



STEAM educational approach and foreign language learning in Europe



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Compendium of Examples of Good Practice reflecting elements of the SeLFiE model

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Introduction

This document is a compendium of learning activities for children at early years' and primary level (ages 4-11 years). These activities are considered as examples of good practice by the partners within the SeLFiE project (<https://project-selfie.eu/>) for second language learning through STEAM (Science, Technology, Engineering, Arts, and Mathematics). This compendium accompanies the SeLFiE toolkit which presents the SeLFiE pedagogical model developed for integrating second language learning through STEAM subject learning and pedagogies. In the SeLFiE pedagogical model these activities are connected through storytelling and involve Content and Language Integrated Learning (CLIL) pedagogies. The aim of this document is to present activities that have been identified and documented from actual classroom practices with the intention to illustrate to teachers across Europe that such pedagogical practices are possible and already exist in schools. These examples also highlight that it is possible to teach a second language through STEAM subjects.

When the SeLFiE team started working to develop the SeLFiE pedagogical model, the first step of the process involved identifying existing effective practices in early years and primary schools where teachers were already using the learning of STEAM to promote second language learning. While the SeLFiE pedagogical model for second language learning was not yet developed at this stage of the project, teachers' pedagogical content knowledge (known as PCK) was already demonstrating that a holistic approach to learning was possible.

This compendium presents a total of 17 examples of good practices where STEAM was used to teach a foreign language. Second language learning identified ranged from English to Spanish to French in schools across Europe. The examples come from actual schools and teachers in Spain, Poland and Malta. They are intended mainly to provide teachers and other educators with examples of what some teachers are already practising and have already achieved. They also serve to convince as well as to inspire teachers that it is possible for young children to learn a foreign language when young while they are also learning curricular content of other subject areas.

This document is divided into a number of sections. Part 2.0 presents a brief description of the key pedagogical approaches that the SeLFiE team were looking for in the examples of good practices identified. Section 3.0 provides a short description of the specific criteria which the activities needed to satisfy to be considered as good practices. The actual good practices are then presented in section 4.0. The examples of good practice are presented in the form of templates as they are intended to provide inspiration rather than prescriptive pedagogies. If you wish to learn more about the SeLFiE pedagogical model, it is highly

recommended that this compendium is read in conjunction with the SeLFiE toolkit which is available at: <https://project-selfie.eu/resources/selfie-toolkit/>

Pedagogical Aspects of SeLFiE model in the Examples of Good practices identified

Many are those innovations which start directly from classroom practices. As teachers undergo a continuous process of knowledge building and skill development in effective teaching practice, this leads them to develop pedagogical content knowledge (PCK). The project-based approach where children learn various subject content knowledge around a common theme is one example of PCK which has been growing in popularity and evolving over the past few years as part of instruction within the early and primary years of education. Shulman (1987) who developed the concept of PCK, defined pedagogical content knowledge as teachers' interpretations and transformations of subject-matter knowledge in the context of facilitating student learning. He identified several key elements of PCK, these being: knowledge of subject matter (content knowledge); understanding of students' conceptions of the subject; and the learning and teaching implications associated with it. To these he eventually added: the teachers' general pedagogical knowledge (or teaching strategies); teachers' curriculum knowledge (Curricular Knowledge); knowledge of educational contexts (contextual knowledge); and knowledge of the purposes of education (Shulman, 1987). Thus PCK represents teachers' understanding of the complexities of teaching and learning within a classroom context as part of the education system setting.

The teachers' PCK on teaching a foreign language through STEAM subjects provided a good context for identifying examples of good practice from which the SeLFiE pedagogical model could be developed. The SeLFiE group were looking for classroom practices which reflected a holistic approach to learning, mainly through a project-based approach. A project-based approach to learning is based on a theme around which integrates teaching and learning of content knowledge from different subject areas. The examples of project-based learning identified included content knowledge in STEAM subjects as well as main STEAM pedagogical approaches such as inquiry-based learning. In these integrative approaches adopted by teachers, immersion in a foreign language as proposed by the Content and Language Integrated Learning (CLIL) pedagogical approach was also sought. If you read the toolkit's description of the SeLFiE pedagogical model, you will note that all these elements are an integral part of the SeLFiE pedagogical model.

Storytelling, which is used for connecting the different activities included in the children's activities within the SeLFiE pedagogical model was not a key feature of the examples of good practice. This aspect of the SeLFiE pedagogical model was added while it was being developed and following the analysis of the examples of good practice collected. Thus, storytelling was not considered as a necessary feature of the activities documented at this stage as the teachers' PCK served mainly as basis for the development of the SeLFiE model.

Criteria for selection of Examples of Good practice

This project took an interdisciplinary approach to teaching as it integrated learning of Steam subjects through inquiry-based learning, and involving elements of creativity and self-expression through the arts, while also concurrently practising and learning a second language. Second language learning was also to involve elements of CLIL which promotes the learning of a foreign language in a contextual approach. In order to identify the examples of good practice there needed to be within the partnership a common understanding of the key characteristics which the examples of good practice were to possess. This ensured consistency with the SeLFiE's project as well as provided the SeLFiE partners with different examples of practices from which they could understand how language through STEAM is being done in schools and use this to build the SeLFiE pedagogical model.

The criteria which the examples of good practice had to fulfil included key pedagogical approaches which the partners wanted to include in the SeLFiE pedagogical model to be developed. They included aspects of: STEAM; inquiry-based learning; and Content and Language Integrated Learning approach for language learning. Each of these aspects is here below (more elaborated explanations are included in the toolkit) to help you understand what we were looking.

Science, Technology, Engineering, Arts and Mathematics (STEAM) learning is an integrated educational approach to learning that uses Science, Technology, Engineering and the Arts and Mathematics as contexts for implementing student inquiry learning, social construction of knowledge through dialogue and critical thinking. This is usually implemented through project-based programmes which focus on learning about a topic in an integrated. The chosen topic needs to have an intentional connection between the curriculum learning objectives, the curriculum, assessment, and lesson design/implementation. As children work on a project, they are able to learn about different elements of the curriculum in both a direct and indirect manner. Many times these projects involve learning experiences with meaningful

maths, science, and technology content to solve real-world problems through hands-on learning activities and creative design.

Inquiry-based learning (IBL) actively engages children in the learning process by tackling authentic and problem-based learning activities with emphasis on observations and experiences as sources of evidence. Many inquiry activities start with a question or a problem which is meaningful and relevant to children. It involves investigative practice which develops the skills of systematic observation, questioning, planning and recording to obtain evidence in response to the question set or a solution to a problem which needs to be solved. As children work in groups, they participate in collaborative group work, interact in a social context and engage in discursive argumentation as they communicate with others in the process of learning. In inquiry, scientific correctness is not the most important aspect of learning, and more attention is given to how the available evidence is used to draw conclusions.

Content and Language Integrated Learning (CLIL) refer to learning a foreign language through situations and contexts when learning other curricular subject areas. Learning thus has dual-focused aims, namely: the learning of specific subject content; and the simultaneous learning of a foreign language. It promotes language immersion that involves teaching subjects such as science, history, geography and art to students through a foreign language. CLIL promotes education through construction rather than instruction. It aims for fluency in a language rather than emphasising accuracy.

Selecting the examples of good practices

In selecting the examples of good practice it was important to ensure that the cases selected included as many aspects of the three key elements (STEAM, IBL and CLIL) as possible. The partners had to select examples from different education systems, different contexts, as well as concurrently learning a different foreign language. It was thus considered important to have a common number of criteria against which the examples collected could be measured and assessed for their features of involving the learning of STEAM alongside second language learning.

The grid below was used by the project partners as a guide to choose the examples of good practice. There was no need for the cases considered as good practices to tick all the elements of the three aspects under STEAM, IBL and CLIL. However, the more aspects ticked, the better fit was the case considered as an example to be considered for inclusion in this compendium.

Table 1: Criteria used for the selection of the examples of good practice

STEAM	Partial	Full
Is project-based		
Learning of meaningful maths, science, and technology content		
Solve real-world problems through hands-on learning activities		
Involves creative design		
Inquiry-based learning		
Starts with a problem or a question		
Involves investigations to test ideas or find answers to question		
Children are involved in group-work		
Evidence (observation) are used to draw conclusions		
CLIL		
Learning related to curricular areas other than foreign language		
Children exposed to language while learning other subject areas		

In the case of STEAM, the partners were looking for project-based activities, activities which target mathematics, science and technological content, as well as have an element of hands-on learning which involved creative design and expression. In the case of inquiry-based learning, activities preferable started with a question or a problem and involved carrying out investigations to gather evidence to draw conclusions. Inquiry also needed to involve an element of group work. With respect to language learning, it was important to note the use of a second language during activities which expose students to a foreign language while learning other subject content.

The examples of good practice

Each of the partners had to identify 2-4 examples of good practice from their education system which they considered as fulfilling the criteria set. The examples of good practice identified are listed in the table below. These amounted to a total of seventeen examples of good practices. The good practices also include contributions from the different partner countries as target different foreign languages. Some of these examples involve single activities on their own while others involve a set of project-based activities planned and implemented around a theme.

Table 2: List of Examples of Good Practice identified

No.	Name of Example	Country	Foreign Language
1	Space mission: Help Big Eye!	Spain	English as a foreign language
2	The senses and the sense organs	Spain	English as a foreign language
3	Humanos y otros animales	UK	Spanish as foreign language
4	Le cycle de l'eau	UK	French as foreign language
5	The Rainbow Fish	Spain	English as a foreign language
6	Andalusian multilingual program	Spain	English as a foreign language
7	Andalusian multilingual program	Spain	English as a foreign language
8	S.T.E.A.M-tastic project	Malta	English as foreign language
9	Weather Lab Malta	Malta	English as foreign language
10	Ecosystem in a Bottle	Spain	English as a foreign language
11	Soap and Sanitizers	Spain	English as a foreign language
12	Healthy Eating	Spain	English as a foreign language
13	Mi Hospital	Poland	Spanish as foreign language
14	Ocean in a jar	Poland	English as a foreign language

15	Climate is a topic! Women's perspective	Poland	English as a foreign language
16	Minecraft Sessions	Poland	English as a foreign language
17	Models of Animal Cells	Spain	English as a foreign language

In order to help you teachers understand better how the three pedagogical aspects (STEAM, IBL and CLIL) were included in the examples identified, the examples are presented in template format, with subheadings which focus on each of the different aspects of the SeLFiE pedagogical model.

Example 1: Space Mission: Help Big Eye!

Title	Space mission: Help Big Eye!
School Author(s)	La Merced and San Francisco Javier Primary School, Burgos Alberto Busto Gonzalez
Origin of the project/ activity	<p>This project combines three areas of learning: Social Science/Studies, Natural Science, and Arts and Crafts into a project called SAP (Scientific Artistic Project). The project was implemented in a bilingual context where children’s native language was Spanish and the project was mainly carried out in English.</p> <p>Project work is part of the school’s formal curriculum of school where throughout the school year children take on projects in a systematic way. And involves at least 6 teachers working together.</p> <p>The project presented here started in 2018 as a response to the necessity to improve the way to teach Science. For years, we could see that teaching from a book unit by unit, we were dealing with different science content in isolated topics. The students could not associate or combine the ideas. The learning was very systematic and they were losing the point of what they were learning for. As teachers, we thus wanted to organize something more meaningful for our students, who would be able to apply the content in context, enjoying themselves and learning while they are living a story with a “mission” that they have to achieve</p> <p>Each school term three missions per course year were implemented as part of a project. All the missions are connected and build on the previous one, so they are not isolated projects. Moreover, each mission is not static. We can adapt or modify it based on the specific circumstances of our social context, pupils’ curiosity or special world events. Each mission lasts approximately 6 weeks. There are 5-6 hours (depending on the course) per week dedicated to the mission (3 hours to work on Sciences and 2 hours to work on the Arts). There is also one session per week where students can bring or show different materials to carry out investigations about what they are learning in the mission that week.</p> <p>In addition, there is also a special classroom where we can carry out the sessions for the missions. This classroom houses a large stand, some tables with wheels that allow us to have a wide and spacious classroom. These tables can also become whiteboards where children can paint or write. There is also a separate space where teachers can organize their work. The classroom can also be used to support those students who experience difficulties.</p> <p>Each mission leads to a result. Some projects are carried out in collaboration with associations, parents, or older students from the high school. The project contents are selected from the Spanish curriculum framework which is developed by the Government. We also work the key competences as established by the European Union. Throughout these missions, students build a portfolio and at</p>

	<p>the end, we have a final product, which is marks the achievement of the mission.</p> <p>In Spain, most children start schooling as from the age of 3 years where they start pre-school. During this time, children learn through different projects. This project (SAP) starts in the first grade of primary when children are 5-6 years old and finishes when they are 11-12 years old. This is the fourth the year of the project's implementation which started from first grade and children in scholastic year 2021-2022 will be in their fourth grade.</p> <p>The missions are different for each grade. What we expect is to motivate our students through real missions in a specific context. To achieve these missions our students need to learn content from both the natural and Social Sciences included in the Spanish curriculum by developing a STEAM methodology which links these content areas with the Arts in order to develop the children's creativity and artistic abilities. Children from each grade will participate in 9 different missions each year. If the content for some years is repeated, it is presented in different contexts.</p> <p>The example here presents one mission called: Space Mission: Help Big! In the previous mission, the class pet (Raccoony) got lost in the city and the children had to find it. In this mission, Raccoony met with another friend called Big Eye who is an alien from Mars and who wants to visit his friend for some days. The teachers tell the children a story about the adventures of Big Eye on Earth and how impressed he was when he saw the sea, clouds and living things... as an alien, he did not understand how the world works. At the end of the tale, Big Eye tries to go back to his planet with his rocket but he bumps into a tree and his rocket broke.</p> <p>This is where the children's mission starts: to help Big Eye to go back to his planet. To do that, the children have to learn everything they can about space (where his planet is, what a planet is, etc.) and also to learn the differences between our planet and his planet and to investigate all the questions about our planet that Big Eye has (What are living things? Are all living things similar? Why are there clouds in the sky? Etc.). The target for the mission is for the children to work in groups to design and make their own rocket help Big Eye.</p>
<p>Age of the students and level</p>	<p>This mission is designed for children in their first grade (5 and 6 years old).</p> <p>Most of these children can read and write to a certain level in their native language (Spanish). However, they are starting to learn English this year, so their level of English is just enough for them to understand the concepts but they are overall not able to express themselves through "free written or spoken way" because they would need complex grammar structures they have not yet achieved. So, their level in English is low because they are beginners.</p>
<p>Target group</p>	<p>The number of students working on the project at the same time varies. In our school, there are three classes per grade, so in some sessions we can join the three groups together in one specific class (approximately 75</p>

	<p>children all-together) to do some special activities or to demonstrate something. Children can also work in three big separate groups (one group per class) around 25 students. When we are working on specific objectives or content, the children can also work in even smaller groups of 4-5 members. Children work individually when we assess content learning.</p> <p>Therefore, the size of the group depends on the activity we are carrying out. With COVID, we do not mix the classes as I described. That was what we did before this pandemic.</p>
<p>Integration of Second Language Acquisition with STEAM Education through active pedagogies?</p>	<p>This example promotes English as Second Language. English is not just a subject which students have to learn, but a means of communication in a context. We do not learn this language in an isolated context, but our aim is to teach English through a CLIC methodology (Content and Language Integrated Learning).</p> <p>It is very important is to plan the sessions being aware of what vocabulary and grammar structures we are going to teach. This language content should take some time to teach at the beginning of each class with images and through repetition. English structures used must be easy and simple to explain and we use many gestures to get the message across.</p> <p>It is also meaningful is to encourage children to reproduce or use this new vocabulary, or grammatical structure in their own speech. For all these reasons, we use different methodologies. Children build their knowledge by becoming active subjects. Through a child-centred active methodology where children are engaged in experiments, craft, etc., we also promote from the beginning of the mission a strong motivation among the children to carry out the activities, even if they may experience difficulty in using a second language. Motivation is thus also the main pillar. Furthermore, it has an introspective methodology where children are aware of their own learning process, conscious of what they already know, what they are learning, and finally also what they have learnt at the end (KWL -Know, Want to learn, Learnt,). This introspection does not only focus on subject content but also on the acquisition of strategies to learn English and positive attitudes towards the language.</p> <p>Children are involved in second language through games and activities. There are several of them available, for example kahoots, quizzlet or genially. All the presentations are in English as well as most of the worksheets in the portfolio. Children also do short weekly assessments to check their level of English and their understanding of what they are learning that week. Checking the results, we can adapt or reinforce the English grammar or vocabulary that they are learning. Most of videos are also in English and obviously, the oral communication with the teacher is in English. Children also present their work in English in a very simple way by using a script provided by the teacher.</p>
<p>Duration</p>	<p>This mission takes 7 weeks with 5 sessions (hours) per week. There is always a motivation activity at the beginning of the project, followed a general review of the mission at the end (KWL).</p>

<p style="text-align: center;">Place</p>	<p>The mission is implemented in different places:</p> <ul style="list-style-type: none"> • Classroom: to build the portfolio and deliver most of the explanations. • Computer Room: to search for information on the computer or using tablets. • Moreover, students can visit some interesting websites for children and play some educational videogames. • S.A.P. classroom: to work in big groups, in order to make some crafts or to share information in the grandstand. • Outdoors: To make their rockets fly. Moreover, we invite at their parents to share with them what they have learnt and show them the rockets. We aim to ensure that the children are learning all the content in the real world, so we often go outside often to check how the Earths moves, shadows, what the weather is like and so on.
<p style="text-align: center;">Short description of the activity</p>	<p>Each mission involves a number of activities to complete. This mission is divided in five topics, a final product, and the final assessment:</p> <p>Topic 1: Living things: life cycle, life processes (nutrition, interaction and reproduction). Children have to guess what a living thing is and why it is considered to be a living thing.</p> <ul style="list-style-type: none"> • Motivation: Big Eye does not know if it is a living thing or not, he tries to speak with a table, a plant and a child... Can you explain to him what a living thing is? • Activities: Songs and Power Points and videos are used to introduce all the content: <ol style="list-style-type: none"> 1. Classify living things and draw elements from the three big groups of living things. 2. Make a craft of a life cycle choosing a living thing. 3. Processes of living things: Nutrition. Classify living things according to their nutrition (they conclude that plants do not eat, because they cannot classify in carnivores, herbivores or omnivores) 4. Processes of living things: Interaction. Classify living things according to how they move (they conclude that living things move in different ways); how they communicate (they conclude that living things can communicate with words, sounds or gestures, so it is important to know each form of communication to understand what living things are expressing); how they express feelings (they conclude about non-verbal communication). Here we challenge them to investigate how to say a word or their name without using sounds, just with gestures (deaf- mute language). 5. Processes of living things: Reproduction. Classify living things according to their reproduction (they conclude that plants are not oviparous -lay eggs or viviparous - young is born alive). 6. Adaptation of living things: We use craft to make a cactus in 3D and we investigate how a cactus can adapt to a hot and dry climate. Moreover, we make a craft of a chameleon using a chromatic circle. 7. Assessment: End of the section

Topic 2: Solar system: Solar system: Celestial bodies, Sun, Earth, Moon and their movements.

• **Motivation:** We have to guess where Big Eye's planet is, and what other celestial bodies we will find the universe.

• **Activities:** We use songs, games, Power Points and videos to introduce all the content:

1. Celestial bodies: Colour and classify celestial bodies (Sun – planet and satellites).
2. The Sun: Go outside, watch the sun and think about what the sun gives us. Take some notes and share the ideas. We fix a stick on the floor and we will check what's going on with the shade. Children will make their hypothesis and then they will try to explain the phenomenon.
3. Colour a sunset in the sea: colour a picture of a sunset using warm coloured paints mixing the colours in order to recreate how it is a sunset. Play some relaxing music.
4. The Earth movements; Rotation: Students in pairs have to represent a model of the Sun and the Earth spinning on its axis explaining what this movement causes. We can use Google Earth to check this phenomenon. Later, make a craft cutting a circle (Earth) colouring half of it with yellow and the other half with grey (day and night). Then they will glue it on a piece of string along the circle (axis).
5. The Earth movements: Revolution: Students in partners have to represent the Sun and the Earth spinning on its axis and moving around the Sun explaining what this last movement causes. Finally, they will make a model of an Earth moving around the Sun.
6. The Moon: We will start with this question: "When can we see the Moon from the Earth? Does the Moon have its own light as the Sun?" With their previous knowledge, the children will answer that we can see it at night. Therefore, we will investigate this by asking them to search the Moon every day in the sky and making notes in a chart. They will notice that we can see the Moon also during the day. We will also take some notes of the shape of the Moon showing how it changes (we can check it on Google if they cannot see the Moon that week). At the end they will make a model about how the Moon can change its shape and why (we will explain the Moon's movements).
7. Assessment: end of the section

Time: seasons, calendar, clock

• **Motivation:** There is a breaking news about the Perseverance, which landed in Mars. It took more than 8 months to travel from the Earth to Mars... but is that more or less than a year? How can we count or measure the time?

• **Activities:** We use songs, games, Power Points and videos to introduce all the content:

1. We introduce mathematics concepts as addition or reasoning with direct and simple equations: If one rotation around the Sun it takes 1 year... how many rotations did the Earth since you were born?
2. Use a calendar and clock. Students have to handle a calendar to check how many months are in a year, if all the months have the same days, how many weeks are in each month...
3. Students will make a flipbook with the days of the week. They will notice that each day of the week is dedicated to a celestial body (Monday = moon, Sunday = Sun, Thursday = Jupiter...)
4. Assessment: end of this section.

Water and Air: properties and characteristics

- **Motivation:** After reading the news about the landing of the Perseverance in Mars, children notice the importance of Water for life (one mission of the Perseverance is to find whether there is water in Mars and analyse what it could mean). Big Eye supports the idea that he has never seen so much water before in any other planet.
- **Activities:** We use songs, games, Power Points and videos to introduce all the content. In this phase we organized some experiments:
 1. Brainstorming: what do we use water for? The teacher writes the answers on the board and with the children conclude that water is very important for many reasons.
 2. Do we have to worry about wasting water if there is so much water on Earth? Using the notes from the previous activity we think about what kind of water we need in each case (salt or fresh water). Then students colour in a world map with two different colours where they can find salt water or fresh water. They check that there is much salt water than fresh. They draw and colour a water landscape.
 3. To explain the properties and characteristics of water we gave them some experiments to do at home. These experiments follow the scientific methodology. They make a hypothesis, then they do the experiment and write down the results. They then shared the results and draw conclusions:
 - Put some water in a tray over a radiator. Check it after 5 hours. What can you see?
 - Heat some water in a pot and cover it. What can you see in the cover?
 - Put some water in the freeze for some hours. What can you see?
 - Put some water in a transparent jar. What colour is it? How does it taste? How does it smell?
 - Did you drink water today? Can you drink a glass of salt water?
 4. Brainstorming: what do we use water for? The teacher writes the answers on the board and concludes that water is very important for many reasons.
 5. Where is the air? We introduce what the atmosphere and climate and weather are.
 6. To explain the properties and characteristics of air we give them some experiments to do in the class. These experiments follow the

scientific methodology as well as STEAM. They make a hypothesis, then they do the experiment and they write down the results. Finally, they show the results and elaborate the conclusion in groups. Each experiment starts with a question:

- How can you describe air? Put air in a jar. What colour is it? Can you taste it? *Conclusion:* air has no colour or taste
- What is the air? Light a candle then cover it with a transparent big bowl. What does it happen to the candle? *Conclusion:* The air is a mix of gases; one of those gases is the oxygen that is needed to light a candle.
- Does the air take up a space? Blow air in a balloon. What would happen if you do not stop of blowing air in? *Conclusion:* The air takes up a space. We introduce the concept of pressure.
- How can an aerostatic balloon fly? Stick a piece of paper in the wall over a radiator. What does it happen to the paper? Try to do the same far away from the radiator. *Conclusion:* The hot air is lighter so goes up. This fact origins weather changes in the atmosphere.
- Do you need air? Try not to breath. How much time can you do it for? *Conclusion:* most of living things need air: oxygen. (We introduce that oxygen is also in water)
- Does air have weight? Weigh a ball with air. Now deflate it and weigh it again. What do you notice? In groups of four, students will draw their own conclusions and then share it with the rest of the class.

7. Assessment: end of this section

Inventions and discoveries:

- **Motivation:** It is high time to make the rocket to help Big Eye.
- **Activities:** inventions and discoveries.
 1. The children investigate about some useful inventions that were designed to travel to outer space and how later these inventions were adapted to use in the daily life.
 2. They investigate about discoveries in the last century about outer space. They learn to distinguish between invention and discovery.
 3. They learn the different tools useful for each job. They think about the tools they use at school and they trace it on a piece of paper.
 4. Later, they design an invention in groups of four that emerged from the need to send Big Eye home. They fill a worksheet explaining the process, materials, use... and finally they build a prototype (STEAM: Engineering design)
- 5. Assessment: end of this section.

Final product: Making a rocket:

We use the methodology of STEAM based on engineering Design.

- 1st The children in groups of four make a drawing about what they want to make.
- 2nd They present their idea to the teacher who helps the group to develop the idea by giving them some clues to improve their design.

3rd Teachers give the children a list of materials and ask them to reorganize their ideas using those materials. Moreover, the teacher explains how the rocket will fly: introducing water inside the bottle and then introducing air, (we have studied previously that air occupies a space, so when the pressure of the air inside a bottle is high, the bottle will fly away).

The teacher will give them this clues:

The rocket must contain water. The cork must be placed in the bottle in order to not drop the water. We introduce the air with an air pump using a needle though the cork. When the pressure is high, the cork will drop so the rocket will fly. Finally, the rocket must have extra weight on the top to land without damaging the rocket. Then, they rethink their idea of the rocket using these materials.

- Two big plastic bottles
- Tape
- Cork
- Plasticine

If they are lost, the teacher can help them by showing them a prototype. Finally, we test the rockets and analyse the results and possible improvements. The children then decorate the models as they wish.

Reflection and assessment

At the end of the mission, the children will assess themselves and their peers from the same group with. Moreover, the children fill in a worksheet called "My learning diary" where they have to express two new things that they have learnt, one fact they want to improve, another fact they are proud of, three words they have learnt in English (in a sentence) and to draw one activity which they enjoyed.

The final assessment is in the children's native language to check what they have really learnt. This assessment also tries to assess the key competences through activities they have to solve using different skills or combining different knowledge learnt from the whole mission.

The learning outcome is stated at the beginning of the portfolio so that the children and their families can refer to them at any time. We work through different subjects' content that are included in the Spanish curriculum:

Cognitive aspect: Educational learning outcomes

Natural Sciences:

- Block 3: Living things
- Block 5: Technology, objects and machines

Social Sciences:

- Block 2: The world in which we live.

Arts:

	<ul style="list-style-type: none"> • Block 1: Audio-visual education • Block 2: Artistic expression. • Block 3: Geometric picture <p>In each block from above, we develop all the content, evaluation guidelines and learning standards as they appear in the DECRETO 26/2016 of 21st of July which is the curriculum for Primary Education in the Autonomous Community of Castilla y León.</p> <p>As a second language the outcome is:</p> <ul style="list-style-type: none"> • Basic vocabulary related to the topic. • Basic grammar structures using the present simple to explain a phenomenon. • The use of present simple to describe a phenomenon. <p>We focus on the acquisition of the four skills:</p> <ul style="list-style-type: none"> • Reading: to be able to understand short sentences identifying key words. • Listening: to be able to understand oral messages decoding the information. • Speaking: to be able to express an opinion or to answer a simple question using the vocabulary or the grammar studied. • Writing: to be able to write some words or short sentences following a pattern with a simple structure. <p>Working with a STEAM methodology the learning outcome is:</p> <ul style="list-style-type: none"> • To know what is the Scientific Method • To follow the steps of a Scientific Method • To be able to apply different skills and abilities in a specific context. • To make hypothesis and follow a scientific method taking some notes from experiments and finally drawing a conclusion. • To build or make something following an Engineering Design Method being aware of all the steps.
<p>Creative aspect of the activity/project</p>	<p>The missions belong to a project called SAP (Scientific Artistic Project). This means that Arts and Crafts are included in all the missions.</p> <p>The main aim is to develop the children’s imagination and creativity in finding solutions for a specific problem. We aim for the children to come up with something original through divergent thinking. We ask them to finish stories, imagine solutions, to make some crafts, paint and colour, glue, stick and make models.</p>
<p>Communication</p>	<p>At the beginning of each project we send parents a list of vocabulary with the grammar and expressions we will teach in class:</p> <p>All of the Grammar and vocabulary taught is attached in the folder for English vocabulary and Grammar:</p>

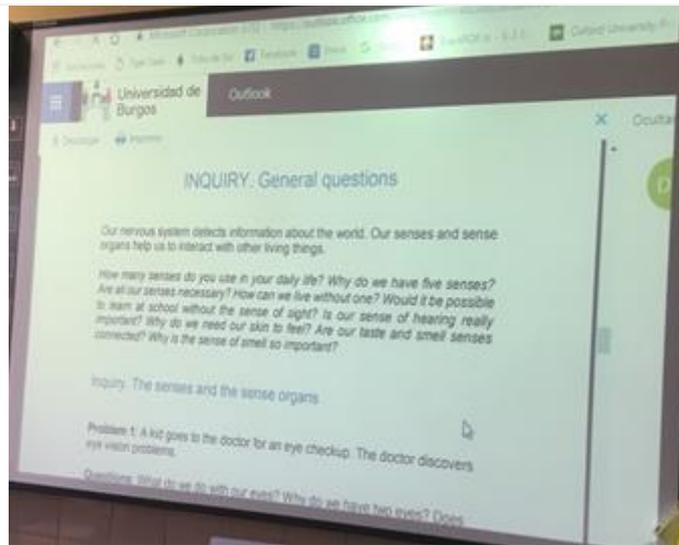
	<p>https://drive.google.com/drive/folders/1upMyAM-e1sVoEyhQRks8fQG5pnP7NuFb</p>														
<p>Culture</p>	<p>In this mission, the children are aware of how wonderful the world is and they have to identify experiences from their daily lives that they did not think about before: "Does the air have weight?" "Look at this sunset... How do you feel?"</p> <p>When children are learning about interaction of living things, they understand how living things interact with each other in different ways. In this section of the mission, they learn how human beings interact in different languages with sounds and with different gestures.</p> <p>They get the idea of how important it is to know each culture to interact properly (you cannot kiss in the face twice as we do in Spain when you meet people for first time in other countries... that could be rude or annoying).</p>														
<p>Evaluation</p>	<p>There are weekly assessments in English: These assess: the knowledge in English of the vocabulary and grammar structures: 20% of the final mark. These assessments can be oral, on paper or using online apps such as kahoot, genially or quizlet.</p> <ul style="list-style-type: none"> • Final Assessment is in Spanish at the end of the project. This assessment also evaluates some of the key competences through more elaborated questions and answers. 30% of the final mark. We decided to do this assessment in the native language because sometimes we consider that children learn content in English but they do not know this content in their native language. They have to learn specific vocabulary in their own language too. Moreover, it is quite difficult for them to argue or explain some ideas or phenomenon in a second language they do not already know. • Portfolio, activities, learning diary (at the end), co-evaluation and auto-evaluation: 30% of the final mark. Here we assess the daily work as well as their notes and worksheets. • Attitude and behaviour during classes 20% of the final mark. In this item, we evaluate his or her individual effort and attitude in the sessions through a systematic observation of each student. 														
<p>Materials / Resources / technical requirements</p>	<table border="0"> <tr> <td>Papers and photocopies.</td> <td>2 Bottles of plastic and a bottle cork</td> </tr> <tr> <td>Coloured cardboards</td> <td>Straws</td> </tr> <tr> <td>Cord or a piece of string</td> <td>Velcro</td> </tr> <tr> <td>Tape</td> <td>Bookbinder</td> </tr> <tr> <td>Candle</td> <td>Big glass bowl.</td> </tr> <tr> <td>Balloon</td> <td>Jar or pot</td> </tr> <tr> <td>Scale</td> <td>Stopwatch</td> </tr> </table>	Papers and photocopies.	2 Bottles of plastic and a bottle cork	Coloured cardboards	Straws	Cord or a piece of string	Velcro	Tape	Bookbinder	Candle	Big glass bowl.	Balloon	Jar or pot	Scale	Stopwatch
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<p>Tips for educators / theoretical background or curriculum context</p>	<p>This project is important to work on when children can read and write and in an autonomous way. It is also essential that children have a basic level of English (in our school, students get this level in pre-schooling from 3-6 years, which makes it easier to start). Moreover, it is very important to use many visual elements in order to support your speech: flashcards, pictures, videos, PPT... are essential.</p>														

	<p>Starting each session remembering previous knowledge will help children to remember and build a meaningful learning. At the end of the session, it is important to have a break in order to solve all the individual questions and review what they learnt. Finally, it is very important to know the level of achievement of each student through an assessment. This will help us to reinforce the learning in those parts, which are confusing for kids. In addition, learning new concepts in a second language can cause a superficial learning for some children so, it is important to clarify and repeat new concepts in their native language to improve their understanding.</p>
Links and Photos	<p>You can check a brief idea of what this project is:</p> <p>https://www.youtube.com/watch?v=398_GnRw9jo</p>

Example 2: The Senses and Sense Organs

Title	The Senses and Sense Organs
School Author(s)	La Salle School (Burgos) David Ruiz Hidalgo
Origin of the project/ activity	<p>This STEAM project was developed in a Catholic Primary school where students learn English as a foreign language. Students learn English for about 2 hours per week in Preschool and 6 hours per week in Primary Education due to the school's bilingual approach that includes English as a foreign language (3 hours), Natural Sciences (2 hours), Music (1 h) and Arts (1h). English is integrated in the formal curriculum according to education law. The teachers involved in the bilingual section have a BA in Education, major English and they also have a B2 or C1 level according to the CEFR.</p> <p>The project was carried out by a primary school teacher. The teacher has about 20 years experience teaching English as a foreign language and about 12 years teaching bilingual subjects. Possessing a master's degree in Education helped the teacher put into practice the STEAM project. This teacher is also collaborating in the initial training of future language teachers at Faculty of Education in Burgos, Spain.</p>
Age of the children and level	Primary Education, Year 6. Students are 11-12 years old.
Target group	<p>26 students participated in the project.</p> <p>CLIL and STEAM methodologies are usually applied in the Natural Sciences classroom. Students also engage in cooperative learning as a learning methodology, with different strategies and techniques which promote collaboration and peer learning.</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<ul style="list-style-type: none"> • I decided to complete my academic background studying an MA in Education, majoring in "innovation and research". There was a subject in the MA about STEAM where one had to design a STEAM lesson, and I tried to implement the lesson plan with my own students at school. • You need to know the STEAM methodology, a little bit of "theory" about integrating different subjects within a project, and how to organize your ideas, change how you usually go about teaching, to design a new project. It is also necessary to observe other teachers or to know what STEAM requires (problem-hypothesis-solution, etc). • STEAM can be integrated with CLIL lessons, specially in Natural Sciences where you can design many different activities including scientific content and hypothesis to let your students investigate and think about the process. There are lots of topics one can use for projects: human body, health, matter, energy, forces, etc. It is possible to learn subject content and new vocabulary through STEAM, but we can't forget that English can be taught at the same time. To achieve this we also need other meaningful resources such as songs, videos, stories and much more, including CLIL methodology.

	<ul style="list-style-type: none"> The children learn new vocabulary, how to cooperate in groups using the second language, to express their ideas and content. Children are strongly motivated by Quizzes, online games, short videos, ICT, etc. in the learning process.
<p>Duration</p>	<p>The project was developed in three weeks (about 6 lessons). The STEAM project was a part of a completed didactic unit. The didactic unit is about 8-9 lessons (two lessons/hours a week)</p>
<p>Place</p>	<p>Ordinary classroom with internet connection, projector and laptops for students</p>
<p>Short description of the activity</p>	<p>AIMS</p> <p><i>Natural Sciences and English</i></p> <ul style="list-style-type: none"> To identify the main organs in the human body; To explain how the five senses and the sense organs work; To know the nervous system; To talk about healthy lifestyle; To collaborate with peers in different activities. <p><i>STEAM PROJECT</i></p> <ul style="list-style-type: none"> To motivate students with a STEAM Project as part of learning national sciences To improve the children’s communicative skills in English. To develop children’s research skills in the Natural Sciences. To collaborate and participate in the class. To develop a STEAM Project integrating different subjects. <p>Lesson 1. The sense of sight</p> <p>Group activity</p> <p>Subjects: Natural Sciences, Math, Engineering and Arts.</p> <p>Our nervous system detects information about the world. Our senses and sense organs help us interact with other living things.</p> <p><i>How many senses do you use in your daily life? Why do we have five senses? Are all our senses necessary? How can we live without one? Would it be possible to learn at school without the sense of sight? Is our sense of hearing really important? Why do we need our skin to feel? Are our taste and smell senses connected? Why is the sense of smell so important?</i></p>



Problem 1: A child goes to the doctor for an eye checkup. The doctor discovers eye vision problems.

Questions: What do we do with our eyes? Why do we have two eyes? Does everybody see the same? Are our eyes connected with our brain? How can we solve eye problems?

Hypothesis:

1. If you have vision difficulties, your eyes need a checkup.
2. If your vision is 20/20, your eyes are working right!
3. If your vision is 20/10 you will need glasses.

Experiments: 20/20 vision chart and 20/20 worksheet

Analyzing data and Results: Math graph about students with 20/20 vision

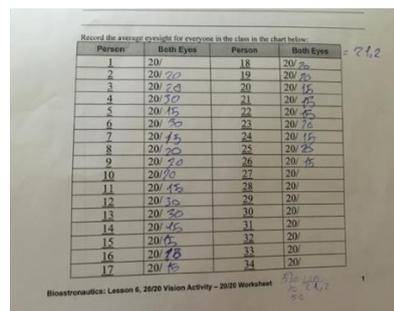
Project: Designing an electronic message board for the teacher taking into account the results.

20/20 Worksheet

1. The vision in my left eye is : 20/ ____ (row number)
2. The vision in your right eye is : 20/ ____ (row number)
3. Adding my answer from 1 with my answer from 2 gives me:
 $20 + 20 = \text{-----}$
4. Dividing the answer in 3 by two gives me: $40 \div 2 = \text{-----}$
This is my average eyesight for both eyes.
5. Is there a difference between your answers in number 4 and numbers 1 and 2? Why or why not?

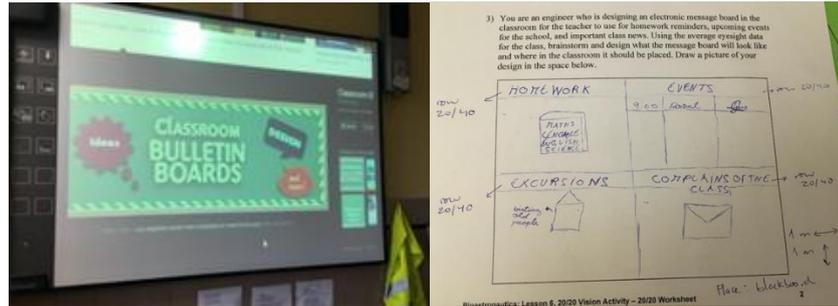
Record the average eyesight for everyone in the class in the chart below:

Person	Both Eyes	Person	Both Eyes
1	20/	18	20/
2	20/	19	20/
3	20/	20	20/
4	20/	21	20/
5	20/	22	20/
6	20/	23	20/
7	20/	24	20/
8	20/	25	20/
9	20/	26	20/
10	20/	27	20/
11	20/	28	20/
12	20/	29	20/
13	20/	30	20/
14	20/	31	20/
15	20/	32	20/
16	20/	33	20/
17	20/	34	20/



- Using the vision data for the class, what is the average or “normal” vision?
- Why do you think new technologies for your classroom should be based on the class average for eyesight?
- You are an engineer who is designing an electronic message board in the classroom for the teacher to use for homework reminders, upcoming events for the school, and important class news. Using the average eyesight data for the class, brainstorm and design what the message board will look like and where in the classroom it should be placed. Draw a picture of your design in the space below.

Designing a bulletin board taking into account the class vision average. 20/21.2



Lesson 2. The sense of hearing

Group activity

Problem 2: A child goes to the doctor for an ear checkup. The doctor discovers hearing problems.

Questions: What do we do with our ears? Does everybody hear the same? Are our ears connected with our brain? How can we solve ear problems? Are loud sound dangerous for your ears? What would you do if you wake up and could not hear?" What do engineers do to help people who cannot hear?

Hypothesis:

1. If you have hearing difficulties, your ears need a checkup.
2. If you listen to loud music, you will lose hearing.
3. If you protect your ears, your hearing will be perfect

Experiments: Common sounds chart and math decibel chart (https://www.teachengineering.org/content/cub_/activities/cub_human/cub_human_lesson06_activity2_soundchart.pdf)

Lesson 3. Building a machine

Analysing data and Results: Completing the Math Decibel worksheet

Project: Designing a machine for hearing loss.

Subjects: Natural Sciences, Math, Engineering, Arts.

Sound Line Activity – Math Decibel Worksheet

Fill in the blank spaces on the chart.

Level	Second(s)	Total Seconds	Other Units of Time (approximate)
10	1 x 10		10 seconds
20	1 x 10 x 10		1 minutes 30 seconds
30	1 x 10 x 10 x 10		15 minutes
40	1 x 10 x 10 x 10 x 10		2 hours 45 minutes

50		1 day 4 hours
60		12 days
70		115 days
80		3 years 2 month 1 day
90		31 years 8 months 2 weeks
100		316 years 11 months

https://www.teachengineering.org/activities/view/cub_human_lesson06_activity2

Lesson 4. Designing mind maps

Cooperative activity to review content. They can use the text book and laptops to look for information.



Lesson 5. Oral presentation.

Speaking activity

Cognitive aspect: Educational learning outcomes

CONTENT

The nervous system, the senses and the sense organs, healthy lifestyle.

- Which organs make up the nervous system?
- How does the nervous system work?
- How do we see and hear?
- How do we taste and smell?
- How can we keep our nervous system healthy?
- Let's work together!

Creative aspect of the activity/project

At the end of the project the students will have to design a bulletin board or message board for their classroom. The students will have to build a machine for hearing loss as well.

<p>Communication</p>	<p>VOCABULARY</p> <ul style="list-style-type: none"> • Interaction: interact, interaction, life processes, natural features, senses • The nervous system - parts: brain, brain stem, cerebellum, cerebrum, motor nerves, sensory nerves, spinal cord • The nervous system: axon, cell body, dendrites, dermis, involuntary movements, nervous system, neurons, synapse • Seeing and hearing: auditory nerve, cochlea, cornea, eardrum, iris, lens, optic nerve pupil, retina • Taste and smell: gustatory nerves, nasal passages, olfactory cells, olfactory nerve, saliva, taste buds • Healthy nervous system: balanced diet, brain, exercise, eyesight, hearing, muscles, rest
<p>Culture</p>	<p>Cooperative and collaborative learning is used during the STEAM project</p>
<p>Evaluation</p>	<p>EVALUATION</p> <ul style="list-style-type: none"> • Quizzes 20% • Students' notebook 25% • Self-evaluation, peer-evaluation, cooperative group evaluation. 10% • Rubrics (oral presentation, listening, speaking, etc) 20% • Test 25% <p>Lesson 6. Test</p> <ul style="list-style-type: none"> • (vocabulary, definitions, questions, mind map, writing, etc)
<p>Materials / Resources / technical requirements</p>	<p>Projector, internet connection, laptops, children classroom stuff, worksheets, etc.</p>
<p>Tips for educators / theoretical background or curriculum context</p>	<p>Further information can be found at the address below: http://dimglobal.net/revistaDIM39/DIMAR39steam.htm</p>

Example 3: Humans and other Animals

Title	Humanos y Otros Animales
School Author(s)	St Charles Catholic Primary School (United Kingdom) Marily Troyano
Origin of the project/ activity	<p>The school is a state primary school in Central London. Second language teaching takes place from year 3 to year 6, that is for pupils aged 7 to 11 years. Second language teaching is a statutory requirement and languages are part of the national curriculum for primary.</p> <p>However, the use of CLIL/STEAM or the application of language teaching to other subjects is not part of the formal curriculum. As a teacher of languages but also the wider curriculum, I have chosen to deliver science topics during second language lessons. The topics chosen for CLIL/STEAM are linked to topics taught elsewhere in the curriculum. In this instance, children in science learn about animal characteristics, healthy diets and classification of animals. The lessons delivered during second languages lessons is complementary to those taught elsewhere in the curriculum, revising and extending knowledge. Planning for the topic included both language and science objectives.</p> <p>As part of my second language teaching, I include topics relating to science, history, geography, art and PHSE (Personal, Health, Social and Emotional education). Other language teachers in the school also deliver some units of work based on other subjects.</p>
Age of the students and level	<p>This unit of work was carried out with pupils aged 9 to 10 years in years 5 and 6 of primary school, that is to say in the last two years of their primary.</p>
Target group	<p>The children involved in this unit of work were from two mixed ability classes of 30 pupils. The first class was a mixed age class with learners from two year groups. Consequently, the both the age span and ability span was wider than in a traditional class. The class was made up of 15 pupils from year 5 (aged 9 to 10 years) and 15 pupils from year 6 (aged 10 to 11 years). The second class was made up of 29 year 6 pupils. Both classes had a number of children with special educational needs; some were working at least 2 years behind their peers and behind age related expectations. The group also included a significant number of children with English as an Additional Language (EAL) and there were 5 native speakers of the second language.</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<p>I have been integrating Second Language Acquisition with other subjects for 7 years now. The motivation was twofold: it is more engaging, relevant and stimulating for pupils and more motivating for me as a teacher.</p> <p>I chose this topic because I wanted to deliver a specific STEAM unit with pupils. I had carried out a number of history and geography units but wanted to apply Second Language Acquisition/CLIL to science. The</p>

topic of Humans and other Animals fitted in with the curriculum content pupils would either have recently completed or were about to study. I also chose the topic because it would allow pupils to undertake scientific enquiry activities within the time constraints of the lesson. I felt the learning could be broken down into accessible chunks the children could assimilate. Science also has the benefit of having many cognates (words in two languages that share a similar meaning, spelling, and pronunciation) and near cognates which are important to support learners, particularly the less able of those who have special educational needs. The activities would be able to be adapted to the different levels of learners.

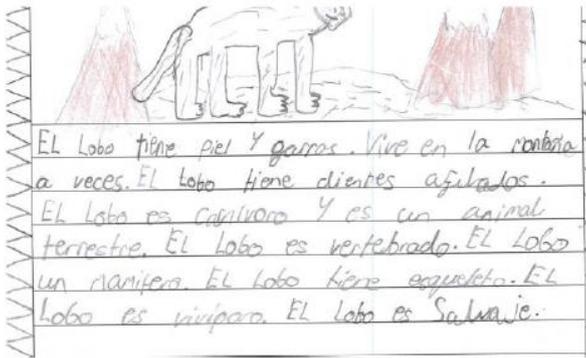
Knowing the children's linguistic capabilities was essential when planning this unit. It was also important to understand the objectives of the science curriculum, both in terms of discreet knowledge children need to acquire and in terms of scientific enquiry. The objectives for second language learning helped shape the linguistic tasks the children would carry out. I have produced a progression map for language skills for children from year 3 to year 6 which supports this. I also attended a course about CLIL/STEAM and higher order thinking skills which has been useful in designing activities and units of work. As with any language lessons, it was important to ensure that all 4 skills (listening, reading, writing and speaking) were developed.

The school believes in inquiry-based learning and this is particularly important in STEAM. In science and humanities children develop inquiry questions which drive learning. It also believes in child-led, creative learning where children are able to use the knowledge and skills they have acquired to create new learning or new outcomes. Both collaborative and independent learning are important pedagogies used throughout the schools. In language lessons, I encourage students to use the whole repertoire of language they have. Although children will be learning specific STEAM vocabulary, in terms of language learning, it is important that children also learn basic vocabulary which they can apply to all topics as well as grammatical constructions that can be applied to many contexts.

As far as possible, new learning is delivered in the second language to aid immersion and the development of listening skills. Children will formulate responses to STEAM questions in the second language using simplified structures that have been clearly modelled in advance. Children will rehearse responses orally before writing them. So, for example, children will describe the characteristics of animals in the second language once they have learnt the appropriate vocabulary. Activities are designed to develop both the STEAM knowledge and the second language skills. The unit culminated in a written activity in the second language which drew together all the learning during the unit. Where necessary, grammar teaching or other necessary instructions are given in the children's main language. Native speakers were given more complex written tasks if their language skills were of a sufficient level. The use of STEAM/CLIL units has the benefit of allowing native speakers to learn and develop cognitively whereas standard second language

	<p>lessons can be demotivating to native speakers if the content is already something they know.</p>
<p>Duration</p>	<p>This unit of work lasted approximately 7-8 weeks with the pupils' weekly 40-minute second language lesson. It started with revising and learning body parts for humans and animals; this was followed with 2 weeks describing healthy diets and specifying which nutritional group different food types belonged to. Then, the unit focused on classifying animals by different attributes - order of animals, diet, characteristics, vertebrates/invertebrate, live birth etc. Finally, the children wrote a fact file about an animal using all the vocabulary they had learnt in the second language and read it to their peers.</p>
<p>Place</p>	<p>The lessons took place in the pupils' classrooms as is normal with both second language and STEAM lessons. The school does not have laboratories or language labs they can use. There were no experiments involved but scientific enquiry in the form of sorting and classifying were included.</p>
<p>Short description of the activity</p>	<p>Lesson 1 - revising body parts in second language. Children were involved in writing sentences about body parts and in dialogues about going to the doctor in second language</p> <p>Lesson 2 - classifying food into the food pyramid. Children learnt the types of food and described which group different foods belonged to in second language.</p> <p>Lesson 3 - continuing with healthy diets. Children described which foods are healthy or not healthy and which should be included or not in a healthy diet. They would combine this with the food groups learnt the previous week. All the work was done in the second language.</p> <p>Lesson 4 -Introduction of main animal classification groups. Children began to categorise animals into different groups first in a table and then by writing sentences in the second language.</p> <p>Lesson 5 - Matching animals to their skeletons. Children learn about vertebrate and invertebrate animals, carivores/herbivores/omnivores. Children, in pairs, sort animals using venn diagrams using different criteria and write sentences with findings in the second language</p> <p>Lesson 6 - Describing animals as laying eggs or giving live births. Also describing whether animals have feathers, fur, scales, tails etc. Begin to describe animals with all the vocabulary they have learnt. Pair games playing "Who's who" with animals using vocabulary learnt in the second language.</p> <p>Lesson 7 - Children wrote a description about the animal using all the language they have learnt in second language.</p>

<p>Cognitive aspect: Educational learning outcomes</p>	<p>Science objectives</p> <ul style="list-style-type: none"> To compare animals, describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals; Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function; Take accurate measurements. <p>Language objectives</p> <ul style="list-style-type: none"> To explore a range of texts in the second language; To listen carefully to spoken language; To write a range of simple texts; To use a bilingual dictionary correctly to extend vocabulary acquisition; To develop language learning strategies; To engage in a wider range of speaking activities including engaging in conversations and presenting information To write accurate complex sentences using conjunctions, quantifiers, negatives and other grammatical structures. 	
<p>Creative aspect of the activity/project</p>	<p>The children engaged in role play (patient/doctor) to develop the language of body parts and to develop their communicative skills. It also helped the children to understand the relevance of second language teaching.</p> <p>They also played games in pairs (Who's who with animals and characteristics). This helped to consolidate and apply the scientific language they had learnt in an engaging activity. It also helped children to learn from each other.</p> <p>The final activity required the children to prepare a description for publication and to present it to their peers. They needed to use good pronunciation and presentation skills to get across their message.</p>	
<p>Communication</p>	<p>Specific scientific vocabulary in second language (vertebrate/ invertebrate, cold blooded/ herbivore/ protein/ carbohydrate, etc)</p> <p>Key grammatical constructions - belongs to/ is/ has/ lives in/ eats/ is healthy/ is not healthy. Quantifiers - a lot/ a little</p> <p>Conjunctions - and, but, also, however, although Revision of body parts and colours</p>	
<p>Culture</p>	<p>This unit did not really cover cultural aspects. However, when learning specific scientific language, there were discussions on the etymology of words in both second and main language. This helped with language learning strategies which are important to promote proficient language learning.</p>	
<p>Evaluation</p>	<p>Most of the evaluation was assessment for learning. Evaluation was based on the work produced by children. For example, sorting activities and the</p>	

	<p>use of tables/venn diagrams demonstrated whether the children understood the scientific concepts. Oral and written sentences helped me to evaluate the acquisition of their second language vocabulary and structures. The final task (animal description) was designed to help me as teacher to evaluate both STEAM and second language learning during the unit of work.</p>
<p>Materials / Resources / technical requirements</p>	<ul style="list-style-type: none"> • Powerpoints to present the information • Venn diagrams and other charts and tables for classification activities • Animal boards for playing “Who’s who” • Food pyramids • Normal classroom materials
<p>Tips for educators / theoretical background or curriculum context</p>	<p>Choosing cognates and near cognates are useful to help children to understand key STEAM concepts. It is particularly important for children with special educational needs.</p> <p>Accompanying all key vocabulary with images also promote independent learning and support children who struggle with second language learning. Scaffolded sheets for children with special educational needs also help.</p> <p>It is important to keep language and language structures simple in second language to support understanding.</p>
<p>Links and Photos</p>	 <p>Un Tiburón vive en el mar. El tiburón es un carnívoro. Es un animal acuático y es vertebrado. Tiene aletas y dientes peligrosos.</p>  <p>El Lobo tiene piel y garras. Vive en la montaña a veces. El lobo tiene dientes afilados. El lobo es carnívoro y es un animal terrestre. El lobo es vertebrado. El lobo es un mamífero. El lobo tiene esqueleto. El lobo es vivíparo. El lobo es salvaje.</p>



El tigre es mamífero. Vive en la selva y el bosque. Tiene piel / pelaje y es vivíparos. Tiene dientes agitados peligrosos y garras. El tigre es un animal terrestre y es vertebrado. El tigre es carnívoro y pesa 400-450 Kg. El pelo es Naranja y Blanco y Negro.



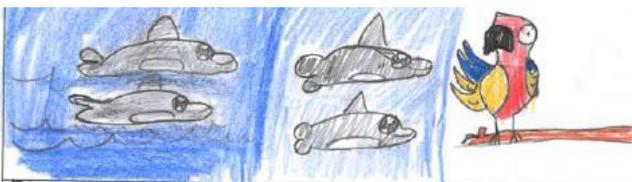
Un armadillo tiene escamas y las escamas lo protegen. Es un animal terrestre y omnívoro. Come plantas y hormigas vive en la Selva.



El tigre es un animal terrestre pero no es un animal acuático. Es un animal que tiene piel pero no tiene plumas. Es naranja y negro. Es un vertebrado pero no tiene concha. Vive en la selva y es un animal salvaje. El tigre es carnívoro y es un animal la montaña. Es un animal mamífero que significa no es un animal del aire.



El tiburón es un animal acuático y tiene dientes muy afilados y come peces y es vertebrado y también es un pez y tiene aletas pero no tiene piernas y también es carnívoro a veces



El delfín es un animal acuático y es un carnívoro y tiene escamas y es un pez. El loro es un animal del aire y terrestre y es un animal herbívoro y tiene plumas y tiene piel.

Example 4: The Water Cycle

Title	Le Cycle de l'Eau
School Author(s)	<p>Sudbury Primary School, United Kingdom</p> <p>Teacher: Noelia Rivas Gutiérrez</p>
Origin of the project/ activity	<p>Sudbury Primary School has an Academy status. It is a mixed school with 4 form entry school and 820 pupils. Almost all pupils are from minority ethnic backgrounds and the majority are from a variety of Asian heritages. Most children speak English as an additional language, of whom over a third are at an early stage of language acquisition.</p> <p>At Sudbury Primary school the curriculum is based around 6 themes taught over each half term throughout the school year. By teaching in this way, the children experience how subjects link together. All year groups learn about the same topics. We call these "spiral themes" (Healthy living, Back in time, Environment, Countries project, Everyone a reader, World of work).</p> <p>Noelia, the French teacher has linked her French lessons to some of these topics. The Water Cycle CLIL/STEAM unit was planned and conducted by the French teacher.</p>
Age of the students and level	Year 6, age 10-11
Target group	4 mixed ability year 6 classes with 30 students each participated in the project. Most children are English Language Learners, with the average of Special Education Needs children at 6/8 per class, 30 in all Year 6. The children have been learning French for 5 years now and they have never learned French from with a CLIL methodology.
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<ol style="list-style-type: none"> 1. I wanted to teach the children the same topic they were learning in Science and use the CLIL/STEAM method together with authentic materials to plan the lessons. Using this approach, the children were going to learn French embedded in the Science lesson about the process of the Water Cycle. 2. Before planning my 6 units of work, I looked at the objectives of the Science curriculum and decided which ones I wanted to cover in my lessons. Then, I thought about which structures and vocabulary I could teach in French linked to the Water cycle topic and those objectives. I wanted to include a range of authentic resources in French, audios, reading activities, diagrams etc. Also, I wanted to include a variety of activities to cover reading, writing, speaking and listening skills. 3. I planned a variety of pupil-centred activities where the children take an active role in the learning process. The language of the unit started with simple words, most of them cognates. Then the lessons moved forward into more complex vocabulary and structures. The children worked in mixed-ability groups and most of the reading and speaking

	<p>tasks provided were group or peer activities, which helped boost pupils' confidence and motivation. Writing tasks were differentiated but before they wrote, the children had a lot of opportunities to familiarize themselves with the language used in the unit along with teacher support, peer support, actions, pictures and repetition.</p> <p>4. The children carried out an experiment and tried different types of water (different bottled water brands), made poster and presented it to the class, took part in debates, etc. The delivery of the lessons was fully in French. All the activities were done in French with the children being able to get feedback and ask questions in English.</p>
<p>Duration</p>	<p>This unit of work lasted approximately 6/7 weeks with the pupils' weekly 50-minute second language lesson.</p> <p>Lesson 1: Learning the states of matter and labelling the water cycle stages</p> <p>Lesson 2: Understand evaporation and condensation. Experiment of melting ice and observing condensation and vapour.</p> <p>Lesson 3: Read and understand what happens in each of the stages of the water cycle.</p> <p>Lesson 4: Create a poster depicting and explaining each stage of the water cycle.</p> <p>Lesson 5: Mineral water: origin, production and treatment. Debate: advantages and disadvantages of drinking mineral water / tap water</p> <p>Lesson 6: Learn about the different water sources in France, learn the Cardinal points and place each brand on the map. Water tasting.</p> <p>Evaluation of the unit</p>
<p>Place</p>	<p>The lessons took place in the pupils' classrooms as is normal with both second language and STEAM lessons. The school does not have laboratories or language labs they can use.</p>
<p>Short description of the activity</p>	<ol style="list-style-type: none"> Authentic video played as motivation to engage in the lesson. The voice in the video has not been slowed down, but the images correspond to the water cycle and the key vocabulary is displayed. The intention is that children are exposed to the target language, can pick up some of the cognates and can work out for themselves what the learning intention of the lesson is. Changing states worksheet. Authentic resource where pupils, in pairs, discuss how water changes from one state into another, and label the name of the change in French.

At this early stage of the unit, children are familiarised with scientific vocabulary and they are practising good pronunciation.

3. **Label the diagram of the water cycle.** Children label the key stages of the water cycle in French. (Most of the names are cognates: evaporation, condensation, precipitation, infiltration, evapotranspiration, ruissellement – surface runoff).
4. **Experiment. “Fabrique des nuages”** by Lucy Montgomery, (Skoldo 3, Ecole Alouette) By putting a plate with ice on top of boiling water, children understand the concept of condensation, evaporation and write their conclusions in French.

Carrying out the experiment in French motivates the children to use the language, as they can talk and write about a real context that is relevant to them.

5. **Group work in mixed ability groups** gives confidence to every child:
 - Vocabulary games (oui / non, c’est... ou c’est...? Qu’est-ce qui manqué? interactive games from French websites)
 - Sorting activities (different items to état liquide, état solide, état gazeuse / statements for mineral water or for tap water)
 - Matching words to pictures and ordering to create full sentences describing each state of the cycle.
6. **Reading comprehension from a French website.** The teacher reads from an animation of the water cycle and asks the children to talk to their partners and discuss what they have understood, then they give feedback to the teacher. In a CLIL lesson we have to check that the children understand the scientific content of what we are teaching, - that’s when the children can speak in English.
7. **Poster.** In pairs or individually, the children design a poster of the water cycle labelling the three states of water and the different stages of the water cycle. Higher ability children can write sentences to explain each stage. Pupils can volunteer to present their posters. In this way they will practise the pronunciation of the phonemes learnt in the unit and there will be a chance for peer-assessment using the success criteria.

At the same time this gives an opportunity for the teacher to assess pupils in the different skills.

8. **Debate.** After learning about the advantages and disadvantages of mineral water and tap water, children can discuss their opinion and say whether they think we should drink tap water or mineral water.
9. **Locate the source of each brand of mineral water.** In pairs, pupils listen to the teacher reading out the location of the source and they move the card to the correct place on the map of France.
10. **Water tasting.** Pupils taste 5 different mineral waters from France and tap water. They tick what they think of each water type (appearance, texture, taste). This activity adds an element of intercultural understanding. Children love tasting French mineral

water and filling the forms like in a real “tasting”. A lot of boys liked the sparkling water, but most of the girls found it disgusting! Everybody voted for Evian to be their favourite French mineral water.

11. **Evaluation of the unit.** Pupils give their feedback about the unit. Which are the activities they enjoyed the most? What went well? Even better if?

- Pupils enjoyed decoding the language, guessing the new language using their previous knowledge and without recourse to English. It was a challenge for them to guess, deduct the information and use the context clues to access meaning. They also liked the pace of the lesson and the variety of activities, deducing the information, listening attentively to the description of the water cycle, doing an experiment and writing the results and findings in French, creating and presenting their posters and last but not least tasting French mineral water!

Shivam: *“It has been a lot of fun, because most of the time we were doing the activities by ourselves and there were a lot of different activities: in pairs, in groups, matching cards, fill in the gaps, talking to partners, experiment, poster, and I really liked tasting the mineral waters”.*

Donita: *“As well as learning a lot of new words it was also really fun, we could actually enjoy the lesson. We could understand the water cycle more because we did experiments, posters and you learn better by enjoying it at the same time”.*

**Cognitive aspect:
Educational learning
outcomes**

- Linking the school topics to French gives children a real purpose to their learning, which is highly motivating and boosts achievement. **Lower ability children were more interested than ever.** They listened attentively and joined in with the activities. This was possible thanks to the scaffolding support included in the unit:
 - Picture + gesture for each scientific term
 - Cognates
 - Memory games
 - Simple, build-on language step by step
 - Matching cards to create sentences
 - Gap- fill with word bank
 - Writing mat
- **Concerning higher ability children, they are much more interested in the lesson.** They loved learning the topic and being immersed in the language. The thinking skills are higher as they are not just learning and remembering new vocabulary, but they are analysing, reasoning and putting the language into context.
- The children were not afraid of having a go at reading and answering questions in French. Because they were learning about the topic in Science, they could make connections and they could guess the

answers using their knowledge of Science. In addition, they were able to work with the authentic resources (worksheet, experiment, reading comprehension), as I started the unit with simple vocabulary and made sure that they were familiar with the terminology before going on to more complex structures in the authentic text about the whole process of the water cycle.

Talha: *"I like the Science lesson in French because I didn't know some of the words like infiltration, in the English water cycle is not part of the stages. I also like to read and speak and it doesn't matter if you make mistakes as this is your second language".*

- The impact of the CLIL/STEAM lesson on the progress of the children was huge. Children met all the expectations that were set for them in the unit. I had several opportunities to assess them and I observed that they were confident at reading comprehension and at applying the vocabulary. After manipulating the language in the first lessons, they used their reasoning skills and language learning skills to write sentences with quite complex scientific content.

Nirosh: *"We have improved at reading in French and also we improved at writing and speaking because we created a poster and presented it to the class".*

- The constant use of the target language enabled the children to develop fluency and to improve their listening skills and their pronunciation.

Prenthika: *"Doing an experiment in French was really fun. Now I feel more confident at understanding French and this topic has encouraged me to speak more in French".*

- Some children even mentioned that the French unit helped them to understand aspects of the water cycle that they didn't understand when they learnt it in Science.

Kurish: *"Learning about the water cycle in French was really fun. It really helped me, because I didn't understand how precipitation happened in English but now after learning it in French I know how it happens".*

Haleema: *"Learning a Science topic in French gives you more information to recap on the Science lesson".*

Creative aspect of the activity/project

Experiment: Clouds factory. Carried out in groups, speaking and writing in French.

Feedback in pairs: after listening to the description of each stage of the Water cycle and looking at the animated diagram, children discuss in English with their partner what they have understood.

Whole class debate tap water / mineral water: the children have to state their opinion and justify in French.

	<p>Sorting cards in pairs: to create full, scientific sentences and to classify the statements for mineral or tap water.</p> <p>Presenting a poster to the class: the children design their own poster and then present it in front of the class</p>	
<p>Communication</p>	<p>Specific scientific vocabulary in second language (condensation, évaporation, évapotranspiration, précipitation, ruissellement, infiltration, état liquid, état solide, état gazeuse, La rivière, La pluie, La neige, Les rayons du soleil, L'eau de la mer, Les nuages, Le sol, S'évapore, Se condense, Se transforme, S'infiltré, cardinal points, adjectives to describe the taste of mineral water, etc.)</p> <p>Key grammatical constructions - in the shape of, melts, evaporates, condensates, freezes, before. In my opinion, we should drink mineral / tap water because....</p> <p>Time connectives – First, after, then, after that, finally</p>	
<p>Culture</p>	<p>The cultural component in this unit was the French tradition of drinking mineral water. We looked at the map of France, located each source and learn about each of the brands.</p> <p>In class, we had a real water tasting where the pupils had to drink and describe the taste of each brand.</p>	
<p>Evaluation</p>	<p>The assessment was based on the work produced by the children. Rather than having a test at the end of the unit, I observed and took notes of the children's work on a daily basis. Assessment for learning was based on:</p> <ul style="list-style-type: none"> • Written work (labelling the diagram, explaining the stages of the water cycle on the poster, creating sentences with mini-flashcards, sentences about the observation of the experiment) • Speaking (pair talk, sorting out cards, stating their opinion on the debate, presenting the poster to the class) • Understanding the scientific concepts: answering questions in class, talking to their partner in English, observations after the debate, explaining the stages of the water cycle) 	
<p>Materials / Resources / technical requirements</p>	<p>Authentic French clips, texts and animated texts</p> <p>Sorting cards Simple diagram to label</p> <p>Experiment:</p> <p>Ice cubes Plate Water</p> <p>Kettle Glass bowl Water</p> <ul style="list-style-type: none"> • Several language scaffolds for the pupils to create their sentences • A3 paper for poster, pencil, colour pencils, felt-tips, rubber Map of France to locate mineral water sources • Plastic caps, jars to serve the different mineral waters and tap water, water tasting form for children to tick • Mini-whiteboards 	

Voyage d'une goutte d'eau

http://www.coursdeau.com/junior_1/divers/pop_oh.php

Expériences

http://www.coursdeau.com/junior_1/le_toucher/experiences.php

Dossiers pédagogiques

Eau Seine Normandie

<http://www.eau-seine-normandie.fr/index.php?id=7962>

L'eau est notre trésor

"5 aventures de Lola et Lolo"

<https://www.eauxdemarseille.fr/Apprendre-en-s-amusant/Supports-pedagogiques>

Préserver l'eau

<http://www.cieau.com/images/stories/junior/monquotidien/appli.htm?onglet=&page=>

http://www.eau-seine-normandie.fr/fileadmin/mediatheque/Enseignant/Outils_Pedagogiques/PPE_Web.pdf

'L'hygiène et la santé dans les écoles primaires'

<http://www.cieau.com/enseignants/89-enseignants/256-kit-pedagogique>

Ressources et activités

<http://www.cieau.com/mediatheque/les-brochures-pedagogiques>

Léo et l'eau (livret enfant)

http://www.inpes.sante.fr/professionnels-education/outils/leo_eau/pdf/livret_enfant.pdf

Léo et l'eau (livret enseignant)

http://www.inpes.sante.fr/professionnels-education/outils/leo_eau/pdf/livret_enseignant.pdf

Label the changes of state

http://physiquecollege.free.fr/physique_chimie_college_lycee/cinquieme/chimie/cycle_eau.htm

La filtration vidéo

<http://www.cieau.com/enseignants/89-enseignants/346-experience-3-la-filtration>

Faire chauffer de la glace vidéo

<http://www.cieau.com/enseignants/89-enseignants/348-experience-5-faire-chauffer-de-la-glace>

Vidéo: Quelle eau choisir ? Robinet ou en bouteille?

<https://www.youtube.com/watch?v=24iCBc7wRck>

<https://www.youtube.com/watch?v=aP23trGwlfq>

http://www.dailymotion.com/video/xb2lma_eau-en-bouteille-ou-eau-du-robinet_lifestyle

Vidéos sur la dégustation d'eau minérale

<https://www.youtube.com/watch?v=RcOounu2HKQ>

<https://www.youtube.com/watch?v=xD0AB5cFx0I>

Jeux, chansons et histoires

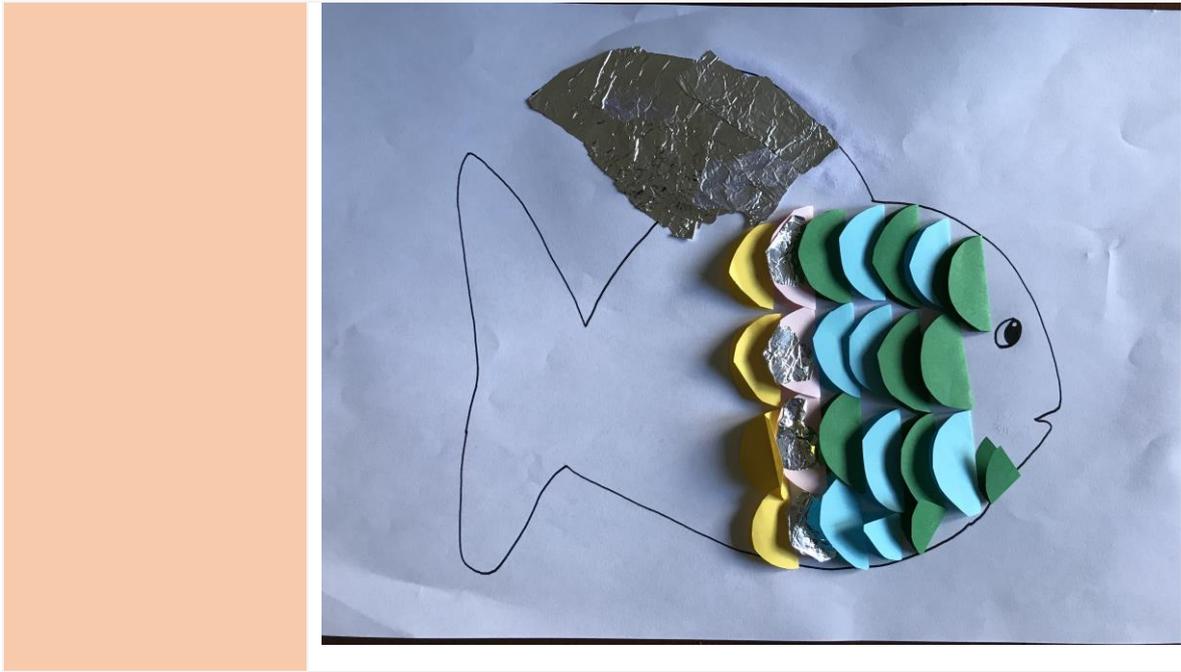
http://www.coursdeau.com/junior_1/sommaire.php

<http://www.eau-seine-normandie.fr/index.php?id=2684>

Example 5: The Rainbow Fish

Title	The Rainbow Fish - Spain
School Author(s)	Ceip Las Mimbres, Maracena (Granada) Raul Munoz Rodriguez
Origin of the project/ activity	<p>First grade bilingual primary school in Southern Spain. Natural/Social Sciences and Physical Education are taught 50/50 in English/Spanish. The children have supplemental English language classes.</p> <p>This activity took place in the Science class. The instructor took advantage of the presence of an English Language Assistant to create a cross-curricular art assignment that required the children to utilize vocabulary learned in Natural Science and English.</p>
Age of the students and level	Grade 1 (ages 6/7)
Target group	24 students from first year of Primary Education. These children had previously had English lessons in pre-school Education. Two students, one with autism and another with general learning needs, had a significant curricular adaptation.
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<ol style="list-style-type: none"> 1. The main teacher decided to take advantage of the English Language Assistant's presence during the session to incorporate vocabulary and content that students were learning in their science classes. 2. Inclusion of Natural Science Unit vocabulary and content knowledge 3. Integrative learning. Natural Science, Art, English cross-curricular assignment. Math also required to a lesser extent.
Duration	1 hour: 5 minutes to watch the Youtube video of the live reading of the book "The Rainbow Fish". 10 minutes to review vocabulary and to explain/demonstrate how to complete the assignment. 5 minutes to hand out materials. 45 minutes to complete the assignment.
Place	Classroom
Short description of the activity	<p>First grade students are tasked with creating their own "rainbow fish" using the outline of a fish body (using an outline provided). First, students view a live read-aloud of the book "The Rainbow Fish" in English. The teacher checks for understanding along the way and reviews vocabulary that students have learned in previous classes (scales, fin, fish, water, ocean, etc.). Then, using photocopies of the outline as well as strips of construction paper provided, students employ glue sticks, pencils, and scissors. They trace small circles on the construction paper, used glue sticks, cut out the circles, and fold them in half, and then paste them onto the body of the fish to form the scales. The children create an even pattern</p>

	with the scales (Example: 10 red scales, 10 blue scales, 10 yellow scales, and repeat)].			
Cognitive aspect: Educational learning outcomes	<ul style="list-style-type: none"> • Memory: Recall relevant vocabulary from Natural Science, Art and English. • Understanding: Youtube Video and instructions • Applying: Application of information to complete task • Creation: Produce new original work: design and construct their own rainbow fish. 			
Creative aspect of the activity/project	This activity involves the use of handicrafts in the creation of a rainbow fish, and, in this way relates science with the subject area of arts-and-crafts.			
Communication	Vocabulary related to Natural Science Unit on Animals and Vertebrates/Invertebrates.			
Culture	With this activity students come in contact with the world of read-aloud books in a second language; this also helps them to understand the artistic possibilities of the world around them.			
Evaluation	<p>At the end there is a brainstorming session in which the children cooperate by naming the parts of the fish, where they live and what material and colours they used in their project.</p> <p>The teacher makes notes on how every student develops the results</p>			
Materials / Resources / technical requirements	Digital Whiteboard, YouTube, Photocopies, Construction paper, glue, scissors			
Tips for educators / theoretical background or curriculum context	<p>The importance of good reading techniques is crucial in the learning process, so in this activity, it is very important that the teacher guides the activity of reading aloud at the beginning of the session. That way students focus their attention on what is most relevant in the book.</p> <p>It is also important to link what students already know about the content of this reading activity.</p>			
Links and Photos	Book: https://www.youtube.com/watch?v=QFORvXhub28			



Example 6: Andalusian multilingual program - Fuentenueva

Title	Andalusian multilingual program
School Author(s)	Fuentenueva Primary School, Granada, Spain. By Pilar Villarroya Bravo
Origin of the project/ activity	<p>The Fuentenueva School is located in a central area of the city of Granada, next to various Science Faculties of the University of Granada. The cultural and socioeconomic level of the families is medium to high. It has been a bilingual centre for 9 years, where bilingualism has been part of the formal curriculum. This means that, in the three infant-stage (pre-school) courses, children have two hours of English per week (linguistic anticipation) and one half-hour weekly conversation session, with an English-speaking conversation assistant. In the 6 primary classes, students have 3 hours a week of English, a weekly session with the conversation assistant teacher and several non-linguistic bilingual subjects (50% English, 50% Spanish). These subjects are Natural Science, Social Science, Music, Art, and Physical Education. To make this possible, the school has 4 bilingual elementary teachers, and a Music and Physical Education bilingual teacher. All have a permanent position at this school, except the bilingual Physical Education teacher, who changes every year.</p> <p>Each year the school is assigned a different conversation assistant teacher, who has a contract of 12 hours a week and who is hired either by the regional local authorities (Junta de Andalucía) or by the MEC (Ministry of Education). In addition, the school offers an after-school English activity in the afternoons.</p> <p>On the other hand, it is important to say that during these 9 courses the school took part in two European projects: KA2 Erasmus + and a KA1 Erasmus +, both with a duration of 2 years. The KA2 project "Andalucia in the science zone" was carried out together with Wales, Italy, Poland and Turkey and included mobility of students and teachers. Students from the participating countries visited the other institutions except Turkey. The mobility to Turkey was only for teachers to learn from each other how bilingual education works in our respective countries. In this school, all the children who were interested, aged 10 and 11 (from 5th and 6th grade) participated in the project. The students were hosted by families from the participating countries and went to school with the family's children. On each trip, the country that hosted the participants prepared co-existence activities at the school for the students: The children attended class there and the teachers also visited some bilingual classes to see how they worked. Cultural visits were organized in the afternoons. The KA1 project consisted of teachers from Spain taking training courses abroad, for example, in Malta.</p>
Age of the students and level	<p>The school's bilingual project included all children from kindergarten (3 years) to sixth grade (12 years) who were receiving English classes. From the 1st to 6th grade they receive English classes in Science, Social studies, Music, Art and Physical Education, as well as conversation with a</p>

	<p>native assistant teacher. Only the 5th and 6th grade students (10-11 years old) participated in the KA2 project.</p>
<p>Target group</p>	<p>All the children participated in the School Bilingual Project, with about 150 kindergarten children of 3, 4 and 5 years of age, and about 300 primary school children, divided into groups of 25 students. Kindergarten children participated in the bilingual project with English language anticipation classes and conversation classes. Primary school children received English and conversation classes in non-linguistic curricular areas, half in English, half in Spanish. Children from Spain, Poland, Italy, Turkey and Wales participated in the KA2 project in small groups of 10-12 students.</p>
<p>Integration of Second Language Acquisition with STEAM Education through active pedagogies?</p>	<p>The Bilingual School Project is an autonomous project offered by the Andalusian Office of Education. Fuentenueva school joined this project because we believe that it is easier for young children to acquire a second language by adopting the CLIL approach. We requested it for the KA2 Project because we believe that true linguistic immersion is enriched by being in contact with speakers of other countries, by using English as the language of communication among the participants.</p> <p>To be able to teach in a bilingual primary school, teachers must have at least the B2 level in English and the corresponding specialization in the curricular area that they teach.</p> <p>The methodology used for bilingual teaching is perfectly combined with the methodology used at school in the rest of non-bilingual subjects, as we use a very active and participatory methodology, in which the children build their own learning (Piaget, 1972; Vygotsky, 1978; Driver, 1988; Bruner, 1987). Cooperative learning techniques (Slavin, 1980 & 1995; Kagan, 1994; Johnson and Johnson 1999 & 2017) are used, through which the children learn to collaborate with other children, and thus obtain better results. Children learn through songs, games, drama technique and oral presentations. The teaching of English as a second language and STEAM education (Yakman, 2008; Tenaglia, 2017; Won Kim, 2016) complement each other. The scientific, artistic, technological areas are learned in English, so the programs are developed in parallel and take into account all these curricular areas. That is, the same topics are approached from several perspectives at the same time and with integrated approach.</p> <p>Children learn a second language through very active, participatory and motivating activities, such as songs, videos, games, role plays, and plays.</p>
<p>Duration</p>	<p>The bilingual school project is permanent. The school has been offering it for 9 years.</p> <p>As the school is a bilingual centre, the students have more hours of English per week. In addition, the school has a conversation assistant teacher assigned to it, and non-linguistic areas are taught in English. All of this does not happen in non-bilingual schools, and given that they have fewer hours of English, do not have a conversation assistant teacher and all non-linguistic subjects are taught in the mother language.</p>

	<p>In each class, there is a bilingual corner in which British and American cultural material is displayed for the students to learn about the culture of English speaking countries.</p> <p>Bilingualism is the most ambitious project of the Andalusian local authorities. The KA2 project lasted 2 years and although only the 5th and 6th grade students traveled to the participating countries, all the children from the school benefited because they all participated in the project activities with the visiting students. In addition, when the 5th and 6th graders returned from visiting other countries, they prepared audiovisual work to explain to their classmates what schools were like in other countries. The children from the 5 countries that participated in the project stayed with families in the host country, went to school together and it was a week of total immersion.</p>
<p>Place</p>	<p>Bilingual classes are taught in the normal classroom, in the language laboratory, in the music class, and even in the courtyard. There is a bilingual corner in the school hall, with displays of objects from the countries with which the school participated in the KA2 project. All classes have a digital blackboard on which videos on the customs of English-speaking countries, songs, scientific or technological documentaries, etc. can be projected. Games are played in the playground, such as "pass the apple" on Halloween, and also Physical Education is taught. The KA2 project activities were carried out in several places: at the school, the science park, in museums, etc.</p>
<p>Short description of the activity</p>	<p>In each subject content is taught by using English as the language of instruction. In our school, the Natural and Social science books are written in English. So both the written activities in the book and the interactive activities in the digital book are in English. In addition, at the end of each unit a project is implemented in English, for example: about living beings, the family, space, mammals, etc. Information is sought in English, it is worked on individually or in groups and it is presented orally. In Music, there are rhythm activities such as songs, and dance in English. In Art, murals are made about English-speaking artists, or the colours used in an artwork are learnt in English. During the two years of the KA2 project, the children, before visiting a country, recorded a video in English where they presented their city and their school and introducing themselves. The video was then projected in the country visited. The children also took typical Spanish products as gifts, and when they were handed out, the children explained what each present was.</p>
<p>Cognitive aspect: Educational learning outcomes</p>	<p>As Coyle (2005) pointed out, CLIL favours the students' progression both in language skills as well as in the construction of knowledge. In addition, it promotes interconnections between cognition and communication, between language development and thinking skills. In this school, these processes take place successfully, with good results with respect to learning English as a second language and subject content. In fact, performance is better than the outcomes obtained by children following a non-bilingual program. This is possibly due to more resources and more time of exposure to content in English as well as presented in a variety of</p>

	<p>contexts. Children can maintain a conversation, appropriate to their level, understand oral and written texts of different length and difficulty depending on their age, can express themselves orally and in writing, and, above all, there is a greater knowledge of the English speaking countries' culture. This is achieved with the help of the native assistant teachers. In addition, with the KA2 project, the students got to know the cultures of the countries with which the school collaborates: Wales, Poland, Turkey and Italy. Bilingual artistic and scientific areas make it possible to learn English in very different contexts. Children learn in English a variety of topics: the parts of a plant, the elements of a landscape, materials and their properties, machines, space, the water cycle, the passage of time, the types of animals and their characteristics, etc.</p>	
<p>Creative aspect of the activity/project</p>	<p>To teach Arts (Music and Plastic Arts) role plays, plays, songs, poetry, drawings, and virtual knowledge of museums are used. The approach followed included taking into account meaningful learning (Ausubel, 1976), that the children build through their own learning in an active and collaborative way, in small groups, where each member has a role and the sum of the effort and knowledge of all leads to the achievement of better results and a better quality of learning. Great importance is given to creativity, imagination and discovering learning in problem solving situations (Bruner, 1966). In each class, there is a bilingual corner that is enriched throughout the year by displaying artistic creations that represent something typical of Anglo-Saxon culture. For example, for St. Patrick's Day, after working on the story, a green clover was made of shiny rubber.</p>	
<p>Communication</p>	<p>In promoting communication as defined by Coyle (2005), depending on the school year and children's age, different communicative functions, vocabulary and grammar are learned and developed according to the subject content. By the end of primary school, children can be proud that they have learned English as a second language as well as subject areas (which were taught as bilingual) such as Science, Art, Music and Physical Education. In addition, with the support of conversation aids about the culture of the language learned, together with the varied vocabulary and basic grammar, the children are able to interact orally and make themselves understood. In each activity, at least one grammatical structure and some vocabulary related to the topic under discussion are used. For example, to learn how to describe animals they used descriptive verbs and adjectives about the animals' body parts as vocabulary.</p>	
<p>Culture</p>	<p>As the relationship between culture and language is complex, intercultural awareness and learning is fundamental to CLIL (Coyle, 2005). For this reason, throughout the academic year, the children learn about the different Spanish festivals and the ones in English-speaking countries. Some videos were watched and analyzed to find out and understand what they are about. Craft reproductions and pictures were created to represent some scenes and placed in the bilingual corner. Investigating aspects of another culture and watching people from other countries doing things different, even if through videos, promotes empathy among children. Also having classes with a conversation</p>	

	<p>assistant teacher every year, who talks to them about the cultural differences between Spain and English speaking countries helps children to value other cultures as well as value their own culture. The students' exchanges with students from other countries that took place as part of the KA2 project also contributed to generate tolerance towards other cultures.</p>
<p>Evaluation</p>	<p>To evaluate the school bilingual programme (Pérez Cañado, 2016; Ortega, Hughes & Madrid, 2018), the children were often observed at work. Every day, teachers made notes in their diary, about the children to reflect their participation and the quality of their interventions. Oral comprehension and expression were assessed by observing the quality of the interactions between: students with students, and students with teacher. The pupils also took some listening's tests. Written expression and comprehension were also assessed through written tests adapted to their age. An individual final project was also implemented in non-linguistic bilingual areas, such as Science, Art, Music and it was also evaluated. In these subjects, content was primarily evaluated, as well as the level of English in the subject is assessed.</p>
<p>Materials / Resources / technical requirements</p>	<p>The interactive board and computers with internet connection were the main resources used when using English as second language in the bilingual subject areas. Thanks to these resources, the children were able to practice discovery such as learning on any area of knowledge or culture and to consult digital books and other digital materials, such as videos and interactive games in English: English magazines, advertising brochures, purchase tickets, museum leaflets, colorful cardboard and <i>eva</i> rubber, colors, markers, crayons, scissors, glue, etc.</p>
<p>Tips for educators / theoretical background or curriculum context</p>	<p>It is very important to make good use of the conversation assistant teacher, as it is a very valuable and motivating resource for students. The age of the students must always be taken into account so as not to plan activities that are too difficult for them or too easy, as this would create frustration and demotivation. It is important to organize participatory activities, in which the children have something to contribute and through which they discover and construct their own learning. The frequent use of songs, theater, poetry, crafts, and artistic and creative activities is highly recommended.</p>
<p>Links and Photos</p>	<p>Ausubel, D. F. (1976). Educational Psychology: A Cognitive View. New York: Holt, Rinehart and Winston.</p> <p>Bruner, J (1987) Actual Minds, Possible Worlds. Cambridge, MA: Harvard</p> <p>Bruner, J. (1966). Toward a theory of instruction. Cambridge Mass.: Harvard University Press.</p> <p>Coyle, D. 2005. Developing CLIL: Towards a Theory of Practice, APAC Monograph 6, APAC, Barcelona.</p> <p>Driver, R. (1988). Un enfoque constructivista para el desarrollo del currículo en ciencias. <i>Enseñanza de las Ciencias</i>, 6 (2), 109-120.</p>

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Example 7: Andalusian multilingual program – Lux Mundi school

Title	Andalusian multilingual program
School Author(s)	Lux Mundi School, Granada, Spain Guasalupe Fernandez Cerezo
Origin of the project/ activity	<p>Since the beginning, at the Lux Mundi School, great importance was given to the acquisition of English as a second language. For this reason, the introduction of bilingualism has been included in a very natural way, with great success among the children and parents. Thanks to the preparation they receive in the pre-school stage, children in the first grade tackle learning the arts, physical education and natural and social sciences subjects in English. When we became a “Cambridge English School”, 6 years ago we presenting all children to the Young Learners English level certification tests straight aware rather than progressively, since we considered that they were already prepared for them. We achieved excellence in the Speaking skill (spoken part of the test) at the first year of Primary, which we have maintained every year, presenting more and more children to the assessment. We consider both the advantages and disadvantages whenever we consider important changes in teaching that may affect all educational levels, to assess what this change brings to the child once the educational stage is finished. We do not focus on what children are going to learn year by year, but on the preparation or competence that they would have acquired once the school stage is over.</p> <p>Multilingualism offers better opportunities of finding good jobs in other countries. So, the teaching of one or more foreign languages is a common advantage in today's society. Learning to communicate in more than one language from an early age means providing children with general linguistic competence. The school takes into account that companies look for profiles of people who master more than one language and show good communication skills, and that a mastery of communication at all levels is an essential requirement to function successfully in the world of work.</p>
Age of the students and level	<p>The Bilingual Project encompasses all the educational stages.</p> <p>The project is included in all areas at pre-school level. At Primary, it is implemented in English, Natural Science, Social Science, Arts and Physical Education. It involves English, Technology and Physical Education in High school.</p>
Target group	<p>Currently, the entire school participates in the project, that is, all the students at all stages of education. In Secondary School exchanges are established with students from Seattle in the US. During the week when the American students visit, the students take the opportunity to organize some activities with them in the primary classes. These activities consist of games, theatres, songs and talks with them (depending on the school</p>

	<p>year). The primary students prepare interviews that deal with their place of origin, culture, customs ... etc.</p>
<p>Integration of Second Language Acquisition with STEAM Education through active pedagogies?</p>	<p>Students who have experienced multilingual teaching since early childhood have a better capacity to understand and adapt themselves to the diversity of the world, breaking down cultural barriers and having a better understanding of their entire environment.</p> <p>The teaching of the Sciences in English, as well as other subjects such as Plastic or Physical Education, helps the children to know how to organize, structure and analyse the content taught. From a very early age, reading comprehension and constructive learning through the elaboration of concept maps is encouraged. They finish schooling with a general, well organized and structured knowledge of the Natural and Social World in both their mother tongue and foreign language.</p> <p>All the teachers who take part in the bilingual programme possessed the European B2 certification in the case of Primary teachers, and C1 for Secondary teachers. In addition, several courses were offered for teachers related to CLIL methodology, student motivation and active methodologies, with the collaboration of the Cambridge Language Assessment team.</p> <p>In practice, the activities carried out in the development of this Project included cooperative work techniques, project-based learning (Science) and inquiry learning (arts).</p> <p>In each unit of content that was developed in the 2nd year of Primary, a mini project related to the content of the topic was carried out, through which simple techniques promoting cooperative work.</p> <p>The integration of language with STEAM (Yakman, 2008; Won Kim, 2016), in these activities, needs more coordination by the teachers, since children tend to speak in their mother tongue when they communicate with each other. However, if children are provided with a script containing the expressions or grammatical structures to be used, they tend to assume the language better, learn faster and retain better, due to the motivational component involved in working in cooperative groups. Furthermore, if we make sure that these cooperative groups (Slavin, 1980 & 1995; Kagan, 1994; Johnson & Johnson, 1999 & 2017), within a class, are truly heterogeneous, that is, that in each group there are children with different abilities, the results improve because the commitment to learning is greater when social relationships between children take place.</p>
<p>Duration</p>	<p>The bilingual project takes place in English as a second language throughout the school hours in specific subjects</p> <p>English: 4 hours a week;</p> <p>Science: from four hours to three, devoting one hour to learning the Spanish language,</p> <p>Arts: 1 hour, and</p>

	<p>P.E .: 2-3 hours depending on the school year.</p>
<p>Place</p>	<p>In ordinary classrooms, those students who have learning difficulties receive educational reinforcement in Science, which consists of: managing information, making diagrams or other intellectual working techniques that help them integrate the subject content.</p> <p>There have also been guided bilingual excursions carried out by a group of biologists in natural landscapes around the school.</p> <p>On the other hand, all the pupils and students, infants, primary and first cycle of Secondary, each year attend the "Theatre in English" that a Granada theatre company offers to schools. Normally it takes place in the theatre room of the Caja Granada Cultural Centre.</p>
<p>Short description of the activity</p>	<p>Plan a healthy picnic menu (2nd -7 years old)</p> <p>Imagine the class is going on a picnic. The children work together to plan the picnic menu. They have to make sure that the menu has lots of fruit, vegetables and cereals, and not too many sweets or fatty foods.</p> <ol style="list-style-type: none"> 1. The children work alone. They have to draw and write five foods that they would like to eat on a picnic. 2. The children work in different-ability pairs. They use think-pair-share technique to develop their team-work and collaboration skills. Each group completes a template with the different types of food groups: fruit (2 points); vegetables (2 points); cereal (2 points); dairy (1 point); meat or fish (1 point); and fats or sugar (0 points). 3. The children work in groups of four: They classify the food by deciding which food group it belongs to. To do this they tick a box. They have to focus on the Language tips box ("Let's put apples", "We can add..." "We can take away....") 4. When they would have finished, they then add up the total points for their picnic food. 5. Now, they work in combined groups of eight. Each group explains the menu to the other group and state how many points they have. The other group should then suggest a way to make the menu healthier, using language tips: "You can change the... for a...." 6. When the two groups are finished, they work together to make a poster for the classroom using their own pictures and excluding the food that is not healthy. 7. At the end, they have to self-evaluate, using a cooperative learning evaluation
<p>Cognitive aspect: Educational learning outcomes</p>	<p>When considering the students' progression in both language skills, their cognitive processes with subject content, together with the interconnections between cognition and communication (Coyle, 2005), in general, the school obtained very positive learning results. The teachers noticed that the students advance not only in linguistic competence, language fluency, and vocabulary acquisition, but also in the Science subjects. The results with respect to the content learnt are very satisfactory. However, at the beginning, we had to deal with some level of distrust by families, who doubted whether their children were capable of</p>

	<p>learning Science content in a foreign language. But later on, that distrust disappeared.</p> <p>In this content area and through the current classroom activities, children improve their confidence to express themselves in English, and to construct and integrate content knowledge (Driver, 1988 & Bruner, 1966 & 1987). They also assume healthy lifestyle habits and are able to compose a healthy menu. Likewise, they acquire communication skills and oral skills in English, as well as improve their social competence (Vygotsky, 1978; Johnson and Johnson, 2017)). So the cognitive aspect of the integration of STEAM (Coyle, 2005; Yakman, 2008; Tenaglia, 2017) appears to be satisfactory and provides good results.</p>
<p>Creative aspect of the activity/project</p>	<p>The integration of the arts was made considering, on the one hand, that it was necessary to reach a certain number of hours in second language learning, and on the other, that it was a subject that allowed the children to use a second language in a more accessible way, favouring creativity (Robinson, 2001; Lehrer, 2012).</p> <p>With the teaching carried out within the bilingual programme, the children end up integrating several artistic skills. In fact, the children often say: "Teacher, we no longer know if we are in Science, English or Arts ...", which I consider a success in terms of the holistic learning, which, in turn, is in line with the current official pedagogical recommendations.</p>
<p>Communication</p>	<p>Through the development of Science, Arts or PE subjects, students make use of simple grammatical structures, that though the years are expanded and become more and more complex. This is achieved mainly thanks to the support provided by the oral skills developed during the English language learning that is offered four hours a week.</p> <p>Through these activities, students increase their procedural knowledge and learn that language fulfils the need for communication to exist. In addition to improving their communicative competence (Canale & Swain, 1983; Bachman, 1990; CEF, 2001), the children also have the need to communicate with others, and how, through communication, they improve their linguistic and communicative skills (Coyle, 2005).</p>
<p>Culture</p>	<p>Through Science, children are able to appreciate and value the elements of their own culture, history, customs, as well as contextualize them within the diversity of cultures that make up the world (Seelye, 1993; Tomalin & Stempleski, 1993; Byram, Gribkova & Starkey, 2002, Corbett, 2003). On the other hand, in the Arts, children have the opportunity to learn in English about the artistic expression of their own country and the artistic manifestations of the ancient culture of their country and the whole world.</p> <p>With this proposed activity, students learn to value, for example, the richness of Mediterranean food. Values of healthy eating and responsible consumption are also used in contrast to "fast-food".</p>
<p>Evaluation</p>	<p>Each of the subjects that make up the project has got its own assessment, consisting of initial, continuous, summative and final evaluation. In addition, systematic observations, scales and questionnaires are applied, depending on the unit that is being evaluated (Pérez Cañado, 2016). In the</p>

	<p>Science, Arts and PE, the acquisition of competences specific to the subject has priority over the acquisition of linguistic competences.</p> <p>In addition, at the end of the programme, a general evaluation of the project is carried out. The evaluations provided by all the teaching staff throughout the course of activities are then used to improve proposals for the following year.</p> <p>In addition, each unit provides two types of self-assessments for students: one to evaluate cooperative work: and the other involving individual evaluation. Through this assessment, students can learn about their own progress, and plan strategies for improvement with the help of the teacher.</p>
<p>Materials / Resources / technical requirements</p>	<p>Materials include content tests, interviews, systematic observation sheets, questionnaires, portfolio, research projects, cooperative works and artistic projects.</p>
<p>Tips for educators / theoretical background or curriculum context</p>	<p>These tips include:</p> <ul style="list-style-type: none"> • Attention to the students' constant motivation as a technique for overcoming difficulties that the students encounter with respect to the foreign language learning. • Continuous training of teachers to improve their own linguistic competence and their pedagogical and teaching skills.
<p>References</p>	<p>Bachman, L. (1990): Fundamental Considerations in Language Testing. Oxford: Oxford University Press.</p> <p>Bruner, J (1987) Actual Minds, Possible Worlds. Cambridge, MA: Harvard</p> <p>Bruner, J. (1966). Toward a theory of instruction. Cambridge Mass.: Harvard University Press.</p> <p>Byram, M; Gribkova, B; Starkey, H; (2002) Developing the Intercultural Dimension in Language Teaching: a practical introduction for teachers. Council of Europe: Strasbourg, France</p> <p>Canale, M & Swain, M. (1980): "Theoretical bases of communicative approaches to second-language teaching and testing", Applied Linguistics 1: 1-47.</p> <p>CEF (2001). Common European Framework of Reference for Languages: learning, teaching, assessment. Strasbourg: Council of Europe.</p> <p>Corbett, J. (2003). An Intercultural Approach to English Language Teaching. New York: Multilingual Matters LTD.</p> <p>Coyle, D. 2005. Developing CLIL: Towards a Theory of Practice, APAC Monograph 6, APAC, Barcelona.</p> <p>Driver, R. (1988). Un enfoque constructivista para el desarrollo del currículo en ciencias. Enseñanza de las Ciencias, 6 (2), 109-120.</p> <p>Johnson, D. W., & Johnson, F. (2017). Joining together: Group theory and group skills (4th ed.). Englewood Cliffs, NJ: Prentice Hall.</p> <p>Kagan, S. (1994). Cooperative learning. San Clemente, CA: Kagan Publications</p> <p>Lehrer, J. (2012). Imagine: How creativity works. Boston: Houghton Mifflin.</p> <p>Pérez Cañado, M. L. (2016). Evaluating CLIL Programmes: Instrument Design and Validation. Pulso, 39. 79-112.</p>

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Example 8: S.T.E.A.M-tastic project

Title	S.T.E.A.M-tastic project
School Author(s)	<p align="center">San Gorg Preca, Hamrun SS, Malta</p> <p align="center">Charmaine Attard</p>
Origin of the project/ activity	<p>Kinder class 2.1 of pre-schoolers, as young as 4-5 years from San Gorg Preca College Hamrun School Street Malta, are exploring STEAM education to help them with their holistic growth while also enhancing English as a second language. This is important to the school, especially since the student population consists of diverse cultures from a range of different native languages. STEAM is also included in the school's development plan, and as an action plan, educators are promoting STEAM through play and implementing it throughout the daily activities.</p> <p>The school is also an eTwinning school. eTwinning helped educators within the school embrace and learn more about STEAM from other educators who use English as the second language. The school educators have steadily engaged in more STEAM projects through ideas that interest the children as well as served for their professional development.</p>
Age of the students and level	<p>Kinder 2 class, aging from 4-5 years of age.</p>
Target group	<p>The target group are children in the Early years. Since collaboration was done with various countries, the target group was for children within the age range of 0-6 years. However the majority of children involved in the project were 5 year olds. The total number of children from Malta participating in this STEAM project were 9 children, while as a collective team, over 50 children from various countries (Turkey, Italy, Greece, Portugal) participated.</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<ol style="list-style-type: none"> 1.The project started through the school's development plan. Since teachers were also enthusiastic about eTwinning, we wanted to increase our knowledge while also form part of a dynamic international team. The eTwinning partners were all from different countries and everyone used English as a second language. Therefore, it was a common aim for everyone to teach STEAM education through the English language. 2.Although we were aware of STEAM education, we learnt a lot from each other because our ideas were cohesive and made sense in the Project. It also allowed room for spontaneous growth and above all to take a Cross curricular approach in the activities that we planned. 3.The activities were definitely child-centred, inquiry-based, enhancing eTwinning pedagogy, play-based, and Cross curricular. The language development was evident through experiments, communication

	<p>between each other, discussions, open ended questions, through polls, quizzes etc</p> <p>4. Children were able to discuss their own ideas, reflect and evaluate their work, while sharing them also with other partners who had English as their second language. Not only that, but we found ways to collaborate together through live calls, singalongs, quizzes and also polls to allow children be the centre of their own learning.</p>
<p>Duration</p>	<p>The project included a wide spectrum of activities which were spread over a whole scholastic year. It involved 6 main themes which included a minimum of 5 activities per theme conducted in class.</p> <p>The themes were discussed and implemented with the children to make it more adaptable to their age group. The 6 themes of our project included activities targeting science, technology, engineering, arts and mathematics involving solving common problems identified by the children. The 6 themes tackled were: Robots; Cylinder systems; Water; Reels; Rocks, Stones and Minerals;</p> <p>The teachers switched to the native language to clarify any difficulties and help children understand better when they struggled with the English language. For the purpose of self-reflection within the project, the activities were later adapted to the English language so that the other project partners could read them and implement them with their children.</p>
<p>Place</p>	<p>Due to the project tackling a vast range of topics, the setting in which the activities were implemented ranged from classroom, yard, to library etc., according to the nature of the STEAM challenge being tackled.</p>
<p>Short description of the activity</p>	<p>The project started with a theme every month. However it was based on the following core principles and approaches:</p> <p>Step 1: Create a theme logo</p> <p>Step 2: Problem solving scenarios for each theme</p> <p>Step 3: Investigate activities accordingly through predications, experimentations, results, evaluations and self reflections.</p> <p>Step 4: Dissemination of work</p>
<p>Cognitive aspect: Educational learning outcomes</p>	<p>Apart from gaining holistic development, the children were able to achieve ICT skills in relation to digital competencies through live calls, polls and quizzes, and also by means of coding skills (sequencing, enhancing words such as forward, backwards, left turn, right turn etc).</p> <p>The children' vocabulary was increased and challenged successfully. Although we are bilingual, these outcomes were evident through self-reflections and evaluations where the children expressed emotions and demonstrated sociably enhanced behaviour. Relationships grew stronger among the children by means of effective communication, especially through videos, pictures and drawings, stories and singalongs, among other types of play.</p> <p>The children' vocabulary also increased as they engaged in experimenting, during which they were also making connections to the real world around them. Examples of experiments included: sinking and floating experiments, mathematical problem solving situations, treasure hunts,</p>

	<p>engineering and construction projects, etc.</p> <p>Body language and gestures also were evident during these activities, helping the children gain confidence in making presentations as another way of communication. For example they learnt how to communicate through Thumbs up and down, nodding of heads, dancing with singalongs etc. The outcomes varied in many ways which also included listening skills, pre-reading and how they responded positively towards the activities.</p>
<p>Creative aspect of the activity/project</p>	<p>During the project the Arts tackled varied from music, stories, dancing, rythm, arts to crafts etc. In particular, one theme focused on Water. The children had to test the components of water by making liquid forms turn into solid and then to water vapour. During this experiment the children were able to enhance their language skills by means of cooking experiments, where they created ice-lollies with water to turn liquid into solids and then prepared a hot chocolate to see the evaporation of water coming out from kettles.</p> <p>Language was enhanced further through these STEAM activities because children were able to follow through with problem solving scenarios whilst also being socially adapt and enjoying ice-lollies and hot chocolate drinks together. Apart from that, they extended their vocabulary which later on was reflected in their role play during freeplay. The children were observed making cups of coffees, boiling water, making ice-cubes and freezing water.</p> <p>The children also wanted to challenge liquid forms and asked to try and freeze paint to see what happens and they enjoyed pre-writing with frozen paint making scribbles, marking and making representations while understanding that their paint was turning from solid to liquid through previous experiments.</p>
<p>Communication</p>	<p>Through ICT skills, the children learnt words related to coding by means of Binary coding (pre-reading). Vocabulary such as forward, backwards, turn left, turn right was learnt. They also learnt how to mute and unmute their live videos whilst also abiding by the code of ethics in relation to online safety (netiquette, being nice to other users of the project, etc)</p> <p>The children responded very well also through the social skills that they demonstrated during group work, discussions, evaluations and class projects. They expressed their opinions and predictions while also listened to others.</p> <p>Through videos, drawings, postal services, forums etc. the children were able to send greetings and well wishes during cultural events like Christmas, Valentines, Easter, Ramadan etc.</p> <p>They also communicated with each other as they worked on any problems set and solved them together. One example related to building bridges where they discussed what materials they wanted to use and why, etc.</p>

<p>Culture</p>	<p>They also participated in greetings exchanged through Christmas cards (pre-writing own names and decorating cards). They sent video messages with Happy Valentines Day love messages for a world of peace. We incorporated activities that we were doing with the partners in our multicultural awareness day at school by using various languages and meanings such as saying `good morning` in various languages while celebrating also our own native language.</p>
<p>Evaluation</p>	<p>Every month the children evaluated the theme of the project by rating (giving a number from 1 being low and 10 being high) how much they liked the monthly theme. After the number rating they expressed their reasons about what activities they liked best and why. Educators did the same exercise in their own reflections.</p> <p>After the whole themes were done, the children, parents and educators participated in a questionnaire to identify what went right, wrong and what could be improved in this project should it be done again.</p>
<p>Materials / Resources / technical requirements</p>	<p>The main tools used for this project were the eTwinning platform, recycled materials and objects found outdoors or at home. ICT web 2 tools such as padlet, kahoot, book creator, story jumper etc. were also used.</p>
<p>Tips for educators / theoretical background or curriculum context</p>	<p>Should anyone wish to find out more about STEAM related activities, one can visit our end product of the project: Book creator with STEAM related activities.</p> <p>https://read.bookcreator.com/library/-M5vRJ4eM8zAM2Dr-Lce/book/iKr0GmEpTyKIYa26sldaXA?fbclid=IwAR30KvKzkv6NrNXdY_GA66xpc1WXI_sHXFOT-ITfMW_WfZrEziRHuBPf8I</p>

Example 9: Weather Lab

	Weather Lab
School Author(s)	St Ignatius College, Siggiewi Primary School Melanie Bonello & Francesca Bugeja
Origin of the project/ activity	<p>School- St Ignatius College, Siggiewi Primary School. Second language learning(English) is part of the school's formal curriculum. The project was created together with Yvonne Christina Evangelou and it involved other European Schools (Italy, Greece, Czech Republic, Romania, Spain). In total 15 teachers took part in this project.</p> <p>In this project we did some research on natural phenomena related to weather and the climate in the context of the S(H)TEAM educational approach.</p> <p>The general objectives of the project: The children would:</p> <ol style="list-style-type: none"> 1. Discover the science of weather through experiments, constructions and hands-on activities; 2. Realize the connection between science and technology to everyday life; 3. Become aware of the environmental problem of climate change and of what we can do about it; 4. Enrich their experiences by getting in touch with children from other countries, their language and their culture; 5. Be able to express their creativity through art; 6. Enhance their collaborative and communication skills; 7. Improve their practical skills through hands-on activities.
Age of the students and level	5- 9 year children in primary school
Target group	<p>Children at different grades were involved in this project. Different schools and countries participated. The main activities of the project included:</p> <ol style="list-style-type: none"> 1. Introduction of children/school/city; 2. Creating a logo for the project; 3. Planning experiments and constructions about the weather 4. Creating games; 5. Creation of a cooperative story; 6. Organizing at Video conference; and 7. Evaluating the project <p>The teachers were free to adapt their activities according to children' age and level.</p>

<p>Integration of Second Language Acquisition with STEAM Education through active pedagogies?</p>	<p>This project promoted Second language acquisition through STEAM education as the children had to participate with other children from different countries. Therefore they had to speak in English. Experiments carried out were written in English, and the children also enhanced their reading skills.</p> <p>Knowledge and skills required: We had to research and plan STEAM activities related to weather. We also researched on inquiry-based learning so that children' were not just presented with an activity but they had to come up with a solution and create the experiment themselves. We also planned ways of how to integrate the project with our curriculum and to give it a cross-curricular approach.</p> <p>All activities done were child-centred as the children carried out different experiments related to weather. The science aspect of the project was all about weather. Technology was used to research and create designs on weather. Engineering & Mathematics aspect of the project involved the creation of weather based designs like windmills and coding of robots. Art was included in the design of the logo for our project. All activities were based on inquiry-based learning as the children were presented with a problem and together they needed to research and come up with a solution and investigate through an experiment. They also had to make assumptions and draw up conclusions from their investigations. Second language acquisition was present through STEAM education as the children had to discuss in English, read and research, write steps and find ways of how to carry out their activity. They also created a collaborative story in English with all the schools that participated in the project, enhancing their vocabulary and imagination.</p>
<p>Duration</p>	<p>9 months</p> <ol style="list-style-type: none"> 1. Introduction of children/school/city; 2. Creation of a logo for the project; 3. Experiments and constructions about the weather; 4. Creation of games; 5. Creation of a cooperative story; 6. Video conference; 7. Evaluation of the project <p>All activities promoted the use of second language acquisition as they were all carried out in English.</p>
<p>Place</p>	<p>Classroom and at home due to Covid19.</p>
<p>Short description of the activity</p>	<p>Main activities:</p> <ol style="list-style-type: none"> 1. Introduction of children/school/city: The children wrote and drew about themselves, then read them out loud and videos were posted and shared on Twinspace. They also listened to the presentations of the children from the other countries in English. 2. Creation of a logo for the project: All the children created their own logo for the project and photos were shared on Twinspace.

	<ol style="list-style-type: none"> 3. Experiments and constructions about the weather: Every class carried out different experiments and constructions about the weather. Some of the activities organized included: Tornado in a bottle, snow, water cycle, cloud in a jar, creating thunderstorms, creating a wind vane, creating a windmill, investigating air. All activities were carried out in English. All the activities promoted group work and investigation. 4. Creation of games 5. Creation of a cooperative story: The children had the opportunity to create a story together with all the children from the schools involved in the project. They read the story in English and wrote sentences and ideas to continue the story. 6. Video conference. 7. Older children were also involved in creating their own presentations through Powerpoints, Moviemaker and Sway. 8. Evaluation of the project
<p>Cognitive aspect: Educational learning outcomes</p>	<p>Objectives</p> <p>The general objectives of the project were for the children to:</p> <ol style="list-style-type: none"> 1. Discover the science of weather through experiments, constructions and hands-on activities; 2. Realize the connection of science and technology to everyday life; 3. Become aware of the environmental problem of climate change and of what we can do about it; 4. Enrich their experiences by getting in touch with children from other countries, their language and their culture; 5. Express their creativity through art; 6. Enhance their collaborative and communication skills; 7. Improve their practical skills through hands-on activities; 8. Enhance their second language skills through discussion, reading and writing of collaborative story; 9. Be aware of the various IT tools one can use to present work.
<p>Creative aspect of the activity/project</p>	<p>The children had the opportunity to create a collaborative story and do a role-play of the story created. They also created a logo for the project, enhancing their creative skills. They also researched and created their own write up on weather.</p>
<p>Communication</p>	<p>The children enhanced their vocabulary skills related to weather and Science as they described what they did and worked with their classmates.</p>
<p>Culture</p>	<p>The children had the opportunity to understand our countries' weather and became aware of our countries' climate. They also became aware of how we can make use of renewable energy based on our countries resources and weather.</p>
<p>Evaluation</p>	<p>No formal assessment was used, the children worked together for a common goal.</p>

Materials / Resources / technical requirements	<p>Different resources were used according to the experiment carried out. The project was presented with the use of videos, photos, padlets, story jumper, presentations, bee-bots.</p>
Tips for educators / theoretical background or curriculum context	<p>Background on the weather topic.</p>
Links and Photos	<p> https://youtu.be/EDGcdWb1xXk https://youtu.be/YZv2e100Nfc https://youtu.be/gf5iVtxcyNo https://youtu.be/c_UIWixHbxM https://youtu.be/dCt196YR00g https://youtu.be/Q5rRAeBGtxw https://youtu.be/HuGDRmJ6lgA https://youtu.be/hEDGz3N98DM https://youtu.be/RcQiwosc3c0 </p>

Example 10: Ecosystem in a Bottle

Title	Ecosystem in a Bottle
School Author(s)	<p>Jesús María Primary School, Burgos, Spain</p> <p>Rebeca Moya & Adolfo Retamero</p>
Origin of the project/ activity	<p>This project is framed within the subject of Science, and with English as the language of communication. The teacher in charge is Rebeca Moya who is the English and Science teacher.</p> <p>The project emerged as a result of a pedagogical shift in focus to approach the bilingual subject areas through projects. Within the Science content, children tackle the topic of ecosystems. From this project-based perspective, several proposals were raised to organise experiences for children about the changes that ecosystems endure and the importance of sustainability.</p> <p>The main target was to make the student understand that any variation in a small part of an ecosystem can alter it all.</p>
Age of the students and level	<p>The project was implemented with students in the 6th year of primary education, at the end of the primary school education cycle.</p> <p>One group of 25 pupils with no interactions with other groups or students of the same or different ages participated in the project</p>
Target group	<p>This project was carried out in collaboration with the University of Burgos (UBU).</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<p>The project targeted Science through English. The topics tackled included: ecosystems, living things and food chains; scientific method. ICT; and ecology.</p> <p>The project was design with connections to some other subject areas such as English, Handicrafts, Maths and Technology.</p> <ul style="list-style-type: none"> • English: students practised instructions, modal verbs and vocabulary related to the content covered; • Maths: content and skills about measurement, weights and graphics; • Crafts: students made a lapbook (an interactive visual organizer where students can research and record, summarize, illustrate and present what they have learnt about a particular topic or unit of work). The lapbook is a scaffolding tool that helps, guides and shapes students' thinking and communication skills. The lapbook was thus where the students captured diverse elements of their learning about the ecosystem: the climate, the flora, the wildlife etc. and which they later shared with the rest of their classmates. • ICT: the students produced a digital poster to explain the whole process.

	<ul style="list-style-type: none"> • Science: the students learnt scientific contents about sustainability, ecosystems, the climate and the trophic level in a food chain; • Technology: the children worked on the different elements of the trophic level in a food chain using Scratch. <p>The project started from Science content, where ecosystems were tackled as the main theme of the project. From this starting point, several activities were designed and carried out to help the students observe the changes generated over time when they introduced some variations in the context considered. To do that, every student had to create his/her own ecosystem in a plastic bottle, with different materials, and then introducing some variations in them. All this was exhibited in the classroom to be able them to observe and register the changes that took place over time.</p> <p>Once the changes were registered, the students used several tools to assess and present the final results of their experience and so be able to show the process to the rest of their classmates.</p> <p>To develop the process, it was necessary to have some previous scientific knowledge about climate, basic investigation methods, observation processes, data collecting, measurements, weights, use of digital tools, etc.</p> <p>The project was developed through having the students working in teams collaboratively. Every group organized the tasks and work independently. This way all the students took a very active part in the process.</p> <p>This project was developed using English as the working language.</p>
<p>Duration</p>	<p>8 lessons:</p> <ul style="list-style-type: none"> • Introduction (1) • Experiment (3) • Conclusions (1) • Lapbook (1) • Conclusions and presentation (2) <p>The project was really rewarding and motivating for all the pupils. They acquired a good competence level in the subject content that they worked on in all the different areas.</p> <p>The project lasted three weeks. All the activities of the project were implemented in English.</p>
<p>Place</p>	<p>The project was carried out indoors</p> <p>Students worked on the different tasks in their classroom, in the lab and in the computer room.</p>
<p>Short description of the activity</p>	<p>The project were engaged in the following activities during the project:</p> <ul style="list-style-type: none"> • Observing and understanding the relationship between the different components of an ecosystem;

- Creating an ecosystem in a bottle using soil, water, oxygen, a plant and a snail;
- Understanding the consequences of changes on different ecosystems;
- Comparing own ecosystem with other ecosystems such as: desert, tundra, forest, rainforest, ocean and pond (each group chooses one)
- Make a lapbook about the findings of their investigations;
- Present their conclusions to their classmates with a digital poster.

The students had to:

- Create an ecosystem inside a plastic bottle which included different materials such as stones, tree bark, sand, grass, water, etc.;
- Use graphics to present statistics about the process;
- Take measurements such as weight;
- Reproduce the trophic level of a food chain in Scratch;
- Make a lapbook;
- Design a poster.

**Cognitive aspect:
Educational learning
outcomes**

Subject specific learning outcomes from STEAM

S (Science) Outcomes:

- Identify questions and problems that can be tested or researched and make predictions based on scientific knowledge;
- Develop questions or hypotheses to be investigated scientifically;
- Analyse interactions between components and processes within ecosystems;
- Analyse how changes in some biotic and abiotic components of an ecosystem affect populations and/or communities;
- Subsequently, all the actions made in the bottles were moved to the garden next to the school, where the students could experiment with the ecosystem variations using real fauna and flora.

T (Technology) outcomes:

- Analyse research data.
- Develop basic technology skills (presentation software and digital communication)
- Use appropriate tools for computing practice (create an ecosystem/food-chain with Scratch).

E (Engineering) outcomes:

- Take decisions about how to design and develop a prototype;
- Use appropriate materials and processes for the manufacture.

A (Arts) outcomes:

- Prepare and present artwork for display. (Ecosystem Lapbook);
- Individually or collaboratively, construct representations or diagrams.

M (Maths) outcomes:

	<ul style="list-style-type: none"> • Use objects, diagrams and technology to explore and solve problems. • Organize data, display data in lists, tables and picture graphs, and interpret results. <p>[L2 learning outcomes]</p> <ul style="list-style-type: none"> • Demonstrate through classroom conversations, comprehension of simple words and phrases used in common everyday context; • Generate simple sentences using appropriate vocabulary (animals, food) and grammatical structures (too/enough, modals); • Use techniques of comparison/contrast and cause/effect to explain a topic.
<p>Creative aspect of the activity/project</p>	<p>The students had to create a whole ecosystem inside a bottle, trying to include as many different aspects as they could.</p> <p>The students had to express in a clear and logical manner the whole process, using different means of expression: graphics, icons, drawings, photographs, etc, which they then represented in a lapbook and a poster.</p>
<p>Communication</p>	<p>The communicative aspect was promoted systematically, including the vocabulary related to the project (ecosystems), instructions in English, as well as modal verbs have to, can etc.</p>
<p>Culture</p>	<p>The importance of taking care of the environment in a sustainable way and through good environmental habits so as not to break the trophic level of a food chain was specially emphasized.</p>
<p>Evaluation</p>	<p>Assessment tools included:</p> <ul style="list-style-type: none"> • Portfolio (Experiment data collecting, conclusions...) • Lapbook • Padlet • Flickers • Oral presentation <p>Evaluation was carried out of the: oral presentation; the process of data collecting; the project outputs (ecosystem, lapbook, Scratch project); and the content that was learnt.</p> <p>Linguistic, scientific, social and civic, mathematic, technologic and artistic competences developed during the project were also evaluated.</p>
<p>Materials / Resources / technical requirements</p>	<ul style="list-style-type: none"> • 4 plastic water bottles • Potting soil • Sand • Fish gravel • 3 plants • 3 snails • Water • Paper • Colours • Posters • ICT tools

**Tips for educators /
theoretical
background or
curriculum context**

Read up about the following:
Inquiry based learning
Cooperative learning
Project based learning
ICT learning

Example 11: Soap and Sanitizers

Title	Soap and Sanitizers
School Author(s)	Jesús María Primary School, Burgos, Spain Rebeca Moya & Adolfo Retamero
Origin of the project/ activity	<p>This project is framed within the subject of Science. It was started from the science subject content area about microorganisms, linking it with another project about health which had been previously implemented.</p> <p>English is used as the language of communication. The responsible teacher was Rebeca Moya, the Science and English teacher.</p> <p>The project has only carried out in this school, specifically with the 5th year of primary education class.</p> <p>The main learning objective was to make students understand how viruses and bacteria impact our body.</p> <p>Another target was to promote good habits related to personal hygiene and health as a means of preventing illnesses.</p>
Age of the students and level	<p>The project was conducted with pupils of the 5th year of primary education: 10 to 11 year-olds.</p> <p>Some of the activities in the project have also been carried out by other student groups of the school, such as testing and preliminary inquiries about viruses and bacteria.</p>
Target group	<p>Middle to end of primary school.</p> <p>2 groups of 25 students.</p> <p>There are no different levels involved and there are no other schools or institutions taking part in the project.</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<p>Science: Health and illnesses, bacteria and viruses, Healthy habits.</p> <p>P.E: Physical activity and good health.</p> <p>English: Idioms, modal verbs and passive voice.</p> <p>Arts: Create visual compositions.</p> <p>Mathematics: statistics, graphics and percentages.</p> <p>This project started within the area of Science, connected with health and with the current situation students were living, when we were all immersed in a pandemic caused by a virus. This situation led us to design some activities related with the effects of viruses and the importance of personal hygiene to prevent infections.</p>

	<ul style="list-style-type: none"> • It was important to have some knowledge about the scientific method, at a basic level, of observation processes and data recording. • Some knowledge about the human body and how the digestive system and the respiratory system work. • The students had to be able to work collaboratively. • The activity was developed working with Project-based Learning (PBL), Cooperative Learning and the Action-research Method. • The language used throughout the whole process was English. • The group studied, learned and used vocabulary about the human body, illnesses and health. • The students also proposed suggestions in English. • Modal verbs and passive voice was the grammar to be developed.
<p>Duration</p>	<p>4 lessons (Soap and sanitiser experiment)</p> <ul style="list-style-type: none"> • Instructions (1 lesson) • Data analysis (2 lessons) • Conclusions (1 lesson) <p>12 lessons (the whole project)</p> <p>The activity was developed collaboratively in working-teams. Every team organized the tasks and worked independently, with all the members taking a very active part in the whole project.</p> <p>The project was performed over two weeks through face-to-face teaching, plus two more months remotely (online) because of the confinement provoked by the pandemic.</p>
<p>Place</p>	<p>Indoors / Chemistry lab/ classroom/ home</p>
<p>Short description of the activity</p>	<p>The students had to determine if soap and sanitizers prevent the spread of microorganisms. They also had to find out effectiveness of hand sanitizers and soap. Finally, they had to experiment and compare the mould development in bread with different treatments (no treatment, water, soap, sanitizer).</p> <p>Some experiments were carried out with bottles which contained viruses (red glitter) and bacteria (green glitter). Different dynamics were created to see the different effects on the human body:</p> <ul style="list-style-type: none"> • They built a respiratory system with plastic bags; • They interviewed some adults; • They presented some statistics using graphics; • They made a time-line (as a class tool) which included the scientists who studied the impact of viruses and those who research on vaccines; • They created a picture collage focused on health and healthy habits. • They wrote letters to different specialists who had been helping with the pandemic (health workers, police officers, fire-fighters, cleaning staff, supermarket workers, etc.)

	<ul style="list-style-type: none"> • They made a presentation about how they were feeling and what they could do to handle their mood.
<p>Cognitive aspect: Educational learning outcomes</p>	<p>Subject specific learning outcomes from STEAM</p> <p>Science:</p> <ul style="list-style-type: none"> • Describe and recognize healthy habits and illnesses; • Outline some responses of the human body to infectious and non-infectious diseases; • Analyse the effectiveness of soap and sanitizers against viruses/bacteria; <p>Arts:</p> <ul style="list-style-type: none"> • Collaboratively, prepare and present a visual composition about feelings. • Create an original virus, with different materials and textures. <p>[L2 learning outcomes]</p> <ul style="list-style-type: none"> • Oral expression: Health habits interview (How often + frequency adverbs); • Know and use health idioms; • Use passive voice to describe advances in medicine; <p>PE (physical education)</p> <ul style="list-style-type: none"> • Health and habits; • Motor skills and health; • Mental health and feelings; <p>Maths</p> <ul style="list-style-type: none"> • Statistics; • Percentages; • Graphics.
<p>Creative aspect of the activity/project</p>	<p>The students created a composition about feelings with Canva (a graphic design platform).</p> <p>The students imagined and drew their own creations of a virus;</p> <p>Students drew the backgrounds and recorded their voices to create an interactive book about emotions to show the children in kindergarten in quarantine (the colour monster) how viruses and bacteria work.</p>
<p>Communication</p>	<p>Vocabulary related to human body, micro-organisms, digestion, respiratory system, illnesses and health.</p> <p>Modal verbs and passive voice.</p> <p>Suggestions.</p>
<p>Evaluation</p>	<p>The following were used for evaluation: Portfolio, Quizzes and Edpuzzle (Science)</p>

	<p>Canva (English)</p> <p>Canva, Genially and children’s own creations (Arts).</p> <p>Several work was evaluated: oral presentations, data collection process, material outputs and content to be learnt.</p> <p>Different competences were assessed: communication, scientific, mathematic, technologic, health and social and civic competence.</p>
<p>Materials / Resources / technical requirements</p>	<ul style="list-style-type: none"> • 4 slices of bread (each group) • 4 plastic sandwich bags • 4 jars • Water, hand soap, hand sanitizer. • Glitter of several colours. • Plastic bags. • Pipes • Posters • ICT (class tools) • Genially • Canva
<p>Tips for educators / theoretical background or curriculum context</p>	<p>It uses Inquiry-based Learning, Cooperative Learning and Project Based Learning.</p> <p>It is also used the experimental and investigation method.</p>

Example 12: Healthy Lubrín Project

Title	Healthy Lubrín Project
School Author(s)	CEIP San Sebastián Rubén Moreno Arrévola
Origin of the project/ activity	<p>This Project was carried out in a primary school and was linked with external actors in the community (e.g. the Town Hall)</p> <p>A total of 4 teachers were involved in the project (the tutor/class teacher, the Art teacher, the Physical Education teacher and the English teacher).</p> <p>The project had one general aim and four secondary specific objectives which were related to the different project phases. These included:</p> <p>Overall aim:</p> <ul style="list-style-type: none"> ▪ To study and improve healthy habits in the town of Lubrín; <p>Secondary objectives</p> <ul style="list-style-type: none"> ▪ To design a survey to find out the healthy habits of people who live and work in Lubrín; ▪ To analyse the data obtained from the survey; ▪ To conduct an awareness-raising campaign to improve healthy habits in Lubrín ▪ To disseminate this research to other schools
Age of the students and level	<p>The project has carried out with the 5th year Primary Education students. The age of the participants ranged between 10 and 12 years of age, Most of them were between 10-11 years old, but 3 of them were repeating the academic year and were a year older.</p>
Target group	<p>In total, there were 13 students and they all participated to the full. They were responsible for shaping the project with the help from the tutor/class teacher, who directed the project. In this way, the students planned and executed the project and disseminated their experiences with others so that other schools could then implement it in their respective contexts.</p>

Integration of Second Language Acquisition with STEAM Education through active pedagogies?

In the project described below, we have included a foreign language – in this case English. This aspect of the project was supported by the specialist English teacher and by native English-speaking students who we had in class.

1. The decision to make this a bilingual project was an initiative of the students themselves, as they realised that there is a large number of non-Spanish (mainly English-speaking) residents in the town. For that reason, in the awareness-raising posters which we completed, expressions were included in both Spanish and English.
2. Carrying out the project required leadership and efficiency from the teacher-coordinator and a large degree of involvement, motivation and responsibility from the students when carrying out their assigned tasks.
3. The activity followed closely the methodological approach applied in class; in other words, the use of active methodologies, such as Project-Based Learning, problem-solving, gamification, flipped classroom, action-research, service learning, and the use and control of new technologies. As an example of this we can mention a series of tasks/activities which were carried out, which include: the creation of a small survey using Google Forms, analysis of the survey results, creation of awareness-raising posters, preparation of a formal meeting with a Town Hall councillor, solving budgetary problems to print posters, planning and agreeing with the Town Hall as to where posters could be posted, carrying out a study to see places where there is a greater concentration of people, etc.
4. In relation to the foreign language, the students acquired a number of language competences: they discovered that English is used as the language of research, they learned pre-fabricated expressions and different advertising slogans, they practised oral skills and written skills.

Duration

Phase 1. Study and creation of the survey

We reviewed the topic and designed a series of questions about different topics related to health in order to create a questionnaire which we would later send by WhatsApp.

From 5 February to 15 March

Related to Objective A

Phase 2. Analysis of the survey and processing of results

When the data was received, we analysed each part using graphs and decided which aspects constituted the worst results so as to have an impact through an awareness campaign.

From 16 March to 18 March

Related to objective B.

	<p>Phase 3. Awareness-raising campaign</p> <p>We designed an awareness-raising campaign using visual (posters) and audio (recordings) media.</p> <p><i>From 19 March to 23 March</i></p> <p><i>Related to Objective C</i></p> <p>Phase 4. Final explanatory video</p> <p>Finally, we created a video (audiovisual resource) to explain the entire project in order to help other schools do the same.</p> <p><i>From 24 March to 26 March</i></p> <p><i>Related to Objective D</i></p>
<p>Place</p>	<p>During the project different spaces were employed:</p> <ul style="list-style-type: none"> • The classroom and school playground: for individual research and writing of ideas, group work, recording of videos, creation of survey and posters. • Video call: from the school to the Town Hall • Town Hall: for conversation with the Mayor and the Councillor for Sports • Different parts of the town: where posters were put up.
<p>Short description of the activity</p>	<p>Here we explain the relationship which this project had with the different subject areas involved:</p> <p>Natural Sciences</p> <p>This project stems from the Natural Sciences, since it is here that students worked on health and fitness. We believe that it is important to identify bad habits that people may have and try to improve them.</p> <p>Social Sciences</p> <p>This subject area is related to: population, census, Town Halls, and public institutions (permissions, organisation, and functioning).</p> <p>Spanish Language and Literature</p> <p>The project was linked to the Spanish Language and Literature because we worked with advertising, and the students were involved in reading, writing and debating, etc.</p> <p>Mathematics</p> <p>The project was related to Mathematics since the learners worked with statistics and interpreted sector graphs, mean scores and percentages.</p>

	<p>Education for Citizenship</p> <p>The project was related to this subject given that having healthy habits is a quality that we should strive to encourage in order to have a healthy and responsible citizenship.</p> <p>English</p> <p>The project is related to English due to the fact that in the awareness-raising campaign, different expressions and slogans in English were employed since a large number of inhabitants in Lubrin are English-speaking. In this way, the message would be accessible and have impact on a greater number of people.</p> <p>Physical Education</p> <p>The project was related to this subject because it dealt with the topic of healthy habits, the prevention of illnesses and accidents, and, additionally, it encouraged physical and sports activities.</p> <p>Artistic Education</p> <p>The project was related to this subject because we carefully considered the aesthetics of the webpage and posters designed.</p>
<p>Cognitive aspect: Educational learning outcomes</p>	<p>In general, the learning results were related to the subject content and competences described above. We can say that the content was acquired by the students in a very satisfactory way. In addition, the students improved their organisation and groupwork skills and their resilience to frustration, managing to finish tasks set. They learned to be patient and dedicate the necessary time to each one of the tasks; they improved their working knowledge of tools such as Google tools, such as Google Forms, Google Presentations, Google Meet, Gmail, etc. They also improved their leadership and organisation skills, they learned to receive constructive criticism and to recognise their errors, among other aspects.</p>
<p>Creative aspect of the activity/project</p>	<p>Design of the survey through brainstorming of creative ideas.</p> <p>Design and creation of posters in which they had to take into account aspects such as placement of shapes, images, texts, colours, etc.</p> <p>Choice of locations for filming the final video, where they had to take into account lighting, camera focus, framing and acoustics.</p> <p>The montage and editing of the video, choosing font types and background music etc.</p> <p>Design and aesthetics of the project webpage.</p>
<p>Communication</p>	<p>They learnt how to write a slogan, taking into account the use of words and rhyme to make messages more memorable.</p> <p>Oral communication through the recording of videos.</p> <p>Functional reading</p>

<p>Culture</p>	<p>This project is related to Education for Citizenship. In this sense, the students linked the project to aspects of social responsibility, health, and the importance of the population knowing about the risks of not having a healthy life.</p> <p>All of this implies care for society and an encouragement of a healthy Mediterranean diet as a cultural aspect, for example.</p>
<p>Evaluation</p>	<p>For the evaluation of the project, the learners used different evaluation strategies.</p> <p>Different modes of evaluation were employed, in other words, where the teacher evaluated students' knowledge throughout the various activities. A series of evaluation tools were employed, including: rubrics, direct observation and presentations of work carried out etc.</p> <p>Co-evaluation was also used. In the project website we included a feedback section for other schools or other visits to the project where they could give constructive criticism. Additionally, the different groups evaluated the work of their peers and made comments and expressed ideas to improve the work.</p> <p>Finally, self-evaluation was employed, by both students and teachers with a view to ascertaining what they had learnt during the course of the project and which aspects could have been improved.</p>
<p>Materials / Resources / technical requirements</p>	<p>The materials used include:</p> <ul style="list-style-type: none"> • Computers and tablets with Internet access; • Paper and pencils; • Printer; • Interactive Digital Whiteboard and webcam; • Mobile phone cameras; • Video Edition software - imovie (for Windows, moviemaker can also be used)
<p>Tips for educators / theoretical background or curriculum context</p>	<p>One of the main tips for carrying out a project like this is to have a very well-organized and mediated structure. Carrying out so many tasks at the same time makes it easy to end up going off track and forget the things that need to be done. For this reason, the assignment of tasks and responsibilities to the different project participants is of vital importance in order to ensure the project's success.</p>
<p>Links and Photos</p>	<p>Here is the link to the project website:</p> <p>https://sites.google.com/view/proyecto-lubrnosaludable/introducci%C3%B3n?authuser=0</p>

Example 13: My Hospital

Title	Mi Hospital
School Author(s)	International Trilingual School of Warsaw, Poland Ibis Mendez
Origin of the project/ activity	<p>The International Trilingual School of Warsaw offers an original teaching model based on trilingualism. The School is guided by the CLIL (Content Language Integrated Learning) principle, in which three languages are an instrument to learn language fluency, school skills and knowledge acquisition.</p> <p>The group of class 5.1 explored for 5 weeks topics related to the body and 1 week the topic of community helpers. This aroused the interest of the children to do a larger project so that all the topics learned could cover all the different languages, including Spanish as a main language, together with mathematics, science, technological thinking and social studies.</p> <p>This project allowed the children to experience learning through role-playing games, including the children's external experiences of their immediate contexts. The activities were based on different parts of the human body.</p> <p>All activities were produced in Spanish including oral and written production. Until now, the project is limited to within the school.</p>
Age of the students and level	<p>The students taking part in the activity are between 5 and 6 years old. They are in the group for 5 years old, considered in Poland as grade zero where children are getting specific skills and knowledge before they move onto the primary school.</p> <p>1 groups: 5 years old</p>
Target group	<p>Class 5.1 included 13 children: 7 boys and 6 girls. Most of them are from Poland. We have two students who are coming from mixed families from Hispanic backgrounds and Poland.</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<ol style="list-style-type: none"> 1. The project started with the children's motivation and the current global situation of the pandemic, a topic that has been immersed in the children's conversations and games as a result of what was happening around them. Adding this concern with the subject of the body and the role of community helpers lend themselves to inspire the organisation of various activities relating to STEAM education which was combined with the support of the Spanish language as a second language. 2. The knowledge and skills that were targeted were kept in mind when planning and carrying out the activity. This led to the search for activities that draw the children's attention to the theme selected, and which provided significant learning experiences to the students, while implementing the project as part of a STEAM education model.

	<p>3. All the activities were designed by seeking to respond to the interests of the children and to respond to their curiosity. The activities focused on a play-based approach through experiences that allowed the children to experience the knowledge learned in other areas as they played. The children had the opportunity to explore, inquire, ask, deduce, among other skills.</p> <p>4. In the use of Spanish as a second language, the children had various experiences of writing, reading and communication that put the knowledge learned into practice. This will help them answer their own questions, draw conclusions and create their own material for the development of the various role-playing activities.</p>
<p>Duration</p>	<p>We implemented the activities having a main topic body and community helpers over a period of 6 weeks.</p> <p>The theme allowed us to work on a project where we included activities with:</p> <p>Science:</p> <p>Body parts and body care.</p> <p>Technological thinking:</p> <p>Creation and design of the hospital and stuff</p> <p>Mathematics:</p> <p>Weight and size.</p> <p>Language:</p> <p>Reading and writing in Spanish</p> <p>Spanish language was used as a main language during this project.</p>
<p>Place</p>	<p>The activity was carried out in the classroom using resources from our didactic room.</p>
<p>Short description of the activity</p>	<p>The project was carried out weekly using the themes proposed for each week in relation to the body and community helpers</p> <p>Step 1:</p> <p>Creation of Cards and medical records by talking about their role in the hospital and their importance.</p> <p>Step 2:</p> <p>Creation of resources for the hospital (beds, instruments, possible accessories, costumes)</p> <p>Step 3:</p>

	<p>Search for possible illnesses that are treated in hospital with possible treatments for example: Fever, stomach pain, fractures, coronavirus (proposed by children), surgeries, among others.</p> <p>Step 4:</p> <p>Role play to use weight and measure concepts.</p> <p>Step 5:</p> <p>Part 1 of the role play related to medical records created by children.</p> <p>Step 6:</p> <p>Part 2 of Role play related to the medical records created by the children.</p>
<p>Cognitive aspect: Educational learning outcomes</p>	<p>It was really interesting to incorporate other areas of knowledge for the children to experience the concepts learned in another way, for example, measurement and weight. Having scales and meters for the children to use generated many questions and possible answers that otherwise would not have been elicited had the children not experienced things directly.</p> <p>The role play included a great level of freedom where the children could listen to their preconceptions, ideas, theories and also to be supported when necessary to expand the children's concepts. The themes were of great interest to the children, who were willing to go a little further than what was proposed since they wanted to learn more. The children felt more confident when writing and using their productions for the role play examples that they proposed.</p>
<p>Creative aspect of the activity/project</p>	<p>This project allowed the children to create their own resources to play hospital. The children, with the help of pre-designed materials, built their medical instruments. In addition, they designed their hospital in the classroom, putting their creativity into play using the resources available in their environment. In addition, the role-playing games allowed the children greater freedom in their expressive and discursive contributions, as well as when trying to relate their previous knowledge with the proposed games to find solutions to situations that they had experienced in their everyday life. Resources such as the use of recycled x-rays helped the children learn to read other types of images/texts, allowing them to deduce what was happening and draw their own conclusions.</p>
<p>Communication</p>	<p>Through this project the children were able to put into practice their communication skills. During the project, the children had the opportunity to express their ideas while attending to the "patients" and looking for a solution / procedure for each case that they wanted to simulate. The role play allowed the children to socialize, look for common solutions, share their ideas and even together wonder among about the different illnesses that they considered. In addition, the children had the opportunity to create medical reports using their own code in Spanish.</p>

<p>Culture</p>	<p>The children during their practice managed to apply different concepts in relation to professions, topics like the body and self-care. There are words that the children managed to establish as different, especially for the children of parents from Chile and Spain where some words change according to the country. This will go some way to expanding the vocabulary range in children.</p>
<p>Evaluation</p>	<p>During each Term, the children are evaluated progressively where we can see the progress that the children have in relation to what they have learned and their age. Much of the children's progress was evidenced in the writing of the initial and final medical reports. In the practice of mathematical concepts when measuring and weighing his patients. During this process, the teacher was supporting one by one, in order to provide additional help for those children who had difficulty in the acquisition or implementation of the new concepts.</p>
<p>Materials / Resources / technical requirements</p>	<p>We used didactic material like toys (dolls for being patients, instruments etc.) for this project. Recycled material (x rays) and printed resources were also used to create some models of medical instruments.</p>
<p>Tips for educators / theoretical background or curriculum context</p>	<p>The theme lends itself to making a larger and long-term project involving more themes and aspects of STEAM education. With more time, greater emphasis could be given to art and work more on producing resources that a hospital could have, for example: Laboratories, stretchers, more medical instruments from previously collected recycling material.</p>
<p>Links and Photos</p>	<p>https://www.facebook.com/119208164760011/videos/792451308150932</p>

Example 14: Ocean in a jar

Title	Ocean in a jar
School Author(s)	International Trilingual School of Warsaw Kathryn Hoover
Origin of the project/ activity	<p>ITWS is a trilingual school, where every child learns Polish, English as well as have the option of a third language (Spanish, French, Mandarin, Japanese). The school is situated in Warsaw, Poland. A high percentage of our students are Polish. However we have some international students and some bicultural families.</p> <p>ITSW's curriculum includes follows an immersion programme for all the target languages.</p> <p>This particular project was put into practice in response to the students' reflections and questions about the terms related to math/physics that they were using.</p>
Age of the students and level	The students taking part in the activity were between 5 and 6 years old. They were in the group of 5 years old students, considered in Poland as grade Zero where children are still developing specific skills and knowledge to move to the primary school.
Target group	<p>Class 5.1 has 13 children: 7 boys and 6 girls. Most of them are from Poland. We had two students who came from mixed families, from Hispanic and Polish backgrounds.</p> <p>Class 5.2 had 12 children: 6 boys and 6 girls. Most of them were from Poland. We had one student from Chile.</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<p>Our activities involved 3 languages (English, Polish, Chinese/Spanish) which were taught through active pedagogies.</p> <ol style="list-style-type: none"> 1. During January, the children from ITSW and their teachers were talking about water habitats. In the 5 year old classes, we decided to create an ocean in a jar and learn about it in more depth: density. English was the language of instruction during this activity. The main areas for learning were science and mathematics. 2. During this lesson the concept of density was introduced to the students to understand that different materials have different density. 3. Students will be able to use unconventional measurement tools
Duration	The activity was designed according to the main Topic "Water Habitats". The theme was discussed during the week through some of the activities which included Mathematics, science, and solving problems.

	<p>We started this project two days before planned, basically as we were inspired by the children's questions about why fish float. Our main topic was "ocean habitat" but we decided to introduce the concept of density to make it broader. We discussed their swimming lessons, how they can also float and how some objects, like their goggles, will sink.</p> <p>After that talk, the teacher introduced the concept of density- which might be pretty difficult for 5-6 year old children, so we decided to have a try at it!</p>
<p>Place</p>	<p>The activity was carried out in the classroom.</p>
<p>Short description of the activity</p>	<p>For the first part of the activity, the kids were sitting in a circle with their teacher and the teacher assistant. The teacher introduced the children to the concept of density (what is it, how to identify it as a property of a material, and provided some examples of it) the students asked questions and shared their experiences of what they have seen related to density.</p> <p>Then, the teacher proceeded to introduce the elements of the experiment. We used sand, food colorant, water and oil. We also had some rocks, shells, and a little plastic animal as well a small wood stick.</p> <p>The teacher asked the children what they thought will float, what will sink and why. After many different answers and hypotheses, we proceeded to develop our own investigation. We took advantage of this lesson to practice with some unconventional measurement systems (spoonfuls, drops etc.).</p> <p>The first material was sand, then a drop of food colorant. After that, it was the water's turn. The children were asked what they thought would happen to the sand. Most of their answers were accurate, as they related the experiment to their experience at the beach, arguing that they always see the sand at the bottom of the beach/sea.</p> <p>Then we added the oil and asked the same questions. When the children saw it at the top, the teacher pointed out that the oil's density is lower than the water and that is why it stays at the top. Then we proceeded to add every single one of the materials (rock, shell, plastic animal and wooden stick) and asked the questions whether it will float or sink.</p> <p>When "the oceans" were done, the students got a chance to shake them, and they started seeing how the water, the sand and the oil would mix, but after leaving it to settle, they would go back to the same position that they had before.</p>
<p>Cognitive aspect: Educational learning outcomes</p>	<p>Mathematics and Physics: the children were able to use measuring tools, both conventional and non-conventional. They also learnt about density, what is it and its use in the world around them.</p> <p>Both the teacher and the children used the target language throughout the activity. They heard and learnt about new concepts and were able to talk about them.</p>

	In addition, some other skills promoted during this project included: respecting listening and speaking times; taking turns; helping peers; following instructions; and patience among many others.
Creative aspect of the activity/project	Freedom to decorate their own ocean and play by mixing colours.
Communication	New vocabulary and its use in actual contexts
Culture	There were words that the children managed to establish as different, especially by those children whose parents came from Chile and Spain where some words change according to the country. This helped the children to expand their range and understanding of the use of vocabulary in different countries.
Evaluation	The most important thing I observed and noted about the children during this activity was the large number of questions and comments that they contributed about the topic and the investigations carried out.
Materials / Resources / technical requirements	Sand, food colorant, objects made out of wood, plastic, water, oil, measuring tools, glass containers.
Links and Photos	https://www.facebook.com/ITSW.School.Escuela.Ecole.XueXiao.Gakko.Warsaw/videos/1293569040994155

Example 15: Climate is a topic! A Women's perspective

Title	Climate is a topic! A Women's perspective
School Author(s)	International Trilingual School of Warsaw, Poland Nikola Cichocka
Origin of the project/ activity	<p>ITSW is a trilingual school where students learn two languages (Polish and English) and have the option to choose a third language (Spanish, French, Mandarin or Japanese). The school is located in Warsaw, Poland and the school's students consist mainly of Poles and people holding dual citizenship. Additionally, some of the children and adolescents come from foreign language families, who are living in Poland temporarily.</p> <p>This inter-school project was implemented in cooperation with the Centre for Citizenship Education, and was funded under the Polish development cooperation program by the Ministry of Foreign Affairs of the Republic of Poland.</p> <p>At the school level, 3 teachers (a physics teacher, a biology teacher, and a geography teacher) whose main language of communication was their native language (Polish) were involved in the project together with a member of the school's board (a social studies teacher) who spoke English.</p>
Age of the students and level	The students taking part in the project were between 8 and 13 years old. The project's main coordinators were 4 female students who have presented the concept of the project to their younger colleagues.
Target group	The target group were children and adolescents from 4th to 8th grade of primary school. In total, about 15 students per class took part in the project.
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<ol style="list-style-type: none"> 1. The project's primary goal was to provide the students with a sense of agency about the possibility to bring about positive changes that benefit all the world's inhabitants, regardless of gender. Additionally, the project was also supposed to present a full picture of the causes and consequences of climate change, in various languages. During the evaluation of the project, the young people were to organize a Global Education Week (TEG), during which the girls were to serve as experts on the topic. Due to the gender of the female participants, the project also integrated the topic of global gender equality and empowered the girls in class and throughout the school. 2. The bulletins sent out by the Centre for Civic Education were a big help to the project. Additionally, I also personally had to think of ways of justifying the topic of gender equality and how to convince the other teachers to reflect on the use of personal pronouns in class (in

	<p>Polish, unlike in English, personal pronouns are used in every sentence)</p> <ol style="list-style-type: none"> In my pedagogical work, I follow inquiry-based and child-centred pedagogy (formative assessment). Thanks to the project I, the teacher, served only as a mentor providing direction to the project's participants. The students had to explain to other children, including children speaking foreign languages, the main objectives of the project and their arguments. In addition, the students also have prepared presentations in English. The students have also been helping to communicate with the other teachers and they had to explain the project's importance in languages other than their native language.
<p>Duration</p>	<p>The activity was cyclical, taking place over the course of 3 months (30-45 minutes per week). The evaluation of the project took one day to complete. Global warming and climate change was the main topic. It combined the issues of global education and education for sustainable development.</p> <p>Physics:</p> <p>Calculations with the conservation of energy principle, how to reduce consumption of energy, how to recover energy from waste.</p> <p>Chemistry:</p> <p>In what way does CO₂ affect temperature?</p> <p>Mathematics:</p> <p>A mathematical approach to the above questions,</p> <p>Biology:</p> <p>How do greenhouse gases affect us?</p> <p>How can we properly separate waste?</p> <p>Geography:</p> <p>Waste export</p> <p>Science, Engineering:</p> <p>Designing experiments</p> <p>Polish, English, and French were used during the project. It was very important to make the students aware that all physics abbreviations come from English and to make them understand where the convention of measures comes from. At the very beginning of learning Physics in grade 7, this is one of the main incomprehensible problems for young students.</p> <p>Students' native language was also used for self-reflection and to help with a better understanding of the topic.</p>

<p>Place</p>	<p>The activity was conducted throughout the school. The students had the idea to further their actions and act more globally. However, with the limited time available for the project, this could not be organized.</p>
<p>Short description of the activity</p>	<p>Step 1:</p> <p>Preparing for the project, presenting the project in the form of questions, problems, and a research project.</p> <p>Step 2:</p> <p>General analysis of the project. It was very important to make the students aware that they were to be the experts on this topic, regardless of the language they used to explain it</p> <p>Step 3:</p> <p>Organizing TEG and Zero Waste Day,</p> <p>Step 4:</p> <p>Analysis of the plastic collected during Zero Waste Day and explaining how much energy had to be used to produce it.</p> <p>Step 5:</p> <p>Presentation of the results to the younger grades.</p> <p>The students' vocabulary increased thanks to the experiments and the work on a lab report from each experiment.</p>
<p>Cognitive aspect: Educational learning outcomes</p>	<ol style="list-style-type: none"> 1. Digital competence involving the skillful and critical use of technology in the information society. An important aspect involved searching for information not only on websites in Polish but also in French and English. 2. Interpersonal competencies, communicative competencies and communication in foreign languages. This applied to both the students and the teachers involved in the project. 3. Social and civic competence, as well as interpersonal and intercultural competence that included a range of behaviours preparing for effective and consistent participation in the project. 4. Competencies related to planning, analysis. Necessary knowledge, skills and attitudes related to mathematics and technology. Analysis and presentation of the collected information. Additionally, learning to learn 5. Interpersonal, social competencies related to communication with younger students in order to present the project. Conducted both in the students' native and non-native language.
<p>Creative aspect of the activity/project</p>	<p>Creating a poster describing Zero Waste Day.</p>

	<p>Creating a notebook with the formative assessment that, in itself, was a work of art.</p>
Communication	<p>The students communicated with each other to solve a given research problem. Each experiment was described and the results were presented to the younger classes.</p> <p>The students handled the presentation very well, improving their social competencies</p>
Culture	<p>The school is an international institution, so in this project, we did not support cultural elements connected only with Polish identity.</p> <p>The students of the school are taught multiculturalism from the very beginning. Instead, the focus was on gender equality and the female students acted as experts.</p>
Evaluation	<p>Lab report, formative assessment, presentation, kahoot, quizizz as a test, voting system (Plickers), Physics toolbox, Phypox</p>
Materials / Resources / technical requirements	<p>We used equipment that was available to us.</p> <p>To conduct the experiments we simply used trash or things one can find at a grocery shop.</p>
Tips for educators / theoretical background or curriculum context	<p>Attention should be paid to pronouns in the text selection, especially in the nature sections. Additionally, I recommend formative assessment, showing what the students will be learning. This will help with preparation for tests.</p>
Links and Photos	<p>https://szkolatolerancji.ceo.org.pl/sites/szkolatolerancji.ceo.org.pl/files/justyna_frydrych_-_jak_wprowadzac_standarty_rownosci_plci_do_szkol_-_podrecznik.pdf</p>

Example 16: Minecraft Sessions

Title	Minecraft Sessions
School Author(s)	International Trilingual School of Warsaw Nikola Cichocka
Origin of the project/ activity	<p>ITSW is a trilingual school where students learn two languages (Polish and English) and have the option to choose a third language (Spanish, French, Mandarin or Japanese). The school is located in Poland, in Warsaw (with over 1 million inhabitants), and the school's students consist mainly of Poles and people holding dual citizenship. Some of the children and adolescents come from foreign language families, who are living in Poland temporarily.</p> <p>A project has been and is currently still being implemented where students at the school still meet for sessions to play the popular game of Minecraft. The idea came about after discussions with the male and female students during the pandemic. The students have limited contact with each other.</p> <p>The project was created by a Physics teacher. A Spanish, and an English teacher from another school also want to join the project. In addition, all the teachers, of different nationalities, can play with the students and use it to teach them science.</p>
Age of the students and level	<p>The students taking part in the project are between 7 and 13 years old. Currently, there are 9 pupils of various ages in the group.</p>
Target group	<p>The target group is grades 1-8. Trying to attract 15 students per class</p>
Integration of Second Language Acquisition with STEAM Education through active pedagogies?	<p>The main language of communication during the sessions has been English. Additionally, the game itself is in English</p>
Duration	<ul style="list-style-type: none"> • Playing classes are held periodically, once or twice a week. The teacher participates in the class for about an hour. • Minecraft is all about building, collecting and destroying. Lots of elements are about programming and coding. Students choose the topic of Science they want themselves. It was already, among others: Physics analysis in Minecraft; Building a school. <p>During the classes, the language used is mainly English, which is the second language of communication for all pupils and pupils.</p>
Place	<p>Due to the pandemic, the activity takes place on Zoom</p>

<p>Short description of the activity</p>	<p>Step 1:</p> <p>Analysis of students' needs, what they want to focus on during the activity, what aspect they want to address</p> <p>Step 2:</p> <p>Completing a task in Minecraft</p>
<p>Cognitive aspect: Educational learning outcomes</p>	<ol style="list-style-type: none"> 1. Digital competencies including the skillful and critical use of technology in the information society. Coding skills 2. Interpersonal competencies, communication competencies and communication in foreign languages. This applies to both the students and the teachers involved in the project. 3. Social and civic competencies, interpersonal and intercultural. 4. Competencies related to planning, analysis. 5. Interpersonal, social competencies related to communicating with younger students to present the project. Both in the native and another language.
<p>Creative aspect of the activity/project</p>	<ul style="list-style-type: none"> • Constructing a model replica of the school building • Division of roles in a society in order to build a computer state. Roles change from game to game. • Learning physics in relation to the game
<p>Communication</p>	<p>Thanks to the game the students can better develop their social skills.</p>
<p>Culture</p>	<p>The school is an international institution. Male and female students communicate in English during the game. They respect each other and have respect for their work done in the game.</p>
<p>Evaluation</p>	<p>There has been no evaluation. The project continues. In addition, it is an extracurricular activity that, besides teaching, allows male and female students to meet after school, talk, explain topics that interest them to each other, e.g., things related to science.</p>
<p>Materials / Resources / technical requirements</p>	<p>Minecraft game, computer, internet access</p>
<p>Tips for educators / theoretical background or curriculum context</p>	<p>Taking care of students' wellbeing during the pandemic.</p> <p>An observation was made that the students did not have a space or a place to talk, and, additionally, to explain some science-related topics. Such space has been created, despite not being able to be in school, the children did manage to learn.</p>

Example 17: Models of Animal Cells

Title	Models of Animal Cells
<p>School Author(s)</p>	<p>Ceip Virgen del la CABEZA David Hidalgo Calvo</p>
<p>Origin of the project/ activity</p>	<p>Our school is located in Priego de Córdoba, and we are a bilingual school since 2006. The role of second language learning in our school is a part of the formal curriculum in subjects like Natural Science and Social Science. Since we are not a big school (only one group for every grade), some activities depend on specific teachers' initiatives that may extend to other classes if the activity is worthwhile.</p> <p>This activity is suitable for 5th - 6th grade because they can learn deeper about living things (cells, tissues and organs that form living things).</p> <p>The main objectives of the activity are:</p> <ul style="list-style-type: none"> • To learn about animal cells, parts and functions; • To understand some basic aspects of the human body functioning; • To provide information to the children by "making" the diagrams or models by themselves, looking for information, materials or ideas; • Being capable of working in groups, planning the project and developing some initiative and entrepreneurial spirit.
<p>Age of the students and level</p>	<p>As pointed above, this activity is suitable for 5th - 6th grade (10-12 years), because it is an activity that needs a higher level of abstraction and imagination: they have to create things that they cannot see with their own eyes. Of course this project is implemented after we have learned and practised all the content in class using simpler activities.</p>
<p>Target group</p>	<p>When we did this project, pupils were really excited. They knew we would do a model at the end of the unit. It motivated them and made them pay more attention while we were learning about the organelles and their function. When we started building the diagrams, they were very careful; they collaborate with each other and organized the work properly.</p> <p>There were 20 pupils in class and, to simplify the work, they created 5 models (one by every group of work that I usually have in class). As part of the work, they had to use clay to recreate the organelles, write the labels, use glue to make the model stronger, etc. Besides, we built a bigger model with the help of the learners that finished their part of the work, so they were always busy.</p> <p>At the end, we will use these models next year to explain the unit to other learners.</p>

<p>Integration of Second Language Acquisition with STEAM Education through active pedagogies?</p>	<p>The motivation behind the idea of this project was that learners usually find this topic difficult and abstract, and I wanted to do something more manipulative to help them learn better and remember (learning by doing).</p> <p>To plan and carry out this project, I needed to know the vocabulary and structures very well, because it was a very technical and specific vocabulary. Once I was prepared, I used several techniques to make it easier for children: using images, using different colours for every organelle, or even creating some mnemonic rules. Also we draw every organelle before modelling them with clay. This project is related to other types of methodologies I usually use in my classes, like Cooperative Learning, AICLE or STEAM (when possible), and has to do with the subject of Arts and Crafts, apart from Natural Science.</p> <p>According to the acquisition of a second language, the children were involved in all the process, and they practiced all skills during the unit: they wrote the descriptions of every organelle using different communicative structures, we played communicative games (for example finding the pair using the name of the organelle and its definition, we listened to presentations about the unit, etc.</p>
<p>Duration</p>	<p>The unit lasted about 3 weeks (16 sessions in total) following this approximate structure:</p> <ul style="list-style-type: none"> • Review of previous ideas: 2 sessions (using brainstorming, Cooperative Learning techniques). • Presentation of new vocabulary and explanation of the unit: 4 sessions (using the Interactive Blackboard, flashcards, summaries of the unit, colour guides, guided written or oral activities). • Practice of oral and written skills: 4 sessions (using some communicative games as explained before, making summaries or diagrams of the unit, etc.). • Create the model: 3/4 sessions. • Assessment: 2 sessions (we did an exam, and used other strategies to evaluate their knowledge (for example using interactive activities like plickers or kahoot, tests in Edmodo, or google forms).
<p>Place</p>	<p>The model was created indoors, in the “Science and Art” classroom we have in our school. There we had enough space and all the materials needed.</p>
<p>Short description of the activity</p>	<p>Sequence of activities:</p> <ul style="list-style-type: none"> • Use clay to recreate the organelles (they practised oral skills because they had to describe the shape, size and colour of every organelle) STEAM and CREATIVE ARTS. • Use clay to recreate the whole cell covering working in groups (they had to decide the colour of the covering). STEAM and CREATIVE ARTS. • They labelled every organelle a part of a cell. • Wrote a brief description of the organelle as well as its functions. • Oral presentation in class about the parts of a cell and its functions (I helped them and provided a guideline for the speech).

<p>Cognitive aspect: Educational learning outcomes</p>	<p>Natural Science outcomes:</p> <ul style="list-style-type: none"> • To have a better understanding of the functioning of living things, knowing the form and structures of cells and tissues. • To use the scientific method to solve problematic situations, being capable to communicate the results and the process followed. • To know deeper about the 3 basic life processes, and how cells are involved. • To work in groups, comparing the information they have and creating documents and projects. <p>Arts and Crafts outcomes:</p> <ul style="list-style-type: none"> • To use several materials and techniques to represent reality. • To be capable of collaborating, using the new technologies to find and create works of art. • To be capable of representing real or imaginary things using a proper art language. <p>2nd Language outcomes:</p> <ul style="list-style-type: none"> • To learn some specific vocabulary and structures and use it properly in context. • To be capable of speaking, listening and understanding simple structures related to the contents of the unit. • To participate in situations where they have to engage in dialogue to achieve a goal, with the help of the teacher. • To be capable to understand and summarize a written text.
<p>Creative aspect of the activity/project</p>	<p>As I explained before, we worked some artistic aspects when we created the model. We needed to respect the real aspect of an animal cell, and also used easy-to-manipulate materials. That's why we had to think very carefully about the materials we used and decided that clay was the best option.</p> <p>When pupils started manipulating the clay they were really excited, and some of them did not know how to recreate some organelles, but with a little help, they finally managed it. They learned that, with a little effort and imagination, they could do it. It was also very motivating to watch them working together in groups, trying to achieve a common objective.</p>
<p>Communication</p>	<p>The main vocabulary and structures used were:</p> <ul style="list-style-type: none"> • Technical vocabulary about the unit: cells, shape, size, unicellular, multicellular, membrane, nucleus, covering, cytoplasm, organelles, mitochondria, ribosomes, rough and smooth endoplasmic reticulum, golgi apparatus, etc. • Some specific verbs: to carry out, to feed, to perform, to create, to store, etc... • We mainly used the present tense and some participles.
<p>Culture</p>	<p>In this unit it was hard to include major cultural aspects.</p>

<p>Evaluation</p>	<p>To evaluate the unit we did an exam (I think they are somehow important, because unfortunately they had to be prepared for exams when they are adult) and used other strategies to evaluate their knowledge, for example using interactive activities like plickers or kahoot, tests in Edmodo, or google forms. I also used some indicators to evaluate the presentation of the model in class as well as the motivation and participation while working.</p>
<p>Materials / Resources / technical requirements</p>	<p>For making the models, we mainly needed:</p> <ul style="list-style-type: none"> • Several polystyrene balls, which were part of the main structure of the cells. (We also made a counterbalance with a plastic bowl and some heavy weight, and stick it to the polystyrene balls using silicone. It also worked for keeping the models straight). • Multicolour clay. • Glue, to harden the clay when all the elements are placed. • Some toothpicks to label the parts of the cells and the description. • Basic drawing materials: pencils, pens, eraser, crayons, scissors, etc.
<p>Tips for educators / theoretical background or curriculum context</p>	<p>The primary sources of information I used were several text books from which I gathered relevant information. Besides, I used the Internet to complement and compare information and gathered images for using in class during the lessons.</p> <p>After that, I created my own summary to gather all the important items altogether. Then I adapted the vocabulary and structures to my pupils, level of English and summarized the unit for them, creating a list of vocabulary and structures.</p> <p>One tip that helped my learners a lot was to repeat in class the main vocabulary and structures almost every day, at least for 5-10 minutes, (mainly orally, but written sometimes).</p>
<p>Links and Photos</p>	<p>http://biblidin.blogspot.com/2019/11/trabajamos-sobre-las-celulas.html http://biblidin.blogspot.com/2019/03/exploramos-las-celulas.html</p>

