in central Asia.1552: Jesuit China Mission, Francis Xavier dies.1553: Mary Tudor becomes the first queen regnant of England and restores the Church of England under Papal authority.1553: The Portuguese found a settlement at Macau.1554: Missionaries Jos de Anchieta and Manuel da Nbrega establishes So Paulo, southeast Brazil.1554: Princess Elizabeth is imprisoned in the Tower of London upon the orders of Mary I for suspicion of being involved in the Wyatt rebellion.1555: The Muscovy Company is the first major English joint stock trading company.1556: Publication in Venice of Delle Navigationi et Viaggi (terzo volume) by Giovanni Battista Ramusio, secretary of Council of Ten, with plan La Terra de Hochelaga, an illustration of the Hochelaga.[13]1556: The Shaanxi earthquake in China is history's deadliest known earthquake during the Ming dynasty.1556: Georgius Agricola, the "Father of Mineralogy", publishes his De re metallica.1556: Akbar defeats Hemu at the Second battle of Panipat.1556: Russia conquers the Astrakhan Khanate.15561605: During his reign, Akbar expands the Mughal Empire in a series of conquests (in the Indian subcontinent).Political map of the world in 15561556: Mir Chakar Khan Rind captures Delhi with Humayun.1556: Pomponio Algerio, radical theologian, is executed by boiling in oil as part of the Roman Inquisition.1557: Habsburg Spain declares bankruptcy. Philip II of Spain had to declare four state bankruptcies in 1557, 1560, 1575 and 1596.1557: The Portuguese settle in Macau (on the western side of the Pearl River Delta across from present-day Hong Kong).1557: The Ottomans capture Massawa, all but isolating Ethiopia from the rest of the world.1558: Elizabeth Tudor becomes Queen Elizabeth I at age 25.15581603: The Elizabethan era is considered the height of the English Renaissance.15581583: Livonian War between Poland, Grand Principality of Lithuania, Sweden, Denmark and Russia.1558: After 200 years, the Kingdom of England loses Calais to France.1559: With the Peace of Cateau Cambrsis, the Italian Wars conclude.1559: Sultan Hairun of Ternate (in present-day Indonesia) protests the Portuguese's Christianisation activities in his lands. Hostilities between Ternate and the Portuguese.The Mughal Emperor Akbar shoots the Rajput warrior Jaimal during the Siege of Chittorgarh in 15671560: Ottoman navy defeats the Spanish fleet at the Battle of Djerba.1560: Elizabeth Bathory is born in Nyirbator, Hungary.1560: By winning the Battle of Okehazama, Oda Nobunaga becomes one of the pre-eminent warlords of Japan.1560: Jeanne d'Albret declares Calvinism the official religion of Navarre.1560: Lazarus Church, Macau1561: Sir Francis Bacon is born in London.1561: The fourth battle of Kawanakajima between the Uesugi and Takeda at Hachimanbara takes place.1561: Guido de Bres draws up the Belgic Confession of Protestant faith.1562: Mughal emperor Akbar reconciles the Muslim and Hindu factions by marrying into the powerful Rajput Hindu caste.15621598: French Wars of Religion between Catholics and Huguenots.1562: Massacre of Wassy and Battle of Dreux in the French Wars of Religion.1562: Portuguese Dominican priests build a palm-trunk fortress which Javanese Muslims burned down the following year. The fort was rebuilt from more durable materials and the Dominicans commenced the Christianisation of the local population.[12]1563: Plague outbreak claimed 80,000 people in Elizabethan England. In London alone, over 20,000 people died of the disease.1564: Galileo Galilei born on February 151564: William Shakespeare baptized 26 April1565: Deccan sultanates defeat the Vijayanagara Empire at the Battle of Talikota.1565: Mir Chakar Khan Rind dies at aged 97.1565: Estcio de S establishes Rio de Janeiro in Brazil.1565: The Hospitallers, a Crusading Order, defeat the Ottoman Empire at the siege of Malta (1565).1565: Miguel Lpez de Legazpi establishes in Cebu the first Spanish settlement in the Philippines starting a period of Spanish colonization that would last over three hundred years.1565: Spanish navigator Andres de Urdaneta discovers the maritime route from Asia to the Americas across the Pacific Ocean, also known as the tornaviaje.1565: Royal Exchange is founded by Thomas Gresham.1566: Suleiman the Magnificent, ruler of the Ottoman Empire, dies on September 7, during the battle of Szigetvar.Siege of Valenciennes during the Dutch War of Independence in 156715661648: Eighty Years' War between Spain and the Netherlands.1566: Da le Balle Contrade d'Oriente, composed by Cipriano de Rore.1567: After 45 years' reign, Jiajing Emperor died in the Forbidden City, Longqing Emperor ascended the throne of Ming dynasty.1567: Mary, Queen of Scots, is imprisoned by Elizabeth I.1568: The Transylvanian Diet, under the patronage of the prince John Sigismund Zpolya, the former king of Hungary, inspired by the teachings of Ferenc Dvid, the founder of the Unitarian Church of Transylvania, promulgates the Edict of Torda, the first law of freedom of religion and of conscience in the World.15681571: Morisco Revolt in Spain.15681600: The Azuchi-Momoyama period in Japan.1568: Hadiwijaya sent his adopted son and son in-law Sutawijaya, who would later become the first ruler of the Mataram dynasty of Indonesia, to kill Arya Penangsang.1569: Rising of the North in England.1569: Mercator 1569 world map published by Gerardus Mercator.1569: The PolishLithuanian Commonwealth is created with the Union of Lublin which lasts until 1795.1569: Peace treaty signed by Sultan Hairun of Ternate and Governor Lopez De Mesquita of Portugal.The Battle of Lepanto1570: Ivan the Terrible, tsar of Russia, orders the massacre of inhabitants of Novgorod.1570: Pope Pius V issues Regnans in Excelsis, a papal bull excommunicating all who obeyed Elizabeth I and calling on all Catholics to rebel against her.1570: Sultan Hairun of Ternate (in present-day Indonesia) is killed by the Portuguese.[12] Babullah becomes the next Sultan.1570: 20,000 inhabitants of Nicosia in Cyprus were massacred and every church, public building, and palace was looted. Cyprus fell to the Ottoman Turks the following year.1571: Pope Pius V completes the Holy League as a united front against the Ottoman Turks, responding to the fall of Cyprus to the Ottomans.1571: The Spanish-led Holy League navy destroys the Ottoman Empire navy at the Battle of Lepanto.1571: Crimean Tatars attack and sack Moscow, burning everything but the Kremlin.1571: American Indians kill Spanish missionaries in what would later be Jamestown, Virginia.1571: Spanish conquistador Miguel Lpez de Legazpi establishes Manila, Philippines as the capital of the Spanish East Indies.1572: Brielle is taken from Habsburg Spain by Protestant Watergeuzen in the Capture of Brielle, in the Eighty Years' War.1572: Spanish conquistadores apprehend the last Inca leader Tupak Amaru at Vilcabamba, Peru, and execute him in Cuzco.1572: Jeanne d'Albret dies aged 43 and is succeeded by Henry of Navarre.1572: Catherine de' Medici instigates the St. Bartholomew's Day massacre which takes the lives of Protestant leader Gaspard de Coligny and thousands of Huguenots. The violence spreads from Paris to other cities and the countryside.1572: First edition of the epic The Lusiads of Lus Vaz de Cames, three years after the author returned from the East.[14]1572: The 9 years old Taizi, Zhu Yijun ascended the throne of Ming dynasty, known as Wanli Emperor.1573: After heavy losses on both sides the siege of Haarlem ends in a Spanish victory.St. Bartholomew's Day massacre of French Protestants1574: in the Eighty Years' War the capital of Zeeland, Middelburg declares for the Protestants.1574: After a siege of 4 months the siege of Leiden ends in a comprehensive Dutch rebel victory.1575: Oda Nobunaga finally captures Nagashima fortress.1575: Following a five-year war, the Ternateans under Sultan Babullah defeated the Portuguese.1576: Tahmasp I, Safavid shah, dies.1576: The Battle of Haldighati is fought between the ruler of Mewar, Maharana Pratap and the Mughal Empire's forces under Emperor Akbar led by Raja Man Singh.1576: Sack of Antwerp by badly paid Spanish soldiers.15771580: Francis Drake circles the world.1577: Ki Ageng Pemanahan built his palace in Pasargede or Kotagede.1578: King Sebastian of Portugal is killed at the Battle of Alcazarquivir.1578: The Portuguese establish a fort on Tidore but the main centre for Portuguese activities in Maluku becomes Ambon.[12]1578: Sonam Gyatso is conferred the title of Dalai Lama by Tumed Mongol ruler, Altan Khan. Recognised as the reincarnation of two previous Lamas, Sonam Gyatso becomes the third Dalai Lama in the lineage.[15]1578: Governor-General Francisco de Sande officially declared war against Brunei in 1578, starting the Castilian War of 1578.1579: The Union of Utrecht unifies the northern Netherlands, a foundation for the later Dutch Republic.1579: The Union of Arras unifies the southern Netherlands, a foundation for the later states of the Spanish Netherlands, the Austrian Netherlands and Belgium.The Irish Gaelic chieftain's feast, from The Image of Ireland1579: The British navigator Sir Francis Drake passes through Maluku and transit in Ternate on his circumnavigation of the world. The Portuguese establish a fort on Tidore but the main centre for Portuguese activities in Maluku becomes Ambon.[12]1580: Spain unifies with Portugal under Philip II. The struggle for the throne of Portugal ends the Portuguese Empire. The Spanish and Portuguese crowns are united for 60 years, i.e. until 1640.15801587: attacks on Spanish possessions influences Philip II of Spain to build up the Spanish Armada. English ships in Spanish harbours are impounded.1580: Spain unifies with Portugal under Philip II. The struggle for the throne of Portugal ends the Portuguese Empire. The Spanish and Portuguese crowns are united for 60 years, i.e. until 1640.15801587: Nagasaki comes under control of the Jesuits.1581: Dutch Act of Abjuration, declaring abjuring allegiance to Philip II of Spain.1581: Bayinnaung dies at the age of 65.1582: Oda Nobunaga commits seppuku during the Honn-ji Incident coup by his general, Akechi Mitsuhide.1582: Pope Gregory XIII issues the Gregorian calendar. The last day of the Julian calendar was Thursday, 4 October 1582 and this was followed by the first day of the Gregorian calendar, Friday, 15 October 1582.1582: Yermak Timofeyevich conquers the Siberia Khanate on behalf of the Stroganovs.1583: Denmark builds the world's first theme park, Bakken.1583: Death of Sultan Babullah of Ternate.15841585: After the siege of Antwerp, many of its merchants flee to Amsterdam. According to Luc-Normand Tellier, "At its peak, between 1510 and 1557, Antwerp concentrated about 40% of the world trade...It is estimated that the port of Antwerp was earning the Spanish crown seven times more revenues than the Americas."[17]1584: Ki Ageng Pemanahan died. Sultan Pajang raised Sutawijaya, son of Ki Ageng Pemanahan as the new ruler in Mataram, titled "Loring Ngabehi Market" (because of his home in the north of the market).1585: Akbar annexes Kashmir and adds it to the Kabul SubahPortuguese fusta in India from a book by Jan Huygen van Linschoten1585: Colony at Roanoke founded in North America.15851604: The Anglo-Spanish War is fought on both sides of the Atlantic.1587: Mary, Queen of Scots is executed by Elizabeth I.1587: The reign of Abbas I marks the zenith of the Safavid dynasty.1587: Troops that would invade Pajang Mataram Sultanate storm ravaged the eruption of Mount Merapi. Sutawijaya and his men survived.1588: Mataram into the kingdom with Sutawijaya as Sultan, titled "Senapati Ingalaga Sayidin Panatagama" means the warlord and cleric Manager Religious Life.1588: England repulses the Spanish Armada.1589: Spain repulses the English Armada.1589: Catherine de' Medici dies at aged 69.Abu'l-Fazl ibn Mubarak presenting Akbarnama to Mughal Azam Akbar, Mughal miniature1590: Siege of Odawara: the Go-Hojo clan surrender to Toyotomi Hideyoshi, and Japan is unified.1591: Gazi Giray leads a huge Tatar expedition against Moscow.1591: In Mali, Moroccan forces of the Sultan Ahmad al-Mansur led by Judar Pasha defeat the Songhai Empire at the Battle of Tondibi.15921593: John Stow reports 10,675 plague deaths in London, a city of approximately 200,000 people.15921598: Korea, with the help of Ming dynasty China, repels two Japanese invasions.15931606: The Long War between the Habsburg monarchy and the Ottoman Turks.1594: St. Paul's College, Macau, founded by Alessandro Valignano.1595: First Dutch expedition to Indonesia sets sail for the East Indies with two hundred and forty-nine men and sixty-four cannons led by Cornelis de Houtman.[18]1596: Birth of Ren Descartes.1596: June, de Houtman's expedition reaches Banten the main pepper port of West Java where they clash with both the Portuguese and Indonesians. It then sails east along the north coast of Java losing twelve crew to a Javanese attack at Sidayu and killing a local ruler in Madura.[18]1597: Romeo and Juliet is published.1597: Cornelis de Houtman's expedition returns to the Netherlands with enough spices to make a considerable profit.[18]1598: The Edict of Nantes ends the French Wars of Religion.1598: Abbas I moves Safavids capital from Qazvin to Isfahan in 1598.15981613: Russia descends into anarchy during the Time of Troubles.1598: The Portuguese require an armada of 90 ships to put down a Solorese uprising.[12] (to 1599)1598: More Dutch fleets leave for Indonesia and most are profitable.[18]Edo period screen depicting the Battle of Sekigahara1598: The province of Santa Fe de Nuevo Mxico is established in Northern New Spain. The region would later become a territory of Mexico, the New Mexico Territory in the United States, and the US State of New Mexico.1598: Death of Toyotomi Hideyoshi, known as the unifier of Japan.1599: The Mali Empire is defeated at the Battle of Jenn.1599: The van Neck expedition returns to Europe. The expedition makes a 400 per cent profit.[18] (to 1600)1599: March, Leaving Europe the previous year, a fleet of eight ships under Jacob van Neck was the first Dutch fleet to reach the Spice Islands of Maluku.[18]1600: Giordano Bruno is burned at the stake for heresy in Rome.Siege of Fiakovo castle during the Long Turkish War1600: Battle of Sekigahara in Japan. End of the Warring States period and beginning of the Edo period.1600: The Portuguese win a major naval battle in the bay of Ambon.[19] Later in the year, the Dutch join forces with the local Hituese in an anti-Portuguese alliance, in return for which the Dutch would have the sole right to purchase spices from Hitu.[19]1600: Elizabeth I grants a charter to the British East India Company beginning the English advance in Asia.1600: Michael the Brave unifies the three principalities: Wallachia, Moldavia and Transylvania after the Battle of elimber from 1599.For later events, see Timeline of the 17th century.Polybius' The Histories translated into Italian, English, German and French.[20]Mississippian culture disappears.Medallion rug, variant Star Ushak style, Anatolia (modern Turkey), is made. It is now kept at the Saint Louis Art Museum.Hernan Cortes (14851547)Henry VIII, (14911547) King of England and IrelandDon Fernando lvarez de Toledo (15071582)Suleiman the Magnificent, Sultan of the Ottoman Empire (15201566)Ivan IV the Terrible (15301584)Oda Nobunaga (15341582)Sir Francis Drake (c. 1540 1596)Alberico Gentili, (15221608) the Father of international lawPhilip II of Spain, King of Spain (15561598)Akbar the Great, Mughal emperor (15561605)Related article: List of 16th century inventions.The Columbian Exchange introduces many plants, animals and diseases to the Old and New Worlds.Introduction of the spinning wheel revolutionizes textile production in Europe.The letter J is introduced into the English alphabet.1500: First portable watch is created by Peter Henlein of Germany.The Iberian Union in 1598, under Philip II, King of Spain and Portugal1513: Juan Ponce de Len sights Florida and Vasco Nez de Balboa sights the eastern edge of the Pacific Ocean.15191522: Ferdinand Magellan and Juan Sebastin Elcano lead the first circumnavigation of the world.15191540: In America, Hernando de Soto expeditions map the Gulf of Mexico coastline and bays.1525: Modern square root symbol ()1540: Francisco Vsquez de Coronado sights the Grand Canyon.154142: Francisco de Orellana sails the length of the Amazon River.154243: Firearms are introduced into Japan by the Portuguese.1543: Copernicus publishes his theory that the Earth and the other planets revolve around the Sun1545: Theory of complex numbers is first developed by Gerolamo Cardano of Italy.1558: Camera obscura is first used in Europe by Giambattista della Porta of Italy.15591562: Spanish settlements in Alabama/Florida and Georgia confirm dangers of hurricanes and local native warring tribes.1565: Spanish settlers outside New Spain (Mexico) colonize Florida's coastline at St. Augustine.1565: Invention of the graphite pencil (in a wooden holder) by Conrad Gesner. Modernized in 1812.1568: Gerardus Mercator creates the first Mercator projection map.1572: Supernova SN 1572 is observed by Tycho Brahe in the Milky Way.1582: Gregorian calendar is introduced in Europe by Pope Gregory XIII and adopted by Catholic countries.c. 1583: Galileo Galilei of Pisa, Italy identifies the constant swing of a pendulum, leading to development of reliable timekeepers.1585: earliest known reference to the 'sailing carriage' in China.1589: William Lee invents the stocking frame.1591: First flush toilet is introduced by Sir John Harrington of England, the design published under the title 'The Metamorphosis of Ajax'.1593: Galileo Galilei invents a thermometer.1596: William Barents discovers Spitsbergen.1597: Opera in Florence by Jacopo Peri.Entertainment in the 16th century^ a b Modern reference works on the period tend to follow the introduction of the Gregorian calendar for the sake of clarity; thus NASA's lunar eclipse catalogue states "The Gregorian calendar is used for all dates from 1582 Oct 15 onwards. Before that date, the Julian calendar is used." For dates after 15 October 1582, care must be taken to avoid confusion of the two styles.^ de Vries, Jan (14 September 2009). "The limits of globalization in the early modern world". The Economic History Review. 63 (3): 710733. CiteSeerX10.1.1.186.2862. doi:10.1111/j.1468-0289.2009.00497.x. JSTOR40929823. S2CID219969360. SSRN1635517.^ Singh, Sarina; Lindsay Brown; Paul Clammer; Rodney Cocks; John Mock (2008). Pakistan & the Karakoram Highway. Vol.7, illustrated. Lonely Planet. p.137. ISBN978-1-74104-542-0. Retrieved 23 August 2010.^ Babur (2006). Babur Nama. Penguin Books. p.vii. ISBN978-0-14-400149-1.^ "16th Century Timeline (1501 to 1600)". fsmitha.com. Archived from the original on February 3, 2009.^ "History of Smallpox Smallpox Through the Ages" Archived 2019-09-24 at the Wayback Machine. Texas Department of State Health Services.^ Ricklefs (1991), p.23^ "A LIST OF NATIONAL EPIDEMICS OF PLAGUE IN ENGLAND 13481665". Archived from the original on 2009-05-08. Retrieved 2009-04-25.^ a b Ricklefs (1991), page 24^ The Sweating Sickness. Story of London.. Accessed 2009-04-25. Archived 2009-05-03.^ Sandra Arlinghaus. "Life Span of Suleiman the Magnificent 14941566". Personal.umich.edu. Retrieved 2013-05-05.^ a b c d e Ricklefs (1991), page 25^ "La Terra De Hochelaga Jaques Cartier a Hochelaga". jacquescarter.org. Archived from the original on December 23, 2008.^ "The Lusiads". World Digital Library. 18001882. Retrieved 2013-08-31.^ Schwieger, Peter (2014). The Dalai Lama and the Emperor of China: a political history of the Tibetan institution of reincarnation. New York: Columbia University Press. ISBN9780231538602. OCLC905914446.^ Miller, George, ed. (1996). To The Spice Islands and Beyond: Travels in Eastern Indonesia. New York: Oxford University Press. pp.xv. ISBN967-65-3099-9.^ Luc-Normand Tellier (2009). "Urban world history: an economic and geographical perspective". PUQ. p.308. ISBN2-7605-1588-5^ a b c d e f Ricklefs (1991), page 27^ a b Ricklefs (1991), page 28^ Polybius: The Rise Of The Roman Empire, Page 36, Penguin, 1979.Langer, William. An Encyclopedia of World History (5th ed. 1973); highly detailed outline of events online free Media related to 16th century at Wikimedia CommonsTimelines of 16th century events, science, culture and personsRetrieved from " 4The following pages link to 16th century External tools(link counttransclusion countsorted list) See help page for transcluding these entriesShowing 50 items.View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Bagpipes (links | edit)List of decades, centuries, and millennia (links | edit)Fashion (links | edit)Giovanni Boccaccio (links | edit)History of Mali (links | edit)History of Mauritius (links | edit)Post office (links | edit)Snare drum (links | edit)Republican Party (United States) (links | edit)20th century (links | edit)15th century (links | edit)17th century (links | edit)16th century (links | edit)1661 (links | edit)1608 (links | edit)1492 (links | edit)1648 (links | edit)1st century (links | edit)13th century (links | edit)4th century (links | edit)12th century (links | edit)11th century (links | edit)1564 (links | edit)1648 (links | edit)1572 (links | edit)1623 (links | edit)1662 (links | edit)1490s (links | edit)1640s (links | edit)1597 (links | edit)1690 (links | edit)1688 (links | edit)7th century (links | edit)10th century (links | edit)9th century (links | edit)8th century (links | edit)6th century (links | edit)5th century (links | edit)3rd century (links | edit)2nd century (links | edit)1573 (links | edit)1570s (links | edit)1574 (links | edit)1436 (links | edit)1476 (links | edit)1542 (links | edit)1540s (links | edit)View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Retrieved from " WhatLinksHere/16th_century"

Reporting limit vs detection limit. Difference between detection limit and reporting limit. Minimum detection limit vs reporting limit. Method detection limit vs reporting limit. Reporting results below detection limit.