

The conference „Visuality & Mathematics – Experimental Education of Mathematics through Visual Arts, Sciences and Playful Activities”

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Theme of the lesson/tool:	Plato solids – connecting mathematics to ecology, electrical engineering, economy
Place in curriculum: (type of school, grade)	Secondary school 3rd grade
Age of the students/pupils:	Approximately 17
Title of the lesson/tool:	Plato solids

Description of the lesson or educational tool			
Time	Exercises, matters, parts of the lesson	Methods and forms of student activities	Developable competencies
20 min.	<i>1st lesson</i> <i>Introducing Plato solids</i> <i>Working in groups and using a computer, tablet or mobile phone, pupils have to find more information and interesting details about Plato</i>	<i>Frontal work, individual work, work in pairs, work in cooperative groups, project</i>	<i>internal motivation, development of ecological competencies and raising</i>

15 min.	<p><i>solids. Pupils of each school (together) have to prepare one short presentation about Plato solids that will show via Skype to friends-colleagues from other schools</i></p>	work	awareness about environmental protection,
6min.	<p><i>Representing presentation. Selection of the best.</i></p> <p><i>2nd lesson</i></p> <p><i>Film: girl who fell silent the world for a 6 minutes</i></p> <p><i>http://www.youtube.com/watch?v=HlEqTnCUNlg</i></p>		development of logical thinking, the ability to apply knowledge to new situations,
20min.	<p><i>Technical School pupils (department: ecologist) talk about the importance of preserving environment, types of pollution, waste recycling options, and energy management by using the previously prepared this presentation</i></p>		development of social and communication skills,
14min.	<p><i>Discussion of all the pupils on the importance of preserving the environment, finding solutions for waste recycling and energy management</i></p>		training for research work
5min.	<p><i>Pupils discuss on the topic of whether mathematics can be applied in ecology and how. For homework they should consider how Plato solids can be used for classification and recycling of waste. Possible discussions via Facebook, Skype and mobile phone</i></p>		
15 min.	<p><i>3rd lesson</i></p> <p><i>Via Skype pupils present to their friend-colleagues (from other schools) their ideas about waste classification by using Plato solids. Discussion about ideas and choosing the best one.</i></p>		

20min.	<p><i>Creating solution models out of paper, wire or something else. Pupils from electrical engineering school have to find some new technical solution that will make solution of the environmental problem more attractive, useful etc.</i></p>		
5 min.	<p><i>Based on experience gained during creating models out of different material and by using different nets, pupils discuss about minimal waste material</i></p>		
5min.	<p><i>Homework:Pupils from Electrical engineering school have to calculate the area and the volume of Plato solids and amount of used material in making realistic model. In order to fulfill this task they can discuss via social networks or mobile phone with friends-colleagues from other schools. Their final calculation needs to be send to colleagues from Economic and trade school that will do financial calculation of average material costs .Pupils from Technical school have a task to implement existing ecological standards into the model solution.</i></p>		
13min.	<p><i>4th lesson</i></p> <p><i>Pupils from Electrical engineering school present their calculation on area and volume of Plato solids. Their also present their solution of using material for creating realistic model. All pupils discuss and choose the best solution.</i></p>		
13 min.	<p><i>Pupils from Technical school present implementation of ecological standards into the models. Discussion about importance of the standards and how they are created.</i></p>		
13 min.	<p><i>Pupils from Economic and trade school present financial calculation on average costs of making</i></p>		

	<i>real model. They explain to their friends-colleagues invoice.</i>		
<i>6 min.</i>	<i>Summary of the all work that has been done.</i>		

Summary

This lesson plan is based on experience that we gain by working on "Plato solids in ecology-Ecology, waste and energy management" (project "Energy is all around us"-2013). We noticed that our pupils enjoyed working together with friends-colleagues from other school. They enjoyed teaching each other and changing experience and opinion about something. We held some experimental lessons about our work together.

Supplements

Used materials:	<p><i>Here you can write down which materials you used, or add a file with the exercise papers, drawings, etc.</i></p> <p><i>Film : http://www.youtube.com/watch?v=HlEqTnCUNlg</i></p> <p><i>Paper, wire</i></p>
Photos:	<p><i>We have some photos from experimental lessons.</i></p> <p><i>Please visit page :</i></p> <p><i>http://eteblog.wordpress.com/</i></p>