

AN ANNEX FOR YOUR TEXTBOOK

Made by AMIT and Mujeres con Ciencia

NO MORE MATILDAS



WHAT WOULD HAVE HAPPENED IF EINSTEIN HAD BEEN BORN A WOMAN?

Try to imagine that Einstein, the world's most famous scientist, had been born a woman. How would her life have been? Easier? More difficult? Do you think she would be as popular as Albert Einstein?



DO YOU KNOW WHAT THE MATILDA EFFECT IS?

The Matilda Effect is the name for a type of discrimination suffered by many female scientists. Throughout history, many women researchers have been denied their contributions and the credit for their findings was given to their fellow male researchers.

This injustice has prevented that women were renowned as they should and, therefore, they are not featured in textbooks.

IT IS NEVER TOO LATE TO BE INSPIRED

In this annex to your textbook, you will find examples of some of those scientists. Pioneering women who should have had more recognition and who now can become an inspiration to new generations of girls and boys, to remind us that science is open to everybody.





BARBARA MCCLINTOCK

(1902-1992) BIOLOGIST, USA

Discoverer of the so-called "jumping genes". It was a phenomenon that was totally unexpected by experts, because it showed that genes do not always occupy the same spot in chromosomes, hence the term "jumping" genes. But her discovery was not accepted by her colleagues. The rejection was such, that she decided to quit this line of research. But twenty years later, other scientists confirmed what she had already discovered and explained years before, and therefore she won a Nobel Prize in Medicine in 1983.

ROSALIND FRANKLIN

(1920-1958) CHEMIST, GREAT BRITAIN.

With the help of X-rays techniques, she obtained an image that revealed, for the first time, the structure of DNA, that is the double helix shaped molecule that transmits genetic information, and the reason why all living things, including humans, look like their parents. For decades, the credit for this discovery was awarded to the head of the laboratory and two of her partners. All men, of course.



HENRIETTA SWAN LEAVITT

(1868-1921) ASTRONOMIST, USA

At the Harvard Observatory, where she worked for years, she went through thousands of glass plates containing images of the night sky from two telescopes. She was able to estimate the distance to the stars by analysing these plates. She filled hundreds and hundreds of notebooks with her precise entries, contributing to the cataloguing of every known and visible star. She also studied a particular type of stars, the Cepheids, which enabled to devise a system for measuring distances among stars in the Cosmos.

INGE LEHMANN

(1888-1993) GEOLOGIST AND SEISMOLOGIST, DENMARK

Our planet is made up of different geological layers such as the crust, the mantle (upper and lower), and the core (outer and inner). Inge Lehmann discovered in 1936 the discontinuity that divides the outer core from the inner core.

What was the importance of this discovery?

Until then it was believed that the Earth was hollow. Lehmann used earthquakes to support and back up her theory.



MARY ANNING

(1799-1946) PALAEOLOGIST, GREAT BRITAIN

She lived in an area of the England coast that was rich in fossils. Since she was a child, she began to collect them, but her passion did not stop there. Very soon she started to study them and made several discoveries such as identifying the first skeleton of an ichthyosaur, a kind of half-fish, half-lizard dinosaur. She also managed to make a living from her passion because she would sell the fossils once she had finished her research. Her buyers were the most important palaeontologists of the time, with whom she also maintained a fruitful scientific relationship. Her work was essential for understanding prehistoric life, but it was not recognized until shortly before her death.

MARGARITA SALAS

(1938-2019) BIOCHEMIST, SPAIN

She spent almost her entire career investigating a virus and discovered a particular molecule of that virus that has many applications in medicine, biotechnology and even criminology. One of these applications is, for example, the PCR techniques that enable us to diagnose coronavirus. Thanks to this discovery, she was granted the patent which has generated, by far, more revenue to the institution where she worked during all her life: CSIC (Spanish National Research Council).





DOROTHY CROWFOOT HODGKIN

(1910-1944) BIOCHEMIST, GREAT BRITAIN

With the help of X-rays techniques, she discovered the structure of penicillin in 1945. Thanks to this achievement, this essential medicine could be produced worldwide to fight all kind of infections. She also discovered the structures of cholesterol and insulin, complex biomolecules whose excess or lack causes serious diseases such as diabetes. Thanks to all these discoveries, she was awarded the Nobel Prize in Chemistry in 1964.

EMMY NOETHER

(1882-1935) MATHEMATICIAN, GERMANY.

Despite her passion for mathematics, she was unable to study that at university or to become a teacher and get paid for it, just because she was a woman. She was forced to flee from Germany to the United States after the Nazi rise to power because her family was Jewish. In her new country she continued to develop her career in algebra, a branch of mathematics, and she even proposed an essential theorem for many fields in Physics, that was finally named after her. Albert Einstein described her as an absolute "mathematical genius".



LISE MEITNER

(1878-1968) NUCLEAR PHYSICIST, AUSTRIA.

She discovered the nuclear fission reaction that enabled to first build the atomic bomb and later the nuclear power plants. Although she was nearly murdered by the Nazis because she was Jewish, she refused to be involved in the USA project that developed the first atomic bomb. In 1944, the Nobel Prize in Chemistry was awarded for the discovery of fission, but she was excluded, and all credit went to her collaborator Otto Hahn.



MARY LEAKEY

(1913-1996) ANTHROPOLOGIST, GREAT BRITAIN.

Her most important discovery was the Laetoli footprints found in volcanic ash deposits. They were a trail of fossil footprints left by a group of hominids, ancestors of humans, more than three and a half million years ago. These footprints gained a huge relevance because their study allowed to learn that those individuals walked upright, like us, and not on all fours like chimpanzees.



HILDEGARD OF BINGEN

(1098-1179) MEDIC, BOTANIST AND COSMOLOGIST, GERMANY.

She wrote a treatise on medicine, which included treatments for most known diseases, and was, therefore, one of the most widely used medicine books in Europe for several centuries. Her remedies involved the use of plants, about which she wrote another treatise.

She also studied the universe and described it in a way that had never been done before. She composed musical plays, was a great painter and even invented a new language. She was a nun and lived most of her life secluded in convents.

MARIE ANNE PIERRETTE PAULZE DE LAVOISIER

(1758-1836) CHEMIST, FRANCE.

Known as Marie Lavoisier, she was an essential collaborator of her husband, Antoine Lavoisier, considered the "father of chemistry". She worked as her laboratory assistant, illustrator, translator and editor. The many translations and reviews she did so that her husband could read chemistry works, pushed forward the discipline and turned it into a modern area of research. Her efforts in the systematization of this science granted her the status of "mother of chemistry".





MARIE THARP

(1920-2006) GEOLOGIST AND CARTOGRAPHER, USA

In 1977 she created the first scientific map of the ocean floor. The map of the Atlantic floor was so large that she had to do it over her bed, which was the largest surface she had available at home. Her work showed that at the bottom of the ocean there was a mountain range known as the Meso-Atlantic Ridge. Thanks partly to her research, the geological theories of continental drift and plate tectonics, which explain how the Earth's surface shifts, were proved to be correct.

HEDY LAMARR

(1914-2000) INVENTOR, AUSTRIA.

From a very early age, she was attracted to engineering but never went on to study it because she had another passion: acting. Actually, she became one of Europe's most famous actresses. A few years later she left Europe to escape from her husband, who was a Nazi fanatic. In America she also had a lot of success and soon became one of the most popular actresses in Hollywood. During World War II she invented and patented a system that enabled torpedoes to remain undetected and offered it to the U.S. Navy, that did not use it until many years later. Today, her system is the basis for extremely popular wireless communications protocols such as WIFI.



ÁNGELA RUIZ ROBLES

(1895-1975) INVENTOR, SPAIN.

She was a school teacher who in 1949 invented a mechanical encyclopaedia, a precursor to electronic books, designed to reduce the weight her pupils carried to school every day. She received many prizes for her invention, which she wanted to be manufactured in Spain, but could not find a company interested in producing it. She also taught grammar, typing and bookkeeping and published books on these subjects in her publishing house ELMACA, an acronym made out of the names of her daughters Elvira, María and Carmen.

ADA LOVELACE

**(1815-1852) FIRST PROGRAMMER IN HISTORY,
GREAT BRITAIN.**

She was a very curious child who was taught mathematics by her mother because she did not want her to become a poet like her father, Lord Byron, who had abandoned his prole. One of her teachers was another great British mathematician, Mary Somerville. Ada Lovelace was the first person in history that managed to program a machine. That accomplishment can be regarded as the direct ancestor of computer programming. In her honour, the US Army named the ADA programming language after her.



GRACE MURRAY HOPPER

(1906-1992) COMPUTER SCIENTIST, USA.

A pioneer in the world of computer science, she was able to develop computer programs using our common language, in her case, English. She created a system able to transform human language directly into a code that computers could understand, which is referred to as a compiler. She was also responsible for the development of the very popular programming language COBOL (1957).

KATHERINE JOHNSON

(1918-2020) MATHEMATICIAN, USA.

Although she was very good at mathematics, she had limited access to education because she could only study in segregated schools and colleges for African-American students. During World War II, she worked for the US Air force to improve the design of their aeroplanes. She then went to work for NASA, and her calculations helped to set course for the flight of the Apollo 11 mission, in which humankind set foot on the moon for the first time.



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