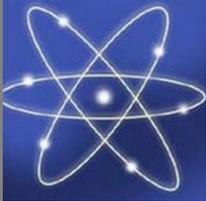
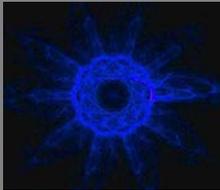


## PROFILES IBSE Learning Module

### Student Activities

**WHAT ARE THE USES OF  
NUCLEAR POWER?  
HOW DOES NUCLEAR ENERGY  
AFFECT OUR ENVIRONMENT?**





### Scenario:

In order to assess the impact of various modern technologies of energy production on the society in which we live, groups of students are hereby established (as Committees), consisting of 5 people: 1) a physicist; 2) a doctor; 3) a biologist; 4) a historian; 5) a mayor. Each Committee must decide on the advisability of building near the city (called X), a power station, having a considerable foreign investment.

Each student will edit a report about how will be the city affected by the construction of the nuclear power, about the advantages and disadvantages of its use, from the perspective of the doctor, biologist, physician, historian and mayor of the city.

### Tasks

1. Make up groups of 5 students each, having a clear role: physicist, doctor, biologist, historian or mayor.

2. Access dedicated websites for gathering the required information.

As mentioned, each member of the group must assume a role differently. Further, it is proposed that a series of questions are waiting clear answers:

- Doctor - how will influence the presence of nuclear power plant the health status of individuals? What are the effects of the power plant built near the city which is full populated by people?

- Biologist - which is the impact of the use of nuclear energy on plants and animals? What criteria should be adopted to avoid a serious imbalance of the environment?
- Physicist - what are the processes by which nuclear power is produced? Are the all taken measures sufficient for the safety of plant operation? Is its existence allowed in the vicinity of a human community?
- Historian - which have been the positive and negative consequences of the use of nuclear energy?
- Mayor - what it would mean for the existence of the local power station nearby? What advantages and disadvantages would include this?

3. Each member of the group (having the mentioned role) will draw up a report (maximum 3 A4 pages) summarizing the own opinions (as expert) regarding the opportunity of building the power plant.

4. After discussing the arguments proposed by the members of the group, a report must be produced. So the group has to edit the report, and take the final decision regarding the desirability of building the power plant. The justifications must be graphical illustrated (poster, collage etc.)

5. The conclusions made by different groups of pupils will be presented and discussed together with the entire class.

### Part 1: PRESENTATION of the QUESTION for DELIBERATION and ALLOCATION of ROLES

Specific competences:

CS1 - describe the nuclear phenomena;

CS2 - identify practical opportunities for the application of theoretical knowledge related to Nuclear Physics;

Derived competences:

CD1 - analyze the selected information in relation to the proposed questions;

CD2 - work in groups in order to take the optimal decisions concerning the agreement for the construction of the power plant, near the city;

CD3 - retrieve specific information from the proposed websites;

CD4 - discuss about the right to work, the right to live in a healthy environment, the right to exercise an economic activity in a democratic society.

### Part 2: INDIVIDUAL REPORTING

Specific competences:

CS1 - compare and classify natural phenomena and characteristics of some phenomena in the field of Nuclear Physics;

CS2 - analyze causal relationships in pursuit of nuclear physics phenomena and apply the acquired knowledge through the study of Physics in related fields;

Derived competences:

CD1 - analyze the selected information in relation to the proposed questions;

CD2 - edit a report where to submit arguments in respect of the reasons and decisions taken;

CD3 - decide individually and as a group if agree or not with the construction of the nuclear power plant near the city;

CD4 - work in groups in order to take the optimal decisions concerning the agreement for the construction of a power plant near the city;

CD5 - analyze the pros and cons of building a nuclear plant near the city;

CD6 - analyze specific solutions found by certain countries for the same problem.

### Part 3: IDENTIFICATION of the MAJOR ARGUMENTS

Specific competences:

CS1 – define the characteristics of some encountered physical systems;

CS2 - describe the nuclear phenomena;

CS3 - identify practical opportunities for the application of the theoretical knowledge related to nuclear physics;

Derived competences:

CD1 - analyze the selected information in relation to the proposed questions;

CD2 - work in groups in order to take the optimal decisions concerning the agreement for the construction of a power plant near the city;

CD3 - retrieve specific information from the proposed websites;

CD4 - identify the consequences of the use of nuclear energy on human health, environment and society;

CD5 - analyze the pros and cons of building of a nuclear plant near the city;

CD6 - analyze the solutions found by certain countries for the same problem;

### Part 4: Presentation of the GROUP POSITION and DELIBERATION REVIEW PROCESS

Specific competences:

CS1 - present in the form of a written or oral report, the results of investigation, using specific physics terminology;

CS2 - argue the advantages and disadvantages of current technologies, from the environmental perspective.

Derived competences:

CD1 - decide individually and as a group if agree or not with the construction of a nuclear power plant near the city;

CD2 - work in groups in order to take the optimal decisions concerning the agreement for the construction of a power plant near the city;

CD3 - submit to collective decisions, made in front of the class;

CD4 - discuss about the right to work and the right to have a healthy environment in a democratic society;

CD5 - identify the consequences of the use of nuclear energy on the human health, environment and society;

CD6 - analyze the solutions found by other countries for the same problem.

## Other considerations: (Deliberation Rules)

During the final sequences of the lesson, students will share the information included in their documentation. This method is a variant of the *Structured Academic Controversy*. Thus, they must comply with the following rules:

- read the material carefully;
- focus on the question / problem for deliberation;
- listen carefully what others say;
- make sure to understand what others say;

- analyze, talk and encourage others to speak;
- based on the text of the lesson, support your ideas and use your relevant knowledge, including life experiences;
- be active, but when you are in a controversy, have respect;
- focus on ideas, not on the person.

## References

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2. <http://sanatate.acasa.ro/boli-7/efectele-radiatiilor-asupra-organismului-uman-151200.html>
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4. <http://www.referatele.com/referate/chimie/online6/Proiect-poluarea-radioactiva---izotopi-radioactivi-referatele-com.php>

### • Biologist:

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6. [http://opengis.unibuc.ro/index.php?option=com\\_content&view=article&id=602:impactul-centralelor-nucleare-asupra-mediului-studiu-de-caz-fukushima&catid=39:noutati](http://opengis.unibuc.ro/index.php?option=com_content&view=article&id=602:impactul-centralelor-nucleare-asupra-mediului-studiu-de-caz-fukushima&catid=39:noutati)
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### • Physicist:

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15. [http://ro.wikipedia.org/wiki/Fisiune\\_nuclear%C4%83](http://ro.wikipedia.org/wiki/Fisiune_nuclear%C4%83)

### • Historian:

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20. <http://www.ziare.com/cultura/documentar/dosarele-istoriei-accidente-nucleare-in-uniunea-sovietica-1045967>

### • Mayor:

21. Constituția României
22. Legislația muncii