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518300-LLP-2011-IT-COMENIUS-CNW

# Students' Motivation to learn Chemistry in Europe

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*International Conference on Training Issues of Chemistry Teachers  
Technical University of Gabrovo 26.06.2013*



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The scientific background of a teacher who started teaching 10 years ago, without a constant update, risks to become soon completely obsolete. But often the language used by most advanced researches is too complicated even for teachers and the knowledge gap between university and research centres and the teachers themselves tends to become too big to be handled, with the most negative effects falling on the students who exit school unprepared to develop their knowledge in scientific issues.

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The **Chemistry Is All Around Network** project aims at stimulating the interest of students towards the study of chemistry. It is based on the collaboration of school teachers, scientific experts and university researchers and each year foresees different activities within a specific area of interest:

- 1. students' motivation;**
- 2. teachers' training;**
- 3. successful experiences and good practices.**

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# The Project Partners

	Belgium
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	Bulgaria
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	Czech Republic
	<a href="#">Institute Of Chemical Technology Prague</a>
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The first year of work, dedicated to analyse in the Countries involved students' motivation to study chemistry, and discuss about concrete solutions, was completed in December 2012. The material produced (papers, reports, teaching resources etc.) as well as the national and the trasnational reports are available in the project portal:

<http://www.chemistryisnetwork.eu>

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The Transnational Report summarizes all the national reports and is divided into sections, as follows:

- 1. Introduction to the National Situation**
- 2. Setting up of the Network**
- 3. Main obstacles to students' motivation to learn chemistry**
- 4. Analysis of teaching resources**
- 5. National Workshop on Students' Motivation**
- 6. Conclusions**
- 7. Acknowledgement**

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# 1. Introduction to the National Situation

The first section is dedicated to collect documents about the organization of the school system of the eleven Countries participating in the project. Some information about the teaching of science, and chemistry in particular, are also provided.





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## 2. Setting up of the Network

At the beginning, each Country selected at least ten teachers (from schools of different grade and level) and five experts in chemistry and/or education, in order to create a national network able to discuss and work on the subjects foreseen for each year of the project.

Now, they are looking for associated partners and schools to involve as support in the dissemination and for testing the selected resources.

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Partners (11)	Experts (70)	Schools/ Teachers (79/163)	Associated Schools (30)	Associated Partners (32)
Belgium	7	11/37	2	4
Bulgaria	5	5/10	4	3
Czech Republic	5	6/11	3	<i>in progress</i>
Greece	7	10/12	5	3
Ireland	5	8/11	3	3
Italy	6	6/10	6	6
Poland	7	8/14	3	3
Portugal	5	7/18	1	4
Slovak Republic	7	5/10	<i>in progress</i>	<i>in progress</i>
Spain	10	6/14	<i>in progress</i>	3
Turkey	6	7/16	1	4



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### **3. Main obstacles to students' motivation to learn chemistry**

The low students' motivation to learn chemistry is a problem that affects all Countries participating in the project. It is a real contradiction for the modern society, where science and technology are continually evolving.

The main reason is in the nature of this discipline.

The necessity of thinking at microscopic level generates many difficulties and the belief that chemistry is abstract and far from personal and professional needs.



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It is obvious that students cannot have interest in something that is seen as detached and irrelevant to their everyday life reality.

Moreover, chemistry involves mathematics, being student's performance in mathematics crucial to support interest in chemistry and other science subjects.

Besides this, mass media contribute has to be considered because too often encouraging the negative image that pupils and their families have about chemistry (pollution, poisons, ecologic disasters...).



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To improve science education, some Countries set up overall national strategies, while others fund or encourage projects and initiatives at national and local level aiming to improve people opinion towards chemistry, or to introduce facilities into schools (i.e. computers, LIM, laboratory equipments), training courses for teachers and new disciplinary approaches for students.

For this, the first activity of the project was to collect documents and select teaching resources to comment inside the national groups of teachers and experts involved.

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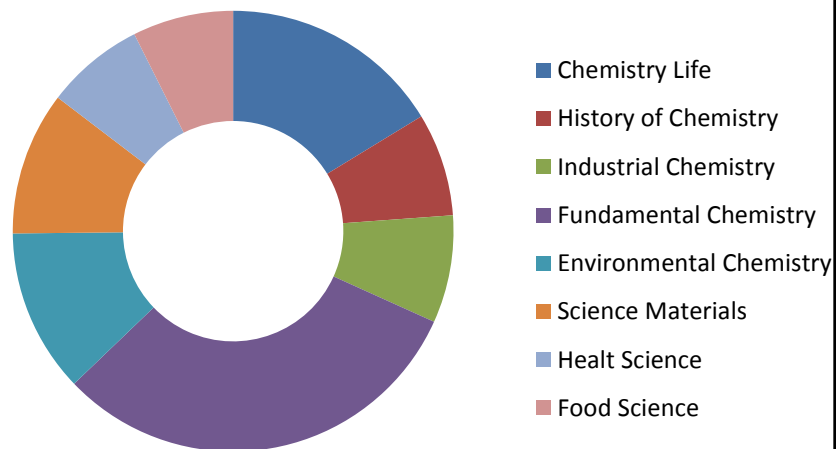
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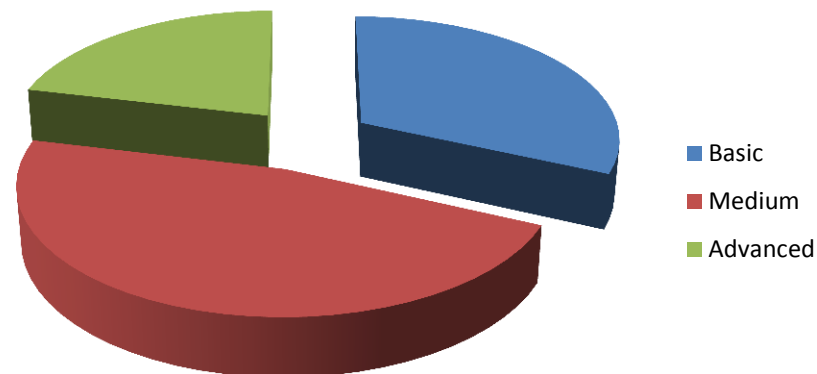
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## 4. Analysis of teaching resources

Subject Area



Level of Chemistry Knowledge





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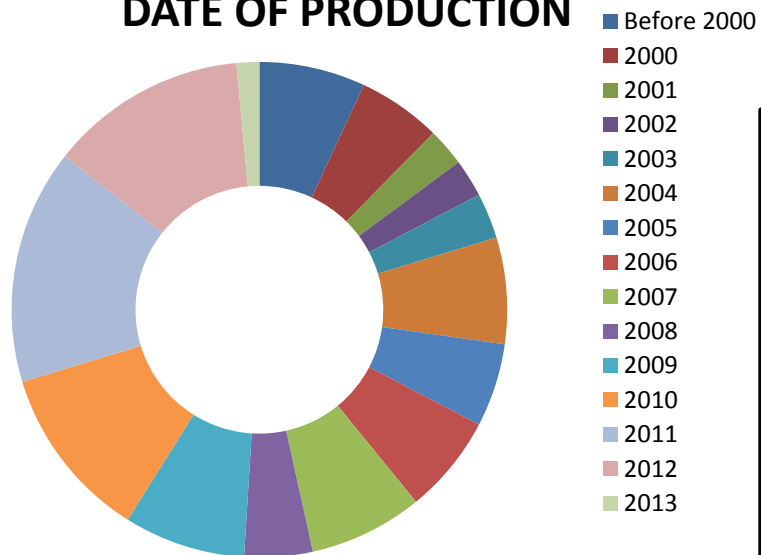
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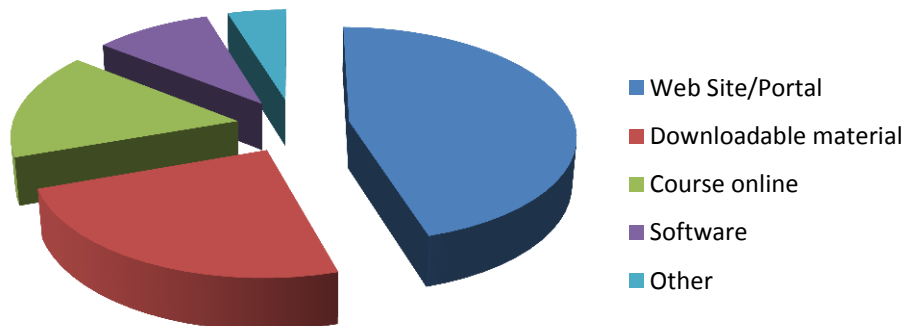
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## 4. Analysis of teaching resources

**DATE OF PRODUCTION**



**Type of product**







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## 4. Analysis of teaching resources

**Dissolution d'un cristal ionique**

- **Dislocation du cristal**  
La proximité des molécules d'eau polaires fragilise les liaisons du cristal qui finissent par se rompre.
- **Solvatation des ions**  
Du fait des interactions électriques, les molécules d'eau entourent les ions et les dispersent.

On dit que les ions sont solvatés, ou hydratés dans le cas de l'eau.

A.W.

[http://www.ostralo.net/3\\_animations/swf/dissolution.](http://www.ostralo.net/3_animations/swf/dissolution.)

[www.ucha.se](http://www.ucha.se)

<http://ucha.se/watch/812/Natrieva-osnova>

Уча.се

Мотивирам.се блогът на Уча.се

СЪЗДАНИ УРОЦИ: 914  
ИЗГЛЕДАНИ УРОЦИ: 1428584

**Натриева основа**

Предмет: Химия, 7 клас  
Раздел: Метали. Натрий и неговите съединения  
Ключови думи: натрий, натриева основа, дисоциация, неутрализация, основа, киселина, обменна реакция, сода каустик, NaOH

Въпроси: 6 (задай въпрос)  
Коментари: 13 (коментирай)  
Брой гледания: 1250  
Сподели: (и добави бг.)

Калцинирана сода  
 $\text{Na}_2\text{CO}_3$

Основа + киселинен оксид → сол + вода

$\text{NaOH} + \text{CO}_2 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O}$

динатриев карбонат = "сода за бивчи"



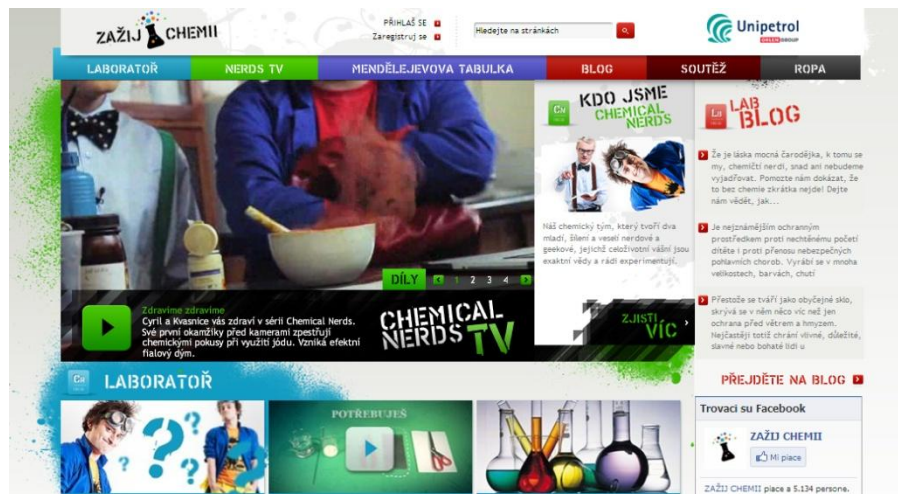


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[www.zazijchemii.cz](http://www.zazijchemii.cz)

<http://www.chemistry-is.eu/>



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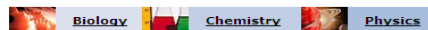
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## Chemistry

Search

The world is made up of a variety of substances.

Some of these occur naturally in our environment, others are made through the combination of naturally-occurring substances to form new materials.

The study of chemistry can lead us to a better understanding of our material world and the processes by which materials can change and be changed.

Material Safety Data Sheets (MSDS) for materials used in this section can be obtained from [http://chemistry.sls.ie/ph\\_materialsafetydata.htm](http://chemistry.sls.ie/ph_materialsafetydata.htm)



### Section 2A

[Classification of substances](#)

### Section 2B

[Air, oxygen, carbon dioxide and water](#)

### Section 2C

[Atomic structure, reactions and compounds](#)

<http://jsss.educast.ie/jsss.go2.ie/jsss/Main/Chemistry.htm>

<http://www.chemistry-is.eu/>



<http://bnd.ibe.edu.pl/subject-page/9>



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<http://www.aquimicadascoisas.org/en/>

**Chemia.sk**

Stránka vedomí, informácie, veda.sk

Chémia

Chémia (z angličtiny: slovo pravdepodobne vzniklo zo slova alchymia) je veda o vlastnostiach, zložení, štruktúre, príprave, premenách a zákonitostiach prvkov, látok a ich zosúlení.

Centrom záujmu chémie sú chemické premeny látok (chemické reakcie), čiže chemické deje, pri ktorých sa atómy v dôsledku chemických väzieb oslobodia zo zoskupení atómov (molekuly, kryštály) alebo pri ktorých sa zoskupenia atómov rozdeľujú na atómy, alebo sa preskupujú v iné zoskupenia. Dôležité sú v chémii aj metódy na delenie látok, napr. destilácia, extrakcia, filtrácia. Viac

**Periodická tabuľka chemických prvkov:**

Skupina \ Perióda	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H																	2 He
2	3 Li	4 Be							5 B	6 C	7 N	8 O	9 F	10 Ne				
3	11 Na	12 Mg							13 Al	14 Si	15 P	16 S	17 Cl	18 Ar				
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
6	55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	72 Hf
7	87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf

[www.chemia.sk](http://www.chemia.sk)

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<http://recursostic.educacion.es/ciencias/ulloa/web/>

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**eba**  
eğitim bilişim ağı

Hakkında İletişim

Lütfen giriş yapınız

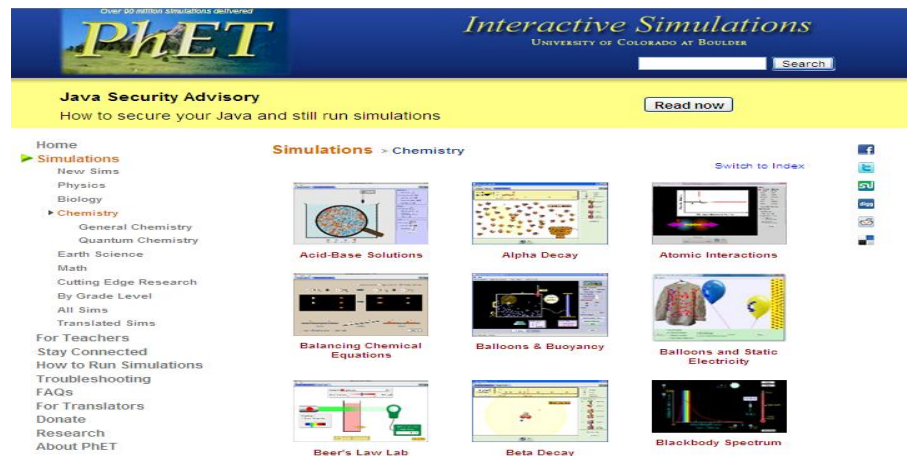


Ana Sayfa sosyal eğitim platformu



<http://www.eba.gov.tr/>

<http://phet.colorado.edu/it/simulations/category/chemistry>



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## 5. National Workshop on Students' Motivation



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General objectives of the workshops were:

- discussion and evaluation of the contents of the “Chemistry is All Around Network” database (Papers and Publications about students’ motivation – Teaching Resources) with particular attention to the non-national materials;
- analysis of the current national situations in relation to students’ motivation to learn chemistry *via* the personal experiences of the participants;
- collection of proposals for overcoming the problem of the lack of students’ motivation to learn chemistry.

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## 6. Conclusions

All Partners agree that chemistry/science teaching must change, since primary school.

If teaching is effective, students learn significantly and are motivated to go on, willingly accepting the challenges that knowledge proposes them.

The teacher figure and the educational and emotional mediation that teacher makes between students and knowledge are key points, therefore it is necessary to work on them. Then, since there is not only one correct way to teach, sensibility and experience will help teachers to choose different methods and tools from time to time, depending on the context.

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For what concerns tools suitable to enhance students' motivation, laboratory practice and ICT resources are warmly supported by all Partners, **but recommending that they are only an instrument and cannot replace the teacher.**

Laboratory activities are important to link theory and practice, to show the connection between chemistry and everyday life, thus arousing curiosity and breaking down prejudices and the virtual laboratories are good instruments to learn how to work in the laboratory. This can be very useful, for example, to understand the safety rules before starting to work really.

**A virtual laboratory, however, can never teach the skill that comes from real experience.**



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ICT is increasing in importance in people's lives and it is expected that this trend will continue, to the extent that ICT literacy will become a functional requirement for people's work, social, and personal lives. The use of ICT in appropriate contexts in education can add value in teaching and learning, by enhancing the effectiveness of learning, or by adding a dimension to learning that was not previously available. ICT may also be a significant motivational factor in students' learning, and can support students' engagement with collaborative learning.



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The first year of the project has been stimulating and fruitful also thanks to the joint effort between teachers from schools of different grades and experts involved in science education research.

In fact, school teachers daily live the report with students, thus knowing their psychology and their difficulties to learn.

On the other hand, researchers know how to carry out a well structured research in order to reach certain objectives, and are able to provide appropriate surveys.

We think that these skills, if used together, could act as valuable tools and a strong impact in science education is foreseen.

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## Acknowledgements

The Transnational Report is the summary of the most important contents presented in detail in the eleven National Reports produced by Partners. Hence, we wish to acknowledge the authors of the National Reports for their contribution:

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- **Zlata Selak, Julien Keutgen** (Inforef- Belgium)
- **Milena Koleva, Adriana Tafrova Grigorova, Maria Nikolova** (Technical University Of Gabrovo – Bulgaria)
- **Eva Krchová, Zdeněk Hrdlička, Helena Kroftová** (Institute Of Chemical Technology Prague - Czech Republic)
- **Dionysios Koulougliotis, Katerina Salta, Effimia Ireiotou** (Technological Educational Institute Of Ionian Islands – Greece)
- **Marie Walsh** (Limerick Institute Of Technology – Ireland)
- **Magdalena Gałaj** (Wyższa Szkoła Informatyki I Umiejętności W Łodzi – Poland)
- **Olga Ferreira, Filomena Barreiro** (Instituto Politécnico De Bragança – Portugal)
- **Juraj Dubrava** (Transfer Slovensko, S.R.O. – Slovakia)
- **Antonio Jesus Gil Torres and Selina Martin Cano** (CECE – Spain)
- **Murat Demirbaş, Mustafa Bayrakci** (Kirikkale University Education Faculty – Turkey)



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## **A particular acknowledgement to:**

Dionysios Koulougliotis, Marie Walsh, Filomena Barreiro, Milena Koleva, Julien Keutgen, Zdeněk Hrdlička, that also collaborated to the check and correction of the Transnational Report and to:

Lorenzo Martellini (Pixel – Italy) for the collaboration and the coordination of Partners' work.

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