Your Name	**Qiu Feng Weng**
Your Course	**Access To Biological Sciences**
Both Units that you are taking	**Science and Technology In Society & Communication: Intermediate 2**
Name of both Lecturers	**Mark Hetherington** **& John O'Neill**
What the report is on	**Hero of Science**
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Title: **Marie Curie ----The Great Woman Scientist**

Maria Sklodowska-Curie

(07/11/1867----- 04/07/1934)

Contents

1．Introduction

This report is to show the work of Marie Curie and has been requested by Mark Hetherington and John O'Neill.
Marie Curie was born in Warsaw, Poland In1867. When she was 24 years old she went to Paris to continue her studies, where she obtained her qualifications in Physics and Mathematical sciences. This led to a great work and special awards. This report is to be submitted on 25th May 2009.

2．Research Methods / Plan

All Information included in this for report was obtained from article accessible on various websites listed in References.

By 30/09/2008 the topic of report and scientific heroes had been chosen.
By 28/10/2008 the brief outline plan had been prepared.
By 12/12/2008 the 200 words of summary was presented.
By 01/06/2009 the Power point presentation had been delivered.
By 04/06/2009 the report had been submitted.

3. Main body **/** Findings

3.1 An overview of Marie Curie's background

Marie Sklodowska was born as the fifth and youngest child of her family. Her parents were well educated; her father was a Professor of Mathematics and Physics. As a child she had a remarkable memory and graduated from high school with a gold medal. At the age of 18 she became a governess to support her sister financially while she studied in Paris. In 1891, Marie moved to the University of Paris where she met many physicists. After 3 years she was introduced by a friend to Pierre Curie, whom she later married. Marie found a subject for her thesis that led her into researching of radiation, which recently reported by Henri Becquerel. Pierre Curie put away his own work, they worked together and combined to receive the half Nobel Prize in Physics for their discovery of the phenomenon known as radioactivity. Henri Becquerel received another half Nobel Prize. On April 19, 1906, Pierre Curie died by an accident, his head was crushed under the wheel of a horse drawn cart. After Pierre's death Marie took over her husband's position and became the first female lecturer in the Sorbonne. Marie successfully isolated pure radium and

awarded second Noble Prize in 1911. In 1915, Marie trained doctors to use her own discovery of radium for the treatment of scar tissue, arthritis and other diseases, in curing some cancers. In July, 1934, aged 66, died of leukaemia due to exposed of among of radiation when she was working.

3.2 An investigation of her work and research

3.2.1 The mystery of the rays

Curie was looking for a subject for her thesis. In December 1895, a German physicist, Wilhelm Roentgen, had discovered rays that could travel though solid wood or flesh. A few months later a French physicist, Henri Becquerel, discoveries that minerals containing uranium also gave off rays. These two mysterious discovered led Marie Curie into radiation research. Because so much attention was on Roentgen X –rays, she decided to turn her attention to Uranium Rays, of which almost nothing was known at the time.

3.2.2 Discovery of Polonium and Radium

She discovered something strange—Normal properties, colour or smell or hardness, changed according to how you treated a substance. Scientists of that time knew that such properties came from the way atoms combined with one another. Most of them believed the atoms themselves had all been created at the beginning of time, and could not possible change. Marie puzzled over this, something was happening inside Uranium atoms that gave rise to rays. When Uranium rays passed through the air near an electrical measuring instrument, which is a very sensitive and precise device. The instrument detected a difference. Marie used this “Curie electrometer” to make exact measurements of the tiny electrical charges that Uranium rays caused by thronging air. She also measured the rays from different Uranium compounds, and discovered that the more uranium atoms in a substance, the more intense the rays the substance gave off. Trying to see what was so special about uranium, she found the mineral pitchblende containing other elements—thorium, which also gave off “Becquerel rays”. To describe the behaviour of these two elements Marie made up the term “radioactivity”.

Curie got another surprise that the mineral pitchblende was more radioactive than uranium and thorium. She was convinced the pitchblende must contain another element emitted highly radioactive never seen before. Pierre put aside his work on crystals to help speed up the discovery. They worked as a team, each responsible for a specific task.

Pitchblende is a highly complex mineral, which made of combinations of up to 30 different elements. To isolate the unknown substances, the Curies used standard chemical procedures to separate the different substances in pitchblende. For instance, a particular element might dissolve in an acid, some of element could pour off, and some of elements will leave behind in a sludge at the bottom of the pot. After the materials were separated into different types of compounds, they used a new method of chemical analysis, using the Curie electrometer to make precise measures to find out which of the separated parts was most radioactive.

Finally, they resolved the problem and discovery of the new two elements, “Polonium”—published in July 1898, it behaved chemically about the same as an element that was already know, Bismuth; and “Radium”—published in December 1898, had about the same chemistry as the element Barium. Yet polonium and radium were different form the known elements in one big way—each was strongly radioactive.

3.2.3 Isolation of Radium

The next step, in order to show that it was a matter of new elements, the Curies would have to determine their atomic weight and isolate them. To do so, they needed large amounts of pitchblende, because it only can extract very low levels of polonium and radium. She obtained permission from the Austrian government to take pitchblende which is waste material contained more radioactive than the original pitchblende, form the uranium producing plant in Bohemia. Also, they need to a spacious laboratory (where was a dilapidated wooden shed on the grounds of the school of Industrial physics and chemistry in Paris), to treat the pitchblende. Marie processed the pitchblende to extract the tiny quantities of radium. This involved working with 20kg batches of the mineral—grinding, dissolving, filtering, precipitating, collecting, redissolving, crystallising and recrystallising. The journey to the discovery had been long and arduous. By 1902, Marie had succeeded to separate out one decigram (one—tenth of a gram= 0.00022 pound) of $RaCl_2$. She was working with Paul Langevin, one of Pierre’s students, after Pierre’s accidental death in 1906, Marie produced pure radium in 1908.

3.3 The impact of their work on society

3.3.1 Radium in medical use:

In 1914, the World War I erupted and Marie Curie saw the opportunity to use medical radiation to treat injuries from the battlefront. She was using tubes of a radioactive gas (now called radon) derived from radium, and prepared 200 stationary, and 20 mobile X-ray stations to help doctors identify and treat bullet and shrapnel wounds as well as broken bones and other ailments. Radon tubes were even used by doctors to destroy patient's diseased tissue, a forerunner of today cancer treatments.

3.3.2 Radium in commercial uses:

In research, radium was used in a wide range of luminescent products, especially paints and antiques like watch with luminescent dials contain radium. Until scientists realized that these uses were dangerous. And also radium is used as a source of neutrons in laboratories and it is researched by scientists who interested in learning more about it and its isotopes.

3.3.3 Polonium in uses:

Polonium has attracted attention for uses as a lightweight heat source for thermoelectric power in space satellites. Polonium can be mixed or alloyed with beryllium to provide a source of neutrons. It is also used on brushes for removing dust from photographic films.

4. Conclusion:

Marie Curie was the first pioneer of woman scientists to win worldwide fame, and also she was first female to receive Noble Prize twice. In 1800's that was extremely unlikely to happen. Marie shows determination. She contributed her whole life into discovery polonium and radium. She has opened a lot of doors for the young women today. Marie not only successful in her work life, but also has a successful family life—her eldest daughter had been awarded the Nobel Prize in chemistry for artificial radioactivity in 1935.

5. Evaluation:

The report was emphasised on Marie Curie's work. Because of lack of knowledge and understanding of chemistry and exactly how it works, so only provide the general information from internet. Before researching this project I did not know anything about the scientists and their work, but through this assessment it pushes to me to be interested in science. I learnt spoken and writing skill.

Sign: Date:

6. Bibliography/ References

http://www.stevenson.ac.uk/heroes/sce/heroes.htm

J:\Science in Poland - Maria Sklodowska-Curie.mht

http://www.polishwashington.com/prominent-poles/maria.sklodowska-curie.htm

http://www.aip.org/history/curie/brief/03_radium/radium_7.html

http://wiki.answers.com/Q/How_did_Marie_Curie_discover_radium_and_polonium

http://www.americanchemistry.com/s_chlorine/science_sec.asp?CID=1245&DID=4723&CTYPEID=113

http://nobelprize.org/nobel_prizes/articles/curie/index.html

http://womenshistory.about.com/od/mariecurie/p/marie_curie.htm

http://www.answers.com/topic/marie-curie

http://nobelprize.org/nobel_prizes/physics/articles/curie/

http://www.aip.org/history/curie/brief/index.html

http://en.wikipedia.org/wiki/Marie_Curie

http://www.mariecurie.co.uk/Life-Story-of-Marie-Curie.htm

http://en.wikipedia.org/wiki/File:Lublin_UMCS_Pomnik_Marii_Curie-Sk%C5%82odowskiej.jpg

Appendices

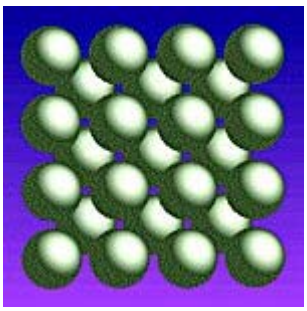
100 YEARS AFTER DISCOVERY

1898 - 1998

Po **English:** polonium | **French:** polonium | **German:** Polonium | **Italian:** polonio | **Polish:** polon | **Spanish:** polonio

Discoverer	Marie Curie
Discovered at	France
Discovery date	18.07.1898
Origin of name	Named after "*Poland*" (birthplace of Marie Curie)
Desription	Polonium was the first element discovered by Marie Sklodowska Curie in 1898, while seeking the cause of radioactivity of pitchblende from Joachimsthal, Bohemia. It required several tonnes of pitchblende to produce very small amounts of polonium.

Ra **English:** radium | **French:** radium | **German:** Radium | **Italian:** radio | **Polish:** rad | **Spanish:** radio



Discoverer	Marie and Pierre Curie
Discovered at	France
Discovery date	26.12.1898
Origin of name	From the Latin word "*radius*" meaning "*ray*"
Desription	Radium was discovered in 1898 by Marie and Pierre Curie in pitchblende (or uraninite) from North Bohemia. The element was isolated in 1911 by Mme. Curie and Debierne by the electrolysis of a solution of pure radium chloride, employing a mercury cathode. On distillation in an atmosphere of hydrogen this amalgam yielded the pure metal.

Statue, Maria Curie- Sklodowska University, Lubin, Poland