

### [Episode 3 - Emmy Noether Transcript]

Hello. My name is Katie Griffith, and I'm pleased to introduce, or perhaps take a better look at Emmy Noether, the female mathematician. What better place to start than when she was born. She was born a German Jew in 1882. She took steps to becoming a teacher and got her certification, but decided that she loved math even more than that, because her father was a mathematician. She studied under him at the University of Erlangen as one of only two women students in the university population of 986. She was only allowed to audit classes; she wasn't truly enrolled, and she had to get permission from specific professors to do that.

In 1907, she completed her dissertation and began to teach at the University of Erlangen as well, just like her father, but did so for seven years without being paid. In 1915, she was invited to join the University of Göttingen, their math department, but she couldn't because the faculty was opposed to women doing so. She finally was able to teach there, but she did so for four years under the name of a male mathematician, Dr. Hilbert, who invited her to join their faculty, but didn't realize it was going to be an issue. In 1919, she was finally awarded the title Privatdozent, which is sort of like a PhD of the time in Germany, and she was allowed to teach, but still not salaried, which really just shows a lot of the issues that were face by women in mathematics at this time.

A lot of her work that I want to talk about that is very famous is the Noetherian symmetry which shows the relationship between certain types of symmetry and conservation laws in physics. So if that symmetry is found, then the conservation laws that we take for granted, sort of, in physics are true for those certain situations. She did this work during that time of seven years when she was not being paid at the University of Erlangen.

There are several things that I find fascinating about this wonderful woman. When she spoke in her classes, she was able to inspire so many people with her ideas with her enthusiasm that she would be very careless with her appearance, which actually provoked a couple of her students that were women to try and talk to her about it, but she was so engaged with a different student at the time, that they just gave up, because, again, she just got too enthused and engaged with her topics. Another reference to her personality that I find fascinating occurred when a journalist was interviewing her about her work, and they went to lunch. She got so excited about math and everything that she was spilling food everywhere and her hair was all disheveled, and she just kept going on and went on and on.

And I think that for me as a woman going into the STEM fields, it is so inspiring to be able to look at someone who went through so many hardships, more than I am ever going to experience, again, being that she was a German Jew in Germany at a time when it was not okay to be a Jew, let alone a woman in math. If she can go through that kind of hardship and still be that excited about her work and give her ideas freely to her students and take no personal credit for the most part or pay for that matter, then I absolutely can do that, and I love that she is able to inspire me from the past in such a way. I think it's super important that as women in math we continue this beautiful gift that we have as women to give and nurture. A really inspiring example from her as well was that the book *Modern Algebra* by Van der Waerden was entirely, or for the most part, was inspired by her work, and she didn't ever want credit for that; she just wanted him to put those ideas out; she wanted those ideas to happen with or without her getting credit for them. And I think that's something that we can all take away for the future about ideas and about the freedom of being who we are, exactly what we are, and giving that value to absolutely everyone and anyone that will accept it. Thank you.