

Writing Prompt

Einstein developed his theory of relativity more than 100 years ago, and since then his discoveries have helped shape the world around us and led to many inventions that we all use every day. His ideas about molecules have been used to create cement and aerosols, his work on atoms changed our understanding of how the world is constructed and his *Theory of Relativity* allowed everything from space flight to satnav, security lights that detect movement to solar panels on our roofs, nuclear power and even the way we communicate almost instantly around the world through the internet.

During 1905 – his “Miraculous Year” – Einstein explained some of his greatest discoveries in letters to his friend Conrad Habicht. Explore what Einstein’s discoveries have contributed to the modern world on pages 52-55, then write a letter or postcard to a friend about your day, explaining the ways in which Einstein’s breakthroughs have made it possible.

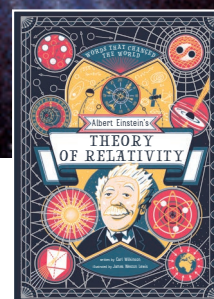


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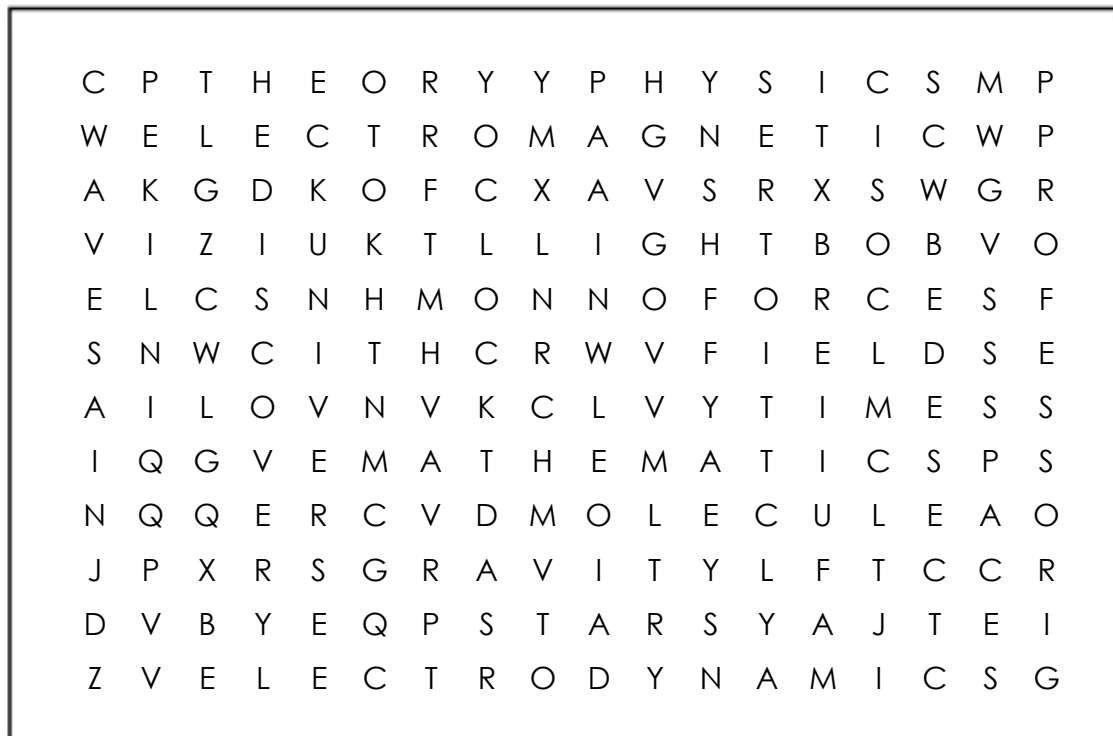
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**Albert Einstein's
Theory of Relativity**

ISBN 9781786277503



Word Search



Find the following words in the puzzle.
Words are hidden → ↓ and ↘ .

CLOCK
DISCOVERY
ELECTRODYNAMICS
ELECTROMAGNETIC
FIELDS
FORCES
GRAVITY

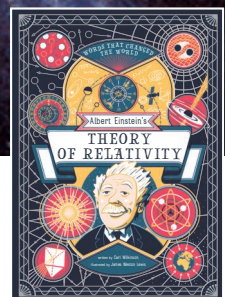
LIGHT
MATHEMATICS
MOLECULE
PHYSICS
PROFESSOR
SPACE
STARS

THEORY
TIME
UNIVERSE
WAVES



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1880

The family moves to Munich.

1884

Lying in bed ill, aged about 5, Einstein is given a compass by his father. The way the compass needle always points in the same direction, attracted by a hidden force field, fascinates young Einstein. Around this time, he also begins to learn the violin. The family moves to Munich.

1894

Aged 15, Einstein drops out of school in Germany and decides to study alone to get a place at college in Switzerland.

JANUARY 1896

Einstein gives up his German citizenship. He sits the Zurich Polytechnic exam again and this time passes. He starts his studies in October.

1902

Einstein starts work at the Swiss Patent Office in Bern as a junior patent clerk, registering the ideas of inventors.

1901

Einstein becomes a Swiss citizen.

JANUARY 6TH 1903

Einstein marries Mileva Maric, a Serbian physics student, in Bern, Switzerland. Maric helped check many of Einstein's mathematical calculations.

1885

Einstein starts school. He was a very good student, regularly coming top of his class. He also was well ahead in maths. But he found the strict way many subjects were taught at the time difficult to take and he often annoyed his teachers by questioning them and seeming disrespectful.

1881

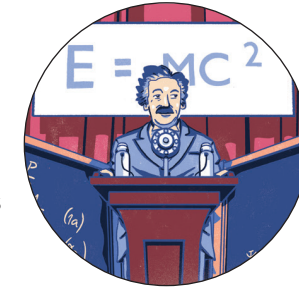
Einstein's sister Maria (known as Maja) is born.

14TH MARCH 1879

Albert Einstein is born in the city of Ulm in southern Germany, the first child of Hermann and Pauline Einstein.

1905

Einstein's "Miraculous Year". He publishes four ground-breaking papers that would change our understanding of time, space and the universe. And he developed the famous equation $E=mc^2$ that showed how the mass of an object was a measure of how much energy it contained.



1919

Einstein and Mileva divorce; Einstein marries his cousin Elsa in Berlin.

MAY 29TH

Scientists photograph a solar eclipse. Their images – finally developed in November – show that the Sun's gravity bends the light coming from stars directly behind it. This is proof of Einstein's general relativity theory. The discovery makes Einstein a global celebrity.

AUGUST 1932

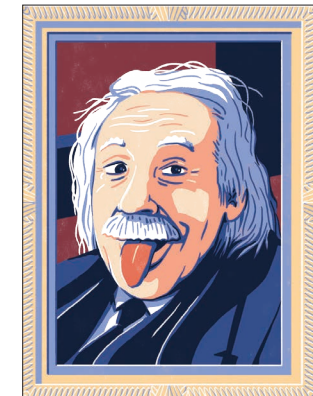
Einstein is appointed to the Institute of Advanced Study in Princeton, USA. He plans to spend half the year in Princeton and the other half in Berlin, but the Nazis come to power in Germany in January 1933. Einstein moves to the United States with his wife and his secretary Helen Dukas.

OCTOBER 1ST 1940

Einstein becomes an American citizen.

AUGUST 16TH 1955

Einstein dies in New Jersey, aged 76. His body is cremated and his papers turned over to the Hebrew University in Jerusalem.



DECEMBER 20TH 1936

Einstein's wife Elsa dies.

AUGUST 16TH 1945

The first atomic bomb is dropped on Hiroshima.

NOVEMBER 9TH 1922

Einstein wins the Nobel Prize in Physics 1921 for his contribution to physics and his discovery of the law of the photoelectric effect.

1915

Einstein publishes his *General Theory of Relativity*, which describes how gravity is a warping of space and time.

26TH OCTOBER 1895

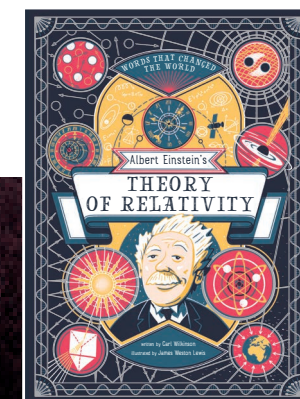
Einstein fails the entrance exam for the Zurich Polytechnic, and instead goes to school in Aarau, Switzerland. He loves it. There he learns to ask questions and visualise ideas and thought experiments – skills that he would use for the rest of his life. Einstein wonders what would happen if you could run alongside a beam of light. What would you see? The question keeps him thinking for the next ten years.



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The Life of ALBERT EINSTEIN

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Einstein's Key Discoveries

Light Quanta, 17th March 1905

Einstein argued that light was not just a wave, but a stream of particles or packets of energy that he called quanta. These are now known as photons.

Molecule Size, 30th April 1905

Einstein worked out a way to measure the size of molecules and proved in the process that everything around us is built from tiny atoms. This discovery finally got him his doctorate: he was now Dr Einstein!

Brownian Motion, 11th May 1905

Einstein solved a mystery that had left scientists scratching their heads for more than 80 years. He showed how thousands of water molecules cause tiny dust or pollen particles to jiggle about when viewed through a microscope. The discovery proved atoms and molecules actually exist.

Electrodynamics, 30th June 1905

Using nothing but thought experiments, Einstein came up with a modification of the theory of space and time that would change the way we think about the universe.

Theory of Special Relativity, 1905

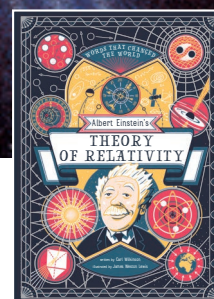
The *Theory of Relativity* says that the laws of physics are the same whether you're moving or standing still. Meanwhile, light always travels at the speed of light (299,792 km/s) – not slower or faster. However, Einstein realised that there was a problem with the theory of relativity when you think about light. If you travel incredibly fast (say at 99,792km/s) alongside a beam of light, then according to the theory of relativity it should only be travelling at 200,000km/s relative to you. But that's slower than the speed of light! So, either the speed of light is wrong, or the theory of relativity is wrong. But Einstein saw another possibility: time and space aren't actually fixed in the way we might think! Time slows down the faster you travel. And, the faster an object travels, the shorter it appears to someone standing still!

Theory of General Relativity, 1915

If nothing can move faster than the speed of light, how does gravity work instantly across vast distances? After coming up with his *Theory of Special Relativity*, Einstein spent 10 years extending his ideas to apply to objects that are accelerating (speeding up) and to gravity. What he discovered was that gravity can bend light beams and change the colour of light by altering its wavelength. He also worked out that gravity is curving space-time and that the universe is expanding.

$E=mc^2$

In 1905, during his "Miraculous Year", Einstein realised that the mass of a particle or an object was another way of measuring the total amount of energy in it. This discovery became possibly the most famous equation in the world: $E=mc^2$. This means that Energy (E) is the same as the mass of an object (m) multiplied by the speed of light multiplied by itself! The discovery led to the development of nuclear power – and the atom bomb.



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