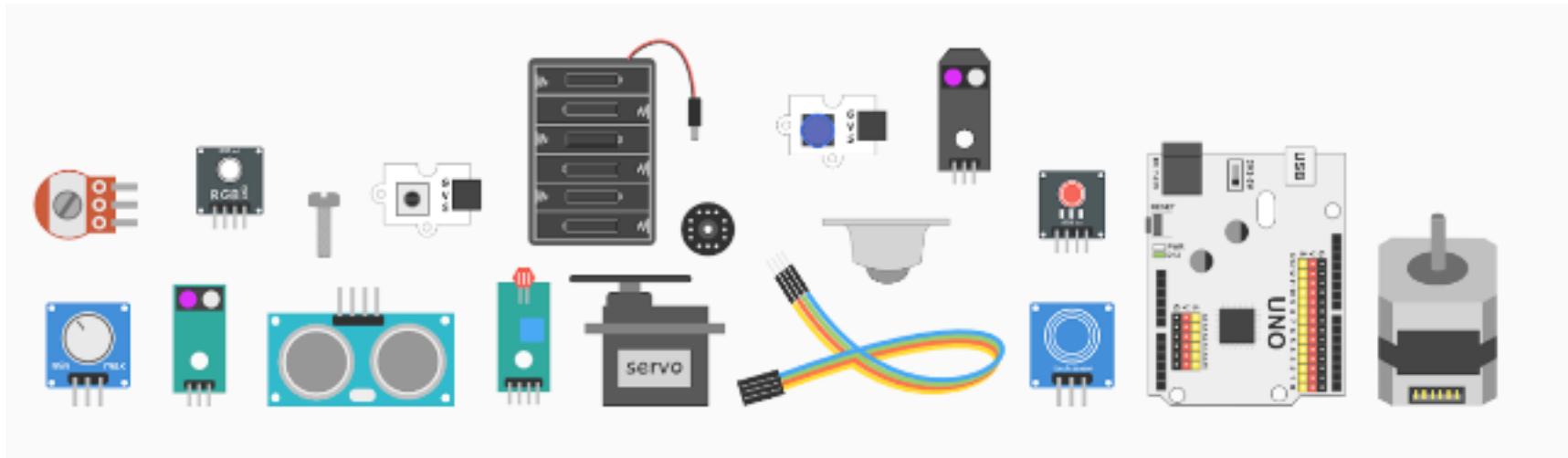


# Arduino bits



**INS Berenguer d'Entença  
Cristobal Selma Tamarit**

**Generació Plurilingüe (GEP)**

**Year 2  
2018-2019**

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# PROJECT PLANNING TEMPLATE for CLIL and Content-Rich Environments

## Identification of the GEP project:

Title	Arduino bits
Authorship	Cristobal Selma
School	INS Berenguer d'Entença
Students' CEFR Level (A1, A2...)	
Grade	4th ESO
Content area(s)	Electronics, programming and robotics
Number of sessions (4, 6 or 9)	4
Teacher(s) involved	Cristobal Selma
Key words	Arduino, code, programming, robotics



## 1. MY PROJECT

**Introduction:** In this project students will use different Arduino based components to create something. They will be able to choose between several components like, buttons, motors, leds, different sensors, etc. After doing some guided activities with them, they have to be able to use different electronic components with Arduino board and make them work together to create something. They can choose among all kind of things, it's up to them.

Some examples are a temp sensor, a doorbell, a fish feeder, a clock, an automated light and much more.

**Driving question:** *What's the coolest thing I can do with an Arduino board?*

**Final product:** Poster presenting the project for the Arduino faire at Barcelona and Arduino project itself

## 2. GOALS

## 2. HOW DO YOU KNOW STUDENTS ARE MAKING PROGRESS? (assessment criteria)

1. Investigate different projects to do with given components

Criteria: They can find different projects online or think about electronic systems based on Arduino.

Assessment tool: Class observation and teacher feedback

2. Discuss and decide which project to choose

Criteria: They can agree on a project that is feasible and realistic.

Assessment tool: Class observation and teacher feedback



<p>3. Create and program a “thing” that uses Arduino. It can be almost anything, games, IoT devices, sensors, etc.</p>	<p>Criteria: They can connect and program an electronic system that uses different components. Assessment tool: Project rubric considering variety of components, difficulty, process and final result. Rubric for teacher assessment and also for self assessment.</p>
<p>4. Explain project to others (short presentation and poster).</p>	<p>Criteria: They are able to explain their project to others in a comprehensible way, enumerating components and steps. Assessment tool: Rubric for presentations, poster</p>

### 3. CURRICULUM CONNECTIONS SPECIFIC COMPETENCES AND KEY CONTENTS

Subject-matter curriculum		Foreign language curriculum	
Specific Competences	Key Contents	Specific Competences	Key Contents
<p><b>Competència 7.</b> Utilitzar objectes tecnològics de la vida quotidiana amb el coneixement bàsic del seu funcionament, manteniment i accions a fer per minimitzar els riscos en la manipulació i en l'impacte mediambiental.</p> <p><b>Competència 8.</b> Analitzar sistemes tecnològics d'abast industrial, avaluar-ne els avantatges personals i socials, així com l'impacte en la salubritat i el medi ambient.</p> <p><b>Competència 9.</b> Dissenyar i construir</p>	<p>Electrònica, pneumàtica i hidràulica. Control i automatització. Disseny i construcció d'objectes. Llenguatge de programació. Programació d'aplicacions.</p>	<p><b>Competència 4.</b> Aplicar estratègies de comprensió per obtenir informació i interpretar el contingut de textos escrits d'estructura clara de la vida quotidiana, dels mitjans de comunicació i de l'àmbit acadèmic.</p> <p><b>Competència 5.</b> Interpretar els trets contextuals, discursius i lingüístics d'un text i reconèixer la seva tipologia per comprendre'l</p> <p><b>Competència 6.</b> Seleccionar i utilitzar eines de consulta per accedir a la comprensió de textos i per adquirir coneixement .</p> <p><b>Competència 8.</b> Produir textos escrits de diferents</p>	<p>Comprensió oral: global, literal i interpretativa. Comprensió escrita: global, literal, interpretativa i valorativa. Criteris de selecció i valoració de la informació. Cerca i gestió de la informació i la</p>



objectes tecnològics senzills que resolguin un problema i avaluar-ne la idoneïtat del resultat.		tipologies i formats aplicant estratègies de textualització	consulta lingüística.
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#### 4. 21<sup>st</sup> CENTURY COMPETENCES

Collaboration	Yes	Information, media and technology	Yes
Communication	Yes	Leadership & Responsibility	Yes
Critical Thinking and Problem Solving	Yes	Initiative & Self-direction	Yes
Creativity & Innovation	yes	Social & Cross-cultural	Yes
Others:			



## 5. KEY COMPETENCES

Communicative, linguistic and audiovisual competence	Yes	Digital competence	yes
Mathematical competence	yes	Social and civic competence	yes
Interaction with the physical world competence	yes	Learning to learn competence	yes
Cultural & artistic competence	yes	Personal initiative and entrepreneurship competence	yes

## 6. CONTENT (Knowledge and Skills)

CONTENT-RELATED KNOWLEDGE	CONTENT-RELATED SKILLS
<p>Robotics</p> <p>Control and automated systems</p> <p>Electronic components</p> <p>Programming languages and code structure</p>	<p><b>Discuss</b> which components to use.</p> <p><b>Design</b> an Arduino program using code and trial and error learning.</p> <p><b>Create</b> an electronic system with Arduino and other components and enumerate process' steps.</p>



## 7. REFERENCES

TA presentation rubric adapted from: <https://www.bie.org>






## 8. COMMENTS (optional)

## 9. ACKNOWLEDGEMENTS (optional)



Skills: R: reading , S:speaking, L: listening, W: writing, I: Interaction  
Interaction: T-S: teacher-student, S-S: student-student, SG: small groups, WG: whole group, S-Expert, S-World  
Assessment: PA: Peer assessment, SA: Self-assessment, TA: Teacher assessment, AT: Assessment tools

## 10. UNIT OVERVIEW

Session	Activities	Timing 	Skills 	Interaction 	ICT 	Assessment 
1	Presentation	10min	L	T-S, W-G		TA
	Instructions	10min	L	T-S, W-G		TA
	Start with activity one	40min	LRWI	T-S, S-S, S-G	yes	TA
2	Continue with activity 2	60min	LRWI	T-S, S-S, S-G	yes	TA





3	Design an electronic system with arduino and a poster	60min	SLRWI	T-S, S-S, S-G	yes	TA-SA
4	Short presentation (each pair)	60min	SI	W-G	yes	PA-TA-SA



## 11. SESSION PLANNING

### SESSION 1: Project presentation

Objectives of the session:

Introduce the PBL to students and give them clear instructions

Content-obligatory language for the session: electronic components, robotics and programming code. Language Scaffolding can be found in each activity on the corresponding section

#### Activities






*include : Name and description; Assessment tool (if any); Material (including language support)*



1.1	Presentation: Introduce the PBL to students: <a href="#">Introduction materials here</a> . Whole class will brainstorm ideas for the project and they will choose one form the list of possible projects. This way we can check out of the list the projects that are not realistic or not feasible.	10	L	T-S, W-G	-	TA
1.2	Instructions: Give them clear instructions on how to proceed and how to use scaffolding: Instructions, contents and scaffolding can be found here: <a href="#">Act 1 materials here</a>	10	L	T-S, W-G	-	TA
1.3	Start with activity one. Instructions, contents and scaffolding can be found here: <a href="#">Act 1 materials here</a>	40	LRWI	TS-SS-SG	yes	TA

Think



<h2>SESSION 2: Continue with activity 2, inputs and outputs</h2> <p>Objectives of the session: Learn how to use different electronic components to process inputs and outputs</p>					
<p>Content-obligatory language for the session: electronic components, robotics and programming code. Language Scaffolding can be found in each activity on the corresponding section</p>					
Activities					
1.1	60	LRWI	T-S, S-S, S-G	yes	TA
1.2					
1.3					



## SESSION 3: Project design

Objectives of the session:  
Design an electronic system with arduino and a poster

Content-obligatory language for the session: electronic components, robotics and programming code. Language Scaffolding can be found in each activity on the corresponding section

### Activities

*include : Name and description; Assessment tool (if any); Material (including language support)*



1.1 Students will think about an electronic system that includes some of the components that they have worked with and design a system. They have to be able to use different electronic components with Arduino board and make them work together to create something.  
Instructions, contents and scaffolding can be found [here](#).  
To make random groups, we will use this tool:  
<https://www.randomlists.com/team-generator>

60

SLRWI

T-S, S-S,  
S-G

yes






TA-S  
A

1.2 They will continue working on the project for several sessions.

-

1.3 TA-SA-PA Project rubric can be found [here](#)


















<h2>SESSION 4: Present your project</h2> <p>Objectives of the session: Students will present their project to the whole group and the whole class will decide which ones go to the Arduino Faire at Barcelona.</p>						
<p>Content-obligatory language for the session: electronic components, robotics and programming code. Language Scaffolding can be found in each activity on the corresponding section</p>						
<p><b>Activities</b> <i>include : Name and description; Assessment tool (if any); Material (including language support)</i></p>						
						
1.1	Project presentation (TA). Instructions, contents and scaffolding can be found <a href="#">here</a> Rubric can be found <a href="#">here</a>	3	SI	W-G	yes	TA
1.2	Project presentation (SA and PA): rubric can be found <a href="#">here</a>	3	SI	W-G	yes	PA-SA
1.3	Poster. Instructions and contents can be found <a href="#">here</a>	1	SI	W-G	yes	TA





P R O J E C T R U B R I C f o r P B L ( T A - S A - P A )

	Below Standard 1	Approaching Standard 2	At Standard 3	Above Standard 4	Points
<b>Diversity of materials</b>	 only one component is used	 a few components are used	 several components are used	Outstanding	
<b>Difficulty</b>	 project is too simple	 project is simple but yet attractive	 project is quite demanding	Outstanding	
<b>Idea</b>	 the main idea is too simple and/or a repetition of something previously done	 the idea is interesting but still too similar to other things previously done	 the idea is very interesting and quite different from anything previously done	Outstanding	
<b>Poster</b>	 its design is very poor and/or lacks information	 its design is quite good but it lacks some parts	 its design is very good and has all required parts	Outstanding	
<b>Result</b>	 the system does not work at all	 the system works partially or works with some errors	 the system works as it's supposed to	Outstanding	

Total:
















# P R E S E N T A T I O N   R U B R I C   f o r   P B L

	<b>Below Standard 1</b>	<b>Approaching Standard 2</b>	<b>At Standard 3</b>	<b>Above Standard 4</b>
<b>Explanation of Ideas &amp; Information</b>	<ul style="list-style-type: none"> <li>• does not present information, arguments, ideas, or findings clearly, concisely, and logically; argument lacks supporting evidence; audience cannot follow the line of reasoning</li> <li>• selects information, develops ideas and uses a style inappropriate to the purpose, task, and audience (may be too much or too little information, or the wrong approach)</li> <li>• does not address alternative or opposing perspectives</li> </ul>	<ul style="list-style-type: none"> <li>• presents information, findings, arguments and supporting evidence in a way that is not always clear, concise, and logical; line of reasoning is sometimes hard to follow</li> <li>• attempts to select information, develop ideas and use a style appropriate to the purpose, task, and audience but does not fully succeed</li> <li>• attempts to address alternative or opposing perspectives, but not clearly or completely</li> </ul>	<ul style="list-style-type: none"> <li>• presents information, findings, arguments and supporting evidence clearly, concisely, and logically; audience can easily follow the line of reasoning</li> <li>• selects information, develops ideas and uses a style appropriate to the purpose, task, and audience</li> <li>• clearly and completely addresses alternative or opposing perspectives</li> </ul>	
<b>Organization</b>	<ul style="list-style-type: none"> <li>• does not meet requirements for what should be included in the presentation</li> <li>• does not have an introduction and/or conclusion</li> <li>• uses time poorly; the whole presentation, or a part of it, is too short or too long</li> </ul>	<ul style="list-style-type: none"> <li>• meets most requirements for what should be included in the presentation</li> <li>• has an introduction and conclusion, but they are not clear or interesting</li> <li>• generally times presentation well, but may spend too much or too little time on a topic, a/v aid, or idea</li> </ul>	<ul style="list-style-type: none"> <li>• meets all requirements for what should be included in the presentation</li> <li>• has a clear and interesting introduction and conclusion</li> <li>• organizes time well; no part of the presentation is too short or too long</li> </ul>	
<b>Eyes &amp; Body</b>	<ul style="list-style-type: none"> <li>• does not look at audience; reads notes or slides</li> <li>• does not use gestures or movements</li> <li>• lacks poise and confidence (fidgets, slouches, appears nervous)</li> <li>• wears clothing inappropriate for the occasion</li> </ul>	<ul style="list-style-type: none"> <li>• makes infrequent eye contact; reads notes or slides most of the time</li> <li>• uses a few gestures or movements but they do not look natural</li> <li>• shows some poise and confidence, (only a little fidgeting or nervous movement)</li> <li>• makes some attempt to wear clothing appropriate for the occasion</li> </ul>	<ul style="list-style-type: none"> <li>• keeps eye contact with audience most of the time; only glances at notes or slides</li> <li>• uses natural gestures and movements</li> <li>• looks poised and confident</li> <li>• wears clothing appropriate for the occasion</li> </ul>	



	<b>Below Standard 1</b>	<b>Approaching Standard 2</b>	<b>At Standard 3</b>	<b>Above Standard 4</b>
<b>Voice</b>	<ul style="list-style-type: none"> <li>• mumbles or speaks too quickly or slowly</li> <li>• speaks too softly to be understood</li> <li>• frequently uses “filler” words (“uh, um, so, and, like, etc.”)</li> <li>• does not adapt speech for the context and task</li> </ul>	<ul style="list-style-type: none"> <li>• speaks clearly most of the time</li> <li>• speaks loudly enough for the audience to hear most of the time, but may speak in a monotone</li> <li>• occasionally uses filler words</li> <li>• attempts to adapt speech for the context and task but is unsuccessful or inconsistent</li> </ul>	<ul style="list-style-type: none"> <li>• speaks clearly; not too quickly or slowly</li> <li>• speaks loudly enough for everyone to hear; changes tone and pace to maintain interest</li> <li>• rarely uses filler words</li> <li>• adapts speech for the context and task, demonstrating command of formal English when appropriate</li> </ul>	
<b>Presentation Aids</b>	<ul style="list-style-type: none"> <li>• does not use audio/visual aids or media</li> <li>• attempts to use one or a few audio/visual aids or media, but they do not add to or may distract from the presentation</li> </ul>	<ul style="list-style-type: none"> <li>• uses audio/visual aids or media, but they may sometimes distract from or not add to the presentation</li> <li>• sometimes has trouble bringing audio/visual aids or media smoothly into the presentation</li> </ul>	<ul style="list-style-type: none"> <li>• uses well-produced audio/visual aids or media to enhance understanding of findings, reasoning, and evidence, and to add interest</li> <li>• smoothly brings audio/visual aids or media into the presentation</li> </ul>	
<b>Response to Audience Questions</b>	<ul style="list-style-type: none"> <li>• does not address audience questions (goes off topic or misunderstands without seeking clarification)</li> </ul>	<ul style="list-style-type: none"> <li>• answers audience questions, but not always clearly or completely</li> </ul>	<ul style="list-style-type: none"> <li>• answers audience questions clearly and completely</li> <li>• seeks clarification, admits “I don’t know” or explains how the answer might be found when unable to answer a question</li> </ul>	
<b>Participation in Team Presentations</b>	<ul style="list-style-type: none"> <li>• Not all team members participate; only one or two speak</li> </ul>	<ul style="list-style-type: none"> <li>• All team members participate, but not equally</li> </ul>	<ul style="list-style-type: none"> <li>• All team members participate for about the same length of time</li> <li>• All team members are able to answer questions about the topic as a whole, not just their part of it</li> </ul>	

# P R E S E N T A T I O N   R U B R I C   f o r   P B L   ( S A - P A )

	Below Standard 1	Approaching Standard 2	At Standard 3	Above Standard 4	Points
<b>Explanation of Ideas &amp; Information</b>	 <p>very poor information and/or poorly chosen</p>	 <p>presents information but it's not always accurate or well chosen</p>	 <p>presents information with appropriate arguments and well selected</p>	Outstanding	
<b>Organization</b>	 <p>does not include everything and/or uses time poorly</p>	 <p>meets most requirements and generally times presentation well</p>	 <p>meets all requirements and organizes time well</p>	Outstanding	
<b>Eyes, Body language and voice</b>	 <p>does not look at audience; reads notes or slides; does not use gestures or movements; mumbles or speaks too quickly or slowly</p>	 <p>makes infrequent eye contact; reads notes or slides most of the time; uses a few gestures; speaks clearly most of the time</p>	 <p>keeps eye contact with audience most of the time; uses natural gestures; speaks clearly</p>	Outstanding	
<b>Response to Audience Questions</b>	 <p>does not address audience questions</p>	 <p>answers audience questions, but not always clearly or completely</p>	 <p>answers audience questions clearly and completely</p>	Outstanding	
<b>Participation in Team Presentations</b>	 <p>Not all team members participate; only one or two speak</p>	 <p>All team members participate, but not equally</p>	 <p>All team members participate for about the same length of time</p>	Outstanding	

Total points: