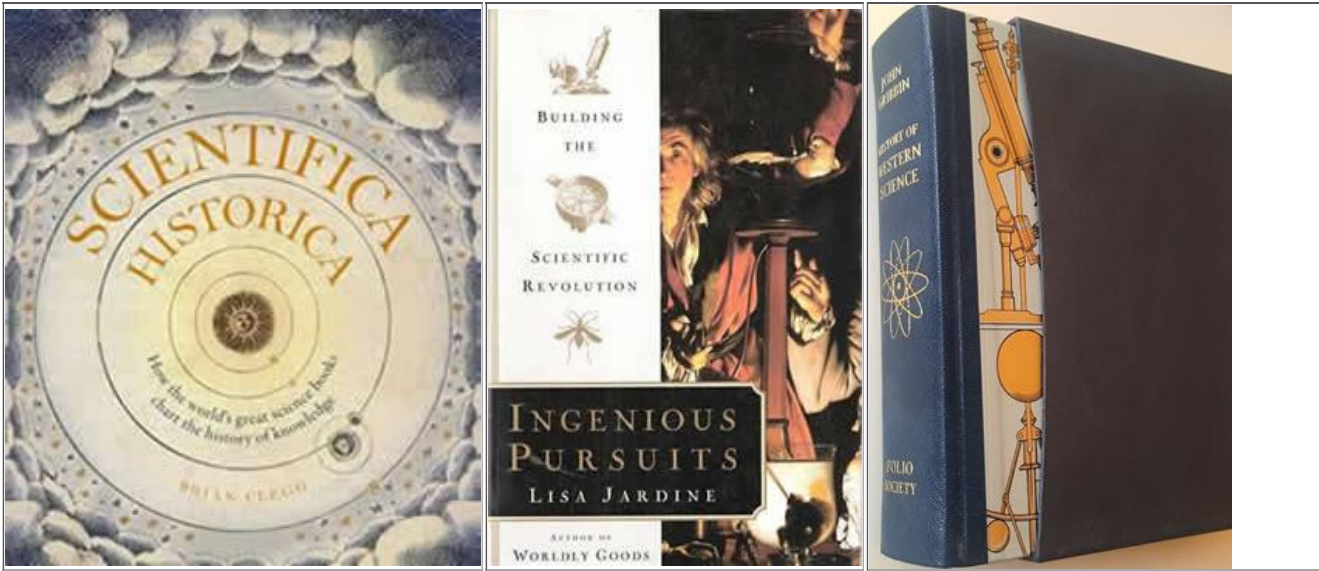


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Historical list of discoveries in Science Taken from Wikipedia article which covers the whole of history. [For timeline of historic inventions Click Here.]		
16th century The Scientific Revolution occurs in Europe around this period, greatly accelerating the progress of science and contributing to the rationalization of the natural sciences. • 16th century: Gerolamo Cardano solves the general cubic equation (by reducing them to the case with zero quadratic term). • 16th century: Lodovico Ferrari solves the general quartic equation (by reducing it to the case with zero quartic term). • 16th century: François Viète discovers Vieta's formulas. • 16th century: François Viète discovers Viète's formula for π.[116]1500: Scipione del Ferro solves the special cubic equation $x^3=px+q$$x^3 = px + q$.[117][118] • Late 16th century: Tycho Brahe proves that comets are astronomical (and not atmospheric) phenomena. • 1517: Nicolaus Copernicus develops the quantity theory of money and states the earliest known form of Gresham's law: ("Bad money drowns out good").[119] • 1543: Nicolaus Copernicus develops a heliocentric model, rejecting Aristotle's Earth-centric view, would be the first quantitative heliocentric model in history. • 1543: Vesalius: pioneering research into human anatomy. • 1545: Gerolamo Cardano discovers complex numbers.[120] • 1556: Niccolò Tartaglia introduces parenthesis. • 1557: Robert Recorde introduces the equal sign.[121][122] • 1564: Gerolamo Cardano is the first to produce a systematic treatment of probability.[123] • 1572: Rafael Bombelli provides rules for complex arithmetic.[124] • 1591: François Viète's New algebra shows the modern notational algebraic manipulation.		
17th century • 1600: William Gilbert: Earth's magnetic field. • 1608: Earliest record of an optical telescope. • 1609: Johannes Kepler: first two laws of planetary motion.		

- 1610: [Galileo Galilei](#): [Sidereus Nuncius](#): telescopic observations.
- 1614: [John Napier](#): use of [logarithms](#) for calculation.
- 1619: [Johannes Kepler](#): third [law of planetary motion](#).
- 1620: Appearance of the first [compound microscopes](#) in Europe.
- 1628: [Willebrord Snellius](#): the law of refraction also known as [Snell's law](#).
- 1628: [William Harvey](#): [blood circulation](#).
- 1638: [Galileo Galilei](#): laws of falling bodies.
- 1643: [Evangelista Torricelli](#) invents the mercury [barometer](#).
- 1662: [Robert Boyle](#): [Boyle's law](#) of [ideal gases](#).
- 1665: [Philosophical Transactions of the Royal Society](#): first [peer reviewed](#) scientific journal published.
- 1665: [Robert Hooke](#): discovers the [cell](#).
- 1668: [Francesco Redi](#): disproved idea of [spontaneous generation](#).
- 1669: [Nicholas Steno](#): proposes that [fossils](#) are organic remains embedded in layers of sediment, basis of [stratigraphy](#).
- 1669: [Jan Swammerdam](#): [epigenesis](#) in [insects](#).
- 1672: [Sir Isaac Newton](#): discovers that white [light](#) is a mixture of distinct coloured [rays](#) (the [spectrum](#)).
- 1673: [Christiaan Huygens](#): first study of oscillating system and design of pendulum clocks
- 1675: [Leibniz](#), [Newton](#): [infinitesimal calculus](#).
- 1675: [Anton van Leeuwenhoek](#): observes [microorganisms](#) using a refined [simple microscope](#).
- 1676: [Ole Rømer](#): first measurement of the [speed of light](#).
- 1687: [Sir Isaac Newton](#): classical mathematical description of the [fundamental force](#) of [universal gravitation](#) and the three physical [laws of motion](#).

18th century

- 1735: [Carl Linnaeus](#) described a new system for classifying plants in [Systema Naturae](#).
- 1745: [Ewald Georg von Kleist](#) first capacitor, the [Leyden jar](#).
- 1749 – 1789: [Buffon](#) wrote [Histoire naturelle](#).
- 1750: [Joseph Black](#): describes [latent heat](#).
- 1751: [Benjamin Franklin](#): [lightning](#) is [electrical](#).
- 1755: [Immanuel Kant](#): Gaseous Hypothesis in [Universal Natural History and Theory of Heaven](#).
- 1761: [Mikhail Lomonosov](#): discovery of the [atmosphere of Venus](#).
- 1763: [Thomas Bayes](#): publishes the first version of [Bayes' theorem](#), paving the way for [Bayesian probability](#).
- 1771: [Charles Messier](#): publishes catalogue of astronomical objects ([Messier Objects](#)) now known to include galaxies, star clusters, and nebulae.
- 1778: [Antoine Lavoisier](#) (and [Joseph Priestley](#)): discovery of oxygen leading to end of [Phlogiston theory](#).
- 1781: [William Herschel](#) announces discovery of [Uranus](#), expanding the known boundaries of the [Solar System](#) for the first time in modern history.
- 1785: [William Withering](#): publishes the first definitive account of the use of foxglove ([digitalis](#)) for treating [dropsy](#).
- 1787: [Jacques Charles](#): [Charles's law](#) of [ideal gases](#).
- 1789: [Antoine Lavoisier](#): law of [conservation of mass](#), basis for [chemistry](#), and the beginning of modern chemistry.
- 1796: [Georges Cuvier](#): Establishes [extinction](#) as a fact.
- 1796: [Edward Jenner](#): [smallpox](#) historical accounting.
- 1796: [Hanaoka Seishū](#): develops [general anaesthesia](#).
- 1800: [Alessandro Volta](#): discovers [electrochemical series](#) and invents the [battery](#).

1800–1849

- 1802: [Jean-Baptiste Lamarck](#): teleological evolution.
- 1805: [John Dalton](#): [Atomic Theory](#) in ([chemistry](#)).
- 1820: [Hans Christian Ørsted](#) discovers that a current passed through a wire will deflect the needle of a compass, establishing the deep relationship between electricity and magnetism ([electromagnetism](#)).
- 1820: [Michael Faraday](#) and [James Stoddart](#) discover alloying iron with [chromium](#) produces a [stainless steel](#) resistant to oxidising elements ([rust](#)).
- 1821: [Thomas Johann Seebeck](#) is the first to observe a property of [semiconductors](#).^{[[citation needed](#)]}
- 1824: [Carnot](#): described the [Carnot cycle](#), the idealized heat engine.
- 1824: [Joseph Aspdin](#) develops [Portland cement](#) ([concrete](#)), by heating ground limestone, clay and gypsum, in a kiln.
- 1827: [Évariste Galois](#) development of [group theory](#).
- 1827: [Georg Ohm](#): [Ohm's law](#) ([Electricity](#)).
- 1827: [Amedeo Avogadro](#): [Avogadro's law](#) ([Gas law](#)).
- 1828: [Friedrich Wöhler](#) synthesized [urea](#), refuting [vitalism](#).
- 1830: [Nikolai Lobachevsky](#) created [Non-Euclidean geometry](#).
- 1831: [Michael Faraday](#) discovers [electromagnetic induction](#).
- 1833: [Anselme Payen](#) isolates first [enzyme](#), [diastase](#).
- 1837: [Charles Babbage](#) proposes a design for the construction of a [Turing complete](#), general purpose Computer, to be called the [Analytical Engine](#).
- 1838: [Matthias Schleiden](#): all plants are made of [cells](#).
- 1838: [Friedrich Bessel](#): first successful measure of [stellar parallax](#) (to star [61 Cygni](#)).
- 1842: [Christian Doppler](#): [Doppler effect](#).
- 1843: [James Prescott Joule](#): Law of [Conservation of energy](#) ([first law of thermodynamics](#)), also 1847 – [Helmholtz](#), Conservation of energy.
- 1846: [Johann Gottfried Galle](#) and [Heinrich Louis d'Arrest](#): discovery of [Neptune](#).
- 1847: [George Boole](#): publishes *The Mathematical Analysis of Logic*, defining [Boolean algebra](#); refined in his 1854 *The Laws of Thought*.
- 1848: [Lord Kelvin](#): [absolute zero](#).

1850–1899

- 1856: [Robert Forester Mushet](#) develops a process for the decarbonisation, and re-carbonisation of iron, through the addition of a calculated quantity of [spiegeleisen](#), to produce cheap, consistently high quality [steel](#).
- 1858: [Rudolf Virchow](#): [cells](#) can only arise from pre-existing cells.
- 1859: [Charles Darwin](#) and [Alfred Wallace](#): Theory of [evolution](#) by [natural selection](#).
- 1861: [Louis Pasteur](#): [Germ theory](#).
- 1861: [John Tyndall](#): Experiments in Radiant Energy that reinforced the [Greenhouse effect](#).
- 1864: [James Clerk Maxwell](#): Theory of [electromagnetism](#).
- 1865: [Gregor Mendel](#): [Mendel's laws of inheritance](#), basis for [genetics](#).
- 1865: [Rudolf Clausius](#): Definition of [entropy](#).
- 1868: [Robert Forester Mushet](#) discovers that alloying steel with [tungsten](#) produces a harder, more durable alloy.
- 1869: [Dmitri Mendeleev](#): [Periodic table](#).
- 1871: [Lord Rayleigh](#): [Diffuse sky radiation](#) ([Rayleigh scattering](#)) explains why sky appears blue.
- 1873: [Johannes Diderik van der Waals](#): was one of the first to postulate an intermolecular force: the [van der Waals force](#).
- 1873: [Frederick Guthrie](#) discovers [thermionic emission](#).
- 1873: [Willoughby Smith](#) discovers [photoconductivity](#).
- 1875: [William Crookes](#) invented the [Crookes tube](#) and studied [cathode rays](#).

- 1876: [Josiah Willard Gibbs](#) founded [chemical thermodynamics](#), the [phase rule](#).
- 1877: [Ludwig Boltzmann](#): Statistical definition of [entropy](#).
- 1880s: [John Hopkinson](#) develops [three-phase](#) electrical supplies, mathematically proves how multiple AC dynamos can be connected in parallel, improves permanent magnets, and dynamo efficiency, by the addition of tungsten, and describes how temperature effects magnetism ([Hopkinson effect](#)).
- 1880: [Pierre Curie](#) and [Jacques Curie](#): [Piezoelectricity](#).
- 1884: [Jacobus Henricus van 't Hoff](#): discovered the laws of chemical dynamics and osmotic pressure in solutions (in his work "Études de dynamique chimique").
- 1887: [Albert A. Michelson](#) and [Edward W. Morley](#): [Michelson–Morley experiment](#) which showed a lack of evidence for the [aether](#).
- 1888: [Friedrich Reinitzer](#) discovers [liquid crystals](#).
- 1892: [Dmitri Ivanovsky](#) discovers [viruses](#).
- 1895: [Wilhelm Conrad Röntgen](#) discovers [x-rays](#).
- 1896: [Henri Becquerel](#) discovers [radioactivity](#).
- 1896: [Svante Arrhenius](#) derives the basic principles of the [greenhouse effect](#)
- 1897: [J.J. Thomson](#) discovers the [electron](#) in [cathode rays](#)
- 1898: [Martinus Beijerinck](#): concluded that a virus is infectious—replicating in the host—and thus not a mere toxin, and gave it the name "virus"
- 1898: [J.J. Thomson](#) proposed the [plum pudding model](#) of an atom
- 1898: [Marie Curie](#) discovered [radium](#) and [polonium](#)
- 1898: [I. J. O'Donnell](#) discovers and documents the order-of-sequence for the [sound](#) of an approaching [tornado](#)

1900–1949

- 1900: [Max Planck](#): explains the emission spectrum of a [black body](#)
- 1905: [Albert Einstein](#): theory of [special relativity](#), explanation of [Brownian motion](#), and [photoelectric effect](#)
- 1906: [Walther Nernst](#): [Third law of thermodynamics](#)
- 1907: [Alfred Bertheim](#): [Arsphenamine](#), the first modern [chemotherapeutic agent](#)
- 1909: [Fritz Haber](#): [Haber Process](#) for industrial production of ammonia
- 1909: [Robert Andrews Millikan](#): conducts the [oil drop experiment](#) and determines the charge on an electron
- 1910: [Williamina Fleming](#): the first [white dwarf](#), [40 Eridani B](#)
- 1911: [Ernest Rutherford](#): [Atomic nucleus](#)
- 1911: [Heike Kamerlingh Onnes](#): [Superconductivity](#)
- 1912: [Alfred Wegener](#): [Continental drift](#)
- 1912: [Max von Laue](#): [x-ray diffraction](#)
- 1912: [Vesto Slipher](#): [galactic redshifts](#)
- 1912: [Henrietta Swan Leavitt](#): [Cepheid variable period-luminosity relation](#)
- 1913: [Henry Moseley](#): defined [atomic number](#)
- 1913: [Niels Bohr](#): [Model of the atom](#)
- 1915: [Albert Einstein](#): theory of [general relativity](#) – also [David Hilbert](#)
- 1915: [Karl Schwarzschild](#): discovery of the [Schwarzschild radius](#) leading to the identification of [black holes](#)
- 1918: [Emmy Noether](#): [Noether's theorem](#) – conditions under which the conservation laws are valid
- 1920: [Arthur Eddington](#): [Stellar nucleosynthesis](#)
- 1922: [Frederick Banting](#), [Charles Best](#), [James Collip](#), [John Macleod](#): isolation and production of [insulin](#) to control diabetes
- 1924: [Wolfgang Pauli](#): quantum [Pauli exclusion principle](#)
- 1924: [Edwin Hubble](#): the discovery that the [Milky Way](#) is just one of many galaxies
- 1925: [Erwin Schrödinger](#): [Schrödinger equation](#) ([quantum mechanics](#))
- 1925: [Cecilia Payne-Gaposchkin](#): Discovery of the [composition of the Sun](#) and that [hydrogen](#) is the most abundant element in the Universe
- 1927: [Werner Heisenberg](#): [Uncertainty principle](#) ([quantum mechanics](#))

- 1927: [Georges Lemaître](#): Theory of the [Big Bang](#)
- 1928: [Paul Dirac](#): [Dirac equation](#) ([quantum mechanics](#))
- 1929: [Edwin Hubble](#): [Hubble's law](#) of the expanding [universe](#)
- 1929: [Alexander Fleming](#): [Penicillin](#), the first [beta-lactam antibiotic](#)
- 1929: [Lars Onsager](#)'s reciprocal relations, a potential fourth [law of thermodynamics](#)
- 1930: [Subrahmanyan Chandrasekhar](#) discovers his [eponymous limit](#) of the maximum mass of a [white dwarf](#) star
- 1931: [Kurt Gödel](#): [incompleteness theorems](#) prove formal axiomatic systems are incomplete
- 1932: [James Chadwick](#): Discovery of the [neutron](#)
- 1932: [Karl Guthe Jansky](#) discovers the first [astronomical radio source](#), [Sagittarius A](#)
- 1932: [Ernest Walton](#) and [John Cockcroft](#): [Nuclear fission](#) by proton bombardment
- 1934: [Enrico Fermi](#): [Nuclear fission](#) by neutron irradiation
- 1934: [Clive McCay](#): [Calorie restriction](#) extends the maximum lifespan of another [species](#)
- 1938: [Otto Hahn](#), [Lise Meitner](#) and [Fritz Strassmann](#): [Nuclear fission](#) of heavy nuclei
- 1938: [Isidor Rabi](#): [Nuclear magnetic resonance](#)
- 1943: [Oswald Avery](#) proves that [DNA](#) is the genetic material of the [chromosome](#)
- 1945: [Howard Florey](#) Mass production of [penicillin](#)
- 1947: [William Shockley](#), [John Bardeen](#) and [Walter Brattain](#) invent the first transistor
- 1948: [Claude Elwood Shannon](#): 'A mathematical theory of communication' a seminal paper in [Information theory](#).
- 1948: [Richard Feynman](#), [Julian Schwinger](#), [Sin-Itiro Tomonaga](#) and [Freeman Dyson](#): [Quantum electrodynamics](#)

1950–1999

- 1951: [George Otto Gey](#) propagates first cancer cell line, [HeLa](#)
- 1952: [Jonas Salk](#): developed and tested first [polio vaccine](#)
- 1952: [Stanley Miller](#): demonstrated that the building blocks of life could arise from primeval soup in the conditions present during early Earth ([Miller-Urey experiment](#))
- 1952: [Frederick Sanger](#): demonstrated that [proteins](#) are sequences of [amino acids](#)
- 1953: [James Watson](#), [Francis Crick](#), [Maurice Wilkins](#) and [Rosalind Franklin](#): helical structure of [DNA](#), basis for [molecular biology](#)
- 1957: [Chien Shiung Wu](#): demonstrated that [parity](#), and thus [charge conjugation](#) and [time-reversals](#), are [violated](#) for [weak interactions](#)
- 1962: [Riccardo Giacconi](#) and his team discover the first [cosmic x-ray source](#), [Scorpius X-1](#)
- 1963: [Lawrence Morley](#), [Fred Vine](#), and [Drummond Matthews](#): Paleomagnetic stripes in ocean crust as evidence of [plate tectonics](#) ([Vine–Matthews–Morley hypothesis](#)).
- 1964: [Murray Gell-Mann](#) and [George Zweig](#): postulates [quarks](#), leading to the [Standard Model](#)
- 1964: [Arno Penzias](#) and [Robert Woodrow Wilson](#): detection of [CMBR](#) providing experimental evidence for the [Big Bang](#)
- 1965: [Leonard Hayflick](#): normal cells divide only a certain number of times: the [Hayflick limit](#)
- 1967: [Jocelyn Bell Burnell](#) and [Antony Hewish](#) discover first [pulsar](#)
- 1967: [Vela](#) nuclear test detection satellites discover the first [gamma-ray burst](#)
- 1970: [James H. Ellis](#) proposed the possibility of "non-secret encryption", more commonly termed [public-key cryptography](#), a concept that would be implemented by his [GCHQ](#) colleague [Clifford Cocks](#) in 1973, in what would become known as the RSA algorithm, with key exchange added by a third colleague [Malcolm J. Williamson](#), in 1975.
- 1971: [Place cells](#) in the brain are discovered by [John O'Keefe](#)
- 1974: [Russell Alan Hulse](#) and [Joseph Hooton Taylor, Jr.](#) discover indirect evidence for [gravitational wave radiation](#) in the [Hulse–Taylor binary](#)
- 1977: [Frederick Sanger](#) sequences the first DNA genome of an organism using [Sanger sequencing](#)
- 1980: [Klaus von Klitzing](#) discovered the [quantum Hall effect](#)
- 1982: [Donald C. Backer](#) et al. discover the first [millisecond pulsar](#)
- 1983: [Kary Mullis](#) invents the [polymerase chain reaction](#), a key discovery in [molecular biology](#)
- 1986: [Karl Müller](#) and [Johannes Bednorz](#): Discovery of [High-temperature superconductivity](#)
- 1988: [Bart van Wees](#) [nl] and colleagues at TU Delft and Philips Research discovered the [quantized conductance](#) in a two-dimensional electron gas.

- **1990:** [Mary-Claire King](#) discovers the link between heritable breast cancers and a gene found on chromosome 17q21.
- **1992:** [Aleksander Wolszczan](#) and [Dale Frail](#) observe the first pulsar planets (this was the first confirmed discovery of planets outside the Solar System)
- **1994:** [Andrew Wiles](#) proves [Fermat's Last Theorem](#)
- **1995:** [Michel Mayor](#) and [Didier Queloz](#) definitively observe the first [extrasolar planet](#) around a [main sequence star](#)
- **1995:** [Eric Cornell](#), [Carl Wieman](#) and [Wolfgang Ketterle](#) attained the first [Bose-Einstein Condensate](#) with atomic gases, so called fifth state of matter at an extremely low temperature.
- **1996:** [Roslin Institute](#): [Dolly the sheep](#) was cloned.
- **1997:** [CDF](#) and [DØ](#) experiments at [Fermilab](#): [Top quark](#).
- **1998:** [Supernova Cosmology Project](#) and the [High-Z Supernova Search Team](#): discovery of the [accelerated expansion of the Universe](#) and [dark energy](#).
- **2000:** The [Tau neutrino](#) is discovered by the [DONUT collaboration](#)

21st century

See also: [List of years in science § 2000s](#), and [Breakthrough of the Year § Breakthrough of the Year](#)

- **2001:** The first draft of the [Human Genome Project](#) is published.
- **2003:** [Grigori Perelman](#) presents proof of the [Poincaré Conjecture](#).
- **2003:** The Human Genome Project sequences the human genome with a 92% accuracy.
- **2004:** [Ben Green](#) and [Terence Tao](#) announce their proof on [arithmetic progressions](#) in [prime numbers](#) known as the [Green–Tao Theorem](#).
- **2004:** [Andre Geim](#) and [Konstantin Novoselov](#) isolated [graphene](#), a monolayer of carbon atoms, and studied its quantum electrical properties.
- **2005:** [Grid cells](#) in the brain are discovered by [Edvard Moser](#) and [May-Britt Moser](#).
- **2010:** The first self-replicating, synthetic bacterial cells are constructed.
- **2010:** The [Neanderthal Genome Project](#) presented preliminary genetic evidence that interbreeding likely occurred and that a small but significant portion of Neanderthal admixture is present in modern non-African populations.
- **2012:** [Higgs boson](#) is discovered at [CERN](#) (confirmed to 99.999% certainty)
- **2012:** [Photonic molecules](#) are discovered at [MIT](#)
- **2014:** [Exotic hadrons](#) are discovered at the LHCb
- **2014:** [Photonic metamaterials](#) are discovered to make [passive daytime radiative cooling](#) possible by Raman et al.
- **2016:** The [LIGO](#) team detects [gravitational waves](#) from a [black hole merger](#)
- **2017:** Gravitational wave signal [GW170817](#) is observed by the [LIGO/Virgo](#) collaboration. This is the first instance of a gravitational wave event observed to have a simultaneous electromagnetic signal when space telescopes like [Hubble](#) observed lights coming from the event, thereby marking a significant breakthrough for multi-messenger astronomy.
- **2019:** The [first image of a black hole is captured](#), using eight different telescopes taking simultaneous pictures, timed with extremely precise atomic clocks.
- **2020:** [NASA](#) and [SOFIA](#) (Stratospheric Observatory for Infrared Astronomy) discover about 350 mL of surface water in one of the Moon's largest visible craters.
- **2022:** The standard reference gene, GRCh38.p14, of the [human genome](#), is fully sequenced and contains 3.1 billion base pairs.