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After traveling to meet with Francisl, he fell ill and died that May. 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GaillardPeter DavidAlan YentobGerry ConnollySebastio SalgadoNominate an articleMay 29: Feast day of Saint PaulVI (Catholicism)Headline in the New York Times1233 MongolJin War: The Mongols entered and began looting Kaifeng, the capital of the Jin dynasty of China, after a 13-month siege.1416 A squadron of the Venetian navy captured many Ottoman ships at the Battle of Gallipoli, confirming Venetian naval superiority in the Aegean Sea for the next few decades.1913 During the premiere of the ballet Le Sacre du printemps by Igor Stravinsky at the Thtre des Champs-lyses in Paris, the avant-garde nature of the music and choreography caused a near-riot in the audience (report pictured).1999 Charlotte Perrelli, representing Sweden, won the Eurovision Song Contest, the first edition not to feature an orchestra or live accompaniment.2011 Residents of Portland, Oregon, held a rally called Hands Across Hawthorne in response to an attack against a gay couple holding hands while crossing the Hawthorne Bridge.Benedetto Pistrucci (b.1783)G.K. Chesterton (b.1874)Hubert Opperman (b.1904)Uro Drenovi (d.1944)More anniversaries: May 28May 29May 30ArchiveBy emailList of days of the yearAboutThe Australian white ibis (Threskiornis molucca) is a wading bird of the ibis family, Threskiornithidae. It is widespread across much of Australia, and has a predominantly white plumage with a bare, black head, long downcurved bill, and black legs. While it is closely related to the African sacred ibis, the Australian white ibis is a native Australian bird. Due to its increasing presence in the urban environment and its habit of rummaging in garbage, the species has acquired a variety of colloquial names such as "tip turkey" and "bin chicken". This Australian white ibis was photographed at the Royal Botanic Garden, Sydney.Photograph credit: Charles J. SharpRecently featured: Hell Gate BridgeAnamondes blandaBluespotted ribbontail rayArchiveMore 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 DeutschEspaolFranaisItalianoNederlandsPolskiPortugusSvenskaTing Vit 250,000+ articles Bahasa IndonesiaBahasa MelayuBn-lm-gCatalнaDanskEestiEsperantoEuskaraMagyarNorsk bokmlRomnThis Wikipedia is written in English. Many other Wikipedias are available; some of the largest are listed below. EnglishSloveninaSrpskiSrpskohrvatskiSuomiTrkeOzbekcha 50,000+ articles AsturianuAzrbaycancaBosanskiFryskGaeilgeGalegoHrvatskiKurdLatvieuLietuviNorsk nynorskShqipSlovenina Retrieved from " 2Calendar yearYears Millennium2ndmillenniumCenturies12thcentury13thcentury 14thcenturyDecades1210s1220s1230s 1240s1250sYears12301231123212331234123512361vte1233 by topicLeadersPolitical entitiesState leadersReligious leadersBirth and death categoriesBirths DeathsEstablishments and disestablishments categoriesEstablishments DisestablishmentsArt and literature1233 in poetryvte1233 in various calendarsMillennia2ndmillenniumCenturies11thcentury12thcentury 13thcentury13thcentury13thcenturyTimelines11thcentury12thcentury13thcenturyState leaders11thcentury12thcentury13thcenturyTheEastern Hemisphere at the beginning of the 12th centuryThe 12th century is the period from 1101 to 1200 in accordance with the Julian calendar. In the history of European culture, this period is considered part of the High Middle Ages and overlaps with what is often called the "Golden Age" of the Cistercians". The Golden Age of Islam experienced significant development, particularly in Islamic Spain.In Song dynasty China, an invasion by Jurchens caused a political schism of north and south. The Khmer Empire of Cambodia flourished during this century, while the Fatimids of Egypt were overtaken by the Ayyubid dynasty. Following the expansions of the Ghaznavids and Ghurid Empire, the Muslim conquests in the Indian subcontinent took place at the end of the century.The Ghurid Empire converted to Islam from Buddhism.1101: In July, the Treaty of Alton is signed between Henry I of England and his older brother Robert, Duke of Normandy in which Robert agrees to recognise Henry as king of England in exchange for a yearly stipend and other concessions. The agreement temporarily ends a crisis in the succession of the Anglo-Norman kings.11011103: David the Builder takes over Kakheti and Hereti (now parts of Georgia).1102: King Coloman unites Hungary and Croatia under the Hungarian Crown.1102: Muslims conquer Seoro de Valencia.11031104: A church council is convened by King David the Builder in Urbnisi to reorganize the Georgian Orthodox Church.1104: In the Battle of Ertsukhi, King David the Builder defeats an army of Seljuks.1104: King Jayawarma of Kadiri (on Java) ascends to the throne.[citation needed]1106: Bohemond V of Antioch launches a Crusade against the Byzantine Empire, becoming the vassal of Alexius I.1109: On June 10, Bertrand of Toulouse captures the County of Tripoli (northern Lebanon/western Syria).1109: In the Battle of Nako, Boleslaus III Wrymouth defeats the Pomeranians and re-establishes Polish access to the sea.1109: On August 24, in the Battle of Hundsfeld, Boleslaus III Wrymouth defeats Emperor Henry V of Germany and stops German expansion eastward.1111: On April 14, during Henry V's first expedition to Rome, he is crowned Holy Roman Emperor.1113: Paramavishnuloka is crowned as King Suryavarman II in Cambodia. He expands the Khmer Empire and builds Angkor Wat during the first half of the century. He establishes diplomatic relations with China.1115: The Georgian army successfully captures the Tbilisi and declares it the capital city of Georgia, ending 400 years of Arab rule.1123: The Jurchen dynasty of China forces Koryo (now Korea) to recognize their suzerainty.1124: In April or May, David I is crowned King of the Scots.1125: On June 11, in the Battle of Azaz, the Crusader states, led by King Baldwin II of Jerusalem, defeat the Seljuk Turks.1125: In November, the Jurchens of the Jin dynasty declare war on the Song dynasty, beginning the JinSong wars.1125: Lothair of Supplinburg, duke of Saxony, is elected Holy Roman Emperor instead of the nearest heir, Frederick of Swabia, beginning the great struggle between Guelphs and Ghibellines.1127: The Southern Song dynasty establishes China's first permanent standing navy, although China had a long naval history prior. The main admiral's office is at the port of Dinghai.1131185: the Chinese navy increases from a mere 3,000 to 52,000 marine soldiers stationed in 20 different squadrons. During this time, hundreds of treadmill-operated paddle wheel craft are assembled for the navy to fight the Jin dynasty in the north.1135: King Jayabaya of Kadiri ascends to the throne.[2]11351154: The Anarchy takes place, during a period of civil war in England.1136: Suger begins rebuilding the abbey church at St Denis north of Paris, which is regarded as the first major Gothic building.1137: On July 22, the future King Louis VII of France marries Eleanor, the Duchess of Aquitaine.1138: On October 11, the 1138 Aleppo earthquake devastates much of northern Syria.1139: in April, the Second Lateran Council ends the papal schism.1139: On July 5, in the Treaty of Mignano, Pope Innocent II confirms Roger II as King of Sicily, Duke of Apulia, and Prince of Capua and invests him with his titles.1139: On July 25, the Portuguese defeat the Almoravids led by Ali ibn Yusuf in the Battle of Ourique; Prince Afonso Henriques is acclaimed King of Portugal by his soldiers.Averroes in a 14th-century painting by Andra di Bonaiuto (modern-day fresco)1141: The Treaty of Shaoxing ends the conflict between the Jin dynasty and Southern Song dynasty, legally establishing the boundaries of the two countries and forcing the Song dynasty to renounce all claims to its former territories north of the Huai River. The treaty reduces the Southern Song into a quasi-tributary state of the Jurchen Jin dynasty.1143: Manuel I Komnenos is crowned as Byzantine emperor after the death of John II Komnenos.1143: Afonso Henriques is proclaimed King of Portugal by the cortes.1143: The Treaty of Zamora recognizes Portuguese independence from the Kingdom of Len. Portugal also recognizes the suzerainty of the pope.1144: On December 24, Edessa falls to the Atabeg Zengi.11451148: The Second Crusade is launched in response to the fall of the County of Edessa.1147: On October 25, the four-month-long Siege of Lisbon successfully brings the city under definitive Portuguese control, expelling the Moorish overlords.1147: A new Berber dynasty, the Almohads, led by Emir Abd al-Mu'min, takes North Africa from the Almoravides and soon invades the Iberian Peninsula. The Almohads began as a religious movement to rid Islam of impurities.1147: The Wendish Crusade against the Polabian Slavs (or "Wends") in what is now northern and eastern Germany.1150: Ramon Berenguer IV, Count of Barcelona marries Petronilla, the Queen of Aragon.1151: The Treaty of Tudlln is signed by Alfonso VII of Len and Raymond Berengar IV, Count of Barcelona, recognizing the Aragonese conquests south of the Jcar and the right to expand in and annex the Kingdom of Murcia.1153: The Treaty of Wallingford, ends the civil war between Empress Matilda and her cousin King Stephen of England fought over the English crown. Stephen acknowledges Matilda's son Henry of Anjou as heir.1153: The First Treaty of Constance is signed between Emperor Frederick I and Pope Eugene III, by the terms of which, the emperor is to prevent any action by Manuel I Comnenus to reestablish the Byzantine Empire on Italian soil and to assist the pope against his enemies in revolt in Rome.1154: the Moroccan-born Muslim geographer Muhammad al-Idrisi publishes his Geography.1154: On December 27, Henry II is crowned King of England at Westminster Abbey.1155: Pope Adrian IV grants overlordship of Ireland to Henry II of England in the bull Laudabiliter.1156: On June 18, the Treaty of Benevento is entered into by Pope Adrian IV and the Norman Kingdom of Sicily. After years of turbulent relations, the popes finally soften to peace with the Hauteville kings. The kingship of William I is recognized over all Sicily, Apulia, Calabria, Campania, and Capua. The tribute to the pope of 600 schifati agreed upon by Roger II in 1139 at Mignano is affirmed and another 400 shift is added for the new lands.1158: The Treaty of Sahagn ends the war between Castile and Len.The Liuhe Pagoda of Hangzhou, China, 11651161: the Song dynasty Chinese navy, employing gunpowder bombs launched from trebuchets, defeats the enormous Jin dynasty navy in the East China Sea in the Battle of Tangdao and on the Yangtze River in the Battle of Caishi.1161: Kilij Arslan II, Sultan of Rum, makes peace with the Byzantine Empire, recognizing the emperor's primacy.1161: In the siege of Ani, troops from the Kingdom of Georgia take control over the city, only to have it sold for the second time to the Shaddadids, a Kurdish dynasty.1162: Genghis Khan, the founder of the Mongol Empire, is born as Temjin in present-day Mongolia.1163: The Norwegian Law of Succession takes effect.11651182: Tensions and disputes between the Pagan Empire and the Kingdom of Polonnaruwa causes the Sinhalese under Parakramabahu the Great to raid Burma.1168: King Valdemar I of Denmark conquers Arkona on the Island of Rgen, the strongest pagan fortress and temple in northern Europe.1169: Political disputes within the Pandya Empire sparks the decade-long Pandyan Civil War.1169: On May 1, the Norman invasion of Ireland begins. Richard fitzGilbert de Clare ('Strongbow') allies with the exiled Irish chief, Dermot MacMurrough, to help him recover his kingdom of Leinster.The defense of the Carroccio during the battle of Legnano (1176) by Amos Cassioli (18321891)1170: The Treaty of Sahagn is signed by Alfonso VIII of Castile and Alfonso II of Aragon. Based on the terms of the accord, Alfonso VIII agrees to provide Alfonso II with three hostages, to be used as tribute payments owed by Ibn Mardan of Valencia and Murcia.1170: On December 29, Thomas Becket is murdered in Canterbury Cathedral.1171: Saladin deposes the last Fatimid Caliph Al-'id and establishes the Ayyubid dynasty.1171: On November 11, Henry II of England lands in Ireland to assert his claim as Lord of Ireland.1172: The Pandyan city of Madurai is sacked by the Sinhalese army due to an attempt to drive off the rival throne claimant, Kulasekara Pandyan.1173: Sinhalese king Parakramabahu the Great gains a decisive victory by invading the Chola Empire in the Pandyan Civil War.1176: On July 29, the Treaty of Windsor is signed by King Henry II of England and the High King of Ireland, Ruaidr Ua Conchobair.1176: On May 29, the Battle of Myriokephalon (Myriocephalum; Turkish: Miryokefalon Sava) is fought between the Byzantine Empire and the Seljuk Turks in Phrygia. It is a serious reversal for the Byzantine forces and will be the final, unsuccessful, effort by the Byzantines to recover the interior of Anatolia from the Seljuk Turks.1177: The Treaty or Peace of Venice is signed by the papacy and its allies, and Frederick I, Holy Roman Emperor. The Norman Kingdom of Sicily also participates in negotiations and the treaty thereby determines the political course of all of Italy for the next several years.1178: Chinese writer Zhou Qufei, a Guangzhou customs officer, writes of an island far west in the Indian Ocean (possibly Madagascar), from where people with skin "as black as lacquer" and with frizzy hair were captured and purchased as slaves by Arab merchants.1179: The Treaty of Cazola (Cazorla) is signed by Alfonso II of Aragon and Alfonso VIII of Castile, dividing Andalusia into separate zones of conquest. Due to the Reconquista would not be stymied by internecine feuding.1180: The Portuguese Navy defeats a Muslim fleet off the coast of Cape Espichel.11801185: the Genpei War in Japan.1181: Parakramabahu the Great conducts a large-scale raid on Burma, after a ship transporting a Sinhalese princess to the Khmer Empire is attacked by Burmese naval Beets.1182: Religious reformations of Theravada Buddhism in Pagan Burma under the patronage of Narapatisithu are continued with the end of the Polonnaruwa-Pagan War.1182: Revolt of the people of Constantinople against the Latins, whom they massacre, proclaiming Andronicus I Comnenus as co-emperor.1183: On January 25, the final Peace of Constance between Frederick Barbarossa, the pope and the Lombard towns is signed, confirming the Peace of Venice of 1177.1183: On September 24, Andronicus I Comnenus has his nephew Alexius II Comnenus strangled.1184: On March 24, Queen Tamar, King of Georgia, accedes to the throne as sole ruler after reigning with her father, George III, for six years.1184: Diet of Pentecost organised by Emperor Frederick I in Mainz.1185: The Uprising of Asen and Peter against the Byzantine Empire leads to the restoration of the Bulgarian Empire.1185: Andronicus I Comnenus is deposed and, on September 12, executed as a result of the Norman massacre of the Greeks of Thessalonika.1185: The cathedral school (Katedralskolan) in Lund, Sweden, is founded. The school is the oldest in northern Europe and one of the oldest in all of Europe.1185: Beginning in this year the Kamakura shogunate deprives the emperor of Japan of political power.1186: On January 27, the future Holy Roman Emperor Henry VI marries Constance of Sicily, the heiress to the Sicilian throne.1187: On July 4, in the Battle of Hattin, Saladin defeats the king of Jerusalem.1187: In August, the Swedish royal and commercial center Sigtuna is attacked by raiders from Karelia, Couronia, and/or Estonia.[3]1188: The Riah were introduced into the Habt and south of Tetouan by the Almohad caliph, Abu Yusuf Yaqub al-Mansur, and Jochem and Acem were introduced in Tamesna.[4]1189: On September 3, Richard I is crowned King of England at Westminster.1189: On November 20, Emperor Frederick Barbarossa drowns in the River Salef, leaving the Crusader army under the command of Philip II of France and Richard I of England, which ultimately leads to the dissolution of the army.1191: Holy Roman Emperor Henry VI by August but fails and withdraws, with Empress Constance captured (released 1192).1191: On September 7, Saladin is defeated by Richard I of England at the Battle of Arsuf.1192: In April, Isabella I begins her reign as Christian Queen of the Kingdom of Jerusalem.1192: In the Battle of Tarain, Muhammad of Ghor defeats the Rajput king Prithviraj Chauhan.1193: Nalanda, the great Indian Buddhist educational centre, is destroyed.1194: Emperor Henry VI conquers the Kingdom of Sicily.1195: On June 16, the struggle of Shamqori. Georgian forces annihilate the army of Abu Baqar.1198: The brethren of the Crusader hospital in Acre are raised to a military order of knights, the Teutonic Knights, formally known as the Order of the Knights of the Hospital of St. Mary of the Teutons in Jerusalem.1199: Pope Innocent III writes to Kaloyan, inviting him to unite the Bulgarian Church with the Roman Catholic Church.1200: Construction begins on the Grand Village of the Natchez near Natchez, Mississippi. This ceremonial center for the Natchez people is occupied and built until the early 17th century.[5]Eastern Hemisphere at the end of the 12th centuryChina is under the Northern Song dynasty. Early in the century, Zhang Zeduan paints Along the River During the Qingming Festival. It will later end up in the Palace Museum, Beijing.In southeast Asia, there is conflict between the Khmer Empire and the Champa. Angkor Wat is built under the Hindu king Suryavarman II. By the end of the century, the Buddhist Jayavarman VII becomes the ruler.Japan is in its Heian period. The Chj-jinbutsu-giga is made and attributed to Toba Sj. It ends up at the Kzan-ji, Kyoto.In Oceania, the Tui Tonga Empire expands to a much greater area.Europe undergoes the Renaissance of the 12th century. The blast furnace for the smelting of cast iron is imported from China, appearing around Lapphyttan, Sweden, as early as 1150.Alexander Neckam is the first European to document the mariner's compass, first documented by Shen Kuo during the previous century.Christian humanism becomes a self-conscious philosophical tendency in Europe. Christianity is also introduced to Estonia, Finland, and Karelia.The first medieval universities are founded. Pierre Abelard teaches.Middle English begins to develop, and literacy begins to spread outside the Church throughout Europe.[6] In addition, churchmen are increasingly willing to take on secular roles. By the end of the century, at least a third of England's bishops also act as royal judges in secular matters.[7]The Ars antiqua period in the history of the music of Western Europe begins.The earliest recorded miracle play is performed in Dunstable, England.Gothic architecture and trouvre music begin in France.During the middle of the century, the Cappella Palatina is built in Palermo, Sicily, and the Madrid Skylitzes manuscript illustrates the Synopsis of Histories by John Skylitzes.Fire and plague insurance first become available in Iceland, and the first documented outbreaks of influenza there happens.The medieval state of Serbia is formed by Stefan Nemanja and then continued by the Nemanji dynasty.By the end of the century, both the Capetian dynasty and the House of Anjou are relying primarily on mercenaries in their military campaigns. Paid soldiers are available year-round, unlike knights who expected certain periods off to maintain their manor lifestyles.[8]In India, Hoysala architecture reaches its peak.In the Middle East, Syria is nestled probably in Constantinople. Everything but the faces will later be retouched, and the icon will go to the Tretyakov Gallery of Moscow.The Georgian poet Shota Rustaveli composes his epic poem The Knight in the Panther's Skin.Shahab al-Din Suhrawardi founds his "school of illumination".In North Africa, the kasbah of Marrakesh is built, including the city gate Bab Agnaou and the Koutoubia mosque.In sub-Saharan Africa, Kente cloth is first woven.In France, the first piedfort coins were minted.The city of Tula burns down, marking the end of the Toltec EmpireIn Peru the Sican culture declines.Near the end of the century, the construction of sailing ships in large assembly lines, hundreds of years before the Industrial Revolution.1106: Finished building of Gelati.1107: The Chinese engineer Wu Deren combines the mechanical compass vehicle of the south-pointing chariot with the distance-measuring odometer device.1111: The Chinese Donglin Academy is founded.1165: The Liuhe Pagoda of Hangzhou, China, is built.1170: The Roman Catholic notion of Purgatory is defined.[9][1185:First record of windmills.Wikimedia Commons has media related to 12th century.^ D'Arcy, R, Drs., Pengantar Sejarah Kebudayaan Indonesia 2, 2nd ed. Penerbit Kanisius, Yogyakarta, 1973, 5th reprint edition in 1988 p.57^ Britannica, T. Editors of Encyclopaedia (1998, July 20). Kairi. Encyclopedia Britannica.^ Enn Tarvel (2007). Sigtuna hukkumine. Archived 2017-10-11 at the Wayback Machine Haridus, 2007 (7-8), p 3841^ Notice sur les Arabes hilaliens. Ismal Hamet, p.248.^ Francine Weiss and Mark R. Barnes (May 3, 1989). "National Register of Historic Places Registration: Grand Village of the Natchez Site (22-Ad-501)" (pdf). National Park Service. and Accompanying 3 photos, from 1989.(680KB)^ Warren 1961, p.129.^ Warren 1961, p.159.^ Warren 1961, p.60-61.^ Le Goff, Jacques (1986). The Birth of Purgatory. Chicago: University of Chicago Press. ISBN0226470822.Warren, Wilfred Lewis (1961). King John. University of California Press. p.362. ISBN9780520036437. {{cite book}} : ISBN / Date incompatibility (help)Retrieved from " 4The following pages link to 12th century External tools(link counttranscursion counsorted list) See help page for transcluding these entriesShowing 50 items.View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Antisemitism in Christianity (links | edit)Catharism (links | edit)List of decades, centuries, and millennia (links | edit)Diacket (links | edit)House of Habsburg (links | edit)House of Hohenzollern (links | edit)Maimonides (links | edit)Passport (links | edit)Sumba (links | edit)Taoism (links | edit)Werewolf (links | edit)Zanzibar (links | edit)Al-Andalus (links | edit)15th century (links | edit)11th century (links | edit)10th century (links | edit)14th century (links | edit)1st century (links | edit)Sumba (links | edit)Maimonides (links | edit)1282 (links | edit)7th century (links | edit)16th century (links | edit)9th century (links | edit)5th century (links | edit)6th century (links | edit)8th century (links | edit)3rd century (links | edit)2nd century (links | edit)4th century BC (links | edit)2nd century BC (links | edit)3rd century BC (links | edit)5th century BC (links | edit)6th century (links | edit)11th century BC (links | edit)1000s (decade) (links | edit)1040s (links | edit)1299 (links | edit)1154 (links | edit)1163 (links | edit)1160s (links | edit)1141 (links | edit)1135 (links | edit)1204 (links | edit)View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Retrieved from " WhatLinksHere/12th_century" In this article, you will learn about the Elastic Constant Young modulus, modulus of rigidity, and Bulk modulus. We will also discuss the differences between the elastic limit. It is denoted by the symbol E. It is also known as the modulus of elasticity or elastic modulus. Where E = Youngs Modulus = Tensile or compressive stress = Tensile or compressive strain The SI unit of Young modulus is N/mm2. Definition: It is defined as the ratio of direct stress to the corresponding volumetric strain within the elastic limit. It is denoted by K. = Direct stress (dV/V)= Volumetric strain The SI unit of C is N/mm2 S.noYoungs ModulusModulus of RigidityBulk Modulus1.It is the ratio of tensile or compressive stress to the corresponding strain within elastic limit.It is the ratio of shear stress to the corresponding volumetric strain within elastic limit.It is the ratio of directstress to the corresponding volumetric strain within elastic limit.2.It is denoted by E.It is denoted by C or G or N.It is denoted by K.3.E = stress/ strainC = shear stress/shear strainK = direct stress/ volumetric strain. This is all about the Elastic Constant Youngs modulus, modulus of Rigidity, and Bulk modulus. And if you found this article informative and useful then dont forget to like and share it. One of the most important tests in engineering is knowing where an object or material will bend or break, and the property that tells us this is the Youngs modulus. It is a measure how easily a material stretches and deforms. Is Young's modulus relevant to research?In the experiment in the video above, we measured the Young modulus of some copper wire which does not extend very much. So a fiducial marker such as some tape can be used to help identify the original and extended lengths. Making multiple measurements with a variety of masses will increase the number of points on the stress-strain plot and make the calculation of Young's modulus more reliable. Another thing to take care of is measuring the cross-sectional area of the wire. Imperfections of the wire may mean that the diameter is not perfectly constant along its length, so taking the mean of several readings with the micro meter could help.Studying of the mechanical properties of materials is important because it helps us understand how materials behave, and allows us to develop new products and improve existing ones. One example research topic at Birmingham looked at developing vaulting poles used by high jump athletes to maximise performance. These poles need to be able to store elastic energy as the pole bends. The pole has to convert elastic energy into kinetic energy as the pole accelerates upwards. Through understanding their mechanical properties we can predict their behaviour in manufacturing and processing, maximise their performance capabilities.The Young's modulus of a material is a useful property to know in order to predict the behaviour of the material when subjected to a force. This is important for almost everything around us, from buildings, to bridges to vehicles and more.Science, Tech, Math All Science, Tech, MathHumanitiesLanguages All ResourcesBulk modulus and Young's modulus are both measures of a material's elasticity, but they describe different aspects of it. Bulk modulus measures a material's resistance to uniform compression or volume change, pressure. It quantifies how much a material's volume changes when subjected to an external force. On the other hand, Young's modulus measures a material's length changes when subjected to an external force. In summary, while bulk modulus focuses on volume change, Young's modulus focuses on length change, making them complementary measures of a material's elasticity. When studying the mechanical properties of materials, two important parameters that often come into play are the bulk modulus and Young's modulus. These moduli provide valuable insights into how materials respond to external forces and deformations. While both moduli are measures of a material's elasticity, they differ in terms of the type of deformation they describe and the physical properties they represent. In this article, we will explore the attributes of bulk modulus and Young's modulus, highlighting their similarities and differences.Bulk ModulusThe bulk modulus, denoted by the symbol K, is a measure of a material's resistance to uniform compression. It quantifies the relative change in volume when a material is subjected to an external pressure. The bulk modulus is defined as the ratio of the change in pressure to the resulting change in volume:K = -V (P/V)where P is the change in pressure and V is the change in volume.The bulk modulus is typically expressed in units of pressure, such as pascals (Pa) or gigapascals (GPa). It is a fundamental property of materials and is often used to characterize their compressibility. Materials with high bulk moduli, such as metals, are less compressible and exhibit greater resistance to changes under external pressure.Young's Modulus Young's modulus, also known as the elastic modulus or the modulus of elasticity, is a measure of a material's stiffness or resistance to deformation when subjected to tensile or compressive forces. It quantifies the ratio of stress to strain within the elastic limit of a material. Young's modulus is defined as:E = P/AL/Lwhere P is the applied force, A is the cross-sectional area, L is the change in length, and L is the original length.Young's modulus is also typically expressed in units of pressure, such as pascals (Pa) or gigapascals (GPa). It is a fundamental property of materials and is often used to compare their mechanical behavior under tension or compression. Materials with high Young's moduli, such as steel, are stiffer and require higher forces to induce deformation.ComparisonWhile both bulk modulus and Young's modulus are measures of a material's elasticity, they differ in terms of the type of deformation they describe and the physical properties they represent.Type of DeformationBulk modulus primarily describes the response of a material to uniform compression or volume changes. It quantifies the relative change in volume when subjected to an external pressure. It quantifies the ratio of stress to strain within the elastic limit of a material.Physical PropertiesBulk modulus is related to the compressibility of a material. Materials with high bulk moduli are less compressible and exhibit greater resistance to volume changes under external pressure. This property is particularly important in applications where materials need to withstand high pressures without significant volume changes, such as hydraulic systems or deep-sea exploration equipment.On the other hand, Young's modulus is related to the stiffness of a material. Materials with high Young's moduli are stiffer and require higher forces to induce deformation. This property is crucial in applications where materials need to maintain their shape and resist deformation under load, such as structural components in buildings or bridges.Measurement TechniquesThe measurement of bulk modulus typically involves subjecting a sample of the material to an external pressure and measuring the resulting change in volume. This can be done using specialized equipment, such as a piston-cylinder apparatus or a high-pressure diamond anvil cell. The change in pressure and volume are then used to calculate the bulk modulus.On the other hand, the measurement of Young's modulus involves subjecting a sample of the material to tensile or compressive forces and measuring the resulting strain. This can be done using various testing methods, such as a tensile test or a compression test. The applied stress and resulting strain are then used to calculate Young's modulus.ApplicationsBoth bulk modulus and Young's modulus find numerous applications in various fields of engineering and materials science. Materials with high bulk moduli are often used in applications where resistance to volume changes under pressure is critical. For example, metals with high bulk moduli are used in the construction of pressure vessels, hydraulic systems, and shock absorbers. Additionally, the bulk modulus is essential in geophysics for understanding the behavior of rocks and fluids under high pressures.On the other hand, materials with high Young's moduli are used in applications where resistance to deformation and stiffness are crucial. For instance, steel, which has a high Young's modulus, is widely used in the construction industry for structural components, such as beams and columns. Young's modulus is also important in the design of springs, cables, and other load-bearing elements.ConclusionIn conclusion, both bulk modulus and Young's modulus are important parameters that provide insights into the mechanical behavior of materials. While bulk modulus describes a material's response to uniform compression and volume changes, Young's modulus describes its response to tensile or compressive forces. These moduli have different physical properties and applications in various fields. Understanding the attributes of bulk modulus and Young's modulus is crucial for engineers and scientists working with materials, as it allows them to select the appropriate materials for specific applications and predict their behavior under different loading conditions. Comparisons may contain inaccurate information about people, places, or facts. Please report any issues.There are three Elastic modulus. These are This is defined as the ratio of longitudinal stress to the corresponding strain within the elastic limit. READ MORE This is defined as the ratio of the volume strain within the elastic limit. READ MORE This is defined as the ratio of tangential stress to shear strain within the elastic limit. READ MORE Let us consider, a tensile force \(P \), acting normally outward to applied to each surface of a cube of unit side, as shown in the adjoining Fig.1. Now the force \(P \) acts along the direction of \(x \) axis), as a result there is an extension \(e \) along that direction. Sine the cube is a unit cube, so \(P \) and \(e \) respectively indicate the tensile stress and tensile strain along that axis. If \(Y \) be the Youngs Modulus, then \(Y=\frac{P}{e} \) or, \(e=\frac{P}{Y} \).Fig.1 Again \(\sigma \) is the Poissons Ratio, then the contraction in other two directions along \(x \) axis \) and \(z \) axis \) are \sigma=\frac{e}{e'}\displaystyle\frac{\sigma\cdot P}{Y} \). Thus the force \(P \) acting parallel to \(x \) axis \) produces extensions \(\displaystyle\frac{\sigma\cdot P}{Y} \), \(\displaystyle\frac{\sigma\cdot P}{Y} \) and \(\displaystyle\frac{\sigma\cdot P}{Y} \) along \(x \) axis), \(y \) axis) and \(z \) axis) respectively (contraction), and \(\displaystyle\frac{P}{Y} \) (extension) along \(x \) axis \) respectively. Similarly, the tensile force \(P \) acting along \(y \) axis \) produces the extensions \(\displaystyle\frac{\sigma\cdot P}{Y} \), \(\displaystyle\frac{\sigma\cdot P}{Y} \) along \(x \) axis), \(y \) axis \) and \(z \) axis \) respectively. Again the tensile force \(P \) acting parallel to the \(z \) axis \) produces the extensions \(\displaystyle\frac{\sigma\cdot P}{Y} \), \(\displaystyle\frac{\sigma\cdot P}{Y} \) along \(x \) axis \) and \(y \) axis \) respectively. So the total extension along each of the three axes is \(\displaystyle\frac{\frac{P}{Y} \displaystyle\frac{\sigma\cdot P}{Y}=\frac{P}{Y}(1-2\sigma) \) All the tensile forces acting together produce a volume strain of magnitude \(P \). This stress produces a volume strain of magnitude \(\displaystyle\frac{P}{K} \), this \(K \) is known as Bulk Modulus. Now, this volume strain is equivalently equal to three times the longitudinal strain along each direction. \displaystyle\frac{P}{K}=3\times\frac{P}{Y}(1-2\sigma) \) and at the right angle to each other two to a strain \(\theta \) in the \(x\) plane \) which is given by \(\displaystyle\frac{\theta=2\frac{P}{Y}(1+\sigma)} \). Hence, Modulus of Rigidity \(\displaystyle\frac{\eta=\frac{P}{\theta}=\frac{PY}{2P(1+sigma)=\frac{Y}{2(1+sigma)}} \) therefore, \(\displaystyle\frac{Y=2\eta(1+\sigma)} \) Now we get, \(\displaystyle\frac{3K(1-2\sigma)=2\eta(1+\sigma)} \) or, 3K-6K\sigma=2\eta+2\eta\sigma \) or, (2\eta+6K)\sigma=3K-2\eta \) or,\sigma=\frac{3K-2\eta}{6K+2\eta}} \). We get, \(\displaystyle{3K(1-2\sigma)=2\eta(1+\sigma)} \), (i) if \(\sigma \) is positive qatuty, the right hand expression and also the left hand expression must be positive. This is possble only if \((1-2\sigma)>0 \) or, 2\sigma-1 \) Therefore, \(\displaystyle{-1