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Physics Extra Credit Essay

Wilhelm Conrad Röntgen

The Nobel Prize for Physics is awarded once a year by the Royal Swedish Academy of Sciences to a person who has made an extraordinary contribution to the world through physics. Alfred Nobel, a great Swedish chemist who invented the dynamite, established the Nobel Prizes in his will. Alfred wanted those who made significant contributions to the world to be remembered forever, and recognized for their greatness. The prizes that were available were Nobel Prizes for physical science, chemistry, medical science, literary work, and for peace. The very first person to be awarded the Nobel Prize for Physics was Wilhelm Conrad Röntgen.

Röntgen was born in Lennep, Germany on March 27th, 1845. He was an only child, and his father was a merchant and cloth manufacturer. Röntgen and his family moved to the Netherlands in 1948, where he was raised. He attended school in the Netherlands, but unfortunately, he was expelled for not revealing the identity of a culprit at his school. Röntgen took the blame for what someone else did, resulting in expulsion. After that, he was unable to gain admittance into any other Dutch or German school. He tried to attend the University of Utrecht but didn't have the necessary credentials. In 1865, however, he found out that he could attend the Federal Polytechnic Institute of Zurich, Switzerland. He passed his exams and became a student there, majoring in mechanical engineering. He became one of his professor's favorite students. He followed his professor, August Kundt, to

the University of Strassburg in 1873. Later on in his life, Röntgen married Anna Bertha Ludwig, and together they adopted a six-year-old girl. This girl was the daughter of Anna's, his new wife, brother. Röntgen was a very religious man. He described those in his life, such as his wife and friends as having been "selected by God". He attended church regularly. Also later on in his life, Röntgen became a professor at Strasbourg University. He eventually went on to become the Chair of Physics in the University of Giessen.

Wilhelm Conrad Röntgen was awarded the Nobel Prize in Physics for producing and detecting electromagnetic radiation in a wavelength range that is known today as Röntgen rays, or x-rays. This discovery was an incredible breakthrough because it advanced the fields of medicine greatly. The x-rays that Röntgen discovered had wavelengths approximately 1000 times shorter than those of light. Röntgen found that these rays could penetrate human skin but not bone or lead. They could also be photographed. These rays were used so that doctors could see inside the human body without the use of surgery. This allowed doctors to easily see inside people and easily see the problems. Then surgery could be preformed, if necessary, where needed. The use of x-rays in medicine has brought medicine a long way.

Röntgen discovered x-rays on his average day in his laboratory. Röntgen had a physics chair at the University of Würzburg. This is where most of his experiments and discoveries, including this one, were preformed. The University gained lots of fame for Röntgen's discoveries. Geopolitics didn't affect Röntgen's work because of the good situations of the time period. This time period was fairly peaceful and void of crises. No major historical events were going on during Röntgen's experiments that influenced his

work. The late 1800 and early 1900's were calm times. Röntgen was simply continuing with his experiments on an average day when his discoveries on x-rays began.

Röntgen was not originally looking for x-rays. In 1895 he was experimenting with the phenomena of the passage of electric currents through gases of low pressures. He was working with several other scientists on this experiment, including Johann Hittorf, William Crookes, Heinrich Hertz, Nikola Tesla, and Philipp von Lenard. They also were working on the properties of cathode rays. Röntgen himself, however, discovered the x-rays on his own through his work with cathode rays. On November 8th of 1895, Röntgen discovered that if he used a discharged tube and sealed it in a think black carton in a dark room to stop all light, then a paper plate covered in barium platinocyanide in the way of the rays would become fluorescent. After discovering this, he investigated farther by preforming additional experiments. Röntgen found that objects of different thicknesses placed in the path of the rays became partly transparent when photographed. Working more on this experiment, Röntgen remained in his laboratory for two weeks, eating and sleeping there. After two weeks, Röntgen preformed his experiment on his wife's hand, and found that the photograph created revealed the bones in her hand, as well as the ring on her finger. The photograph, however, ignored the skin, because the x-rays penetrated the skin. Röntgen's wife said that she had "seen (her) death!"

On December 28th, 1895, Röntgen published his original paper on the new rays he discovered, which he liked to call X-rays, even though they became more commonly known as Röntgen Rays at the time. Röntgen concluded that x-rays are of the same electromagnetic nature as light, but have higher frequencies in their vibrations. These rays were 1000 times shorter in wavelength than light. Röntgen realized that these rays could

pass through substances of lower densities. His conclusions on x-rays resulted in great medical advances, as previously stated, allowing doctors to see bones and to save more lives.

In conclusion, the Nobel Prize of Physics given to Röntgen was much deserved. His work was so important that it is still used today. It has been improved upon, but Röntgen set the basis for x-ray technology today. Whenever we break a bone or are ill without knowing why, an x-ray is always preformed to find the severity of the broken bone or the cause of the illness. Röntgen's work on x-rays changed the world so greatly, that he was awarded the first ever Nobel Prize in Physics. Had Alfred Nobel lived to see this day, he would have been very proud. Unfortunately, Röntgen died on February 10th, 1923 from carcinoma of the intestines. Luckily, however, it isn't believed that this carcinoma was caused by his work with the X-rays. Röntgen almost always used a protective lead shield while working with these rays in his lab. In his will, Röntgen wanted all of his personal and scientific correspondence destroyed. In the end, Röntgen died a famous and successful man, recognized across the world, and remembered to this day.