

# CLIL Module Plan

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<b>School Grade</b>	<input type="radio"/> Primary		<input type="radio"/> Middle		<input checked="" type="radio"/> High
<b>School Year</b>	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input checked="" type="radio"/> 5
<b>Subject</b>	Matematica	<b>Topic</b>	Linear Programming		
<b>CLIL Language</b>	<input checked="" type="radio"/> English			<input type="radio"/> Deutsch	

<b>Personal and social-cultural preconditions of all people involved</b>	N.of students: 22. CEFR Level: B1. Learning preconditions: previous CLIL experience in class 4 (20 hours). Teacher's role: main teacher. Subject taught: Mathematics.
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<b>Students' prior knowledge, skills, competencies</b>	<b>Subject</b>	<b>Language</b>
	Students didn't have any prior experience concerning the content of the lessons	Students have adequate interactive communication skills when working in groups. Students have good reading skills knowledge (gist, main idea, skimming and scanning).

<b>Timetable fit</b>	<input checked="" type="radio"/> Module	Length 20 hours
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<b>Description of teaching and learning strategies</b>	The lessons will predominantly follow the “activate prior knowledge / guide understanding / task-based learning / review” format. Classroom activities will be as communicative as possible with students involved in inquiry-based / collaborative / cooperative learning in a task-based learning environment using information exchange / information gap activities. Exercises will be exploited and scaffolded both for content and language learning. Extensive use of videos and presentations will be made to introduce new information, facilitate students’ comprehension and guide vocabulary acquisition. A mixture of ‘frontal’ and ‘student-centred’ teacher roles will be used as appropriate to the lesson phases. During the latter, the teacher will act as facilitator and guide. Continuous assessment to include motivation, language use and language accuracy using. Formative assessment in the form of teacher using appropriate questioning.
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# Overall Module Plan

<b>Unit: 1</b> Linear Programming <b>Unit length:</b> 20 hours	<b>Lesson 1</b> Introduction to OR (Operational Research) and LP (Linear Programming)
	<b>Lesson 2</b> Linear Inequalities in Two Variables (1)
	<b>Lesson 3</b> Linear Inequalities in Two Variables (2)
	<b>Lesson 4</b> Linear Inequalities in Two Variables (3)
	<b>Lesson 5</b> Compound Inequalities in Two Variables (1)
	<b>Lesson 6</b> Compound Inequalities in Two Variables (2)
	<b>Lesson 7</b> A real problem (1)
	<b>Lesson 8</b> A real problem (2)
	<b>Lesson 9</b> Test on inequalities in two variables
	<b>Lesson 10</b> Test revision
	<b>Lesson 11</b> Introduction to Linear Programming
	<b>Lesson 12</b> Linear Programming (1)
	<b>Lesson 13</b> Linear Programming (2)

**Lesson 14**

Linear Programming (3)

**Lesson 15**

Linear Programming (4)

**Lesson 16**

Linear Programming (5)

**Lesson 17**

Linear Programming with 3 variables (1)

**Lesson 18**

Linear Programming with 3 variables (2)

**Lesson 19**

Test on Linear Programming

**Lesson 20**

Test revision

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	1	<b>Title</b>	Introduction to OR (Operational Research) and LP (Linear Programming)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	5 min	Introduction to OR and LP	T's role: explains Learning outcomes of the lesson	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Operational Research, Linear Programming</p> <p><b>Communicative structures</b> The topic of this unit is ...</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>ppt01_operational_research.pptx</li> </ul> PPT presentation: ppt01_operational_research.pptx	
L	S	R	W								

2	45 min	Viewing of a video about Operational Research to understand the aims of the OR and to learn ESP language	T's role: T shows the video and, sometimes, stops it to clarify. S's role: S watch the video and ask for information.	<p><b>Skills</b></p> <table border="1" data-bbox="797 165 1135 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Operational Research Linear Programming Decision Support System</p> <p><b>Communicative structures</b> Is the video clear? Do you need subtitles?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<a href="#">link</a> WhatIsOperationalResearch - The OR Society (17:06)	
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	2	<b>Title</b>	Linear Inequalities in Two Variables (1)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	10 min	Solve linear inequalities in two variables by graphing the solution set.	Viewing of a video which gives some rules about solving linear inequalities in two variables (English subtitles may be included). T's role: T shows the video and, if needed, stops it to clarify. S's role: S watch the video.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Inequality, dashed/solid line, boundary line, strict inequality, solution set.</p> <p><b>Communicative structures</b> Is the difference between equations and inequalities clear?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<a href="#">link</a> Linear Inequalities in Two Variables - Mathispower4u (6:52)	
L	S	R	W								

2	20 min	<p>Know the difference between linear equation and linear inequality in two variables. Build on an ESP vocabulary. Solve linear inequalities by graphing the solution set.</p>	<p>Presentation of Glossary 01 on linear inequalities in two variables. T's role: T shows glossary on the LIM and distributes a copy of it. S'role: S read the glossary and listen to the teacher and ask for clarification if necessary.</p>	<p><b>Skills</b></p> <table border="1" data-bbox="1077 167 1417 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Inequality, dashed/solid line, boundary line, strict inequality, solution set.</p> <p><b>Communicative structures</b> Now I'll show you the steps to graphing the solution to a linear inequality</p>	L	S	R	W	<p><input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work</p>	<ul style="list-style-type: none"> <li>glossary01 inequalities in two variables.pdf</li> </ul> <p>glossary01 inequalities in two variables.pdf</p>	
L	S	R	W								
3	10 min	<p>Solve linear inequalities in two variables by graphing the solution set.</p>	<p>Students are given Task 01. They have to graph the solution set of some inequalities in two variables. T's role: T distributes Task 01 and explains learning outcomes of the task. S's role: S interact in pairs and, if needed, with the teacher.</p>	<p><b>Skills</b></p> <table border="1" data-bbox="1077 932 1417 976"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Inequality, dashed/solid line, boundary line, strict inequality, solution set.</p> <p><b>Communicative structures</b> Is the task clear enough?</p>	L	S	R	W	<p><input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work</p>	<ul style="list-style-type: none"> <li>task01 inequalities in two variables.pdf</li> </ul> <p>task01 inequalities in two variables.pdf</p>	<p>Formative: the teacher can assess the vocabulary which needs to be revised.</p>
L	S	R	W								

4	10 min	Solve linear inequalities in two variables by graphing the solution set.	Check of Task 01 with Desmos ( <a href="http://www.desmos.com">www.desmos.com</a> ) of Geogebra ( <a href="http://www.geogebra.org">www.geogebra.org</a> ). T's role: corrects if necessary. S's role: a student is asked to graph the solution set of Task 01 on the LIM.	<p><b>Skills</b></p> <table border="1" data-bbox="1077 165 1417 212"> <tr> <td>L</td> <td><b>S</b></td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Inequality, dashed/solid line, boundary line, strict inequality, solution set.</p> <p><b>Communicative structures</b> Now we are going to go through the solution</p>	L	<b>S</b>	R	W	<input type="checkbox"/> Whole class <input checked="" type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• task01 inequalities in two variables.pdf</li> </ul>	
L	<b>S</b>	R	W								



# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	3	<b>Title</b>	Linear Inequalities in Two Variables (2)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	10 min	Revise and consolidate basic properties of inequalities in two variables and the steps to graphing the solution set.	Presentation of Task 02 on the LIM to assess the students' comprehension of the activity. T's role: T shows and explain the exercises on the LIM. S's role: S listen to the teacher and ask for clarification if necessary.	<p><b>Skills</b></p> <table border="1"> <tr> <td><b>L</b></td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See lesson 2</p> <p><b>Communicative structures</b> Is the task clear enough?</p>	<b>L</b>	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task02_inequalities_in_two_variables.pdf</li> </ul> task02_inequalities_in_two_variables.pdf	The teacher checks if the outcomes are clear.
<b>L</b>	S	R	W								

2	40 min	Revise and consolidate basic properties of inequalities in two variables and the steps to graphing the solution set.	Students are given Task 02. In the first part they have to decide the right inequality symbol should be used by looking at the graph of the solution set of some inequalities in two variables. In the second part they have to graph the solution set.	<p><b>Skills</b></p> <table border="1" data-bbox="837 165 1108 213"> <tr> <td>L</td> <td>S</td> <td><b>R</b></td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See lesson 2</p> <p><b>Communicative structures</b> Decide which inequality symbol should be used by looking at the graph. Graph the solution set. Do you need help?</p>	L	S	<b>R</b>	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input checked="" type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task02_inequalities_in_two_variables.pdf</li> </ul> <p>task02_inequalities_in_two_variables.pdf</p>	Formative: the teacher can assess the content of the previous two lessons.
L	S	<b>R</b>	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	4	<b>Title</b>	Linear Inequalities in Two Variables (3)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	15 min	Revise and consolidate basic properties of inequalities in two variables and the steps to graphing the solution set.	Correction of Task 02. Students interact in pairs and check their solutions.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td><b>S</b></td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Lesson 2</p> <p><b>Communicative structures</b> Work in pairs and compare your solutions.</p>	L	<b>S</b>	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task02_inequalities_in_two_variables.pdf</li> </ul>	Formative: the teacher circulates and facilitates.
L	<b>S</b>	R	W								

2	35 min	Revise and consolidate basic properties of inequalities in two variables and the steps to graphing the solution set.	Class correction of the Task 02. T's role: T shows the solution of the task on the LIM using Desmos or Geogebra. S's role: S check their solutions and ask questions if necessary.	<p><b>Skills</b></p> <table border="1" data-bbox="949 165 1292 209"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Lesson 2</p> <p><b>Communicative structures</b> Did you understand? Do you agree with this solution set?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task02_inequalities_in_two_variables.pdf</li> </ul>	Formative: assessment of content learning and ESP vocabulary.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	5	<b>Title</b>	Compound Inequalities in Two Variables (1)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	10 min	Solve Compound Linear Inequalities in two variables by the intersection of the solution set of each inequalities.	Viewing of a video which gives some rules about solving compound linear inequalities in two variables (English subtitles may be included). T's role: T shows the video and, if needed, stops it to clarify. S's role: S watch the video.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Compound Linear Inequalities, intersection, overlap, union</p> <p><b>Communicative structures</b> Do you want to watch the video again? Do you prefer using subtitles?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<a href="#">link</a> Introduction to graphing systems of linear inequalities - Khan Academy (5:35)	
L	S	R	W								

2	20 min	Be able to solve compound linear inequalities in two variables. Build on an ESP vocabulary.	Presentation of Glossary 02 on compound linear inequalities in two variables. T's role: T shows glossary on the LIM and distributes a copy of it. S'role: S read the glossary and listen to the teacher and ask for clarification if necessary.	<b>Skills</b> <table border="1" data-bbox="1066 165 1406 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <b>Key vocabulary</b> See activity 1  <b>Communicative structures</b> The meaning of intersection (AND) is ... The meaning of union (OR) is ... The "overlap" of two regions means ...	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>glossary02 graphing a compound linear inequality.pdf</li> </ul> glossary02 graphing a compound linear inequality.pdf	
L	S	R	W								
3	20 min	Be able to graph the solution set of compound inequalities in two variables.	Students are given Task 03. In the first part they have to graph of the solution set of some compound inequalities in two variables. In the second part they have to graph the feasible regions of multiple compound inequalities. If necessary students have to finish it at home.	<b>Skills</b> <table border="1" data-bbox="1066 785 1406 831"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <b>Key vocabulary</b> See activity 1  <b>Communicative structures</b> If you aren't finished with this task, you have to finish it at home.	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task03 compound inequalities in two variables.pdf</li> </ul> task03 compound inequalities in two variables.pdf	Formative: the teacher can assess the content of the previous two lessons.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	6	<b>Title</b>	Compound Inequalities in Two Variables (2)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	50 min	Revise Task 03 and reinforce students' knowledge of compound inequalities in two variables and the procedures for finding the solution set.	Class correction of the Task 03. T's role: T shows the solution of the task on the LIM using Desmos or Geogebra. S's role: S check their solutions and ask questions if necessary.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> see Glossary 02</p> <p><b>Communicative structures</b> GeoGebra helps us to better understand the solution set of the task assigned. Is everything clear?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>glossary02 graphing a compound linear inequality.pdf</li> <li>task03 compound inequalities in two variables.pdf</li> </ul>	Formative: both vocabulary and comprehension of the topic is assessed.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	7	<b>Title</b>	A real problem (1)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	30 min	Build on some vocabulary to describe mathematical procedures. Be able to use inequalities in two variables in order to solve a real life problem.	Students are given Task 04. Students read the task and ask for clarification if necessary. The teacher checks if the outcomes are clear. Students discuss and try to solve the exercise.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Glossary 02</p> <p><b>Communicative structures</b> Set up a system of inequalities that represents this scenario Identify the range ...</p>	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>glossary02 graphing a compound linear inequality.pdf</li> <li>task04_a_real_problem.pdf</li> </ul> <p>task04_a_real_problem.pdf</p>	Formative: the teacher circulates and facilitates.
L	S	R	W								



2	20 min	Revise Task 04 watching the Video 04	Viewing of a video which shows how to solve the problem of the Task 04. T's role: T shows the video and, if needed, stops it to clarify. S's role: S watch the video and ask for clarification if necessary.	<p><b>Skills</b></p> <table border="1" data-bbox="880 165 1220 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Glossary 02</p> <p><b>Communicative structures</b> Is the video clear enough?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• glossary02 graphing a compound linear inequality.pdf</li> <li>• task04_a_real_problem.pdf</li> </ul> <p><a href="#">link</a> about Systems of linear inequalities word problems example – Khan Academy (9:44)</p>	Formative: assessment of learning and peer-teaching efficacy.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	8	<b>Title</b>	A real problem (2)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	20 min	Reinforce the ability of using inequalities in two variables to solve real life problems.	Students are given Task 05. Students read the task and ask for clarification if necessary. The teacher checks if the outcomes are clear. Students discuss and try to solve the exercise.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Glossary 02</p> <p><b>Communicative structures</b></p>	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• glossary02 graphing a compound linear inequality.pdf</li> <li>• task05_a_real_problem.pdf</li> </ul>	Formative: the teacher circulates and facilitates.
L	S	R	W								

2	30 min	Revise Task 05 and discuss about the problem and some possible alternatives.	Class correction of the Task 05. Class discussion about the topic and the possible alternatives if something changed. T's role: T shows the solution of the task on the LIM opening equations and inequalities.pdf. S's role: S check their solutions and ask questions if necessary.	<p><b>Skills</b></p> <table border="1" data-bbox="855 167 1193 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Glossary 02, equations and inequalities.pdf</p> <p><b>Communicative structures</b> Is the ordered pair <math>(x_0, y_0)</math> part of the feasible region? What does it mean? Graph the feasible region with this additional constraint At which point in the new feasible region ... ?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• equations and inequalities.pdf</li> <li>• glossary02 graphing a compound linear inequality.pdf</li> <li>• task05_a_real_problem.pdf</li> </ul> <p>equations and inequalities.pdf page 49</p>	Formative: both vocabulary and comprehension of the topic is assessed.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	9	<b>Title</b>	Test on inequalities in two variables
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	50 min	Assess both the language and the knowledge of the contents of the previous lessons (1-8)	Teacher hands out the test Students do the test	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b></p> <p><b>Communicative structures</b> Do you need further information? Time is over. I need you to hand your test back to me.</p>	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input checked="" type="checkbox"/> Individual work	test01_inequalities_in_two_variables.pdf	Sommative: both the language and the knowledge of the contents of the previous lessons (1-8) are assessed.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	10	<b>Title</b>	Test revision
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	50 min	Knowledge revision and consolidation.	Class correction of the Test 01. Teacher shows the test on the LIM. Students, taking turns, propose their solutions. The whole class interacts to correct the exercises.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Glossary 02</p> <p><b>Communicative structures</b> Let's correct the test. Do you have any questions? Do you need further information?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>glossary02 graphing a compound linear inequality.pdf</li> <li>test01 inequalities in two variables.pdf</li> </ul> Desmos, GeoGebra or other	Formative: the teacher checks if the students have understood the contents and the language of the previous lessons (1-8).
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	11	<b>Title</b>	Introduction to Linear Programming
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	25 min	Introduction to Linear Programming (LP)	Viewing of the Video 05 which gives some examples about the usefulness of the LP as a decision support system. T's role: T shows the video and, if needed, stops it to clarify. S's role: S watch the video.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> Linear programming, constraints, maximise profits, unknowns, objective function</p> <p><b>Communicative structures</b> Pay particular attention to the last part of the video.</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	Video 05 <a href="#">link</a> Introduction to Linear Programming (1/3) METAL film 4.01 - METALMathProject (10:49)	
L	S	R	W								

2	25 min	Be able to solve an LP problem identifying the objective function and the constraints thru inequalities in two variables.	Students are given Task 06. S try to graph the systems of constraints, find the feasible region and, also, graph the objective function. The teacher checks if the outcomes are clear.	<p><b>Skills</b></p> <table border="1" data-bbox="904 165 1247 212"> <tr> <td>L</td> <td>S</td> <td><b>R</b></td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See activity 1</p> <p><b>Communicative structures</b> Is the objective function to maximize or minimize? The constraints of a linear programming problem are represented by a system of inequalities. You have to graph the feasible region.</p>	L	S	<b>R</b>	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input checked="" type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• task06_lp_chocolates.pdf</li> </ul> task06_lp_chocolates.pdf	Formative: the teacher circulates and facilitates.
L	S	<b>R</b>	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	12	<b>Title</b>	Linear Programming (1)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	25 min	Collaborative learning.	Students are invited to check the solution of Task 06 in small groups.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See lesson 11 activity 1</p> <p><b>Communicative structures</b> Who wants to share their solution?</p>	L	S	R	W	<input type="checkbox"/> Whole class <input checked="" type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task06_lp_chocolates.pdf</li> </ul>	The teacher circulates and checks if the topic is assessed.
L	S	R	W								



2	25 min	Consolidate basic properties of LP.	Viewing of the Video 06 which is the second part of the previous video (Video 05). The video shows the solution of the Task 06. T's role: T shows the video and, if needed, stops it to clarify. S's role: S watch the video.	<p><b>Skills</b></p> <table border="1" data-bbox="904 165 1247 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See lesson 11 activity 1</p> <p><b>Communicative structures</b> Now we are going to go through the solution. Please, try to correct any mistakes you can find.</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• task06_lp_chocolates.pdf</li> </ul> <p><a href="#">link</a> Linear Programming - final two steps (2/3) METAL film 4.02 - METALMathProject (9:14)</p>	
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	13	<b>Title</b>	Linear Programming (2)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	30 min	Consolidate basic properties of LP and revise new language terms.	Viewing of the Video 07 which gives useful information and a guided example of using LP. T's role: T shows the video and, if needed, stops it to clarify. S's role: S watch the video.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See lesson 11 activity 1</p> <p><b>Communicative structures</b></p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	Video 07 <a href="#">link</a> - Introduction to Linear Programming - Mathispower4u (10:37)	
L	S	R	W								

2	20 min	Consolidate the technical vocabulary of LP.	Presentation of the first part of Glossary 03: technical terminology list, steps to be followed to solve a LP problem. T's role: T shows glossary on the LIM and distributes a copy of it. S'role: S read the glossary and listen to the teacher and ask for clarification if necessary.	<p><b>Skills</b></p> <table border="1" data-bbox="833 165 1173 210"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Glossary 03</p> <p><b>Communicative structures</b> Here we have a list of the most important words related to Linear Programming.</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	glossary03_linear_programming.pdf	
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	14	<b>Title</b>	Linear Programming (3)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	30 min	Understanding the main difference between the geometric approach and the algebraic approach of solving an LP problem.	Presentation of the second part of Glossary 03: geometric approach and algebraic approach. T's role: T shows glossary on the LIM. S'role: S read the glossary and listen to the teacher and ask for clarification if necessary.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Glossary 03</p> <p><b>Communicative structures</b> What does it happen if we move the line through the graph?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work		
L	S	R	W								

2	20 min	Assess the students' knowledge about the meaning of an LP problem and how to solve it.	Viewing of the Video 07 for the second time not using subtitles. T's role: T shows the video and, sometimes, stops it and asks something to the students. S's role: S watch the video and reply to the teacher.	<p><b>Skills</b></p> <table border="1" data-bbox="1122 165 1464 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Glossary 03</p> <p><b>Communicative structures</b></p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	Video 07 <a href="#">link</a> - Introduction to Linear Programming - Mathispower4u (10:37)	Formative: the correct vocabulary is assessed, as well as the knowledge of LP problem solving.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	15	<b>Title</b>	Linear Programming (4)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	25 min	Be able to understand and solve an LP problem.	Students are given Task 07 that is a guided exercise. Students read the task and ask for clarification if necessary. The teacher checks if the outcomes are clear. Students discuss and try to solve the exercise.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Glossary 03</p> <p><b>Communicative structures</b> You have to complete the table. Write down the objective function. Complete the constraints. Find the feasible region. Compare your solution.</p>	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>glossary03 linear programming.pdf</li> <li>task07 lp shoe factory (guided).pdf</li> </ul> <p>task07 lp shoe factory (guided).pdf</p>	Formative: the teacher circulates and facilitates.
L	S	R	W								

2	25 min	Revise Task 07 and discuss about the difficulties met doing the exercise.	Class correction of the Task 07 showing the solution on the LIM using task07 lp shoe factory (guided) solution.pdf. T's role: T shows the solution. S's role: S check their solutions and ask questions if necessary.	<p><b>Skills</b></p> <table border="1" data-bbox="981 164 1330 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Glossary 03</p> <p><b>Communicative structures</b> Do you agree with the final solution? Did you find any difficulties?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>glossary03 linear programming.pdf</li> <li>task07 lp shoe factory (guided) solution.pdf</li> </ul> <p>task07 lp shoe factory (guided) solution.pdf</p>	Formative: both vocabulary and comprehension of the topic is assessed.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	16	<b>Title</b>	Linear Programming (5)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	25 min	Consolidate properties of LP and further training about LP problem.	Students are given Task 08. Students read the task and ask for clarification if necessary. The teacher checks if the outcomes are clear. Students discuss and try to solve the exercise.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Glossary 03</p> <p><b>Communicative structures</b> Do you know all these words?</p>	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• task08_lp_tailor.pdf</li> <li>• glossary03 linear programming.pdf</li> </ul> task08_lp_tailor.pdf	Formative: the teacher circulates and facilitates.
L	S	R	W								



2	20 min	Revise Task 08 and discuss about the difficulties met doing the exercise.	Class correction of Task 08 showing the solution on the LIM using task08 lp tailor solution.pdf. T's role: T shows the solution. S's role: S check their solutions and ask questions if necessary.	<b>Skills</b>	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task08_lp_tailor_solution.pdf</li> <li>glossary03 linear programming.pdf</li> </ul> task08 lp tailor solution.pdf	Formative: both vocabulary and comprehension of the topic is assessed.				
				<table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table>				L	S	R	W
				L				S	R	W	
<b>Key vocabulary</b> See Glossary 03											
				<b>Communicative structures</b> Remember non negativity constraints. Pay attention to the slope of the line.							

3	5 min	Further training about solving LP problems.	Teacher distributes a copy of Task 09 as homework task and asks the students to read it. Students read the task and ask for clarification if necessary.	<b>Skills</b>	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input checked="" type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task09_lp_farmer.pdf</li> </ul> task09_lp_farmer.pdf	Formative: the teacher checks if the topic is clear.				
				<table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table>				L	S	R	W
				L				S	R	W	
<b>Key vocabulary</b>											
				<b>Communicative structures</b> Is the task clear enough? Please do this at home.							

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	17	<b>Title</b>	Linear Programming with 3 variables (1)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	20 min	Revise Task 09 done at home and discuss about the difficulties met doing the exercise.	Class correction of Task 09 showing the solution on the LIM using task09 lp farmer solution.pdf. T's role: T shows the solution. S's role: S check their solutions and ask questions if necessary.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b></p> <p><b>Communicative structures</b> Let's have a look at the different possibilities.</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task09_lp_farmer_solution.pdf</li> </ul> task09 lp farmer solution.pdf	Formative assesment of learning outcomes.
L	S	R	W								

2	30 min	Learn how to solve LP problems with 3 variables using the substitution method.	Presentation of linear programming with 3_variables.pdf. It is an example that shows the steps to be followed to solve a LP problem with 3 variables. T's role: T shows the exercise on the LIM and distributes a copy of it. S's role: S listen to the teacher and ask for clarification if necessary.	<p><b>Skills</b></p> <table border="1" data-bbox="837 165 1178 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See linear programming with 3 variables.pdf</p> <p><b>Communicative structures</b> We have to rewrite the problem using only two variables. One of the constraints must be an equation. We have to do a substitution.</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>linear programming with 3 variables.pdf</li> </ul> <p>linear programming with 3_variables.pdf</p>	Formative: the teacher checks if the topic is clear.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	18	<b>Title</b>	Linear Programming with 3 variables (2)
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	25 min	Applying the knowledge of lesson 17 in order to solve LP problems with 3 variables.	Students are given Task 10. Students read the task and ask for clarification if necessary. The teacher checks if the outcomes are clear. Students discuss and try to solve the exercise.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See linear programming with 3 variables.pdf</p> <p><b>Communicative structures</b> You have to identify the equation. Compare the equation of the function and the system of constraints.</p>	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input checked="" type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>task10_breeder.pdf</li> <li>linear programming with 3 variables.pdf</li> </ul> task10_breeder.pdf	Formative: the teacher circulates and facilitates.
L	S	R	W								

2	25 min	Revise Task 10 and discuss about the difficulties met doing the exercise.	Class correction of Task 10 showing the solution on the LIM using task10 breeder solution.pdf. T's role: T shows the solution. S's role: S check their solutions and ask questions if necessary.	<p><b>Skills</b></p> <table border="1" data-bbox="831 165 1173 212"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> linear programming with 3 variables.pdf</p> <p><b>Communicative structures</b> What will happen if you use another unknown?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>• task10_breeder_solution.pdf</li> <li>• linear programming with 3 variables.pdf</li> </ul> <p>task10 breeder solution.pdf</p>	Formative: both vocabulary and comprehension of the topic is assessed.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	19	<b>Title</b>	Test on Linear Programming
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	50 min	Assess both the language and the knowledge of the contents of the previous lessons (11-18)	Teacher hands out the test Students do the test	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b></p> <p><b>Communicative structures</b> Do you need further information? Time is over. I need you to hand your test back to me.</p>	L	S	R	W	<input type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input checked="" type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>test02_linear_programming.pdf</li> </ul> test02_linear_programming.pdf	Sommative: both the language and the knowledge of the contents of the previous lessons (11-18) are assessed.
L	S	R	W								

# CLIL Lesson Plan

<b>Unit number</b>	1	<b>Lesson number</b>	20	<b>Title</b>	Test revision
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Activity	Timing	Learning Outcomes	Activity Procedure	Language	Interaction	Materials	Assessment				
1	50 min	Knowledge revision and consolidation	Class correction of the Test 02. Teacher shows the test on the LIM. Students, taking turns, propose their solutions. The whole class interacts to correct the exercises.	<p><b>Skills</b></p> <table border="1"> <tr> <td>L</td> <td>S</td> <td>R</td> <td>W</td> </tr> </table> <p><b>Key vocabulary</b> See Glossary 03</p> <p><b>Communicative structures</b> Let's correct the test. Do you have any questions? Do you need further information?</p>	L	S	R	W	<input checked="" type="checkbox"/> Whole class <input type="checkbox"/> Group work <input type="checkbox"/> Pair work <input type="checkbox"/> Individual work	<ul style="list-style-type: none"> <li>test02_linear_programming.pdf</li> </ul>	Formative: the teacher checks if the students have understood the contents and the language of the previous lessons (11-18).
L	S	R	W								