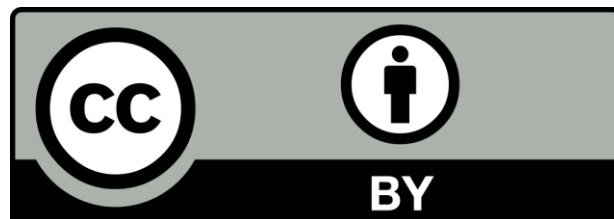




24 scenarios of innovative lessons

Lesson plans including such methods as for example cross-curricular, problem-based teaching, IBSE method (Inquiry Based Science Education), CLIL lessons, collaborative learning and teaching, worksheets etc. Lessons will be planned and conducted by teachers of the partner schools during the project.



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Co-funded by the
Erasmus+ Programme
of the European Union



Lesson Plan

Class: 1 or 2	Grade: 13/14 years old	Time: 45 minutes or more
Teacher: Kinga Myśliwiec		Date: February
Country: Poland	Subject: Geography	
Topic Area: Map and plan		
Aims: By the end of this lesson students will be able to: <ul style="list-style-type: none">- know what is 'map', 'plan', 'grid', 'cartographic grid',- explain the difference between a grid and a cartographic grid and a square grid,- explain the difference between a plan and a map,- can read the information from a map and a plan,- elaborate a trip route on a given city or country using a map/plan.		
Aids ¹ : a textbook, a map, a plan, worksheets given by a teacher, a mobile phone with 'Endomondo' and 'GPS' apps		
Procedure:		Time
Warm up/ review: A teacher explains students the difference between a map and a plan.		5 minutes
Step 1: Students answer to the following questions: <ul style="list-style-type: none">- name scales which were made maps and a plan,- define the actual distance in the area which is 1 cm on maps and on a plan,- what is the type of grid,		15 minutes

¹ Attach worksheets, Other material used, links to websites...

<ul style="list-style-type: none"> - what is a geographic coordinate system of some cities, - what are cartographic signs placed in a legend of a car map, - what are signatures placed in a legend of a plan, - what information gives us a map and a plan. <p>Step 2: Students work in groups using maps/plans of cities/countries and doing some tasks which are given by a teacher (appendix 1,2,3, a task set A,B,C).</p>	25 minutes
<p>Homework:</p>	
<p>Evaluation: A teacher discusses solutions and evaluate their correctness.</p>	
<p>Summary: This lesson improves pupils' skills to use a different source of information, communicate with others and work in team.</p>	

Appendix 1 A plan of a town/city

Appendix 2 A tourist map

Appendix 3 A car map

A task set A A plan of your town/city (e.g Krempachy/Warsaw/London)

Students elaborate a trip route from one point to another. They describe what interesting places do they pass. Using their mobile phones with 'Endomondo' and 'GPS' apps, pupils track their walks, duration, distance, heart rate and average pace to achieve their goal.

A task set B A tourist map

Students elaborate a trip route from one point to another. They describe what interesting places do they pass, what are directions of the world, what is the actual distance and what information is placed on a map.

A task set C A car map

Students elaborate a trip route from one city to another city. They describe what interesting places do they pass, what is the actual distance and what information is placed on a car map.



Lesson Plan

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Class:	Grade:6	Time:50 Minutes
Teacher: Oxana Nikolaeva		Date: 01/12/2017
Country: Estonia		Subject: Nature studies
Topic Area: Bird watch of the Baltic Sea		
Aims: By the end of this lesson students will be able to: <ul style="list-style-type: none"> • name main birds in Estonia in the Estonian language • say what kinds of birds affect on the Baltic Sea • learn how to work with a text and choose the right information 		
Aids¹: a worksheet		
Procedure:		Time
1. SS read the text one by one - 15 minutes 2. SS write out the main terms to their exercise book - 10 minutes 3. SS work with text + the worksheet - 15 minutes 4. Summing up - 5 minutes		45 minutes
Homework: -		
Evaluation: -		
Summary: <ol style="list-style-type: none"> 1. During the lesson, the students acquire the skills of reading, writing and speaking 2. They are able to work with the text of the textbook 3. They are able to listen to their classmates 4. They acquire knowledge of local bird species 5. They are able to characterise particular species of birds 		

¹ Attach worksheets, Other material used, links to websites...

TÖÖLEHT: LÄÄNEMERE LINNUSTIK, 6. KLASS

1. Kirjuta lünkadesse täishäälikud. Saad celmise tunni põhimõisted ning nii selgrootud loomade kui ka kalade nimetused.

	Tähed lünkadesse:
S_LGR__T_D	o, o, u, e
K_RPV_H_L_S_D	e, i, i, i, ä
R_NN_K_RB_D	i, a, a, a
S_D_K_RP	a, ü, a
L_M_K_RP	e, a, a
M_R_K_L_D	a, e, a, e
S__RD_K_L_D	i, a, i, a, e
_NG_RJ_S	e, a, a
L_H_	e, õ
R__M	i, ä
K_L_	u, i

2. Loe õpiku materjali läbi ning täida lüngad puuduva informatsiooniga.



Naerukajakas on, kes võib pesitseda nii kui ka Tema põhitunnuseks on esiosa. Oma nime on saanud läärmaka tõttu, mis meenutab Naerukajakad pesitsevad Nende peamiseks toiduks on ja muud Aga õhust ta püüab ka ja



Üks kaunimuid on kümnokk-luik. Teeb oma kõrge kuhilataolise roostikku. Oma nime on ta saanud nokal. Tema peamiseks toiduks on



Võimsam Eestis. Pesitseb nii kui ka lähistel, on Tema toiduks on



Lesson Plan

Class: 10 (upper-secondary level); Lesson time - 45m	
Teacher: Deniss Tšertov	Date: 17,02,2017
Country: Estonia	Subject: English
Topic Area: "Dreams come true" VOCABULARY CONSOLIDATION	
Aims: by the end of this lesson students will be able to: <ul style="list-style-type: none"> • answer questions about the education system in Estonia; • consolidate the vocabulary using various learning digital environments. 	
Aids¹: students' digital devices; a projector, laptop, various digital apps and WebPages: emaze.com, quizlet.com, facebook, learningapps.org; https://goo.gl	
Abbreviations: T = teacher; S = student; SS = students	
Procedure:	Time (m)
Warm up: T provides SS with a linguistic game (http://imgur.com/a/aCQzz). (the key: http://imgur.com/jppRNnw)	4
Step 1: one S had a homework task to prepare a presentation in an emaze.com platform on the topic of the education system in Estonia. The S shows her presentation to her classmates and introduces the topic (shareable) (https://www.emaze.com/@AWFIICFQ/untitled). In the end of the presentation, the S asks other SS questions based on the material to check their understanding. The link to the presentation is also added to a facebook closed group of this class.	15
Step 2: T creates a study set of the target vocabulary in a quizlet platform beforehand and uses different types of tasks to revise the words with the SS with the help of their digital devices in the class. <ul style="list-style-type: none"> *a flashcards mode: https://quizlet.com/159150454/flashcards; *a learning mode: https://quizlet.com/159150454/learn; *a spelling mode: https://quizlet.com/159150454/spell; *a test mode: https://quizlet.com/159150454/test; *a matching mode: https://quizlet.com/159150454/match; *a game mode: https://quizlet.com/159150454/gravity; *a quizlet live game mode for collaboration (available for registered users): https://quizlet.com/features/live. SS need to use their 	20

¹ Attach worksheets, Other material used, links to websites...

digital devices to play the game in groups by means of collaboration.

Step 3:

T uses a **URL shortener application** (<https://goo.gl/>) to change the link to a learningapp activity (<http://LearningApps.org/view2712761>) so that SS wouldn't need to type a longer link. T provides the shortened link and SS access the page (goo.gl/2ZZvmQ). SS solve the task on their devices and then T checks it together with all SS with the help of a projector and T's laptop.

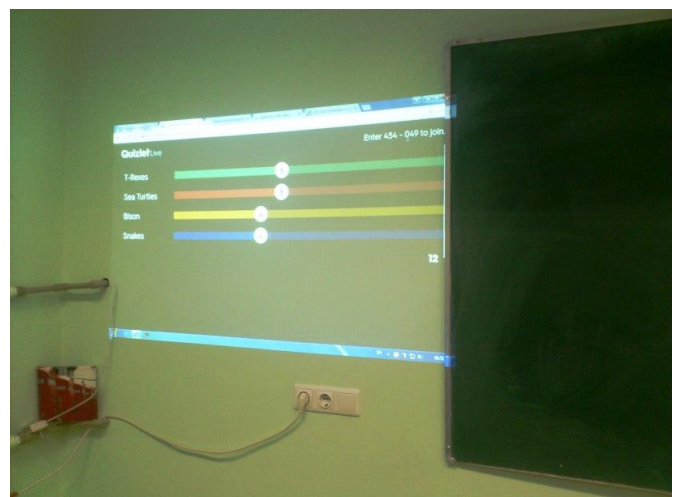
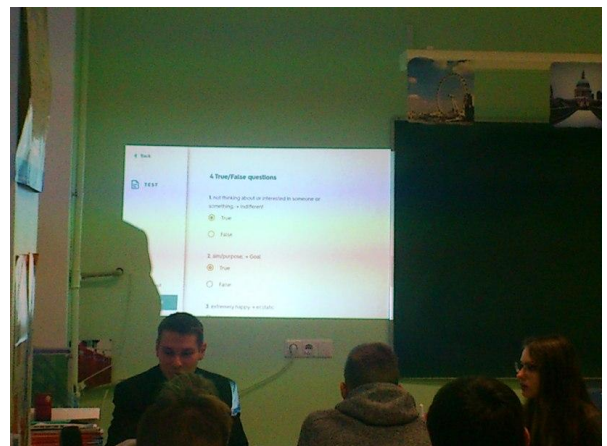
6

Evaluation:

direct observation

Summary:

SS were able to answer their classmate's questions on the topic of the Estonian education and completed several revision tasks online on the vocabulary topic "Dreams come true". Besides, the students have developed their digital competence while working with their devices. During the lesson 2 main aims have been reached.





Lesson Plan



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Class: 5E	Time: 45m
Teacher: Vladislava Avramenko	Date: June, 2017
Country: Estonia	Subject: Maths
Topic Area: Applying Formulas	
<p>Aims: By the end of this lesson students will be able to:</p> <ul style="list-style-type: none"> *Know the formulas for calculating the perimeter and the area of a rectangle and a square. * Know how to find the distance, speed and time 	
<p>Aids¹: students' digital devices; a projector, smartboard, various digital apps and WebPages: www.learningapps.org www.create.kahoot.it</p>	
Procedure:	Time
<p>Warm up/ review:</p> <p>Step 1: A brainstorm activity. Presenting a cluster on the topic of "Formulas". Presentation «Formula of the distance». Filling the table.</p>	10
<p>Step 2: In the learning environment www.learningapps.org with the help of gadgets doing an exercise "Property-formula": http://LearningApps.org/display?v=p4bdp6t6216. Here's a video of this stage: https://youtu.be/SJDN4Kds_Fo</p>	12

¹ Attach worksheets, Other material used, links to websites...





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Lesson Plan

Class: A and C	Grade: 8º	Time: 3 lessons (150 ')
Teacher: Alexandra Fernandes		Date: 9/ 01/2017; 11/01/2017; 16/01/2017
Country: Portugal	Subject: Science	
Topic Area: Earth Sustainability (Ecosystems - Influence of light on animals)		
Aims: Inquiry skill focus By the end of this lesson students will be able to: <ul style="list-style-type: none"> • Formulate the problem • Develop hypothesis • Plan investigations • Form coherent arguments • Work collaboratively Scientific reasoning and literacy <ul style="list-style-type: none"> • Scientific reasoning (identifying variables) • Scientific literacy [Explain how light influences animals (rabbits)] 		
Aids¹: <ul style="list-style-type: none"> - Engaging situation - Rubric used for the assessment of students' skills - Self-evaluation worksheet 		
Procedure: Activity development according to Inquiry methodology (theoretical model 5 E's: Engage - Explore - Explain - Extend - Evaluate). The use of research activities in the context of the classroom and their evaluation.		Time 150 min
Warm up/ review: Activity A: Planning a investigation Step 1: Students are invited to read about rabbit's coat (attachment 1) Step 2: The teacher asks questions to encourage the students to consider how rabbit's coat changes.		5 min 5 min

¹ Attach worksheets, Other material used, links to websites...

Step 3: Students first discuss their ideas in small groups, they need to formulate the problem, develop hypotheses, plan investigations)	20 min
Step 4: Teacher gives the result of the planning investigation and students have to formulate a conclusion and decide whether they respond to the problem and whether or not the hypothesis is true.	15 min
Activity B: Preparing a presentation [poster presentation]	
Step 1: Students do an illustrative poster of planned activity.	45 min
Activity C: Presentation	
Step 1: Each group elects a spokesman.	2 min
Step 2: The teacher moderates a debate about the planned investigations.	25 min
Step 3: Students reflect on what they have learned through carrying out the activity.	20 min
Homework: -----	
Evaluation: Within the suggested learning and assessment sequence specific inquiry skills are emphasised for development and assessment. Note, that throughout the activities students will have opportunities to practice a range of inquiry skills not identified in the description.	
Summary 1: Theoretical practical activity: change of coat of the rabbits (definition of problem and hypothesis, planning of experimental activity, presentation of results: preparation of poster).	
Summary 2: Theoretical practical activity: change of coat of the rabbits (preparation of presentation - doing a poster).	
Summary 3: Debate (Discussion of theoretical-practical activity: influence of abiotic factors on the change of coat of rabbits.)	
Evaluation	



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Class: A	Grade:9	Time:50 Minutes
Teacher: Francisco Cavaco		Date:12/12/2017
Country: Portugal	Subject: Geography	
Topic Area: Economic Geography Tourism		
<p>Aims: By the end of this lesson students will be able to:</p> <ul style="list-style-type: none"> • Distinguish leisure tourism. • Interpret global tourism development based on statistical data. • Explain the increase in touristic activity. • Relate different physical and human factors to the practice of different forms of tourism. • Identify the main forms of tourism: beach / mountain / cultural / religious / thermal / business / rural / adventure / extreme / nature (...). • Explain the main worldwide touristic destinations and areas of provenance of tourists. • Discuss the main impacts of tourism. • Reflect on the importance of sustainable tourism. 		
Aids: projector, PPT, computer, board, hotpotatoes exercises		
Procedure:		Time
<p>- Using a PowerPoint presentation: - As the teacher shows the different slides, students are asked to comment and discuss some aspects of the touristic activity. - Group work: 10 minutes before the end of the lesson sts form groups and take notes of the main conclusions</p>		50 minutes
Homework: Worksheet to be made available on the school's Moodle learning platform.		
<p>Evaluation: Notes of hotpotatoes exercises available on the Moodle platform. Worksheet available on the learning platform of the school.</p>		
Summary: Definition of tourism, the different types of tourism, the main touristic centers of the world		

Erasmus+ “Science 4 all”



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Lesson Plan: King Arthur's story

Class:	Grade: 6th	Time:
Teacher: Béatrice Gonzalez (English)		Date: January 2017
Topic Area: King Arthur Lexical items: chivalry (the knights of the Round Table) Structural items: preterite, linking words		
Aims: By the end of this lesson students shall be able to tell King Arthur's story using the preterite		
Aids: powerpoint presentation, texts about King Arthur's life, video with King Arthur's story told with lego toys → https://www.youtube.com/watch?v=NFqCgYl9d88		
Procedure:		Time
Warm up/ review: powerpoint presentation with images that correspond to vocabulary linked to chivalry		
Step 1: in groups of 4/5, read one text linked to King Arthur's story and get ready to act the scene out		
Step 2: each group mimes the scene and the class tries to guess which text is mimed		
Step 3: each group acts the scene out (they can read the text)		

Step 4: in groups, they work on the dubbing of the video. They imagine the voice-over, the noises, the words said by the characters (they can use some of the sentences that are in the texts)	
Homework:	
Evaluation: The work of acting out the scene, dubbing the video can be evaluated, as well as the ability to write a text that tells King Arthur's story.	

King Arthur's life

1. King Arthur's childhood...

Uther, the King of Britain fell in with Lady Igraine, but she was to Gorlois, the Duke of Tintagel.

King Uther decided he must marry Igraine so he with Gorlois and Gorlois was

King Uther Igraine and they had a called Arthur.

It was a very dangerous time so King Uther gave his son to his, Merlin, for safety but Merlin gave Arthur to Sir Ector. He grew up with his foster, Kay.



2. How King Arthur became King of England ...

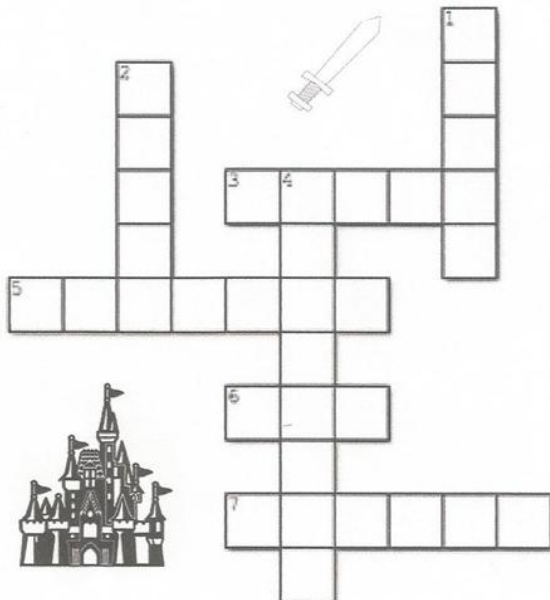


When King Uther died, a mysterious with a sword magically appeared in London. There was a message on it : « The person who pulls the sword from the stone will become the of Britain ».

A lot of people tried to pull the sword out but it was for them.

Years later, Arthur's elder foster brother, Kay, went to London for his first He forgot his sword so Arthur went to look for one and he the sword in the stone. He pulled it out easily. Arthur was 15 at that time so he was very when he the king of England.

Read the definitions and complete the crossword:



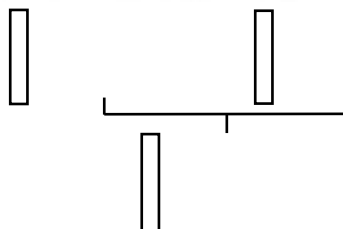
Down

1. Whoever pulls it becomes King of Britain
2. Arthur's adoptive father
4. Uther's castle

Across

3. Arthur's father
5. Arthur's mother
6. Ector's son
7. Uther's wizard

Complete Arthur's family tree :



3. Arthur, the successful king ...

Arthur's royal palace was Camelot.

Merlin helped King Arthur to rule Britain. He took him to a lake. Merlin's friend, the « Lady of the Lake » lived there. She gave Arthur a sword called « ».

Arthur married a princess called Guinevere. As a wedding, her father gave them a huge table.

All the knights in the country wanted to be soldiers for King Arthur. The bravest of them were allowed to sit at the round table. They were called the « of the ». It was round so no one was more important than the others, they were all equal.



Arthur and the Knights of the Round Table against the Saxons in many Arthur decided to take his army to Europe. After a lot of fighting, Arthur won the western half of

Back in Britain, the Knights of the Round Table had lots of adventures. Some rescued Some fought dr..... or bad knights. Many of them went to look for a religious cup called the « ».

4. Arthur is lied to ...

The best and bravest of the Knights of the Round Table was called Sir L..... He was very handsome and Queen Guinevere fell in with him. They escaped together to Brittany.

Arthur took a big army across the English Ch..... to Brittany. He wanted to punish Lancelot and Guinevere.



As Arthur had no children, Mordred, his nephew would become the king after Arthur's death, but he could not wait. When Arthur was in Brittany, Mordred told everyone that King Arthur had been killed fighting. People believed him and Mordred made himself king of Britain. When Arthur heard that, he returned to Britain with his army. Arthur killed Mordred, but was very badly hurt himself.

Arthur knew he was going to die. He gave Excalibur to Sir Bedivere. He told him to throw it into the When he did that, the hand of the Lady of the Lake came out of the water to catch it. Three queens arrived in a boat and took Arthur away to the Isle of Avalon. He died there soon afterwards.



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Lesson Plan:

What is civilization in prehistoric times ?

Class: 6. 11 years	Grade: college	Time: 1 hour
Teacher: Thomas Galois		Date: 3 février 2017
Topic Area: history		
Lexical items: prehistoric, ancient history		
Structural items: activity with internet		
Aims: By the end of this lesson students shall be able to: explain what is civilization in prehistory times. They can also create a small video to explain the lesson.		
Aids: lesson, books, library, devices for internet.		
Procedure:		Time
Warm up/ review:		
Step 1: Explain the aim of the video : the teacher gives 5 subjects for the leasson and pupils need to create a team for one subject. We have 6 teams in a classroom.		10 minutes
Step 2: Create a small video about one subject (Lucy for example). They draw on a paper a sketch to explain their subject. Then, we do a video of two minutes in each team.		40 minutes
Step 3: Look at the video on the website's teacher to do a summary. Each team need to understand to be better next time.		10 minutes

Homework: Read the book to prepare the leasson	
Evaluation: Do a summary of one item of a video done.	
Summary: Create teams, do a video and analyze it.	



SCIENCE 4 ALL

Lesson Plan

Class: 1 or 2	Grade: 13/14 years old	Time: 60 minutes
Teacher: Kinga Myśliwiec		Date: March
Country: Poland	Subject: Geography	
Topic Area: Meteo station and measuring weather elements – Kasprowy Wierch.		
<p>Aims: By the end of this lesson students will be able to:</p> <ul style="list-style-type: none"> - know what are weather elements, - know what is the weather, symbols/units of measure, - explain the directions of the world, - can read the information from a map, - read the altitude height of the highest top and the lowest top in the nearest area, - use a compass, name the measuring device, - explain the zoning of plants life in the mountains, - calculate the height difference between the tops, - know vocabulary about the weather and air temperature. 		
<p>Aids¹: a thermometer, a map of the Tatra Mountains, a compass, a barometer, a stick with a ribbon, worksheets given by a teacher,</p>		
Procedure:		Time
Warm up/ review: A teacher explains students what is the weather/weather forecast/meteorology?		5 minutes
Going up to Kasprowy Wierch by the cable car.		10 minutes
Two students explain what are the names of the measuring device by showing the pictures prepared earlier.		5 minutes
Students are divided into 5 groups.		30 minutes

¹ Attach worksheets, Other material used, links to websites...

<p>Group 1 have to give the name of measuring device and units of measure to each weather elements (appendix 1).</p> <p>Group 2 and 3 have to complete appendix 2 – air temperature, wind direction, overcast, type/amount of precipitation, atmospheric deposit and weather phenomena, using symbols of measure.</p> <p>Group 4 have to define the directions of the world, find the highest/lowest top of the Tatra Mountains, calculate the altitude height of these tops (appendix 3).</p> <p>Group 5 draw, write Western and Eastern Tatras, mark the directions of the world, write the zoning of plants life in the mountains. They also explain how can we protect natural heritage of this region (appendix 4).</p> <p>Going down from Kasprowy Wierch by the cable car</p>	<p>10 minutes</p>
<p>Evaluation: A teacher discusses solutions and evaluate their correctness.</p>	
<p>Summary: This lesson improves pupils’ skills to use a different source of information, communicate with others in English and work in team.</p>	

Appendix 1 A task set for students A

Appendix 2 A task set for students B

Appendix 3 A task set for students Group 4

Appendix 4 A task set for students Group 5






















A task set for students A

Weather elements	The name of measuring device	Unit of measure	Other notes
Air temperature and soil			
Precipitation			
Air humidity			
Atmospheric pressure			
Wind direction and speed			
Insolation/overcast			

A task set for students B

Time of observation	date	Monday 13.03.2017			Tuesday 14.03.2017			Wednesday 15.03.2017			Thursday 16.03.2017			Friday 17. 03.2017		
	time	10 ⁰⁰	13 ⁰⁰	19 ⁰⁰	10 ⁰⁰	13 ⁰⁰	19 ⁰⁰	10 ⁰⁰	13 ⁰⁰	19 ⁰⁰	10 ⁰⁰	13 ⁰⁰	19 ⁰⁰	10 ⁰⁰	13 ⁰⁰	19 ⁰⁰
Weather elements	Air temperature															
	wind direction															
	wind force															
	overcast															
	Type of precipitation															
	Amount of precipitation															
	Atmospheric deposit															
	Weather phenomena															

Weather elements		Symbols / unit of measure	
Temperature		°C	
Wind	direction	↓ or N	nothern
		↙ or NE	North-eastern
		← or E	eastern
		↘ or SE	south-eastern
		↑ or S	southern

		 or SW	south-western
		 or W	western
		 or NW	north-western
	force	Beaufort scale (1–12) or m/s	
Overcast			Cloudless (niebo bez chmur)
			Scattered Clouds (mniej niż połowa nieba zachmurzona)
			Partly (połowa nieba pokryta chmurami)
			Mostly cloudy (więcej niż połowa nieba zachmurzona)
			Overcast (niebo całkowicie zachmurzone)
			fog
Precipitation	Type		Drizzle (mżawka)
			rain
			snow
			Sleet (deszcz ze śniegiem)
			Hail (grad)
			Snow pellet (krupa śnieżna)
	Amount	mm	
Atmospheric deposit			Rime (szadź)
			Dew (rosa)
			Glazed Frost (goleledź)
			Hoarfrost (szron)
Weather phenomena			storm
			rainbow

A task set for students Group 4 Names:

1. Define the directions of the world using a compass.
2. Look at the map and find the highest and the lowest top of the **Tatra Mountains in Poland**.
3. What is the altitude height of the highest top and the lowest top in the nearest area?

Altitude of the highest top:

.....

Name:

Altitude of the lowest top:

.....

Name:

4. What is the height difference between these tops?

Calculation:

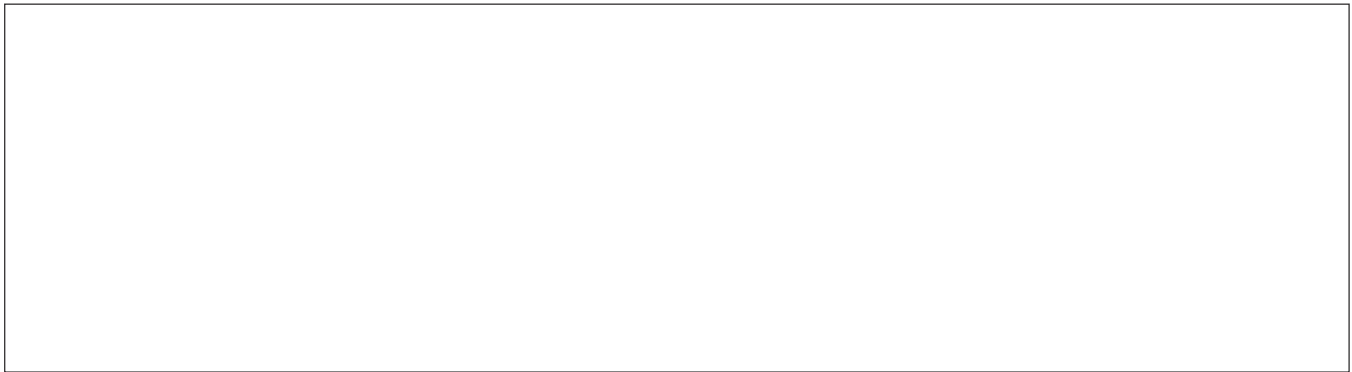
.....
.....
.....
.....

Answer:

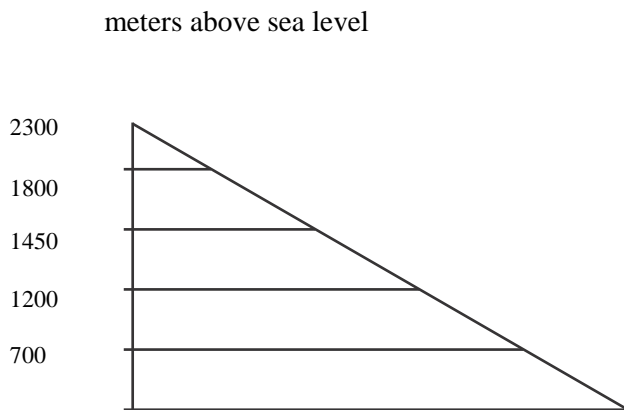
.....

A task set for students Group 5 Names:

1. Draw Tatra Mountains. Write Western and Eastern Tatras. Mark the directions of the world.



2. Write in a correct place zoning of plants life in the mountains.



Pastures, peaks, lower riegel, dwarf mountain pine, higher riegel

3. How can we protect natural heritage which are Tatras? Write your suggestions how to protect this region.

.....

.....

.....



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SCIENCE 4 ALL



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Lesson Plan

Class: B,C,D,E	Grade: 8	Time: 2 lessons (100')
Teacher: António Roldão		Date: 15/01/17; 16/05/17
Country: Portugal	Subject: Maths	
Topic Area: Powers		
Aims: By the end of this lesson students will be able to: <ul style="list-style-type: none">• Know the rules of operation with powers• Solve numeric expressions with powers		
Aids ¹ : https://edpuzzle.com/join/cuvcugr Entering this code in their account cuvcugr		
Procedure:		Time
Warm up/ review: The revision of the rules of operation with powers will be done using eddpuzzle. Step 1: A tablet will be distributed to each student and the respective link with the access code to the same Step 2: Each student will visualize the video and answer the questions		Two lessons

¹ Attach worksheets, Other material used, links to websites...

Step 3:

At the end each student will answer the question that is posed and there will be a discussion with the class. Each student should base their opinion on mathematical knowledge.

(100')**Homework: ---****Evaluation:**

The evaluation will be done by the number of right and wrong questions through the application.

Summary 1, 2: Rules of operation with powers - revision.



Lesson Plan

Class: 6; Lesson time - 45m	
Teacher: Deniss Tšertov	Date: 01,02,2017
Country: Estonia	Subject: English
Topic Area: GRAMMAR CONSOLIDATION: Present Simple VS present continuous + FOOD (vocabulary)	
Aims: by the end of this lesson students will be able to: <ul style="list-style-type: none"> • consolidate the grammar of Present Simple and Present Continuous; • consolidate the vocabulary on the topic of food. 	
Aids ¹ : students' digital devices; a projector, laptop, various digital apps and WebPages: QR code generator; QR code reader; padlet.com; learningapps.org; kahoot. Abbreviations: T = teacher; S = student; SS = students	
Procedure:	Time (m)
Warm up: a hangman game - a S plays with his/her classmates.	3
Step 1: T revises with his/her SS the topic of Present Perfect/Continuous; SS complete some online exercises (projected on the wall) to refresh the knowledge; T introduces a game of kahoot for SS: https://play.kahoot.it/#/k/596cec14-e94e-45d5-9385-29b1c6922287 (shareable). SS use their digital devices to play the game.	15
Step 2: T creates beforehand a QR code with a link to a vocabulary revision task (topic FOOD) using http://goqr.me . T asks students to use their digital device and a QR code reader app (from Play market, for instance) to scan the code and get to a learning app task - a crossword : http://LearningApps.org/view3067659 (shareable); after that T checks SS's pair work result by playing the same game with SS on the laptop and projecting questions on the wall; T asks students to complete the second vocabulary task - "who wants to be a millionaire" game using the previous technique: http://LearningApps.org/view3067695 (shareable).:	20
Step 3: T asks SS to use their digital devices and go the a padlet page; T asks SS to upload pictures and the target vocabulary:	7

¹ Attach worksheets, Other material used, links to websites...

<http://imgur.com/a/a9HTC>

Homework:

is given only to those SS who might fail completing the padlet task for any reason.

Evaluation:

is based on the task results + SS's activity during the lesson.

Summary:

Only a poor Internet connection may prevent the class from reaching the aims successfully, in terms of developing SS's digital competence.



Lesson Plan



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Class: B,C,D,E	Grade: 8	Time: 4 lessons (200')
Teacher: António Roldão		Date: 20/06/17; 21/06/17
Country: Portugal	Subject: Maths	
Topic Area: Related Function, Linear Function		
<p>Aims: By the end of this lesson students will be able to:</p> <ul style="list-style-type: none"> • Solve problems • Use functions to model real situations • Improve their mathematical communication • Work collaboratively 		
<p>Aids¹: Worksheet + Interactive White Board</p>		
Procedure:		Time
<p>Warm up/ review: The revisions related to the concepts studied in the previous year were made in previous lessons.</p> <p>Step 1: A previous reading will be done together with the students to clarify the doubts that may exist and to clarify the purpose of the problem.</p> <p>Step 2: Each group will develop the work autonomously and outline their strategies for solving the problem.</p>		

¹ Attach worksheets, Other material used, links to websites...

<p>The teacher will observe the work of each group, clarifying questions that may exist and posing questions that can guide the students allowing them to follow their work.</p> <p>Step 3: Each group presents its conclusion. Discussion between teacher and students to gauge the strategies and conclusions of each group.</p> <p>Step 4 : Final systematization by the teacher. Study of the characteristics of the related function from the problem given to the students.</p>	<p>Two lessons (100')</p> <p>Two lessons (100')</p>
<p>Homework: ---</p>	
<p>Evaluation: There will be no formal evaluation Direct observation</p>	
<p>Summary 1, 2: Group work involving the study of related function. Summary 3, 4: Presentation and systematization of the conclusions obtained in the work done in the previous lesson. Study of the characteristics of the related function</p>	



Lesson Plan

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Class:	Grade:7	Time: 45 Minutes
Teacher: Oxana Nikolaeva		Date: 05/12/2017
Country: Estonia		Subject: Geography
Topic Area: Springs, rivers and lakes		
Aims: By the end of this lesson students will be able to: <ul style="list-style-type: none"> • describe a structure of the river • show on the map and name the world's largest rivers • compare the river and the lake as water body • remember the main and intermediate sides of the world • learn how to work with the world map and the Estonia map 		
Aids¹: worksheets		
Procedure:		Time
1. Revision of the previous material - 5 minutes (6 task) 3. Work with a text of the textbook + name parts of the river - 10 minutes 4. Work with a Map on the board + work with the map on the worksheet 5. A task related to knowledge of the parts of the world - a diagram on the board - 5 minutes 6. Comparison of the river and the lake - the scheme (similarities and differences) - 5 minutes 7. Working with illustrations - expressing your opinion - 5 minutes		45 minutes
Homework: -		
Evaluation: -		
Summary: <ol style="list-style-type: none"> 1. During the lesson, the pupils will learn the basic terms in the Estonian language 2. They acquire the skill of working with a map + recognize the nomenclature in Estonian 3. They are able to express and defend one's point of view 4. They know different types of water bodies 6. They may read the map of the world. 		

¹ Attach worksheets, Other material used, links to websites...

Nimi Klass

TUND 3.

ALLIKAD, JÕED JA JÄRVED

1. Leidke veed ja parandage neid.

1. Koer, kass ja kala on eluta loodus.
2. Turvast on tehtud akna klaasid.
3. Graniit kasutatakse ahjudes.
4. Kivistüsi on hea ehitusmaterjal.
5. Liiv, savi ja lubjakivi on elus loodus.
6. Liiv tekib loomade jäänustest.
7. Basalt tekib tardkivimite purustamisel.

.....

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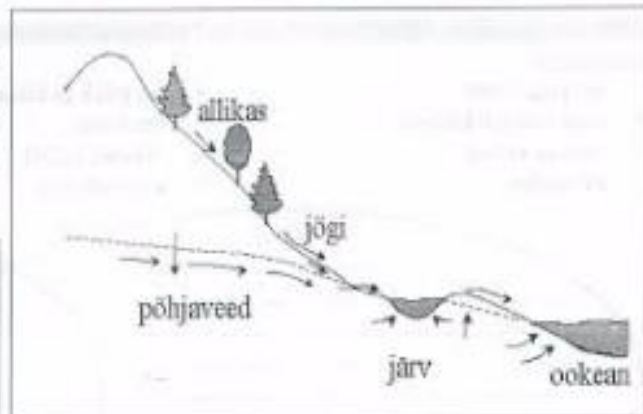
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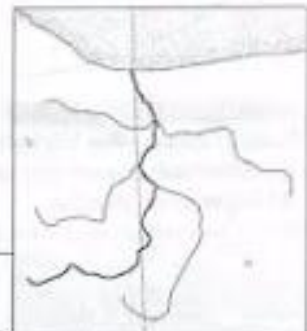
2. Tõelise vee keelde.

Suvel sajab vihma ja talvel sajab lund. Osa vett imub maasse ja tekivad põhjaveed. Teine osa voolab ära ja tekib jõgi. Kohati põhjaveed tõusevad maapinnale ja siin tekib allikas. Tavaliselt allikast saab aluse jõgi.



3. Lugege tekst läbi ja märkige skeemil jõestiku osad: jõelähe, peajõgi, lisajõgi, jõesuu.

Koht, kust saab aluse jõgi, on jõelähe. Jõgi võib aluse saada allikast (nagu Pärnu jõgi) või järvest (nagu Narva jõgi). Kõige suurem jõgi on peajõgi. See on tavaliselt kõige pikem ja suubub järvesse, lahte, merre või ookeani. See koht on jõesuu. Mõned väikesed jõed suubuvad peajõesse. Nad on lisajõed.



4. Suuremad maailma jõed. Leidke kaardilt ja märkige kontuurkaardile numbritega need jõed:



1. Niilus
2. Amazonas
3. Jantse
4. Huang He
5. Mississippi
6. Kongo
7. Doonau
8. Ob
9. Enissei
10. Leena

Nimi Klass

5. Vastake küsimustele sõltuvalt jõgi.

MIS?	KUS?
põhi	põhjus
lääs	läännes
lõuna	lõunas
ida	idas
loe	loodes
kirre	kirdes
kagu	kagus
edel	edelas

Kus asub Leena jõgi?

Ta asub Euraasia põhjas lõunas.

Kus asub Niilus?

Kus asub Amazonas?

Kus asub Mississipi?

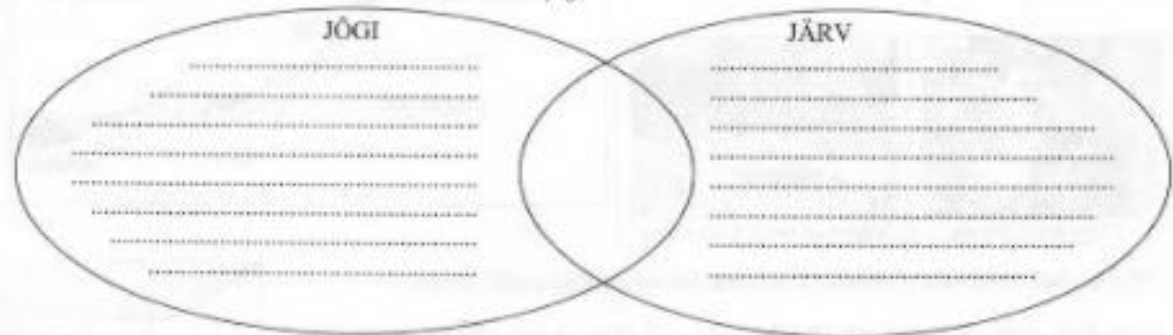
Kus asub Huang He?

Kus asub Kongo?

6. Võrrele jõgi ja järve. Millised on need sarnasused? Millised on nende erinevused?

Omadused:

- | | | |
|------------------------|---------------------|---------------------|
| • on palju vett | • on pikk ja kitsas | • voolab välja jõgi |
| • vesi voolab kiiresti | • on ümar | • on lihe ja suue |
| • vesi ei voola | • elavad kalad | |
| • on kallas | • suubub jõgi | |



7. Kirjutage piltele pealkirjad.

Ennejõgi voolab välja Võrtsjärvest.

Vihnametsades voolab jõgi väga aeglaselt.

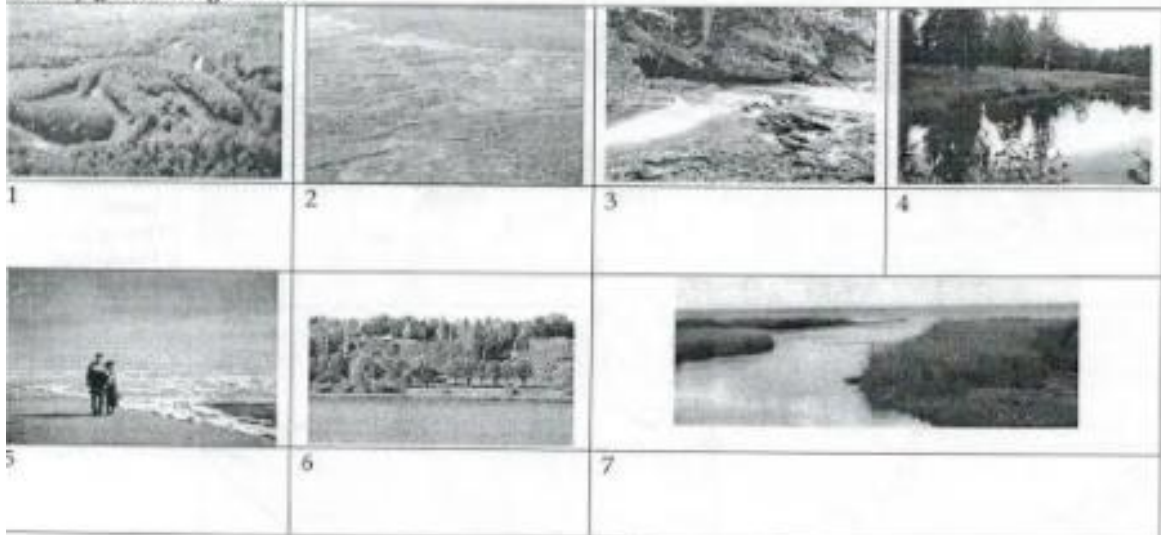
Jää Peipsi järve rannikud.

Kahati jõgi voolab väga kiiresti.

Sügava jõgi voolab aeglaselt ja on nagu järve.

Tundras on palju jõgesid ja järvesid.

Viljandi järve tannikul asuvad Viljandi lossi varemed.





Lesson Plan

Class: 3B	Grade: 14-16 years old	Time: 2 x 45 minutes
Teacher: Urszula Utnicka		Date: December 2017
Country: Poland		Subject: Mathematics
Topic : Star Wars with Maths		
<p>Aims: 1. Practicing calculating volume and area of solids of revolution 2. Increasing pupils motivation in Maths. 3. Enhancing pupils' skills in working in groups 4. Widening creativity and</p>		
Aids: interactive whiteboard, worksheets, paper, markers, calculators		
<p>Description: 1st lesson for practising formulas and calculations related to circumference, volume and area of surface of solids of revolution: ball, hemisphere and cylinder. Pupils aged 15. In the lesson will be used robots from Star Wars, as examples of solids of revolution. Additionally pupils will learn/know deeper elements of the pop culture and a phenomenon of the Star Wars film. Exercises in the lesson requires spatial imagination, proper reading data in the technical drawings and descriptions. There are also some Maths skills from previous lessons needed: calculating decimals, rounding, converting units. Links and a worksheet are attached. Students present and compare results of calculation In 2nd lesson students invent and draw a robot for doing a homework. They present results of their work, rest of class vote for the best robot. If there is enough time a short discussion "Will robots replace humans?"</p>		
<p>Outcomes Knowledge: Know how to calculate volume and area of solids and what are Star Wars. Application: Calculate area and volume of real solids in concrete situation Analysis: Understand relation between circumference of a ball (3D) and passed distance (2D). Synthesis: Join knowledge in robots in the film, solids of revolution and spatial imagination into a project of the robot. Evaluation: Pupils go beyond known environment. Imagine world of XXII century and place there the invented robot. Affective learning outcomes: Pupils can work in a group, respect its rules, take a role in a group and responsibility.</p>		
Procedure:		
<p>Lesson 1 Read Watch Listen 10 minutes 22 students Tutor is available Intro: Star Wars trailer + worksheet (page 3) A teacher presents Star Wars trailer to pupils. Discussion on the film and the characters. Pupils are divided into four similar groups, a teacher share worksheets, pupils can cut them or ask for more copies; every group can use calculators.</p>		

Collaborate 20 minutes 4-6 students Tutor is not available

Each group must:

1. Share responsibilities and tasks, including presenting results of common work.
2. Solve three problems presented in a worksheet.

Practice 15 minutes 4-6 students Tutor is not available

Pupils in the group: practice formulas and do proper calculations on a paper (1 exercise=1 page).

Produce 10 minutes 22 students Tutor is not available

Each group shows the work done to the class - pupils compare the results and chose the most interesting robot.

Lesson 2

Read Watch Listen 10 minutes 22 students Tutor is available

Examples of robots which replace humans (surgeons, workers in factories, soldiers, lorry drivers etc.) and/or short video in this topic.

Collaborate 20 minutes 4-6 students Tutor is not available

Each group must invent a robot to help with homework in the future. One of its parts must be a ball.

Practice 10 minutes 4-6 students Tutor is not available

Pupils in the group: draw and/or describe the robot.

Produce 20 minutes 22 students Tutor is not available

Each group shows the work done to the class - pupils compare and vote the most interesting robot.

Discuss 10 minutes 22 students Tutor is available

Summary of the lesson. Evaluation. If there is enough time - a short video on R2-D2. Discussion "Will robots replace humans?"

At the beginning of the assignment, students are given a rubric to assess whole group or group members and self-assessment check-list.

Star Wars 8 trailer <https://www.youtube.com/watch?v=QOCbN8sfihY>

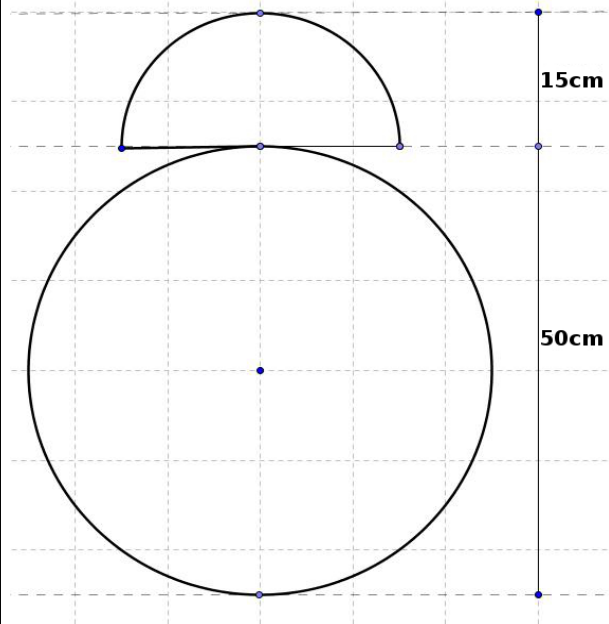
Homework:

Students watch at home StarWars films or trailers. They have to calculate volume of a thing at home with shape of a ball (more difficult) or a cylinder (easier).

Evaluation:

- Students assess teammates in - the teacher add results and gives notes for group work.
- Teacher's assessment of the worksheets with solved excercises.

Droid BB-8



1. Calculate area of surface of a droid BB-8. Use the approximate dimensions in a simplified drawing on the right. Write a result in cm^2 .
2. How many whole turns will do the ball of the droid BB-8 in a distance of 2 miles (1 mila = 1609,344 m), $\pi=3,1$.

Droid R2-D2



3. A droid R2-D2 consists of many parts, but the main (body) was created by joining a cylinder and a hemisphere with a diameter 46 cm. The whole 'body' has a height of 73 cm.

Calculate approximate volume of the droid R2-D2. Write an answer in litres and round to the whole, $\pi=3,1$.



Lesson Plan

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Class: 1 or 2	Grade: 13/14 years old	Time: 45 minutes
Teacher: Kinga Myśliwiec		Date: June, 2017
Country: Poland	Subject: Geography	
Topic Area: Time		
<p>Aims: By the end of this lesson students will be able to:</p> <ul style="list-style-type: none"> - know the effects of the rotation, - know the features of the rotation, - know what is 'solar time,' 'official time,' 'zone time' and 'universal time,' and can explain the difference between these times, - calculate the difference of solar time between selected points, - read the time from a map of time zones, - point on the map an international line of changing dates. 		
Aids¹: textbooks, atlas, worksheets given by a teacher		
Procedure:		Time
Warm up/ review: A teacher explains students the difference between time zones and how to use a map of time zones.		10 minutes
Step 1: Students work in pairs/groups using atlases and doing some tasks which are given by a teacher (appendix		25 minutes

¹ Attach worksheets, Other material used, links to websites...

<p>1).</p> <p>Step 2: Students have to complete a plane ticket (appendix 2).</p>	<p>10 minutes</p>
<p>Homework:</p>	
<p>Evaluation: A teacher discusses solutions and evaluate their correctness.</p>	
<p>Summary: This lesson improves pupils' skills to use a different source of information, communicate with others and work in team.</p>	

Appendix 1 A plane ticket with explanations

Appendix 2 A plane ticket to complete by students

A task set A

Warsaw – Bangkok

1. Complete the table.

Warsaw (Poland) to Bangkok (Tajland) total price:1457.65PLN

Lp.	Departure from	Arrival	Plane	Flight number	Meal	Time of departure	Time of arrival
1.	WAW	MUC	EMJ	LO351	B	06:30	
2.	MUC	BKK	332	LT1752	M	18:00	

Flight distance: WAW-MUC: **1h40min** MUC-BKK:**9h15min**

WAW-Warsaw

EMJ-Embraer 170/190

B-breakfast

BKK-Bangkok

332-Airbus

M-snack

MUC-Munich

2. Calculate the difference of solar time between Warsaw (21°E) and Bangkok (101°E).

0°

21°E

101°E

3. It's the last weekend of March and it just changes the time of Eastern European (winter) to the Middle European (summer). Think about if you need to get up earlier or later to catch a flight from Warsaw to Munich.

A task set B

Warsaw – Buenos Aires

1. Complete the table.

Warsaw (Poland) to Buenos Aires (Argentina) total price: 2830.90 PLN

Lp.	Departure from	Arrival	Plane	Flight number	Meal	Time of departure	Time of arrival
1.	WAW	FCO	319	AZ553	M	13:10	
2.	FCO	EZE	772	AZ680	M	21:50	

Flight distance: WAW-FCO: **2h25min** FCO-EZE: **15h**

WAW-Warsaw

319-Airbus A319

FCO-Rome

772-Boeing777

M-snack

EZE-Buenos Aires

2. Calculate the difference of solar time between Warsaw (21°E) and Buenos Aires (59°W).

59°W

0°

21°E

European (summer). Think about if you need to get up earlier or later to catch a flight from Warsaw to Dublin.

A task set D

Warsaw – Sydney

1. Complete the table.

Warsaw (Poland) to Sydney (Australia) total price:2900.64PLN

Lp.	Departure from	Arrival	Plane	Flight number	Meal	Time of departure	Time of arrival
1.	WAW	VIE	735	LO225	L	17:20	
2.	VIE	SYD	767	CA7002	M	20:15	

Flight distance: WAW-VIE: **1h25min** VIE-SYD:**16h40min**

WAW-Warsaw
lunch/dinner

735-Boeing 737-500

L-

VIE-Vienna

767-Boeing 767

M-snack

SYD-Sydney

2. Calculate the difference of solar time between Warsaw (21°E) and Sydney (151°E).

0°

21°E

151°E

3. It's the last weekend of March and it just changes the time of Eastern European (winter) to the Middle

European (summer). Think about if you need to get up earlier or later to catch a flight from Warsaw to Vienna.



Lesson Plan

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Lesson Plan

Grade: 7		Time: 45m
Teacher: Vladislava Avramenko		Date: 7.11.17.
Country: Estonia	Subject: Mathematics	
Topic Area: Actions with rational numbers		
Aims: By the end of this lesson students will be able to: * use rules of addition and subtraction of negative and positive numbers * use rules of multiplication and division of rational numbers * applying the rules, solve tasks of all actions with rational numbers		
Aids¹: students' digital devices; projector, smartboard, various digital apps and WebPages: www.learningapps.org , https://www.thatquiz.org/tq-1/math/arithmetric/ http://www.zum.de		
Procedure:		Time
Warm up/ review: Step 1: Mental arithmetics. Completing worksheets in pairs. http://kke.innove.ee/images/failid/pdf/toolehed/7_klass/Matemaatika_1_pa45-53.pdf		15
Step 2: Group work. Solution of exercises in the form of a puzzle in the learning environment www.learningapps.org https://learningapps.org/display?v=pcgysnvt		10

¹ Attach worksheets, Other material used, links to websites...

c16

Step 3: Individual solution of the exercises on the web-sites

<http://www.zum.de/dwu/depothp/hp-math/hpmzz16.htm>

<http://www.zum.de/dwu/depothp/hp-math/hpmzz21.htm>

<http://www.zum.de/dwu/depothp/hp-math/hpmzz25.htm>

Step 4: Checking answers

15

5

Homework: solve 20 exercises on the website

<https://www.thatquiz.org/tq-1/math/arithmetric/>

Evaluation: Verbal, formative

Summary:

Students are able to solve exercises with all actions of rational numbers





ERASMUS+ “Science 4 all”

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Qual dos carros alugar? Which car to rent? (Resolução de problemas usando funções afim)

A young student on vacation arrives at the railway station of the Portuguese village and must use a rental car to travel to a village located at the top of the mountain, 40 km from the station.

He was immediately approached by a little boy who, very solicitous, asked him which of the two cars parked there wanted him to use,

Facing the student's surprise, he explained:

"- Here, there are only these two cars, but they charge different prices. Mr. Mota charges € 2.5 for the transport of the luggage and € 0.40 for the kilometer; Mr. Passos charges € 0.60 per kilometer, but does not charge anything for the transportation of the luggage. You know? People from the Ver-o-Rio village, which is 8 km from here, just want to go in Mr. Passos's car and those in Beira-Serra, which is just over 12 km from the station, say how much ... "



After a little thought, our young tourist decided to go in Mr. Mota's car because he needed to save money

1. Does it seem like a wise choice?

And do the inhabitants of the two villages know how to manage their transportation expenses?

2. Represent in a reference the graphs of the two functions. Use the graphs you constructed to properly justify the answers given in question 1.

3. For each of the rental cars, write an equation that allows you to calculate the price of the trip according to the number of kilometers and the price of transport of the luggage.



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Lesson Plan

Class: first/second	Grade: 13-14 years old	Time:45 minuts
Teacher: Monika Miśkiewicz		Date: February, 2017
Country: Poland	Subject: Physics	
Topic Area: What can we do when the power runs out- solar panels?		
<p>Aims: By the end of this lesson students will be able to:</p> <ul style="list-style-type: none"> • know the basic English vocabulary related to this topic. Lesson conducted partly in English, students become familiar with the English vocabulary connected with this subject. • be convinced that alternative sources of energy should be used very often, and in this way each of us can help our environment and save energy, • construct an electric circuit with a solar panel, • know how calculators work. • develop their ability of logical thinking • construct a robot solar robot. 		
Aids ¹ : interactive whiteboard, circuits with solar panels, solar robot, worksheets.		
Procedure:		Time
<p>Warm up/ review:</p> <p>Step 1: Students come to the dark class (where the binds is shut, and there is light darkness). Their first question is - Can we turn on</p>		

¹ Attach worksheets, Other material used, links to websites...

the light?

Nevertheless the teacher ask the question – “What would happen if really, one day run out of energy? Students give different possibilities, "what would happen if could run out of power? – brainstorming.

What is energy?

Is it the gas that fuels our cars and planes? The electrical current that comes from a wall socket? Is it the calories transformed from the food we eat? Is it food itself?

Where does energy come from?

Is it buried in the earth? Does it flow through rivers? Through the wind? Does it radiate from our sun?

How do we use energy?

How do our neighbours ,People in other countries use energy? Does everybody use the same kind of energy to do things? What would we do without energy?

These questions are fundamental to conversations that take place at every level of society and in every part of the world today— conversations involving science and technology, politics, economics, environmentalism, community, and family issues. The questions are critical to every person living on the planet and yet the ideas, experiences and answers are different for everyone.

Engage the class in a discussion about renewable and solar energy.

Step 2: The topic is announced.

Teacher checks the list of presence and dictates the topic of lesson.

Step 3:

Teacher presents in power point presentation about a basic sources of energy used in Poland. Students notice that we do not use of alternative energy sources.

Students watch a movie

<https://www.youtube.com/watch?v=hEghkVpQsk4>

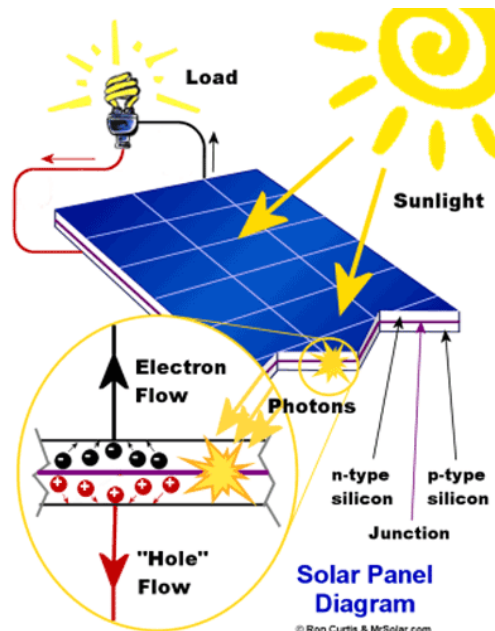
Teacher shows a simple experience with inflamed paper by a magnifying glass. On a piece of paper teacher paints a black area, attaches magnifier in the sun and shows students that solar energy

can set fire to paper.

Step 4: The teacher divides the students into four groups. Each of group is assigned to one table where he has a specific job to do. If one group finishes their task they move to the next table, and do the task which was doing by the group before. In this way, each of group does four tasks.

The first table: students should write a few advantages and disadvantages of using solar panels- pupils use of texts on this subject in the English language, which are prepared by the teacher. Their answers in English are sticked on a common board. The group can use the dictionaries.

The second table:



The second group construct circuitries including solar panels and explain why this current flows.

The third table:

Students use the instruction and construct robots which are powered by solar energy.



The fourth table:

Students are supposed to get some information about the cost of purchasing and installing such panels in our homes on the internet. How much energy provides one of that standard solar panel. Students have to decide whether is better to buy if they would like have panels at their homes, separately panels or order special outsource company which deals with it, they mount and installation it. Students have to estimate costs and decide what is better to buy panels separately or order the company. Students also have to find on the internet three companies that deal with solar panels, compare their offers and choose the best.

Homework:

Students watch at home part of the popular science film about energy, and they make notes to notebook.

<https://www.youtube.com/watch?v=LfKzSrLOUlw>

Evaluation:

the teacher will evaluate the students' work card

the teacher control students if they mounted circuits with solar panels or if

they need help.

After all this tasks the teacher gives students series of questions regarding solar energy and assesses how they understood the issue.

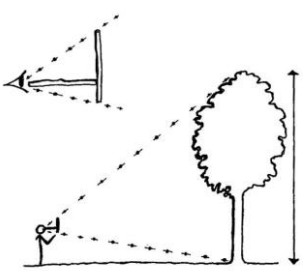
Summary:

This may be one of several lessons about saving energy and profits to society. We can talk about water, wind or nuclear energy.

Work this form is suited better to classes with a small number of students.



Lesson Plan

Class: 5°2, 5°4	Grade: 6	Time: Entire day
Teacher: Mrs Trofimoff		Date: March, 2018
Country: France		Subject: Numbers
Topic Area: Learning Maths in the forest, interdisciplinary work.		
Aims: Estimate the height of trees. Calculate the age of a tree. Discover shapes and patterns in the nature. Work in teams		
Aids ¹ : students' digital devices, worksheets		
Procedure:		Time
Warm up/ review: Revision about trees, wildlife, plants in our forests. <ul style="list-style-type: none"> ● Step 1: Measure of the height of a tree using twigs.  <ul style="list-style-type: none"> ● Step 2: Measure and calculate the age of trees counting rings on trunks and without cutting it down. ● Step 3: Study of various patterns in nature ● Step 4 : Daisy sampling using a quadrat 		

¹ Attach worksheets, Other material used, links to websites...

Homework : The students can draw pie charts or bar charts to show how location affects plant growth.

Evaluation: No formal evaluation

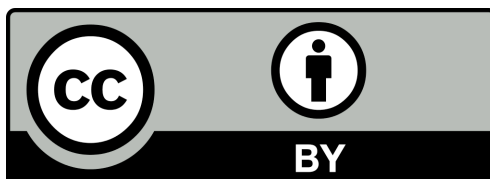
Summary :



Lesson Plan

Class: 5°4, 5°5	Grade: 6	Time: 4 lessons
Teacher: Mrs Trofimoff		Date: February, 2017
Country: France	Subject: Numbers	
Topic Area: Numbers symbolism in the Middle Ages, interdisciplinary project.		
Aims: <ul style="list-style-type: none">● Knowing more about the link between architecture and maths● Increasing pupils motivation in mathematics● Widening creativity		
Aids ¹ : https://www.dartmouth.edu/~matc/math5.geometry/unit8/unit8.html		
Procedure:		Time
Warm up/ review: Step 1: Collect informations through books and websites. Step 2: Prepare a slideshare or a lapbook Step 3: Presentation to the classmates Step 4: Visit of a construction site (Guedelon)		
Homework: Research about Roman architecture		
Evaluation: by peers.		
Summary: Discovery of numbers symbolism in architecture		

¹ Attach worksheets, Other material used, links to websites...



Lesson Plan

Class: second	Grade: 13-14 years old	Time:45 minutes
Teacher: Monika Miśkiewicz		Date: January
Country: Poland	Subject: Chemistry	
Topic Area: Causes and effects of environmental pollution		
Aims: Pupils will be aware of the negative impact of air pollution on further development of life on Earth. Innovation of the lesson consists in this that students are able to carry out experiments, describe observations and conclusions about how each of us can help our environment. Specific objectives: Pupils: <ul style="list-style-type: none">- know the causes and effects of air pollution;- name the sources of emission of carbon oxides, sulfur and nitrogen and other pollutants;- know how acid rain, ozone hole, greenhouse effect, smog arise- predict the effects of further progressive changes in the environment;- become convinced that renewable sources of energy should be used very often and in this way each of us can help our environment and influence further development on Earth.		
Aids ¹ : interactive whiteboard or multimedia projector and computer, paper sheets, markers, equipment and chemical reagents, Work methods and techniques: brainstorming, mind map, talk, discussion, experiments, demonstration.		

Procedure:

1. Providing the topic and goals of the class.
2. Organizational matters: a reminder of health and safety at work rules while carrying out chemical experiments, presenting the timetable
3. Students define the concept of "pollution" - brainstorming.
4. Students watch a short film about air pollution, e.g. (It can be a video recorded by students of school, e.g. as part of an ecological project or any movie on that topic downloaded from the internet.

<https://www.....>

5. Students create a map of thoughts on the sources and types of air pollution ".
6. Experimental part of the class - students take an active part in experiments, selected students could carry out experiments under teacher's supervision.
After each experiment they create a description (scheme, observations and conclusions). Students work in pairs and complete a worksheet.

Experiment 1. How sulfur oxide (IV) affects plants.

Equipment : conical flask, plant material (petals and leaves of flowers, twigs of trees), burner, spoon for burning, matches.

Reagents: sulfur.

Put plant material into the conical flask. In the flame of the burner, we set the sulfur on fire, bring the burning sulfur to the conical flask, stop the flask and observe the changes taking place.

Observations: flower buds decolorized, the leaves turned yellowish, ugly, damaged. Small changes can be seen on the tree trunks.

(changes on the conifer branch are visible after a few days therefore, the experiment can also be prepared a few days earlier – so that we can compare the changes immediately after the experiment and after a longer time.)

Experiment 2. How nitric oxide affects plants.

Equipment: tubes with a stopper, plant material (dill or parsley, grass etc.).

Reagents: copper filings, nitric acid (V).

Teacher puts copper filings into the tube, adds a few drops of nitric acid (V), students put other dill into the tubes and close the tube quickly with a stopper; Everyone is watching changes.

Observations: After the addition of acid to copper, yellow - brown gas is released, under its influence on plants, the dill or parsley turned yellow.

Conclusions: The gas obtained is nitric oxide IV - it is a poisonous gas and it has got negative impact on plants.

Experiment 3. What happens with IV sulfur oxide when it rains?

Equipment: conical flask, burner, burning spoon, matches.

Reagents: sulfur, methyl orange, water.

Add water to the conical flask, add a few drops of methyl orange, teacher ignites the sulfur in the flame of the burner, puts burning sulfur into the conical flask, stops the flask, mixes the contents and everyone observes the changes.

Observations: Sulfur burns with a blue flame during combustion, we get gas that is easily soluble in water. Water with methyl orange turned red - it means that acid was formed.

Conclusions: The red color of the solution indicates a change in pH from neutral to acidic. In this way we can conclude that sulfur contained in the air dissolves and falls on our Earth in the form of acid rains.

Homework:

After finishing this lesson, every student (every young person) should be convinced that our environment should be protected because air pollution affects our health, animals and plants which surround us. If we destroy one element of our ecosystem, we will

<p>also kill ourselves.</p> <p>Students will be divided into two groups. One of the groups must collect information on ways to protect the environment, while the other one should find the information about alternative sources of energy which can reduce pollution of our planet, for example by reducing the amount of toxic gases emitted to our atmosphere.</p>	
<p>Evaluation:</p> <p>After all these tasks, the teacher gives students a series of questions about environmental pollution and assesses how they understood this issue.</p> <p>The teacher assesses the students' worksheets thus gains the information about the level of understanding of the subject by the students.</p>	
<p>Summary:</p> <p>This lesson can become a prelude to a series of lessons about environmental protection. It can also become a great topic on the student project on this subject.</p>	

Work sheet for students.

Number of experiment.	Observations (writing a possible chemical reaction)	Conclusions	Additional comments
Experiment 1.			
Experiment 2.			
Experiment 3.			



SCIENCE 4 ALL

Lesson Plan

Class: 6⁵	Grade: 6	Time: 10 lessons
Teacher: Mrs Trofimoff		Date: First term, 2017-2018
Country: France	Subject: Numbers	
Topic Area: Mental arithmetic		
Aims: <ul style="list-style-type: none">● Increasing pupils skills in basic calculation with a chronometer		
Aids¹: http://matoumatheux.ac-rennes.fr/num/ment800/mental6/02Tables/accueil.htm		
Procedure: At the beginning of each lesson of the term		Time 10 min
<ul style="list-style-type: none">➤ Prepare a table sheet for each student➤ Project the website on the board➤ Decide the time of the chronometer➤ Decide the level of the calculation➤ Launch the site➤ Ask pupils to answer on their own sheet➤ Correct the sheets at home		
Homework: Review multiplication and addition tables.		
Evaluation: individual		
Summary: very efficient to review tables and gain tricks to improve one's skill.		

¹ Attach worksheets, Other material used, links to websites...



SCIENCE 4 ALL

Lesson Plan

Class: 3B	Grade: 12-16 years old	Time: 45 minutes
Teacher: Urszula Utnicka, Anna Klocek		Date: 16.05.2018
Country: Poland	Subject: Physical Education & Mathematics	
Topic : Fitness science		
Aims:		
<ol style="list-style-type: none"> 1. Knowing physical indicators of health. 2. Understanding relation between body mass and health. 3. Enhancing pupils' skills in working in groups 		
Aids: Body analyser scale, worksheets, measuring tapes, laptops/computers/smartphones		
Description: Pupils aged 12-16 measure the body weight using a body analyser scale. They calculate some indicators (BMI and BF) using mathematical formulas and/or online calculators; then formulate conclusions. Students find information on healthy life, create recommendations for themselves.		
NOTE:		
<ol style="list-style-type: none"> 1) BMI and BF for children and teenagers are calculated in a different way, than for adults! 2) Some students can be ashamed of measuring their weight or even can refuse it. The lesson should be preceded by brainstorm/discussion/film etc. on acceptance of body image and importance of knowing health indicators. 3) Before the lesson (homework a day before) students should watch the film about healthy life for teens, 15 minutes. PL: https://www.youtube.com/watch?v=e0BI1CSdIDg 		
Outcomes:		
Knowledge: Know physical indicators of health.		
Application: Calculate BMI and other physical indicators.		
Analysis: Can measure and calculate physical indicators for themselves.		
Synthesis: Understand relation between health and a life style.		
Evaluation: Can implement rules for healthy life in the future.		
Affective learning outcomes: Pupils can work in a group, respect its rules, take a role in a group and responsibility.		
Procedure:		
Read Watch Listen 5 minutes 20 students Tutor is available		
<p>A teacher presents a body analyser scale (<i>Tanita BC 543</i>), explains how to use it and what indicators are shown:</p> <ul style="list-style-type: none"> • Body weight in kg • Fat mass in % <p>Prevention of overweight and obesity of children and adolescents is one of the most important health-related tasks. To properly assess whether overweight takes place, it is necessary to determine the body fat content, because the health risks result from excess fat, not body weight.</p> <p>The composition of body mass, height and age of girls and boys constantly change, so the formula for calculating BMI for adults is not very accurate. This is why scientists have developed special indicators</p>		

for children and adolescents by gender - called "percentiles", which is applicable to people aged 2-20. (what "percentiles" are: <https://www.mathsisfun.com/data/percentiles.html>) Pupils are divided into four similar groups, a teacher share worksheets, every group can use computers or smartphones.

Collaborate 20 minutes 4-6 students Tutor is not available

Each group must:

1. Share responsibilities and tasks, including presenting results of common work.
2. Measure the body weight of the group members.
3. Calculate Body Mass Index (BMI) using online calculator for teenagers

PL: <http://oblicz-bmi.pl/bmi-dzieci-mlodziezy.html>

EN: <https://nccd.cdc.gov/dnpabmi/Calculator.aspx?CalculatorType=Metric>

EN, PT, FR, DE, IT, ES: <https://www.smartbmiccalculator.com/>

4. Calculate BMI using mathematical formula: $BMI = \text{weight (kg)} \div \text{height}^2 (\text{m}^2)$
5. Fill in individual worksheets and analyse if their weight is correct.

Practice 10 minutes 4-6 students Tutor is not available

Students analyse own body indicators of health and propose recommendations for themselves. Find information (web quest, discussion etc.) on healthy style of life, in particular what can we do to be healthy, what are consequences of bad habits. Write a summary of findings in pt.5.

Produce 10 minutes 20 students Tutor is not available

Each group shows the work done to the class .

Evaluation:

Students assess teammates in - the teacher add results and gives notes for group work.

Homework:

Students have to calculate fat mass in % and compare with results from a body analyser scale:

$$1. \text{ BF Fat mass in \%} = (1.20 \times \text{BMI}) + (0.23 \times \text{age}) - (10.8 \times \text{sex}^*) - 5.4$$

PL: Tkanka tłuszczowa % = $(1.20 \times \text{BMI}) + (0.23 \times \text{wiek}) - (10.8 \times \text{płeć}^*) - 5.4$

(* kobiety/women = 0, mężczyźni/men = 1)

PL: http://www.pella.pl/page/Kalkulatory/kalkulator_poziomu_tkanki_tluszczowej.html

EN: <https://www.gigacalculator.com/calculators/body-fat-calculator.php>

BODY ANALYSIS/ ANALIZA		Date of Measurement: Data pomiaru:	
Age (years, months): Wiek (lat, miesięcy):		Sex: Płeć:	
Height: Wzrost [cm]		Weight: Waga [kg]	
BMI – Body Mass Index	<i>Wskaźnik masy ciała</i>	<input type="checkbox"/>	underweight niedowaga
<ul style="list-style-type: none"> = weight (kg) ÷ height² (m²) = masa (kg) ÷ (wzrost)² w metrach 		<input type="checkbox"/>	healthy weight waga prawidłowa
<ul style="list-style-type: none"> Online calculator/ kalkulator on-line PL: http://oblicz-bmi.pl/bmi-dzieci-mlodziezy.html		<input type="checkbox"/>	overweight nadwaga
BF% - Body fat mass in % <i>Tkanka tłuszczowa w %</i>			
<ul style="list-style-type: none"> body analyser scale / analizator wagi 			
<ul style="list-style-type: none"> = (1.20 × BMI) + (0.23 × age) - (10.8 × sex*) - 5.4 = (1.20 × BMI) + (0.23 × wiek) - (10.8 × płeć*) - 5.4 (* kobiety/women = 0, mężczyźni/men = 1)			

BMI for girls	BMI for boys
Less than 25 percentiles	underweight /niedowaga
25-85 percentiles	healthy weight / waga prawidłowa
More than 85 percentiles	overweight / nadwaga

Source: The Children's Memorial Health Institute, Warsaw Poland
http://www.czd.pl/index.php?option=com_content&view=article&id=1717&Itemid=538