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## December

## DECEMBER SCIENTIST

- 1** **Klaproth, Martin Heinrich** (1 December 1743–1 January 1817), German scientist. He is known for the discovery of uranium, chromium, and zirconium. He is considered the father of analytical chemistry.
- 2** **Minot, George Richards** (2 December 1885–25 February 1950), American doctor. He was co-laureate of the 1934 Nobel Prize in medicine with W.P. Murphy for their discovery of an anemia treatment using the liver.
- On 2 December 1942**, the first nuclear chain reaction was conducted by Enrico Fermi.
- On 2 December 1999**, the structure of a human chromosome was decoded.
- 3** **Siegbahn, Karl Manne Georg** (3 December 1886–26 September 1978), Swedish scientist. He was awarded the Nobel Prize in physics in 1924 for his work developing the technique of X-ray spectroscopy.
- Kuhn, Richard** (3 December 1900–1 August 1967), Austrian-German scientist. He was the first to isolate vitamin B2 and to become interested in the research on carotenoids; this earned him the Nobel Prize in chemistry in 1938.
- Crutzen, Paul Josef** (3 December 1933), Dutch scientist. He was a co-winner of the Nobel Prize in chemistry in 1995 with Molina and Rowland for their studies on atmospheric chemistry, which have contributed to the progress on understanding the mechanism of formation and decomposition of ozone.
- 4** **Bondar, Roberta** (4 December 1945), first woman Canadian astronaut. She participated in space missions of great scientific interest for humanity.
- 5** **Sommerfeld, Arnold Johannes Wilhelm** (5 December 1868–26 April 1951), German scientist. He made decisive contributions to the field of quantum theory. This scientist is particularly known for characterizing the fine structure of spectral lines of hydrogen and important studies on the behavior of electrons in a metal environment.
- Spacu, Gheorghe** (5 December 1883–23 July 1955), Romanian scientist, the father of the Romanian school of coordination chemistry. He is known for his work in the field of analytical chemistry and the chemistry of iron, nickel, cobalt, zinc, silver, and mercury.
- Karl, Heisenberg, Werner** (5 December 1901–1 February 1976), German physicist. He studied the atomic nucleus, nuclear forces elementary particles, and atomic radii. He is considered the architect of quantum mechanics. In recognition of his contributions to quantum mechanics and the discovery of the allotropic forms of hydrogen, he was awarded the Nobel Prize in physics in 1932.
- Powell, Cecil Frank** (5 December 1903–9 August 1969), British scientist. He was awarded the Nobel Prize in physics in 1950 for his research on photographic methods; he had a large involvement in the understanding of nuclear processes.

**Glashow, Sheldon Lee** (5 December 1932), American scientist. He was the co-winner of the Nobel Prize in physics in 1979, with S. Weinberg and A. Salam, for his contribution to the theory of weak and electromagnetic interactions between elementary particles.

**Dumitriu, Emil** (5 December 1946), Romanian scientist. He is known for his work in the field of nanomaterials and heterogeneous catalysis/biocatalysis at the highest level. His works on the reaction mechanism of catalytic reactions are standard reference works, and he made decisive contributions to the understanding of the mechanisms of catalytic reactions.

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**6** **Gay-Lussac, Louis Joseph** (6 December 1778–9 May 1850), French scientist. In 1802, he discovered that, from 0° to 100 °C, all simple gases or compounds under the same pressure expand equally with increasing temperature, and 100 volumes of gas at 0° become 137 volumes at 100°. Thus, he discovered the law of expansion of gases and volumetric laws that bear his name. In 1815, he discovered cyanogen and hydrogen cyanide.

**Hall, Charles Martin** (6 December 1863–27 December 1914), American engineer. He is known for extracting aluminum from alumina by electrolytic means, of which he was the inventor.

**Porter, George** (6 December 1920–31 August 2002), British scientist. He was the co-winner of the Nobel Prize in chemistry in 1967 with R.G.W. Norrish and M. Eigen for their reference work on highly fast chemical reactions.

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**7** **On 7 December 1877**, Thomas Edison conducted the first demonstration of the phonograph he invented.

**On 7 December 1888**, the patent for filling a tire using an air valve was filed by John Boyd Dunlop.

**On 7 December 1909**, The chemist Leo Baekeland filed a patent for Bakelite.

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**8** **Cech, Thomas Robert** (8 December 1947), American scientist. This scientist was a co-winner of the Nobel Prize in chemistry in 1989 with S. Altman for the discovery of the catalytic properties of RNA (ribonucleic acid—a linear polymer consisting of a chain of nucleotides).

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**9** **Scheele, Carl Wilhelm** (9 December 1742–21 May 1786), Swedish scientist. He is known for having discovered barium hydroxide, molybdenum and tungsten. He discovered many acids, including tartaric acid, citric acid, benzoic acid, malic acid, oxalic and gallic acids in the plant kingdom, lactic and uric acids in the animal kingdom, and molybdenic arsenic in the mineral kingdom. He is also known for the discovery of the effect of light on silver compounds, which 50 years later was used in the development of photography.

**Berthollet, Claude Louis** (9 December 1748–6 November 1822), French scientist. He is known for demonstrating in 1785 that chlorine can be used to bleach; he invented liquid bleach. In 1803, he defined for the first time the concept of chemical equilibrium and the laws of double decomposition, known thereafter as the laws of Berthollet. He also used coal to purify water and manufactured several detonating powders.

**Haber, Fritz** (9 December 1868–29 January 1934), German scientist. In 1909, he designed a glass electrode used to measure the acidity of a solution, an easy method to measure pH. He studied the possibility of combining nitrogen and hydrogen under pressure, ammonia synthesis, using a catalyst based on iron to form ammonia. Ammonia could be easily converted into fertilizers or explosives. He was the winner of the Nobel Prize in chemistry in 1918 for his work on the preparation of ammonia.

**Rainwater, Leo James** (9 December 1917–31 May 1986), American scientist. He was the co-winner of the Nobel Prize in physics in 1975 with B.R. Mottelson and A.N. Bohr in recognition of their work on the discovery of the connection between collective motion and particle motion in atomic nuclei.

**Lipscomb, William Nunn** (9 December 1919–14 April 2011), American scientist. He was the winner of the Nobel Prize in chemistry in 1976 for his contribution to the study of boranes (molecule composed of atoms of boron and hydrogen).

**Kendall, Henry Way** (9 December 1926–15 February 1999), American scientist. He was the co-winner with R.E. Taylor and J.I. Friedman of the Nobel Prize in physics in 1990, due to their research work on the study of deep inelastic scatterings of electrons on protons and bound neutrons.

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- 10** **Karpen, Nicolae Vasilescu** (10 December 1870–2 March 1964), Romanian scientist. He is known for his early work in the field of telegraphy and telephony, and electrochemistry. He is also responsible for notable achievements in mechanical and civil engineering, long-distance telephony. He invented the so-called Karpen pile.
- On 10 December 1901**, the Nobel Prize, founded through Alfred Nobel's will, was awarded for the first time.
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- 11** **Brewster, David** (11 December 1781–10 February 1868), Scottish inventor. This inventor is known for the invention of the kaleidoscope in 1816. He built stereoscopes, through which two different images are observed, one with each eye, providing the illusion of three-dimensionality.
- Cross, Charles Frederick** (11 December 1855–15 April 1935), English scientist. He was responsible for the development of a method for dissolving cellulose in carbon disulfide and removing the viscous solution through small holes. The methods have been developed to press the viscous solution into a slot instead of a hole, and thereby produce transparent sheets of cellophane.
- Born, Max** (11 December 1882–5 January 1970), German-British scientist. He is known for the development of the mathematical foundations of quantum physics. He was awarded the Nobel Prize in physics in 1954 in recognition of his fundamental research in quantum mechanics, namely for the statistical analysis of the wave function.
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- 12** **Baumann, Eugen** (12 December 1846–3 November 1896), German scientist. He is particularly known for the discovery in 1896 that the thyroid gland is rich in iodine. Iodine was not known to naturally occur in animal tissues. Only thyroid contains iodine. This led to the discovery of the thyroid hormone containing iodine and its use for treating disorders of the thyroid gland.
- Werner, Alfred** (12 December 1866–15 November 1919), Swiss scientist of French origin. He was the winner of the Nobel Prize in chemistry in 1913 for his work in the field of inorganic chemistry and minerals. He provided explanations of the structures of the complexes of transition metals.
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- 13** **Döbereiner, Johann Wolfgang** (13 December 1780–24 March 1849), German scientist. This scientist is known to have grouped chemical elements by their properties. He is responsible for discovering the disinfectant properties of coal and for the discovery of chloralkali.
- von Siemens, Ernst Werner** (13 December 1816–6 December 1892), German inventor. He established in 1866 the principle of the dynamo, the device that operates as an electric generator. He lent his name, "Siemens", to the unit of measurement for electrical conductance.
- Anderson, Philip Warren** (13 December 1923), American scientist. He is the co-winner with van Vleck and Mott of the 1977 Nobel Prize in physics for their fundamental contribution to the understanding of the electronic structure of magnetic and disordered systems.
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- 14** **Basov, Nikolay Gennadiyevich** (14 December 1922–1 July 2001), Soviet scientist. He is known for directing one of the first lasers using a semiconductor. He was the co-winner of the Nobel Prize in physics in 1964 with A.M. Prokhorov and C.H. Townes for their fundamental work in quantum electronics, which led to the construction of oscillators and amplifiers based on the principle of the maser-laser.
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- 15** **Bequerel, Antoine Henri** (15 December 1852–25 August 1908), French scientist. In 1896, he discovered radioactivity. He showed that the only place from which electrons in radioactive uranium could originate was the atom, and, in 1901, he identified part of the radioactive compound. He was the winner of the Nobel Prize in physics in 1903 due to the discovery of spontaneous radioactivity.
- Cândea, Constantin** (15 December 1887–4 March 1971), Romanian scientist. He is known for his studies on the separation of metals from the copper group, and for the separation of sulfide acids and other compounds of sulfide precipitation. He studied fuels and petroleum-based fuels.
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- 16** **Ritter, Johann Wilhelm** (16 December 1776–23 January 1810), German scientist. He is known for the invention of the dry electric battery and for the discovery of ultraviolet radiation in the electromagnetic spectrum. He made a decisive contribution to electroplating.
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- 17 Davy, Humphry** (17 December 1778–29 May 1829), British scientist. He is known to have applied the electrolysis process to isolate potassium, sodium, calcium, strontium, and barium. He had an important role in the field of catalysis. He invented the miner's lamp, the Davy lamp, in which a flame is surrounded by a metal cylinder.
- Kennelly, Arthur Edwin** (17 December 1861–18 June 1939), American engineer. He is known for the theorem of Kennelly. He also described the discovery of the reflection of radio waves in the ionosphere process in 1902.
- Libby, Willard Frank** (17 December 1908–8 September 1980), American scientist. He developed radiocarbon dating. He explained that the formation of yttrium in the atmosphere as a result of nuclear reactions induced cosmic rays. He also established that the dating of water and wine can be ascertained with tritium. He was awarded the Nobel Prize in chemistry in 1960 for discovering the use of the carbon-14 method.
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- 18 Thomson, Joseph John** (18 December 1856–30 August 1940), English scientist. He was the first to prove the existence of particles in cathode rays, and to prove their subatomic size. He determined that the load was equal to the minimum charge ions, whereas the mass of particles of the cathode ray was a fraction (we know today it is 1/1837) of hydrogen. He invented the first mass spectrograph action combined with a magnetic and electric field on a beam of ionized particles. He was awarded the Nobel Prize in physics in 1906.
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- 19 Michelson, Albert Abraham** (19 December 1852–9 May 1931), American scientist of German origin. In recognition of his work on highly accurate optical instruments (an interferometer) used in spectroscopic and metrological studies, he was the winner of the Nobel Prize in physics in 1907.
- Cornell, Eric Allin** (19 December 1961), American scientist. He was co-winner of the Nobel Prize in physics in 2001 with W. Ketterle and C. Wieman for the invention of the Bose–Einstein condensation in dilute gases of alkali atoms and for the studies that ensued.
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- 20 Heyrovský, Jaroslav** (20 December 1890–27 March 1967), Czech scientist. He was the winner of the Nobel Prize in chemistry in 1959 for the discovery and development of the polarographic methods.
- Balandin, Aleksei Aleksandrovich** (20 December 1898–22 May 1967), Soviet scientist. He is best known for developing the multiplet theory of heterogeneous catalysis.
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- 21 Graham, Thomas** (21 December 1805–16 September 1869), Scottish scientist. He was interested in the chemistry of colloids and was one of the promoters in the area. He also found that the diffusion rate of a gas is inversely proportional to the square root of its molecular weight, which is known as Graham's law.
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- 22 Slater, John Clark** (22 December 1900–25 July 1976), American scientist. He is known for his decisive contributions to quantum theory, on which he worked with N. Bohr and H.A. Kramers. He established the asymmetric wave functions for fermions known as Slater determinants and the exponential functions to describe atomic orbitals.
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- 23 Cronstedt, Axel Fredrik** (23 December 1722–19 August 1765), Swedish mineralogist. He is considered the founder of modern mineralogy. He reformed nickel mineralogy by introducing a classification of minerals according to their chemical structure. He is particularly known for the discovery of zeolites in 1756.
- Schützenberger, Paul** (23 December 1829–26 June 1897), French scientist. His research interests cover the field of organic chemistry, physical chemistry, and inorganic chemistry. He discovered sodium hydrosulfite, cellulose acetate synthesis, and natural glycosides.
- Hell, Stefan Walter** (23 December 1962), German scientist of Romanian origin. He is known for his reference work on super-resolved fluorescence microscopy. He was awarded the Nobel Prize in chemistry in 2014 together with E. Betzig and W.E. Moerner for their work in the field of nanoscopy.
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- 24** **Joule, James Prescott** (24 December 1818–11 October 1889), British scientist. He defined the principle of mechanical work that led to the first law of thermodynamics. He established the Joule effect (1841), namely, when a current flows in a homogeneous, conductive material, the material heats up. In his honor, the unit of measurement of labor bears his name, “joule”.
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- 25** **Gregor, William** (25 December 1761–11 June 1817), English mineralogist. He discovered titanium in corundum in Tibet and tourmaline in a tin mine.
- Frasch, Herman** (25 December 1851–1 May 1914), German engineer. In 1887, he patented a special method to extract sulfur compounds using metal oxides.
- Windaus, Adolf Otto Reinhold** (25 December 1876–9 June 1959), German scientist. He synthesized histamine, a compound with significant physiological properties, and located the sulfur atom in the vitamin B1 (thiamine) molecule. He also developed research on the structure of cholesterol (sterol) and was the winner of the Nobel Prize in chemistry in 1928.
- Herzberg, Gerhard** (25 December 1904–3 March 1999), Canadian scientist. He was awarded the Nobel Prize in chemistry in 1971 for his decisive contribution to the electronic structure and geometry of molecules, with a large preference for free radicals.
- Ruska, Ernst** (25 December 1906–25 May 1988), German scientist. He was awarded the Nobel Prize in physics in 1986 for the design of the first electron microscope. He developed the first transmission electron microscope, made in 1933.
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- 26** **Winkler, Clemens Alexander** (26 December 1838–8 October 1904), German scientist. He discovered germanium.
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- 27** **Kepler, Johannes** (27 December 1571–15 November 1630), German astronomer, the father of the modern science of optics. He enunciated three laws that bear his name and had the great merit of providing forecast calculations that were consistent with observations. He was the proponent of the heliocentric theory.
- Pasteur, Louis** (27 December 1822–28 September 1895), French scientist, the undisputed architect of microbiology. He proffered the initial bases of the biological theory of fermentation. He is known for the Pasteur Effect. In 1881, his team developed the vaccine against anthrax in sheep. He is considered one of the fathers of stereochemistry.
- Mittasch, Alwin** (27 December 1869–4 June 1953), German scientist. He is known for developing catalysts based on non-noble oxides; this was based on iron for the Haber–Bosch process for ammonia production.
- On 27 December 1831**, Darwin developed his theory of evolution.
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- 28** **Mullis, Kary Bank** (28 December 1944), American scientist. He was the winner of the Nobel Prize in chemistry in 1993 for his work in molecular biology. He found the polymerase chain reaction, the reaction that allows the reproduction of DNA or RNA sequences from small quantities of nucleic acid. This finding facilitated the detection of HIV, GMO and hepatitis B, C, and D.
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- 29** **Macintosh, Charles** (29 December 1766–25 July 1843), Scottish scientist. He invented dyes and produced steel from iron using high-temperature processes. He is particularly known for the invention of the waterproof raincoat (patented in 1823) called a mackintosh.
- Goodyear, Charles** (29 December 1800–1 July 1860), American scientist. He studied the chemical composition of rubber, the effect of sulfur on rubber and rubber’s adhesive properties. He is particularly known for the discovery (accidentally) of the rubber vulcanization process. He also prepared ebonite.
- Parkes, Alexander** (29 December 1813–29 June 1890), English metallurgist. He is known for the discovery (between 1861 and 1862) of the first synthetic plastic, Parkesine.
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- 30** **Candler, Asa Griggs** (30 December 1851–12 March 1929), American businessman. He is known to have purchased and developed the recipe for Coca Cola.
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- 31** **Hershko, Avram** (31 December 1937), Israeli scientist of Hungarian origin. This scientist was a co-laureate of the 2004 Nobel Prize in chemistry with I. Rose and A. Ciechanover for their work in cell biology. Primarily, his discovery was the controlled degradation of proteins by ubiquitin.
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Ioana Fecete  
*Institut de chimie et procédés pour l'énergie,  
l'environnement et la santé (ICPEES), UMR 7515 CNRS,  
université de Strasbourg, 25, rue Becquerel, 67087 Strasbourg cedex 2, France*  
E-mail address: [ifecete@unistra.fr](mailto:ifecete@unistra.fr)