

Student's Learning Activities (Marie Sklodowska-Curie: Discoverer of two radioactive elements)

Activity 1

You will watch a video with narration or listen to a story from your teacher about Maria Curie and her contribution to science. Please write the most important points of the story according to your view and discuss them in your group. Indicative important points: (the political and social situation prevailing at that time, the study the Becquerel rays, the discovery of two new chemical elements by Maria Curie with her husband, the Nobel Prize was given to Maria Curie for two times, the procedures of separation and processing which Maria Curie and her husband succeeded to isolate radium, the effects of radiation on his health,).

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Activity 2

In the link: <u>http://www.aip.org/history/curie/polgirl1.htm</u> is presented more information about the life of Maria Curie. You can find information about the life, the contribution and the recognition of the work of Maria Curie.

1. Please compare the socio-economic environment in which she grew up and took the decisions about her future with those that prevail in your country now. What are the biggest differences?

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2. Based on information on the website above please create a timeline for the life and work of Maria Curie in order to be uploaded on the internet and posted in your classroom.

Activity 3

Maria, Pierre and their collaborators, managed to isolate one decigramme of radium in the state of its permanent salt and to determine its atomic mass. Please research in the internet and write a text (300 words) in order to describe the procedures of separation and processing which they succeeded to isolate radium.

Activity 4

Maria and Pierre Curie studied the "rays of Becquerel». Please look for online information about the discovery of Becquerel. (Indicatively at <u>http://www.nuffieldfoundation.org/practical-physics/henri-becquerel-discovers-radioactivity</u> or

http://www.youtube.com/watch?v=e7HNAmmSc7U)

What they added or further developed or researched the on the discovery of Becquerel? In order to organize your study you can use the table below

| The | discovery | of | The | discoveries | of | the | The | differences | between | the | two |
|-----------|-----------|--------|--------|--------------|-------------|-----|-----|-------------|---------|-----|-----|
| Becquerel | | Curies | | | discoveries | | | | | | |
| and its | meaning | | and th | neir meaning | | | | | | | |
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| In the address http://periodictable.com/Elements/Radioactive/ you can find information about the radioactive elements, their properties and their uses. Please discuss in your group and write a text (30 mode) about the radioactive |
| words) about the radium. |
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Activity 6

The study of the rays was the context in which there were realized important scientific achievements such as the cathode rays, the X-rays, the rays of Becquerel, the a,b,c, rays or the alpha, β eta, and γ rays. Please all groups made an agreement, so that each group to study one or two concepts and present the information to the whole class. Using the above concepts as key words into your search engine: a) identify the historical context, the date in which was officially announced their discovery, b) the scientist or scientists who made the discovery, c) the country and the institution they worked in. Working collaboratively in your group please place the date of the above discoveries in the axis of time. In modern science what is the accepted name and the nature of each of these rays?

Activity 7

The concept of chemical element is initially displayed in the works of Aristotle (4th century BC), it was redefined by Dalton (1661) and Mendeleev (1871) with his work on the periodic table of elements. According to them the element is elementary and not further degradable in any simpler. Was the proposal of Maria Curie for the radioactive elements in agreement with the above position for the element or not? Who contemporary scientist to Maria Curie, according to the narrative, intervened in the debate on the meaning of the chemical element?



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Storytelling Teaching Model: http://science-story-telling.eu

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Please discuss in your group to: a) determine the issue about the meaning of the chemical element, raised **storytell** again b) search in textbooks or in the internet for the modern meaning of the chemical element and the location of radioactive elements in the modern periodic table (eg: http://www.ptable.com/).

Please write a text (300 words) in which the important points of the History of Science are included for the conceptual evolution of the term: "chemical element" from the ancient years until today.

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Activity 8

Using the list of ideas that describe the characteristics of science and the ways it develops, try to locate and write these ideas in the story you heard and the activities of this lesson. These ideas that scientists call Nature of Science (Nature Of Science-NOS-) are:

Characteristics of Nature of Science (NOS)

- 1. Science demands and relies on empirical evidence.
- 2. Knowledge production in science includes many common features and shared habits of mind.
- **3.** Scientific knowledge is tentative but durable.
- 4. Laws and theories are related but distinct kinds of scientific knowledge.
- 5. Science is a highly creative endeavor.
- 6. Science has a subjective element.
- 7. There are historical, cultural, and social influences on science.
- 8. Science and technology impact each other, but they are not the same.
- 9. Science and its methods cannot answer all questions.

Scientists argue that in order to learn science one must first understand what exactly science is. Because it is difficult to define science, scientists give a list of its characteristics.

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Activity 9

Please research in the internet for information about the contribution of Maria Curie in Chemistry. Using the information you have collected please make a presentation in your class about Maria Curie and her work, or present it to a conference about the human rights or women scientists.

Activity 10

In address <u>http://www.fiami.ch/MC/MC_E/MC_E_home.html</u> is presented through comics the relation of Maria's Curie theories with those of Aristotle's, Lavoisier's, etc. For every comic you will find, please write a text on the differences between Maria's Curie theories and those of the respective scientists.

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