STEAM Tales

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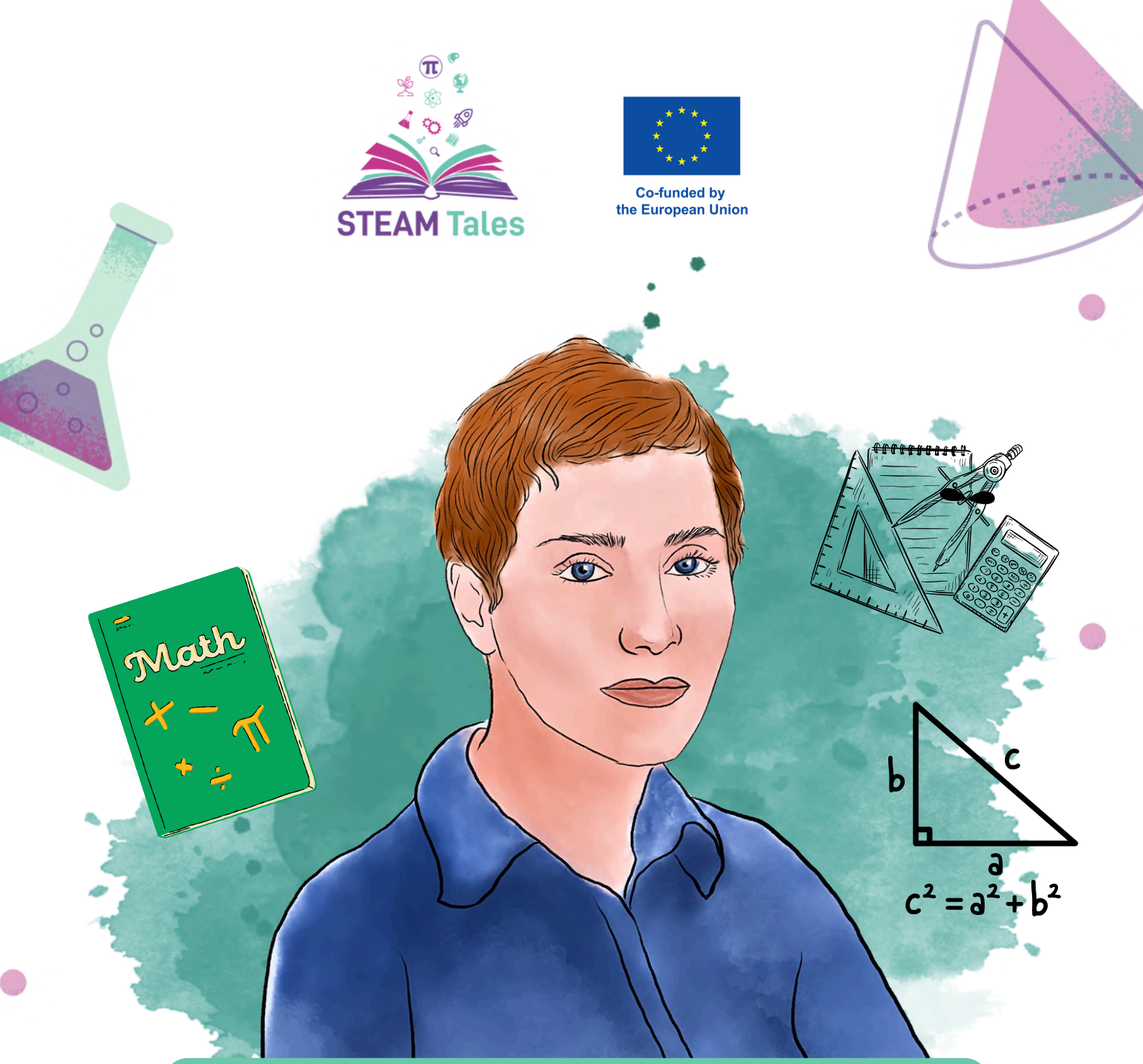

Stories of inspiring women in STEAM:

Maryam Mirzakhani

Prepared by LogoPsyCom

LogoPsyCom

Project Title

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Maryam Mirzakhani, the mathemagician!

The little dreamer

Once upon a time, in 1977, under the bright sun of Tehran in Iran, a blue-eyed girl named Maryam was born. She grew up in a family of four, with very supportive and encouraging parents who wanted their children to have have nice and enjoyable jobs, but didn't care much for success and big achievements as long as they were happy.

She finished elementary school around the end of a very tough war between Iran and Iraq, which brought new hopes and chances to the people, especially the young people. As a kid, Maryam loved watching documentaries about famous figures such as Marie Curie and dreamed of doing great things with her life. She also loved stories with exciting adventures and dreamed of becoming a writer!

Question for children:

Do you like stories too? What kind of adventures do you imagine when you read? Which subjects do you prefer: maths and sciences or literature and art?

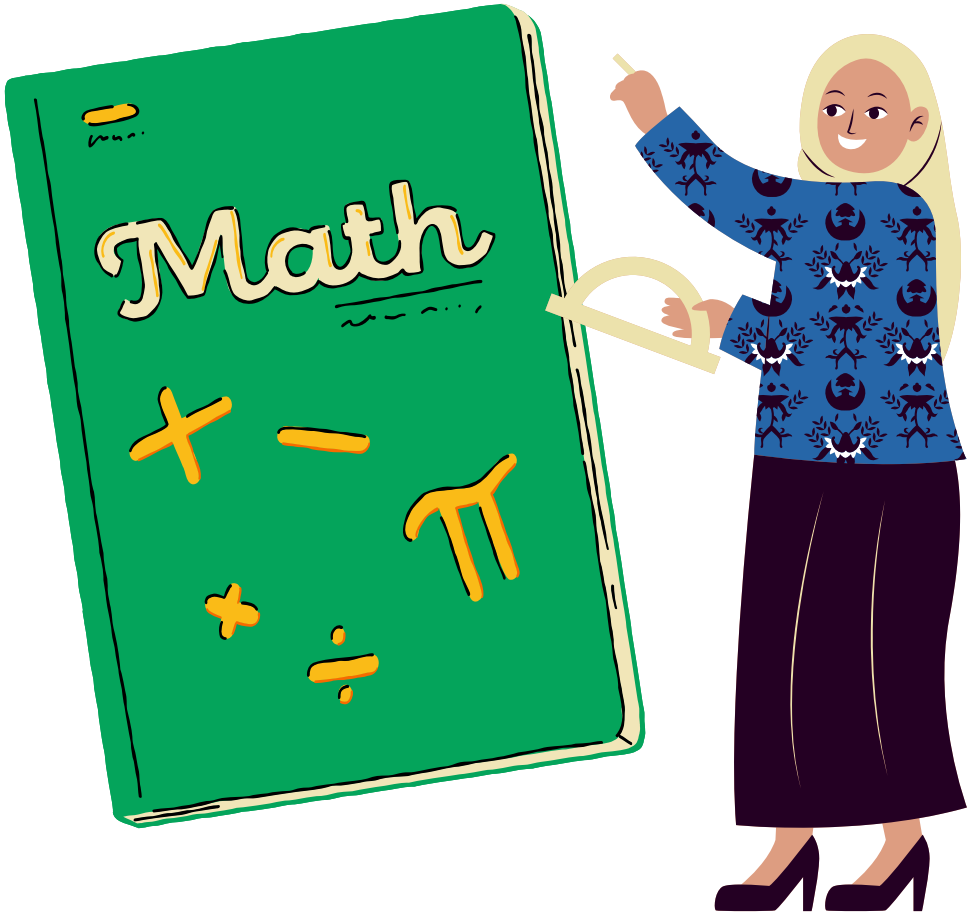
An unexpected new passion

Maryam didn't think about numbers very much since she preferred to read storybooks. So when she was in middle school, she didn't do well in math at first and her teacher didn't believe ithat she would get better, which made her feel quite sad.

The next year, she had a different teacher who became very important for her and encouraged her to improve, and she did! Her grades got much better and her interest in maths too!

Question for children:

Have you ever tried something again after not doing well the first time? Did you feel discouraged or determined? How did it feel to try again and persevere?



Maryam's older brother also got her interested in mathematics by telling her what he learned in boys' school: they would talk about maths problems and how to find solutions, which made Maryam think of math as an amazing and fun puzzle to solve. Then, in high school, she and her best friend wanted to participate in the Iranian National Olympiad, a big competition about science and maths, but her girls-only school didn't have the same problem-solving classes as the ones taught at the schools for boys.

Question for children:

Do you think it's fair that boys and girls wouldn't be taught the same things at school? That doesn't seem fair, does it?

True to herself

But Maryam still loved reading and storytelling more than mathematics, so at first, she wasn't sure about joining the Olympiad - or even if she would be able to - since she was afraid of failing and was upset that the classes were only for boys. She felt anxious about starting something new, especially something she wasn't very good at in the beginning, because of the negative judgment she received for her poor grades and the fact that her passions seemed so opposed to each other.

Never alone

But she grew more excited as she realised how much fun math could be and how exploring it could be a cool adventure. With the support of multiple people, like her nice teacher, her passionate friend and her older brother, she decided to do it and try her best!

Maryam and her friend met with the school principal, a strong woman with a positive personality, who decided to add better classes for girls, so they could have the same chances as boys and could learn to understand and do the same things.

The magic of math

Thanks to this help, Maryam started to see maths as a way to create and imagine, just like her stories. With this new way of thinking and her eyes bright with excitement and determination, she began to shine brighter than the ridiculous idea that girls couldn't be good at the same subjects as boys. She and her friend made it to the Olympiad team and Maryam won a gold medal the first year and got a perfect score the second year!

Question for children:

If you had a friend or sibling with a big idea or goal, would you join them in trying something new, even if it seemed scary or difficult? And even if it led to travelling around the world to do something very different from your original dream?

A new adventure

That's when she discovered her true passion for mathematics and its beauty and decided to explore the adventurous world of numbers even further! She now understood that it was full of mysteries and patterns, like pieces of a puzzle that needed to be carefully put together.

She learned about shapes that twist and turn in ways we can only imagine, called "hyperbolic" shapes, and she loved to doodle her ideas on paper, drawing difficult topics to make sense of them. Those ridiculous views about what girls aren't capable of and her struggles from before with math classes couldn't stop her anymore!

Question for children:

Have you ever used drawing to understand something? What would you draw to help solve a big puzzle?

Zero to hero

Even if Maryam was very clever, things were not always easy for her. People doubted her because no other girl from her country had won in the Olympiad like she did, and asking her principal to change the way the school treated girls compared to boys was a big risk to take. But every time it got hard for her, Maryam worked even harder, thanks to the beauty that she saw in maths.

The principal made everything possible for her to follow her dream since her gold medal at the National Olympiad made it possible for her to get into college without passing the entrance exam. The principal kept pushing her to follow higher studies and become even more successful!

At 17, Maryam became the first Iranian woman to win a gold medal at the International Mathematical Olympiad in Hong Kong, meaning that she competed with smart people from many different countries, and she won! And just one year later, at the same competition in Toronto, she became the first Iranian to get the full score and win two gold medals! From high scores in her country to worldwide gold, nothing could stop her!

The big discovery

Maryam continued to study mathematics as she grew up, graduating from Sharif University of Technology, and then she got her PhD at Harvard University, one of the most famous and respected universities in the US! She studied patterns and hyperbolic geometry by observing "doughnut-shaped" surfaces. She kept her habit of drawing and doodling a lot when working on her research to help her stay focused and better understand the difficult concepts she was exploring.

Most problems she worked on were related to geometric structures on surfaces and their deformations. She studied a very famous problem in her field, which was about what a ball does as it bounces around a billiard table shaped like any polygon. Her new approach and creativity helped her find answers that others couldn't see because she saw math as a kind of art where every pattern and twist told a story.

Question for children:

If you could make up a math puzzle, what would it look like? Would it have shapes or colours?

Becoming a star

Her adventure from school to college ended with her becoming a professor at some of the most respected American universities: Princeton at just 27 years old and Stanford at 32 years old. She also received multiple prizes, like the Clay Research awards, and in 2014, Maryam became the very first woman ever, and the first Iranian, to win the Fields Medal, the highest honour in mathematics!

People all over the world were amazed by her work and the incredible things she'd done, describing her as one of the most intelligent mathematicians of her time, but Maryam preferred to avoid the spotlight. She was very discreet, didn't look for publicity and didn't really like the attention of the media. For her, the real joy was in solving problems and exploring new ideas, and there were many great female mathematicians besides her that she wishes would be more recognised.

Question for children:

If you were incredibly successful in a certain field, would you want the world to know and praise you or would you stay discreet and live a normal life despite your success? Why do you think she wanted to stay out of the spotlight?

Family and health

Even though Maryam was celebrated around the world, she wanted her personal life to stay private, but the world soon learned about her marriage to another scientist, named Jan Vondrák, and the birth of her daughter. Unfortunately, they also discovered her health problems and her fight with breast cancer, a very serious disease. She was already struggling with it when she earned the Fields Medal, but it didn't stop her from working hard, as always, and spreading her passion to the world.

The art of math

Maryam kept focusing on her family and research and even balanced her math with being a mom, often drawing and solving complex problems with her daughter by her side. This helped her keep the magic in her work every day, as she described herself as a "slow" mathematician, saying that "you have to spend some energy and effort to see the beauty of math." Her daughter even described her mother's work as "painting".

Question for children:

What's something you enjoy doing with family? How does it make you feel? Do you think math and science can be artistic and creative? Would you describe a scientist or mathematician's work as art? Why?

A hero's legacy

She was one of the first girls to learn difficult math problems in a girls-only school in Iran, went from competing in the National Olympiad to earning medals in different countries and reaching important roles in very respected universities, receiving multiple awards and admiration. Maryam proved that there is beauty and art in mathematics and that storytelling and imagination aren't so different from science and mathematics, and can even make people understand those topics better!

Unfortunately, in 2017, at the age of 40, Maryam passed away from cancer, but what she loved survives through the many discoveries, projects, movements and awards in her honour, like the the Maryam Mirzakhani New Frontiers Prize, the 12 May Initiative and the Mirzakhani Society at the University of Oxford, all dedicated to helping women have the same chances in maths.

The little girl who loved adventure books and found math class too difficult decided to become the author of her own story, the hero of her own book and, with the support of her family, friends and educators, she reached incredible success that people of her time didn't think a woman could reach.

Maryam's life shows the power of determination, curiosity and creativity. Even when facing challenges, she became one of the greatest mathematicians in the world and stayed passionate and humble. Today, Maryam's work continues to help young girls and boys believe that with imagination, courage, dedication and hard work, you can solve any puzzle and find the magic in any topic you explore!

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