

★ *Certificate of Authenticity* ★



COLLECTION NUMBER: 03141879-026-122004
NUMBER:
01007

★ *Limited Edition* ★

The Timecapsule Toys talking action figure's trade dress and design, the dual color Timecapsule Toys gold and associated logos are U.S. trademarks of Timecapsule Toys.

Timecapsule Toys Inc. 30045 FM 2978, Magnolia, TX 77354-5132 Printed in Hong Kong
COLLECTION NUMBER: 03141879-026-122004 © 2005 Timecapsule Toys



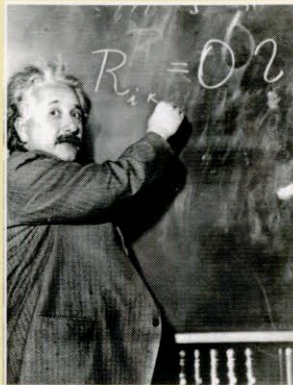
The Life and Work of Dr. Albert Einstein

★ *Theoretical Physicist* ★

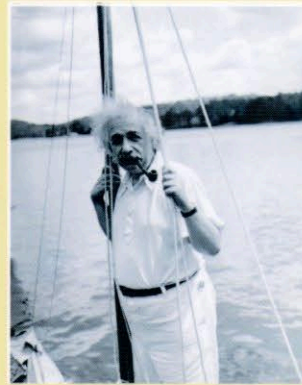
Dr. Albert Einstein: Biography



Dr. Albert Einstein at the age of 40 in his study in Berlin, Germany, 1919*



Dr. Einstein writes out an equation for the density of the Milky Way, Carnegie Institute, Mt. Wilson Observatory, Pasadena, California, January 14, 1931*



Einstein's Adirondacks vacation at Saranac Lake, New York, July 3, 1936*



Einstein playing violin in his study, August 23, 1944*

“Above all it is my individual disposition for abstract and mathematical thought, my lack of imagination and practical talent...one always likes to do things for which one has talent. And then there is a certain independence in the scientific profession which greatly pleases me.” –Einstein, age 16

Theoretical physicist, Albert Einstein was born March 14, 1879 to parents Pauline Koch and Herman Einstein (a featherbed salesman who later ran an electrochemical works) at Ulm in Württemberg, Germany, spending only one year of his life there before his family, of Jewish origin, moved to the predominately Catholic community of Munich after his father's unsuccessful business venture. Einstein grew up with a younger sister, Maja with whom he remained close throughout his life until he lost her at the age of seventy. Despite, his Jewish origins, Einstein attended a Catholic elementary school near his home from the ages of five to ten, later transferring to Luitpold Gymnasium, a strict British public secondary school in Munich. Attending the Catholic school was out of practicality as the Jewish school was expensive and quite a distance away from the Einstein home. Einstein did not grow up in a strict Jewish background; his father believing most of the customs and traditions of the Jewish faith to be 'ancient superstition,' the family did not attend the local synagogue.

Although a proven genius in physics, no early indications remained until the age of sixteen when he began formulating ideas concerning physics in a paper he wrote to his Uncle Cäsar.¹ Despite Einstein's later developments, his potential remained and lobbied

unrecognized as a boy. When his father asked Einstein's elementary school headmaster what profession would best suit his son, the headmaster's reply was: "It doesn't matter; he'll never make a success of anything." However, Einstein later proved otherwise and displayed strength in math and physics at Luitpold, gaining early exposure from his uncle's and father. His Uncle Jakob, a sound engineer, described algebra as a "merry science," explaining mathematical theories to young Einstein through the use of playful analogies—a trait Einstein later used when describing his theory of relativity to non-mathematicians. His exposure to science came at age 5 when he received a model of a steam engine from his Uncle Cäsar Koch and a pocket compass from his father, with the compass introducing a curiosity for astrophysics (young Einstein was fascinated by that 'something' in empty space that acted upon the needle). At age twelve, while at Luitpold, Einstein's interests were further fostered through, Max Talmey, a Jewish medical student who became a mentor of sorts, giving Einstein books on science and mathematics and reviewing Einstein's math problems he solved. Einstein's mother also played a role of influence, insisting that her son take violin lessons from age six to age thirteen. Thus, Einstein also received exposure to the mathematical rules that govern musical harmony,

*AP/Wide World Photos

¹Paper titled, "Concerning the Investigation State of Ether in Magnetic Fields" outlined the relationship between electricity, magnetism and ether (hypothetical non-material entity that as presumed to fill all space and to transmit the electromagnetic waves. In the paper Einstein considered what he would be able to see if he were to follow a beam of light at its own velocity through space.

although unbeknownst to him until age thirteen, when his awareness led to his fascination with the instrument.

In 1894, just shy of graduating from Luitpold, the family's electrochemical business failed and Einstein's parents and sister moved to Pavia, Italy (near Milan). Einstein stayed in a boardinghouse under the care of a distant relative to finish school. However, six months later, disliking his high school, he was easily convinced to leave at mid-term when suggested to do so by his teacher under the premises that his 'very presence destroyed the other students respect for the teacher.' Einstein joined his family in Italy, enjoying freedom from academic schooling for a half of year. In 1895 sixteen year-old Einstein left Milan for Zurich, Switzerland, attempting to bypass finishing out his secondary education by taking an entrance exam to the top technical university in central Europe, the Swiss Federal Institute of Technology (E.T.H.) with plans to study electrical engineering. Einstein failed the liberal arts portion and thus finished out his secondary education at the cantonal school in Aarau, Switzerland, where he graduated in 1896 as stateless person, having renounced his German citizenship.²

Upon graduating from secondary school, Einstein passed the entrance examination to the Swiss Federal Institute of Technology (E.T.H.). Despite his father's earlier push for electrical engineering, Einstein chose coursework in mathematics and physics to become a professional teacher. During his university years Einstein reflected a demeanor of one who was absentminded, moodily aloof, arrogantly impatient and uncannily charismatic. Einstein often left behind his key to his lodging and forgot other personal items at various locations, leading others to conclude that his absentmindedness would result in little success. Dr. Bucky (knew Einstein for many years) noted Einstein's aloofness in his avoidance to spend his energy focusing on personal matters, describing him as "...devoid of the human feelings that can cause trouble and misery." Those Einstein deemed inattentive to his musical performance got a taste of his impatient arrogance when he would stop playing his violin and make a coarse comment. Although aloof and arrogant, he also revealed a compassionate nature in many letters to his friends Max and Hedi Born and a charisma in his interactions with others. As a college student, Einstein was not afraid to challenge accepted beliefs in physics, and sought self-education versus college coursework, studying the works of Kirchhoff, Helmholtz, Hertz, Mach and Maxwell while working in the library or laboratory instead of attending university lectures. Before examinations Einstein would review his friend Marcel Grossmann's lecture notes, however his independent study resulted in an undistinguished student record, graduating in 1900 with his teaching diploma in mathematics and physics with a 4.91 grade point out of 6.00.

²Einstein's German citizenship ceased on January 28, 1896 when his father yielded to his son's wishes and wrote a letter to German officials requesting his son's denunciation of German citizenship.

Aside from his studies at the Zurich Polytechnic (E.T.H.), he not only picked up a passion for sailing, he also met his future wife—a Serbian woman, Mileva Marić, in his physics class. Mileva was the 5th woman to be accepted to the E.T.H., a sign of her intellect, but once she began her love affair with Einstein in 1899 she abandoned her studies and failed her final exam. The couple coined each other with the nicknames "Dollie" and "Johnny." Despite their affections, Einstein's family opposed their marriage and the birth of their first daughter, Lieserl, whose fate is unknown (speculations are that she either died in infancy or was given up for adoption). It has been reported that Einstein never saw his child. The couple married on January 6, 1903 (Mileva 28 and Einstein 24) and shared the birth of two sons, Hans Albert (1904-1973) who became a hydraulic engineer (professor at the University of California, Berkeley) and Eduard (1910-1965) who became ill with schizophrenia, dying in an asylum. As a mathematician, Marić shared an intellectual commonality with Einstein and a relationship that ended with their separation in 1914 and ultimately divorce in 1919.

After graduation Einstein published "Deductions from the Phenomena of Capillarity" on December 13, 1900; and although unsuccessful in obtaining a university position, he gained a few temporary teaching positions in Switzerland—an assistant to a professor of astrophysics and astronomy in 1900, a math teacher at the Technical High School in Winterthur and as a tutor in a private school in Schaffhausen in 1901. On February 21 of the same year, he received his Swiss citizenship and did not serve the obligatory three-month military service, being rejected for his flat feet and varicose veins. Meanwhile, Shortly before leaving Schaffhausen, Einstein applied for a position at the Swiss Patent Office in Bern and sent his thesis "*A new determination of molecular dimensions*"³ (covered the kinetic theory of gases) to the University of Zurich for his Ph. D. Einstein was successful in both ventures—gaining a probationary appointment with the patent office in 1902 and earning his doctorate in 1905. Einstein's appointment with the patent office turned permanent in 1904, resulting in a seven-year career as a technical expert, utilizing his knowledge of physics examining inventors' patent applications. In 1905 while evaluating patent claims, Einstein wrote a series of theoretical physics publications on the photoelectric effect, Brownian motion, electromagnetism and motion, and special relativity. 1905 is commonly referred to as the Annus Mirabilis (The Miracle Year) of Einstein, as it was in this year, at the mere age of twenty-six, that he formulated theories that were published in the leading German physics journal, "Annalen der Physik," which led to his fame as a theoretical physicist.

In March 1905 Einstein sent to the journal his first paper, "On a Heuristic Viewpoint ways

³Einstein dedicated this thesis to his friend Marcel Grossmann

Concerning the Production and Transformation of Light," introducing his quantum theory of light, a feat which later earned him a Nobel Prize. In this paper Einstein explained the photoelectric effect by describing light as consisting of discrete particles of energy or quanta (photons) that carry a fixed amount of energy proportional to the frequency. Using statistical analysis, Einstein showed that very high frequency light kicked electrons out of a chunk of metal, while low frequency light did not liberate any electrons regardless of intensity. The experimental result was explained by the fact that low frequency photons did not carry the minimum energy required to liberate an electron. Up to this point, the photoelectric effect had not been adequately explained.⁴ Although, experiments supported Einstein's theory as correct, the possibility of light quanta was not universally accepted by most until after the discovery of the Compton effect⁵ in 1922, the year he received his 1921 Nobel Prize award for his equation on the photoelectric effect.

In April 1905 Einstein completed his Ph.D. dissertation, "A new determination of molecular dimensions" which was published later that year. The paper revealed a new method of counting and determining the size of the atoms or molecules in a given space. It showed how to obtain Avogadro's number⁶ and the sizes of ions in solution from measurements of osmotic pressure and the coefficient of diffusion.

In May 1905 Einstein published "*On the Motion—Required by the Molecular Kinetic Theory of Heat—of Small Particles Suspended in a Stationary Liquid*," covering his study on Brownian motion⁷. Brownian motion is the empirical observation that tiny specs of dust suspended in a liquid shake back and forth when viewed under a microscope. Einstein's work explained that this movement is caused by the dust particle's continuous bombardment by water molecules, and assumed that the liquid is made up of atoms that randomly collide with the specs of dust. This provided empirical evidence for the existence of atoms and the validity of statistical mechanics to describe atomic behavior, both of which were controversial at the time.⁸ Einstein's quantitative theory of Brownian motion was the first to obtain decisive results, predicting motions of magnitudes that a microscope could observe.

In June 1905, "*On the Electrodynamics of Moving Bodies*" introduced the Special Theory of Relativity—a theory of time, distance, mass and energy. Einstein's March paper explained light as particles and in this paper he explained light as a continuous field of waves. Thus, he sees light as wave and particle. Einstein introduced the theory by forming two postulates: one that all physical laws are the same either at rest or moving at a pacifist

⁴Maxwell's electromagnetic theory of light, had asserted that when light, thought to be composed of waves, strikes substances the energy of the liberated electrons ought to be proportional to the intensity of the light. These results were at odds with experimental evidence.

⁵The discovery of Compton scattering of x-rays provided direct support that light consists of point like quanta of energy called photons

⁶NA the number 6.02×10^{23} (the calculated value of the number of atoms, molecules, etc. in a gram mole of any chemical substance)

⁷Named for the Scottish botanist Robert Brown, the first to study various physical phenomena in which some quantity is constantly undergoing small, random fluctuations

⁸Jean-Baptiste Perrin verified Einstein's analysis and established a physical theory of Brownian motion that ended the skepticism about the existence of atoms and molecules as actual physical entities

constant speed in a straight line, and as a consequence of the first, the second that the speed of light is the same regardless of the motion of the light source and the observer. Einstein thus concluded that the velocity of light was a constant that was independent of the uniform motion of the bodies emitting it or receiving it, in other words, the speed of light was fixed and not relative to the movement of the observer. These results have been verified experimentally many times since his discovery and have altered beliefs in the nature of time, where time and space are almost interchangeable concepts.

In September 1905 Einstein explored the consequences of Special Relativity further in his paper, "Does the Inertia of a Body Depend upon Its Energy Content?," revealing his famous equation that the energy of a body at rest (E) equals its mass (m) times the speed of light (c) squared: $E = mc^2$. In other words, an object accelerates by gaining energy (it gains mass). As the object approaches the speed of light, its mass approaches infinity. An infinite amount of energy is required to accelerate an object to the speed of light, so the speed of light acts as a speed limit for matter. This equation was central to understanding many early experiments in particle physics and ultimately the development of quantum field theory, which is the framework for describing the interactions of most known forms of matter.

Einstein's discoveries built on the work of Galileo, Isaac Newton, James C. Maxwell, and Hendrik A. Lorentz, and others who set the foundation from which he constructed his theory of relativity. Special Relativity was incomplete in that it did not allow for accelerating observers or gravitation, thus Einstein spent the next ten years working on General Relativity to address these issues.⁹ In 1915 he presented a paper on his new theory of gravity¹⁰ to the Prussian Academy of Science. General Relativity improved on Newton's description of gravity, considering all observers equivalent regardless of whether they are accelerating or moving at constant velocities. In this framework gravity is no longer a force field surrounding a massive body, it is a consequence of the curvature of space-time (space and time, matter and energy are locked together). Many scientists were skeptical of Einstein's general relativity theory of gravity until 1919 when Arthur Eddington's experiment during the May 29 solar eclipse proved Einstein's theory worked. Eddington's measurements confirmed that light rays from distant stars were deflected by the gravity of the sun in just the amount Einstein predicted in his theory of gravity, General Relativity. However, despite the application a few scientists remained unconvinced and later resentful when Einstein stated their skepticism resulted from their inability to understand the mathematics involved.

Meanwhile, Einstein was promoted to technical examiner second class at the patent

⁹Part of the reason it took so long to formulate was that at the time the mathematical language of General Relativity was known to only a few mathematicians, thus Einstein had to discover this branch of mathematics and learn how to use it before he could make further progress.

¹⁰The theory of gravitation is explained by the equation $G = 8\pi F$, where G is a measure of the curvature of space-time and F is a measure of the energy (or mass) located in this space-time.

office in 1906 before receiving his license in Bern, Switzerland as an unsalaried teacher and becoming a lecturer at the University of Bern in 1908. In 1911, Einstein's teaching career flourished, serving as the first associate professor at the University of Zurich, and full professor at the University of Prague, and gaining a full professorship of theoretical physics at the ETH Zurich the following year.

While Einstein's success in physics and his teaching career flourished, his success with relationships floundered. Mileva took their two sons, one aged ten and the other four, back to Zurich and left him in 1914. Their separation ended in divorce upon the insistence of Einstein on February 14, 1919 and Einstein married his first cousin (maternally) and his second cousin (paternally), Elsa Einstein Löwenthal several months later on June 2. Elsa had nursed Einstein back to health when he suffered a partial nervous breakdown combined with a severe stomach ailment in 1917. The couple shared no children, Einstein gaining two stepdaughters, Margot, who helped with housekeeping when Elsa died in 1936, and Ilse.

Einstein served as director of the Kaiser Wilhelm Institute for Physics in Berlin from 1914 to 1933. World War I began in 1914, which led to the five-year testing delay of his General Relativity Theory. During the war, Einstein revealed his pacifist sympathies by serving as a leading member of the German League for Human Rights, helping to form a nonpartisan coalition that promoted peace. He also signed a manifesto that created a progressive middle-class party—the German Democratic Party, and thus, as a gesture of support, resumed his German citizenship.

After the war, Einstein continued in his political and scientific contributions. In the 1920's, he traveled extensively as a spokesman for liberal causes and as a representative of the physics community and made further research breakthroughs. With his work on relativity still in dispute, in 1922 he received the 1921 Noble Prize for his work on the photoelectric effect.¹¹ Two years after Einstein's Noble Prize, Louis de Broglie discovered that light was a stream of particles guided by waves, and extended this wave-particle nature to all electrons, protons, and all other matter. The dual nature of light as asserted by Einstein in 1905 was just beginning to gain scientific acceptance when Broglie extended the idea of such duality to matter and that particles actually move in a wavelike manner. Einstein endorsed the idea and the discovery led to the 'quantum world.' In 1924, Einstein published an article explaining and contributing to Indian physicist Satyendra Nath Bose's description of light as a gas of photons. Einstein posed that Bose's statistics could also describe light as a gas of atoms. A consequence of these ideas formed what became

¹¹ The Noble Prize money went to Mileva, as was agreed upon at the time of their divorce two years earlier.

known as the Bose-Einstein condensate. This condensate constituted a new state of matter at very low temperatures that was just recently created in laboratory experiments. Two years later he also co-invented a refrigerator with Leó Szilárd that used a thermodynamic refrigeration cycle using ammonia, butane, and water that provided cooling at a constant pressure with no moving parts, using only heat as an input. The pair received a US. Patent on November 11, 1930 for the refrigeration cycle that produced a refrigerator commonly called the Einstein Refrigerator. In 1928, Einstein was diagnosed with a serious heart condition and was warned that his aorta may burst if he did not take care, so he took time to recuperate on the Baltic coast north of Hamburg before resuming his work on science and pacifist causes.

Several years following his diagnosis, Adolf Hitler came into power in 1933. Despite his success, Nazi physicists attempted to discredit his theories, denouncing his theory of relativity as "Jewish-Communist physics." Such anti-Semitism pushed Einstein to support Zionism,¹² although he believed in a world government versus nationalism, and to once again renounce his German citizenship. Einstein moved to the United States and accepted a position at the Institute for Advanced Study in Princeton Township, New Jersey. He established permanent residency in the United States, becoming an American citizen in 1940, never again to return to Germany.¹³ Interestingly, although not enforced, the U.S. FBI recommended against Einstein's entrance into the United States under the Alien Exclusion Act, alleging his service as honorary chairman for three communist organizations, his affiliation with thirty-four communist fronts and his avocation of a doctrine that permitted anarchy.¹⁴ Deemed a communist by U.S. authorities, Einstein considered himself a pacifist and later a socialist.

Although a pacifist, Einstein opposed tyranny and thus, the Nazi regime and initially favored the U.S. construction of the atomic bomb to ensure Hitler did not do so first. He helped write a letter to President Roosevelt at the start of World War II warning the administration to prepare the United States for nuclear warfare as the technology of other nations could lead to the creation of a nuclear bomb. The Roosevelt administration responded to the warning by initiating a nuclear weapon program—the Manhattan Project. The project created the first atomic bomb, producing clear evidence of $E = mc^2$; and lending further support that this mass-energy relation may be used to predict how much energy in the form of light or heat will be released or consumed by chemical and nuclear reactions. Einstein played no other role in the nuclear bomb project outside of serving as a consultant for the United States Navy's Bureau of Ordnance, as he was denied security clearance for his support of left-wing causes. However, after the war, Einstein resumed his

¹² A political movement among Jews formally founded in 1897 (although supported by some non-Jews and not supported by some Jews) which maintains that the Jewish people constitute a nation and are entitled to a national homeland.

¹³ Still retained Swiss citizenship

¹⁴ <http://foia.fbi.gov/foiaindex/einstein.htm>

for nuclear disarmament, becoming the chairman of the newly formed Emergency Committee of Atomic Scientists in May 1946. He also supported the black civil rights movement, a homeland in Palestine for Jews, and the creation of a Jewish university in the United States. Einstein also served on the original committee that founded Brandeis University and was offered the post as second president of Israel by the Israeli government in 1952, which he declined.

In the last years of his life, Einstein continued in his attempts to fill the gap in quantum theory.¹⁵ Though, Einstein's discoveries were instrumental to the birth of quantum mechanics, he spent most of his remaining scientific career attempting to absolve its probabilities that had given rise to the incorrect notion that there is no clear connection between cause and effect. Einstein's distaste for modern quantum theory was due to its lack of complete knowledge about nature. Thus, he spent the last fourteen years of his life in Princeton attempting to formulate a unified field theory of matter that would unify the laws of physics. He proposed numerous theories in various mathematical forms, all of which were flawed. In the end, Einstein's quest to form a generalized theory of gravitation to unify nuclear forces remained unsuccessful until fifteen years after his death, which the String theory successfully accomplished mathematically in 1970. Although there is no experimental evidence for String Theory at this point, it continues to be the only theory that provides a quantum description of gravity.

Einstein died from heart failure¹⁶ on April 18, 1955 at a hospital in Princeton, New Jersey. Upon his wishes, he was cremated and his brain preserved for research. Albert Einstein's work as a theoretical physicist from 1905 to 1955 contributed to the development of quantum mechanics¹⁷, statistical mechanics, and cosmology. The quantum theory and his theory of relativity, form the theoretical basis of modern physics.

¹⁵Quantum theory successfully describes the properties of atoms, yet it poses problems regarding its interpretation. In particular, the wave-particle duality produces uncertainties that can't be explained.

¹⁶Einstein opposed surgery to repair a small leakage of blood from a hardening of his aorta (during this time chances of survival during such operation were low)

¹⁷The final mathematical formulation of the Quantum theory that was developed during the 1920's
Quantum theory was developed over a period of thirty years through the efforts of many scientists

Dr. Albert Einstein: His Great Discoveries

1905 (The Miracle Year)

- ❖ Quantum Theory of Light
- ❖ Invented a new method of counting and determining the size of atoms or molecules
- ❖ Proved the existence of atoms and the validity of statistical mechanics through his explanation of Brownian motion
- ❖ Explained light as both a wave and a particle
- ❖ Special Theory of Relativity: proved that the energy content of a body is equal to the mass of the body times the speed of light squared ($E=mc^2$)

1907

- ❖ Proved Gravity and acceleration are equivalent, two facets of the same phenomenon

1910

- ❖ Answered question: "Why is the sky blue?" in his paper on critical opalescence: examined the cumulative effect of the scattering of light by individual molecules in the atmosphere

1911

- ❖ First to recognize dualism in nature—the co-existence of particles and waves at the level of quantum
- ❖ Addressed the need to resolve the quantum issue in physics

1913

- ❖ Theory of relativity predicted that when ray of light passes near a massive body, the ray should be bent
- ❖ Showed how gravity should deflect light near the sun, making the stars appear to shift their positions

1915

- ❖ Completed theory of gravity: General Relativity
- ❖ Matter and energy mold the shape of space and the flow of time
- ❖ What is felt as the 'force' of gravity is the sensation of following the shortest path we can through curved, four-dimensional space-time

1917

- ❖ Published a paper on cosmology

1919

- ❖ Revealed the probabilistic nature of Quantum theory in it's inability to completely describe cause and effect
- ❖ Posed problem with the classical notion of cause and effect: Given the dual nature of quanta as both waves and particles it may be impossible to tie effects to their causes

1924-1925

- ❖ Last work predicted a new state of matter to add to list of solid, liquid and gas called Bose-Einstein condensate¹⁸
- ❖ Continued in his quest to unify the laws of physics as to address the problems with quantum theory

Dr. Albert Einstein: Personal Trivia

Birth Name: Albert Einstein **Birth Date:** March 14, 1879 **Birthplace:** Ulm, Württemberg, Germany **Hometown:** Munich **Parents:** Pauline Koch and Hermann Einstein **Childhood and Youth Activities:** Building models and mechanical devices **Hobbies:** Sailing **Education:** Luitpold Gymnasium Secondary school; Cantonal School; Federal Institute of Technology; University of Zurich **Career:** Technical assistant examiner at the Swiss Patent Office; Physics Tutor; Professor; Theoretical Physicist **Spouse(s):** Mileva Maric (married 1903-1914); Elsa Einstein Löwenthal (married 1919-1936) **Children:** Hans Albert, Eduard **Religion:** Raised Jewish, yet did not practice Judaism; religion described as pantheism¹⁹ **Died:** April 18, 1955

Key Establishments/Notable Facts

- ❖ Theory of Relativity: $E = mc^2$
- ❖ Significant contributions to the development of quantum mechanics, statistical mechanics, and cosmology
- ❖ Youngest to attend the invitation-only Solvay Conference in Brussels (the first

world physics conference)

- ❖ President of the German Physical Society
- ❖ Chairman of Emergency Committee of Atomic Scientists
- ❖ Named "Person of the Century" in 1999 by Time Magazine
- ❖ Only United States citizen to be offered a position as a foreign head of state²⁰

Awards

- ❖ 1921 Nobel Peace Prize for his work on the photoelectric effect
- ❖ Copley Medal of the Royal Society
- ❖ Foreign Fellowship of the Royal Society
- ❖ Royal Astronomical Society's Gold Medal
- ❖ Max Planck Medal
- ❖ Received several honors in the scientific community: The Einstein is a unit used in photochemistry, Einsteinium coined as a chemical element' and the asteroid 2001 Einstein was also named in his honor

Interesting Facts

- ❖ Applied to the Swiss Federal Institute of Technology twice: failed entrance exam first time
- ❖ Retained German, Swiss and American citizenship²¹
- ❖ Shared the birth of a daughter with Mileva Maric before their marriage in 1902²²
- ❖ German by nationality and Jewish by origin
- ❖ Was not present to receive Nobel Prize in 1921 being on a voyage to Japan
- ❖ Second marriage was to his cousin
- ❖ Skepticism of medicine arose from the inability to express biological procedures mathematically
- ❖ Saved by a classmate when he slipped on a steep slope while climbing the Santis mountain
- ❖ Co-founder of the liberal German Democratic Party
- ❖ Injured his hand in 1899 after tearing up instructions on how to do an experiment one way and attempting to do it another way
- ❖ Formed Olympia Academy with friends, meeting to read and discuss books on science and philosophy
- ❖ Recent theory concerning the unusual structure of his brain reveals that he may have suffered from Asperger's syndrome, a condition related to autism
- ❖ Active in the establishment of the Hebrew University in Jerusalem
- ❖ Fame has exceeded that of any other scientist in history
- ❖ Face remains the most recognizable in the world

¹⁸ Condensate was finally created (at exceptionally low temperatures) last year

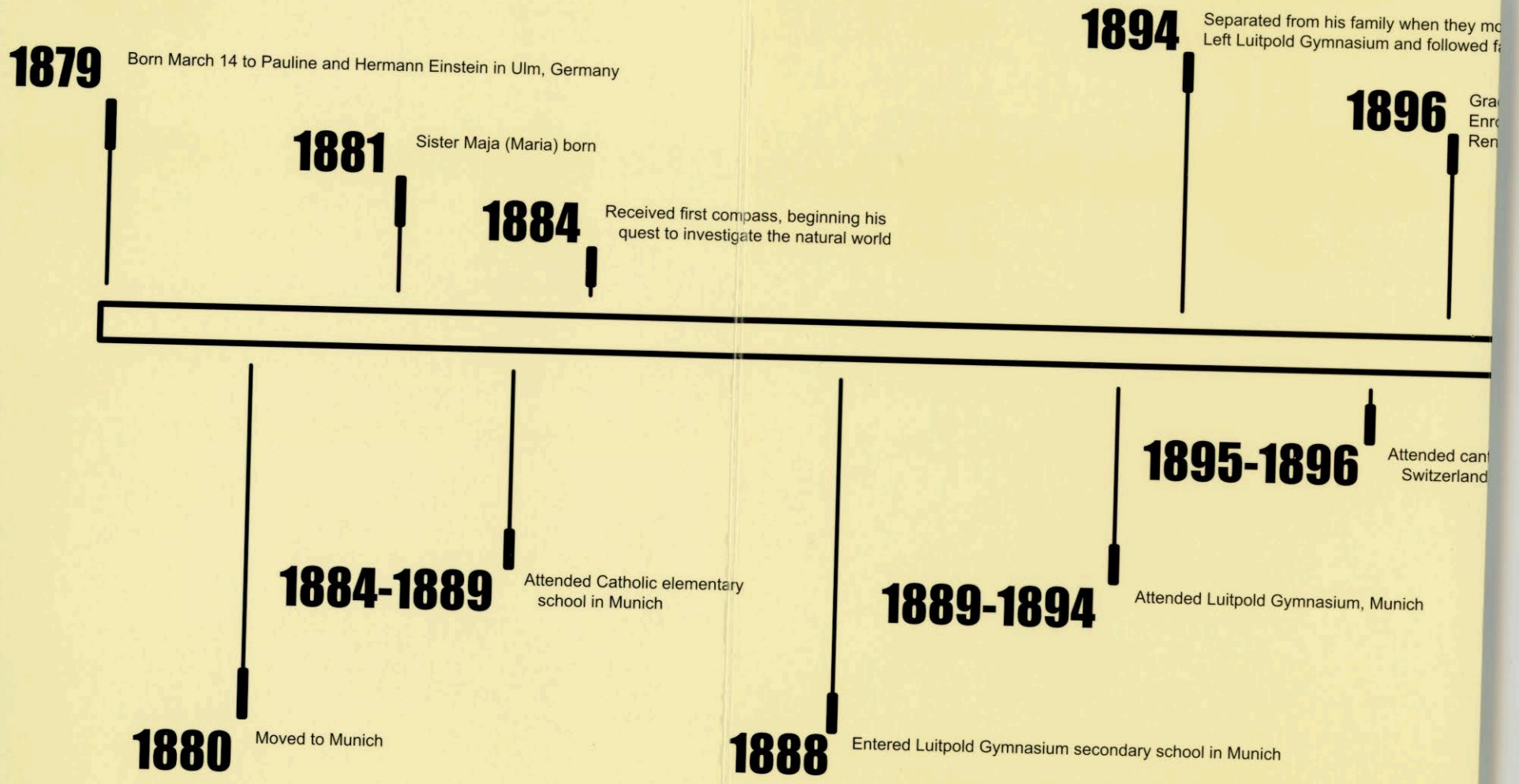
¹⁹ For information, <http://plato.stanford.edu/entries/pantheism/>

²⁰ Israeli government offered Einstein a post as second president in 1952

²¹ Renounced German citizenship in 1869 and resumed in 1914, renounced again in 1933 permanently

²² Fate of daughter unknown

Dr. Albert Einstein: Timeline



* AP/Wide World Photos

ve to Italy
family to Italy after first term

uated from high school at age 17
illed at the E.T.H. (Swiss Federal Institute of Technology) in Zurich
ounced German citizenship

1900 Graduated from the E.T.H.

1901-1902 Private tutor at Schaffhausen School

1902 Mileva gave birth to their daughter,
Lieserl in January
Baby Lieserl reportedly became ill;
all record of her disappeared
Father died

1905 "Miracle Year":

1903 Married Mileva Maric ("Mitza")
January 6

1900

onal school in Aarau,
to finish high school

1902-1909 Employed as a technical officer at the
Swiss Patent Office in Bern

1901 Granted Swiss citizenship
Mileva became pregnant and moved to Hungary to
give birth at her parent's home
Worked in Schaffhausen, Switzerland as a tutor
Moved to Bern

1898 Romance with Mileva Maric¹ began

1904 First son, Hans Albert born May 14

¹Hungarian physics classmate at the E.T.H.

his Special Theory of Relativity born June 30th

1909

Resigned from the Swiss Patent Office
Professor of Physics at the University of Zurich
Further work on quantum theory

1911-1912

Professor of Physics
at Prague University

1914-1918

1913

Worked on his new Theory of Gravity

Promoted to technical examiner
second class at the Swiss Patent Office

1910

Son Eduard ("Tete") born July 28

1907

Began applying the laws of gravity to his Special Theory of Relativity
Published quantum theory for solids (specific heats)
Published the principle of general relativity:
gravitation is equivalent to acceleration

1908

Lecturer at the University of Bern

1911

Associate professor at the University of Zurich
Full professor at Karl-Ferdinand University in Prague
Attend the Solvay Conference in Brussels (the first world physics confer
Predicted bending of starlight at eclipses (gets magnitude wrong)

1912

Professor of Theoretical Physics at the Swiss Fed
Co-published preliminary paper on general relativity

1914-1933

Director of the

World War I

1914 Professor of theoretical physics at the University of Berlin
Member of the Prussian Academy of Sciences
Separated from Mileva and divorce proceedings began

1916 General theory of relativity published²
President of the German Physical Society

1919 Divorce from Mileva finalized February 14
Married cousin Elsa Einstein Löwenthal June 2
May 29 solar eclipse viewed from South America supported general relativity

1921 First visit to the United States to lecture on international cooperation
Lectured in England and France
Awarded Foreign Fellowship of the Royal Society

1922 Awarded the Nobel Prize in physics for the photoelectric effect
Worked on unified field theory
Visited the Far East

1924 Inauguration of the Einstein Institute
Published the theory of special relativity

Kaiser Wilhelm Institute in Berlin

Technical Institute of Technology
collaboration with Marcel Grossman

1915 Completed the General Theory of Relativity & introduced his theory of gravity
Cosigned "Manifesto to Europeans" separating himself from German militarism

1917 Collapsed to near death and became seriously ill
Published first paper on cosmology

1920 Public attacks on relativity theory and Einstein by anti-Semites
Mother died

1923 Quantum physics introduced

1925 Awarded the Einstein Prize

1929

²Die Grundlage der allgemeinen Relativitätstheorie

1927 Attended fifth Solvay Conference
Began developing the foundation of quantum mechanics with Bohr

of Einstein Institute with
ower" in Potsdam
e "Bose-Einstien" quantum
tatistical fluctuations

1929 Publicized attempt to unify gravitational
and electromagnetic field theories

1932 Appointed professor at the Institute
for Advanced Study, Princeton

1933 Adolf Hitler became chancellor of Germany, giving rise to the Nazi party
Moved to the United States
Assumed a post at the Institute for Advanced Study at Princeton

1935 Continuing debate over quantum mechanics

1936 Elsa died in December

1939 Wrote famous letter to
Franklin D. Roosevelt

1926 Awarded the Royal Astronomical
Society's Gold Medal

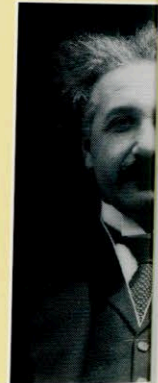
Royal Society's Copley Medal

1928 Einstein began pursuing his idea of a unified field theory
Diagnosed with a serious heart condition

1930 Extended visit to the United States
at the California Institute of Technology



Professor Einstein with wife Elsa on
the deck of a ship while enroute from
Panama to California, 1931



Dr. Albert Einstein

1939-1945 World War II

1940 American citizenship granted

1946 Served as chairman of Emergency Committee of Atomic Scientists

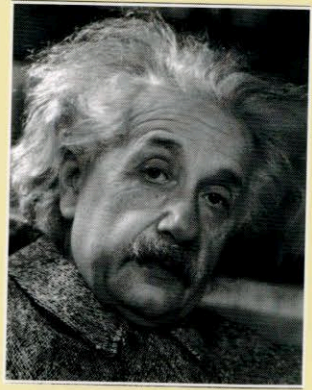
1952 Offered presidency of Israel and declined

1955 Died of heart failure on April 18 in Princeton

President of the American Physical Society, 1947-1952
President of the American Academy of Arts and Sciences, 1952-1955
President of the American Philosophical Society, 1955-1956
President of the American Association for the Advancement of Science, 1956-1957
President of the American Academy of Arts and Sciences, 1957-1960
President of the American Philosophical Society, 1960-1963
President of the American Association for the Advancement of Science, 1963-1966
President of the American Academy of Arts and Sciences, 1966-1969
President of the American Philosophical Society, 1969-1972
President of the American Association for the Advancement of Science, 1972-1975
President of the American Academy of Arts and Sciences, 1975-1978
President of the American Philosophical Society, 1978-1981
President of the American Association for the Advancement of Science, 1981-1984
President of the American Academy of Arts and Sciences, 1984-1987
President of the American Philosophical Society, 1987-1990
President of the American Association for the Advancement of Science, 1990-1993
President of the American Academy of Arts and Sciences, 1993-1996
President of the American Philosophical Society, 1996-1999
President of the American Association for the Advancement of Science, 1999-2002
President of the American Academy of Arts and Sciences, 2002-2005
President of the American Philosophical Society, 2005-2008
President of the American Association for the Advancement of Science, 2008-2011
President of the American Academy of Arts and Sciences, 2011-2014
President of the American Philosophical Society, 2014-2017
President of the American Association for the Advancement of Science, 2017-2020
President of the American Academy of Arts and Sciences, 2020-2023
President of the American Philosophical Society, 2023-2026
President of the American Association for the Advancement of Science, 2026-2029
President of the American Academy of Arts and Sciences, 2029-2032
President of the American Philosophical Society, 2032-2035
President of the American Association for the Advancement of Science, 2035-2038
President of the American Academy of Arts and Sciences, 2038-2041
President of the American Philosophical Society, 2041-2044
President of the American Association for the Advancement of Science, 2044-2047
President of the American Academy of Arts and Sciences, 2047-2050
President of the American Philosophical Society, 2050-2053
President of the American Association for the Advancement of Science, 2053-2056
President of the American Academy of Arts and Sciences, 2056-2059
President of the American Philosophical Society, 2059-2062
President of the American Association for the Advancement of Science, 2062-2065
President of the American Academy of Arts and Sciences, 2065-2068
President of the American Philosophical Society, 2068-2071
President of the American Association for the Advancement of Science, 2071-2074
President of the American Academy of Arts and Sciences, 2074-2077
President of the American Philosophical Society, 2077-2080
President of the American Association for the Advancement of Science, 2080-2083
President of the American Academy of Arts and Sciences, 2083-2086
President of the American Philosophical Society, 2086-2089
President of the American Association for the Advancement of Science, 2089-2092
President of the American Academy of Arts and Sciences, 2092-2095
President of the American Philosophical Society, 2095-2098
President of the American Association for the Advancement of Science, 2098-2101
President of the American Academy of Arts and Sciences, 2101-2104
President of the American Philosophical Society, 2104-2107
President of the American Association for the Advancement of Science, 2107-2110
President of the American Academy of Arts and Sciences, 2110-2113
President of the American Philosophical Society, 2113-2116
President of the American Association for the Advancement of Science, 2116-2119
President of the American Academy of Arts and Sciences, 2119-2122
President of the American Philosophical Society, 2122-2125
President of the American Association for the Advancement of Science, 2125-2128
President of the American Academy of Arts and Sciences, 2128-2131
President of the American Philosophical Society, 2131-2134
President of the American Association for the Advancement of Science, 2134-2137
President of the American Academy of Arts and Sciences, 2137-2140
President of the American Philosophical Society, 2140-2143
President of the American Association for the Advancement of Science, 2143-2146
President of the American Academy of Arts and Sciences, 2146-2149
President of the American Philosophical Society, 2149-2152
President of the American Association for the Advancement of Science, 2152-2155
President of the American Academy of Arts and Sciences, 2155-2158
President of the American Philosophical Society, 2158-2161
President of the American Association for the Advancement of Science, 2161-2164
President of the American Academy of Arts and Sciences, 2164-2167
President of the American Philosophical Society, 2167-2170
President of the American Association for the Advancement of Science, 2170-2173
President of the American Academy of Arts and Sciences, 2173-2176
President of the American Philosophical Society, 2176-2179
President of the American Association for the Advancement of Science, 2179-2182
President of the American Academy of Arts and Sciences, 2182-2185
President of the American Philosophical Society, 2185-2188
President of the American Association for the Advancement of Science, 2188-2191
President of the American Academy of Arts and Sciences, 2191-2194
President of the American Philosophical Society, 2194-2197
President of the American Association for the Advancement of Science, 2197-2200
President of the American Academy of Arts and Sciences, 2200-2203
President of the American Philosophical Society, 2203-2206
President of the American Association for the Advancement of Science, 2206-2209
President of the American Academy of Arts and Sciences, 2209-2212
President of the American Philosophical Society, 2212-2215
President of the American Association for the Advancement of Science, 2215-2218
President of the American Academy of Arts and Sciences, 2218-2221
President of the American Philosophical Society, 2221-2224
President of the American Association for the Advancement of Science, 2224-2227
President of the American Academy of Arts and Sciences, 2227-2230
President of the American Philosophical Society, 2230-2233
President of the American Association for the Advancement of Science, 2233-2236
President of the American Academy of Arts and Sciences, 2236-2239
President of the American Philosophical Society, 2239-2242
President of the American Association for the Advancement of Science, 2242-2245
President of the American Academy of Arts and Sciences, 2245-2248
President of the American Philosophical Society, 2248-2251
President of the American Association for the Advancement of Science, 2251-2254
President of the American Academy of Arts and Sciences, 2254-2257
President of the American Philosophical Society, 2257-2260
President of the American Association for the Advancement of Science, 2260-2263
President of the American Academy of Arts and Sciences, 2263-2266
President of the American Philosophical Society, 2266-2269
President of the American Association for the Advancement of Science, 2269-2272
President of the American Academy of Arts and Sciences, 2272-2275
President of the American Philosophical Society, 2275-2278
President of the American Association for the Advancement of Science, 2278-2281
President of the American Academy of Arts and Sciences, 2281-2284
President of the American Philosophical Society, 2284-2287
President of the American Association for the Advancement of Science, 2287-2290
President of the American Academy of Arts and Sciences, 2290-2293
President of the American Philosophical Society, 2293-2296
President of the American Association for the Advancement of Science, 2296-2300



Einstein, 1934



Einstein, Princeton, New Jersey, 1939

1943-1946 Consultant to the U.S. Navy's Bureau of Ordinance

1948 Generalized theory of gravitation

1949 Mileva died