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

STEP by STEP

Project number – 2017-1-ES01-219-037962

CURRICULA

Integrating

Computational Thinking

Coding

Robotics

Table contents

How do we introduce robotics in the classroom?

We are working in an European project and we plan to introduce Robotics in the classroom because teachers like:

1. Students have access curricular contents in a different way
2. Students face the daily challenges putting into practice concepts and cognitive skills related to curricular areas.
3. Students get familiar with programming languages , learning by doing.
4. Students Implement learning by trial and error.
5. Teachers introduce educational robotics as another learning tool.
6. Students implement their curiosity about the world of robotics.
7. Make sure **teachers and students think carefully about the learning objective** CPI O Cruce uses Bee Bot lern curricular contents, Italy uses Robby, UK uses Sphero and Portugal uses Arduino.
8. **Choose a meaningful learning context**
9. **Students should have time to explore and make mistakes**

Students from 3-7 can learn about Video

1. Basic colors
2. Performing arithmetic operations
3. Identification of figures
4. Learning concepts of number and quantity and their correspondence

It can be used to work any topoic like reading and in adition BEE-BOT can be used to implement different skills: creativity, problem solving and think of possible solutions to a task, valuing the possibility to get more than one result.

First the teacher looks at the student curricula and introduces each activity integrating it in the curricula.

GAME- PAPER

The teacher asks students what is a robot? and students say what they think and what are their feelings.

Training in Italy

The teacher starts by disguising a robot student (with a plastic bag that has robot buttons on his back). In pairs, one student is the robot and another is driving it.

We disguise a student with a plastic bag and put the buttons on them as BEE BOT and the student gives the instructions to go to a number. At first, the movements consist simply in advancing and retreating. The student acts like a robot.

Students roll a dice or take a card with numbers and the **student-robot** looks for and finds the position (number)

We go on looking for different numbers

With 3 years old, we start with numbers from 0-5. We do just a line with numbers

1	2	3	4	**5**

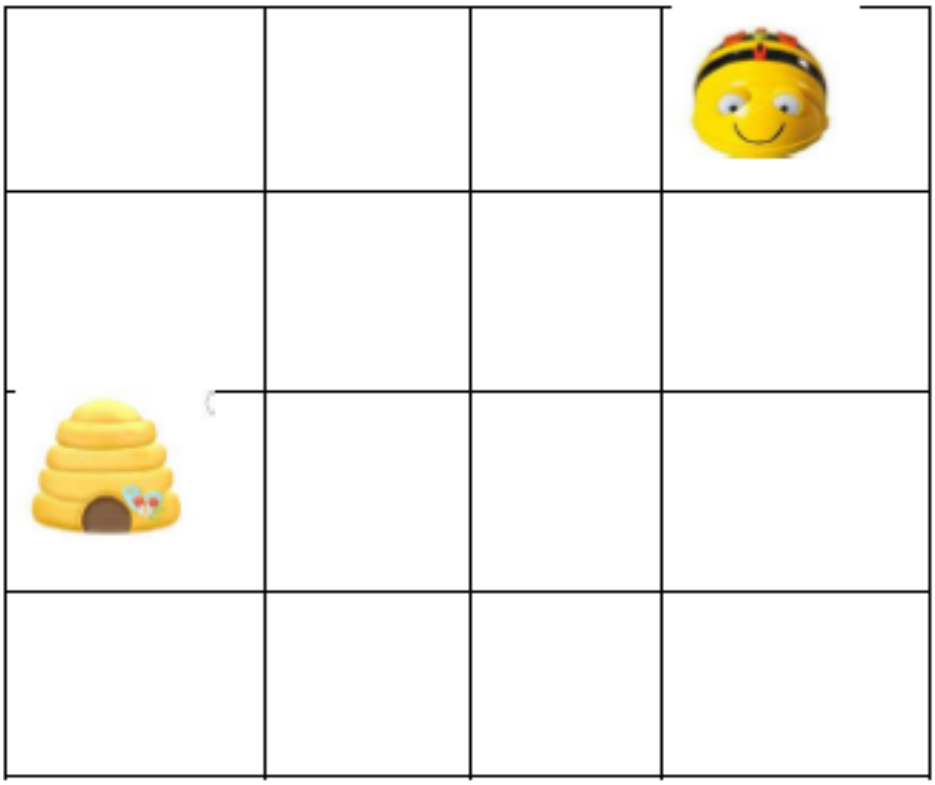
programming the route

Student- robot acts like a Bee Bot

We work different positions to make sure students know how to get the object and how to program the route

The teacher starts doing each activity throgh the 3 steps

Later students work with papers



Take Bee Bot to the hive

Lleva a Bee Bot a la colmena

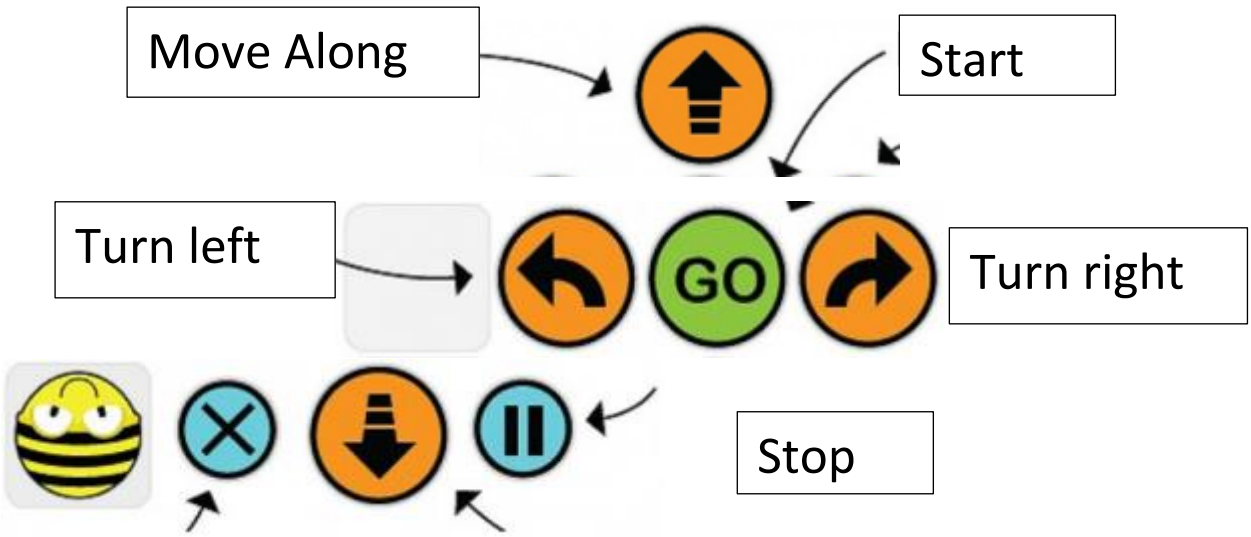
Draw it

Dibújalo

After practicing with games, papper, the teacher introduces students the BEE BOT, students get familiar with the buttons and the way it works.

and later they start to use the Bee Bot

What is a robot? students explain their idear about a Robot



GAME- PAPER- ROBOT

Teacher and students go to the Robots' conner and shows students how the Bee Bot works:

We offer to teachers some ideas to practice and how to integrate them in the curricula.

We provide teachers templates for students from 3-8 on how to work with robotics and they ccreate new ones.

When preparing an activity with the Bee-Bot, it should be taken into account that they advance forward or back 15 cm in each step, and that the turns are always 90 degrees. On the other hand, if we want to change a program we must press the X button to erase the memory of the robot, otherwise it will accumulate the new instructions to which it already had stored.

The Bee-Bot accepts up to 40 instructions or commands of the type forward, backward, turn left and turn right, which are programmed by intuitive arrow keys. Once the chosen sequencing has been programmed, you simply have to press on the GO key so that the Bee-Bot executes the program. The robot will blink once and emit a slight sound at the end of each instruction, which will help our students to evaluate their program proposal. At the end of this, the robot will indicate that it has finished flashing 3 times

The teacher proposes activities integrated in the curriculum through a project. The project, the teacher proposes is integrated in students curriculum and Robotics is a tool to students engage in the learing proccess and at the same time they increase their knwledge they learn robotics and coding.

In this example students must identify the number of the card and must program Bee Bot so that it reaches the sheet that has as many points as the number indicates.

Bee Bot must start from a number (graph) and get to the card with as many points as the starting numbers, letters...

Here we have different activities, each time we include new difficulties

The Bee Bot can be used also to work LECTURE-WRITING

Word Formation: Program bee bot to create the word (month, mash,...).

Search for hidden words and program Bee Bot to get the letters you need.

Teachers from the same school year plan activities to implement in their classroom

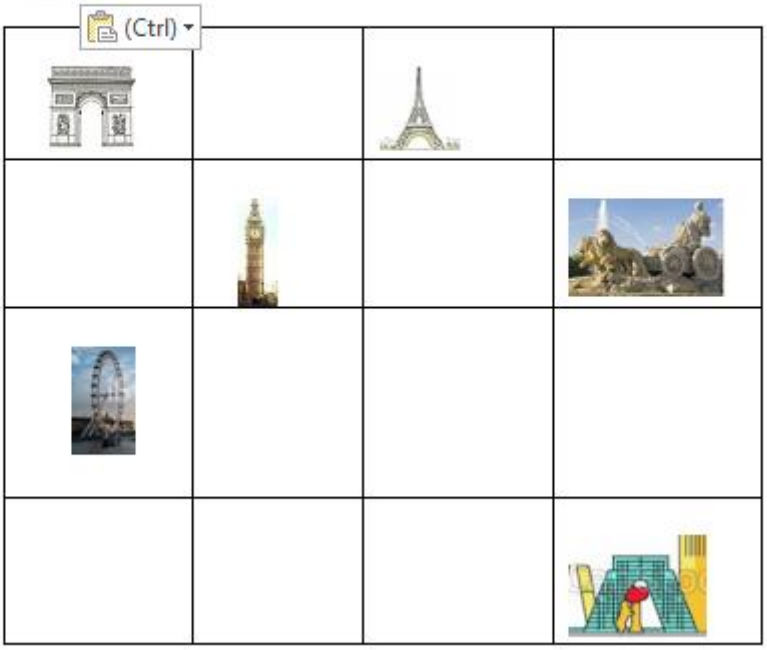
Comprehensive reading: Program to Bee Bot to go through the scenes of the story and show students reading comprehension

Activities for primary students

Bee Bot should be programmed to visit all monuments

In UK the use Sphero

In Italy Roby



Years 3 and 4 Primary

Geometric figures and bodies
The way of playing is the following: in pairs students select a figure or geometric body and place it in the corresponding box of the panel. Next they program the route that the Bee Bot has to do to arrive at that box.

Combine the activities proposed below with QR codes and augmented reality. The game is the same but students get wider knowledge using QR codes or AR. Older students prepare the activities with the teachers and younger students use them for their learning. This materials can be build by students year 5 and 6 Secondary and used in year 3 and 4 Primary

The Math Idea

Stdents create simple maps and use these maps to solve questions, is a fun way to teach kids basic map skills and get a deep knowledge on spatial skills. This activity will also help kids develop an understanding of direction (which way?), location (where?), and representation (what a drawing stands for). Students improve communication skills to describe object's location and position related to other objects, this contributes to improve students vocabulary.

There is a wide variety of activities, as wide as the ability to be creative of the teacher and the students. (students in the blended moblity n Italy.

Guess Who

This is a great activity for helping children to become familiar with famous people. The famous people can include people from all ove the world, as long as the children are reasonably familiar with them. Between the group, the children need to know who the people are and what they do (or the pictures need to have sufficient clues for them to guess!). They will write clues for the others in their group to identify the famous personality and then program Bee-Bot to get there.

Resources

- Bee-Bot
- Pictures of faces.

Transparent grid and table tray

Activity

Discuss the pictures on the cards. Who are these people? What is special about the person? What do they do? Where are they based? Look at the different characteristics of the faces - Can the children find someone with glasses, a beard, long hair, no hair, earrings…

Place the faces under the transparent grid. Help the children to write a clue for one of the faces. For example, this person plays football. He is from Wales 3. He plays in a Sapnish football team. Who is it?

Once the children have guessed the person, they can find the face and program Bee-Bot to get there.

Children could also create their own pictures of people in art class , or colect the photographs themselves.

Variant of the activity

One student writes the name of a famous persone and others make questions. The student who rote the name anser only yes or not ; once they they know who is he/she.

Once the children have guessed the person, they can find the face and program Bee-Bot to get there.

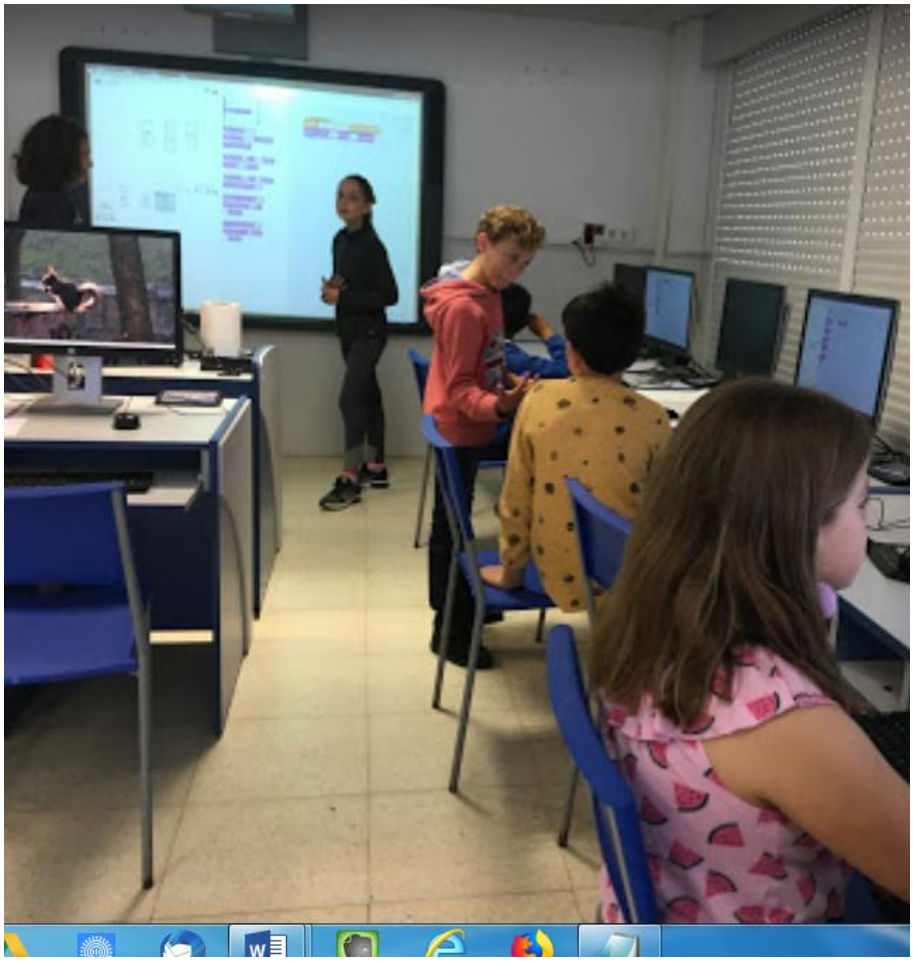
We can do this activity with monuments, capital cities...

ACTIVITIES FOR YEAR 5 AND 6

For 5th and 6th graders we can propose diferent type of activities so that students can develop the same type of boards but incorporating QR codes and Augmented Reality in addition to using the Blue Bot. Then they respond to a question.

In 5th and 6th we propose activities with the Playground application.

We propose to teach students to create Apps with inventor App, first because it is interesting for them and allows them to carry out research work, transform information into knowledge and be able to communicate information through multimedia resources. The App inventor is very useful because although initially it is a bit difficult to them, the ability to work with App inventor opens up many possibilities for students in programming and in the construction of arduino circuits, once learned the programming activities are very easy for them.



After working App Inventor students learnt to program circuits with MBOT

In year 5 and 6 Prmary, the use of Apps like Playground to learn Robotics is also very appropriate, since students see it as a video game, but they acquire all the concepts of Programming and Robotics and without complications of material only with having a Ipad.

Also in 5th and 6th we have done very interesting activities for students with LEGO and We Do. The students carry out all the phases of the project which is very motivating and we also have it integrated as a curriculum activity. See examples in the LEGO section.

<u>Complementary activity</u>

Dentro del Proyecto Boats4schools (k201 Erasmus+ Los alumnos de 6º han aprendido a crear objetos con 3D , entre ellos barcos y después han aprendido a crear los mecanismos para los barcos teledirigidos, así los alumnos han aprendido como a partir de Makeblock tenemos programación de arduino y como para el manejo del barco pueden utilizar App inventor esta actividad resultó bastante asequible para los alumnos. En la actividad de los barcos los alumnos pudieron aplicar los conocimientos adquiridos con App inventor y Robótica.

TITLE: **LET'S REBUILD THE ALPHABET WITH TINO, THE ROBOT**

DESCRIPTION:

Pupils are introduced to the SEQUENTIAL INSTRUCTION rebuilding the Alphabet letters in alphabetical order, using the directional cards, the chessboard drawn on the floor and the 21 letters of the alphabet written in some. Pupils are divided into two teams: the first team writes the letters of the alphabet on sheets and places them in the right order into the boxes of the chessboard and in this way they prepare a route; the second team writes the instructions to find the letters in alphabetical order, using the directional cards.

Finally, the second team gives previously written instructions with cards to a child, who pretend to be "Tino the robot": he checks the connection between execution and planning instructions through debugging activities (program control to find out the mistake).

"CODE.STUDIO

Students are introduced into the platform called "CODE.STUDIO (https://studio.code.org/s/course4) and they follow 22 lessons composed by a series of progressive exercises.

Students will learn how to tackle puzzles with increased complexity as they learn how to combine several concepts when solving each challenge.

Lesson 2: Students will first help the zombie get to the sunflower using a combination of sequences and loops, then review conditionals with the flower-hunting bee.

- Create a program for a given task using sequential steps
- Count the number of times an action should be repeated and represent it as a loop
- Analyze a problem and complete it as efficiently as possible
- Employ conditional statements to assess which actions are correct for a given step

Lesson 3 : This is a review of loops and nested loops. Students will use the traditional artist character, as well as a very artistic zombie, to complete and recreate repetitive drawings

- Create programs that utilize repetition to create gorgeous designs
- Use trial and error to recreate detailed designs in proper scale
- Divide the number of degrees in a circle into even segments
- Calculate the angles in equilateral and 30 60 90 triangles
- Decompose a shape into its smallest repeatable sequence

Lesson 6: In this lesson, students will explore the creation of repetitive designs using variables. Students will learn how variables can be used to make code more simple to write and easier to read.

- Create programs that utilize repetition to create gorgeous designs
- Use trial and error to recreate detailed designs in proper scale
- Calculate angles by dividing 360 by the number of sides in a polygon
- Decompose a shape into its smallest repeatable sequence

Lesson 7 : In this activity, students will have the opportunity to play with variables in a situation that illustrates just how useful they can be. Students will edit games to give themselves the advantage and make their characters more powerful using variables as parameters.

- Identify the numbers that are responsible for specific elements of a program
- Create a game that incorporates numerical parameters
- Replace numbers with descriptive variables

Lesson 9 : Students use the Bee environment to write programs that use loops with embedded counters/index variables. These loops are called for loops, and they utilize predetermined start and stop values.

- Break one long sequence of steps into shorter looped sequences
- Use the "for loop" structure to repeat an action a variable number of times each iteration

Lesson 10 : Students use the Artist environment to write programs with for loops, similar to what they did in the previous Bee level.

- Predict the number of steps needed to increment in each for loop iteration
- Determine start and stop values for multiple for loop examples

Lesson 11 : Building on the previous Play Lab activity, students will add deeper interactivity as they bUtilize for loops to count from 1 to 100

- Count by tens repeatedly using the for loop structure
- Employ skills from previous lessons to create more difficult looping algorithms uild their own video games

Lesson 12 : Students use the Artist environment to draw complicated images using functions for repeated tasks.

- Identify repeated movements and utilize functions to simplify their program
- Use trial and error to re-create complex patterns
- Break complex tasks into smaller repeatable sections
- Combine simple shapes into complex designs with functions

Lesson 14: Students will use the Artist environment to draw complicated images using functions with parameters to create similar shapes with small differences.

- Identify repeated movements and utilize functions to simplify a program
- Break complex tasks into smaller repeatable sections
- Combine simple shapes into complex designs with functions
- Utilize parameters to make one function work for multiple purposes

Lesson 15 : Having experienced the creation and use of functions and parameters, students will get the opportunity to use the skill in the creation of Play Lab games. Later puzzles incorporate the use of multiple parameters.

- Identify repeated movements and utilize functions to simplify a program
- Utilize parameters to make one function work for multiple purposes
- Adapt their understanding of functions to allow for the use of multiple parameters

Lesson 16: This short stage illustrates how students can use their new skills with functions and parameters to change direction using binary logic.

- Edit existing functions to make them work for specific tasks
- Combine similar functions into a single one by utilizing parameters

Lesson 18: Rounding out Course 4 is the Artist: Binary lesson. Here, students will build binary images, translating 0s and 1s to offs and ons (or blacks and whites).

- Match binary sequences to encoded images
- Utilize loops and binary code to recreate provided images
- Identify repeated sequences and break long codes up into smaller chunks that can be looped
- Create pictures using unique combinations of on and off

Lesson 19: In this lesson, students will be challenged to dig deep into what they have learned throughout their journey to solve a handful of complex puzzles.

- Create programs that utilize repetition to create gorgeous designs
- Decompose large, difficult puzzles into managable pieces
- Use variables to capture patterns in complex tasks

Lesson 20: Students use a mix of different environments to test their knowledge of for loops.

- Predict the number of steps needed to increment in each for loop iteration
- Determine how to use a for loop in a way that makes sense for each unique puzzle
- Decompose large complex problems into smaller pieces

Lesson 21: This challenging stage allows students to hone their skills with functions and parameters to solve complex puzzles with grace and efficiency.

- Look for patterns where they can implement functions
- Utilize parameters to make a single function work for multiple problems

Lesson 22 : The final stage in this course is intended to test comprehension and transfer of all concepts to blended puzzles

- Choose from many techniques to find the one that best suits each problem
- Think critically about what they need to accomplish, given the tools that they have

Students training in UK - 7 to 12 octubre 2018

During the week English partner shared lots of tools and activities with project partners. Among them we worked with Papper and we learnt to do different activities like:

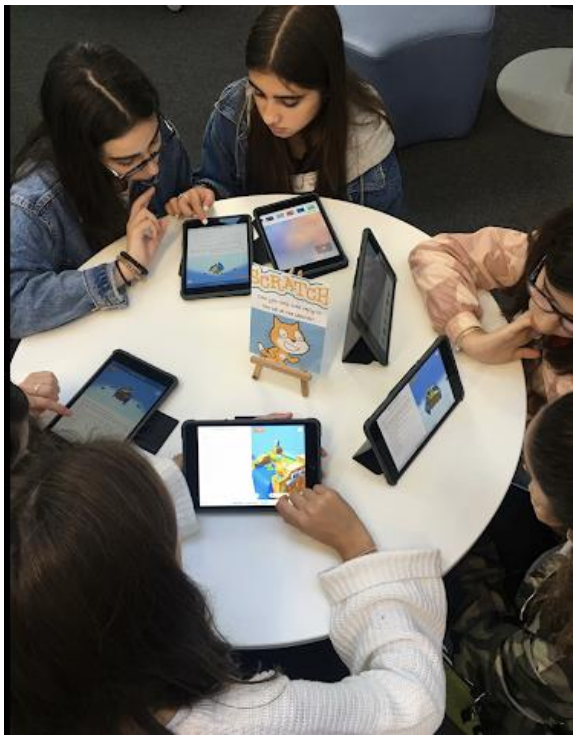
Work coding and robotics, students love it and makes easier to learn because teacher don't have to create the materials and the programme is very good, it works all robotics aspects.

We worked robotics with playground

With **Papper** students also learnt to use it for Art

Virtual reality

Students worked with Scratch



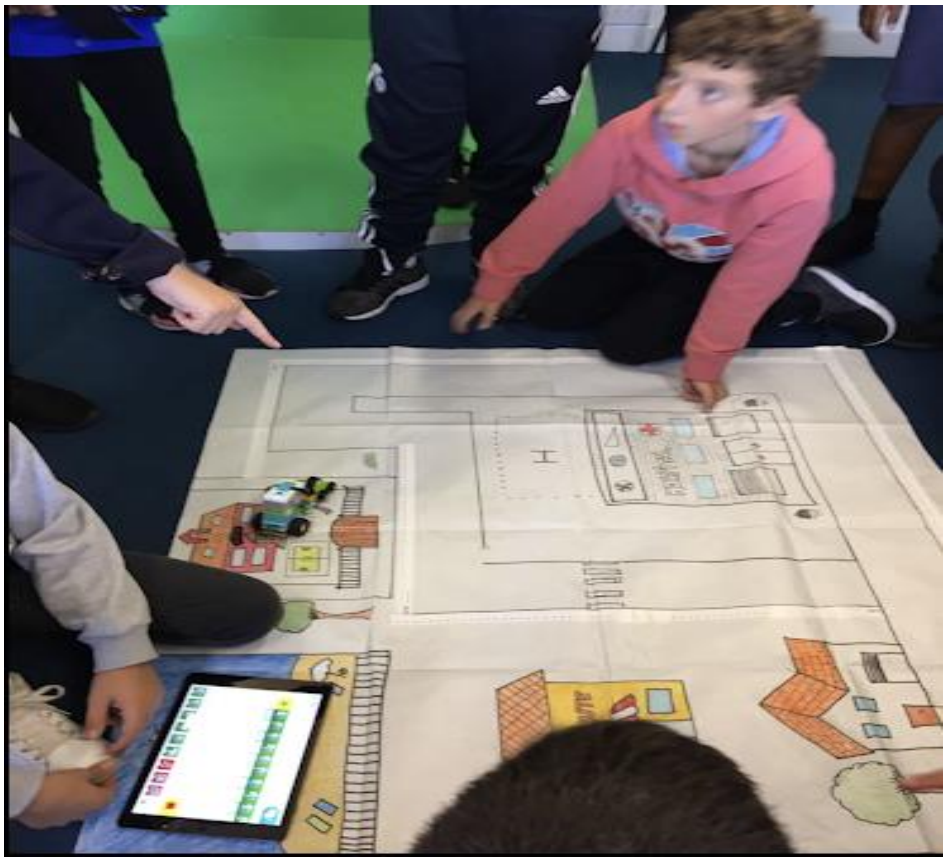
Students learnt to do videos using the Ipad and CROMA

Spanish partner brought activities with **Lego.** The teacher proposes a project using lego and the scientific method.

Question withch is the shortest way?

Students elaborate an **hipotesis**, they build all the materials to do the project

students work different projects with Lego and WeDO

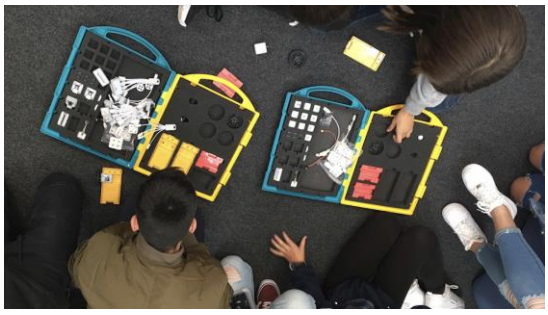


Solving problems with robotics - Looking for evidences

Enlish students taking notes with bookcreator of the activity

More about Robotics **Sphero**

Students did activities in **Space maker**



Portuguese partners presented an activity with Arduino

Italian partner presented an activity made by a student with a Robot

[Training in Portugal- Photos]

BEST PRACTICES

ENGLAND

ITALY

PORTUGAL

SPAIN

Partner/country: Agrupamento de Escolas de Barcelos / Portugal

Title:	**Computational Thinking – Game with No Instructions** .
Teacher	Antonio Trigo
Target group	Primary School 8-11 years old /secondary
Content/ Subject areas (*taged with modules*):	Computational Thinking Mathematics Algorithm
Learning objectives / competences	This lesson gives students the opportunity to practice the four arts of computational thinking (decomposition, pattern matching, abstraction, and algorithms) in one cohesive activity
Description of the activity	For this activity, no instructions are provided. Instead, students will use examples of what imaginary players have done to figure out how to play the game. This lesson is all about a "Game with No Instructions." Students will be charged with figuring out how to play the game as a small group. The small details of their final algorithm are unimportant. What is important is that they were able to take a huge task like "figuring out how to play a game on their own" and take small steps toward achieving the goal.
Description of the process teaching/ learning strategies used	Students will be guided toward discovering the rules using the steps of computational thinking. The teacher must resist the temptation to point the students toward "doing it right" and allow them just to do it on their own. If they feel stumped or confused, the teacher must encourage the students to look at the information that has been given to them, or if they must, ask a classmate

Types of assessment	One die per group One Computational Thinking Kit per group Pens, Pencils, & Scissors Computational Thinking Assessment for each student Self assessment and worksheet assessment
Materials and tools	One die per group One Computational Thinking Kit per group Pens, Pencils, & Scissors Computational Thinking Assessment for each student
Timing and learning environment	45 minutes
Why do you consider this practice is innovative?	Using the tools of Computational Thinking, then you can figure out how to solve problems that no one has already taught you how to solve...just like we did here! This will be an extremely powerful skill for the rest of your life!"
Where did you find it? Internet address	https://code.org/curriculum/course3/1/Teacher#Vocab

Students training in Mazara Italy

Partner/country: UK - Derek Hewie

Title:	. **Algorithms**
Target group	Primary 8-11
Content/ Subject areas	**Coding**
Learning objectives / competences	To use the language of position, direction and movement.
Description of the activity	Children introduced to position, direction and movement language including the terms 'half-term' and 'quarter turn'. They used this language to direct an object from the start to the end of a maze, learning that these instructions are called algorithms
Description of the process teaching/ learning strategies used	The children were introduced to position, direction and movement language. They physically practised a half-turn and quarter turn. They then used this knowledge and applied it to an algorithm; as a class they directed a child from one door to the other. The children then practised using algorithms to direct each other around the classroom in pairs. Subsequently the children were introduced to a maze showing the headteacher who has "lost" his way to his office. The children used an A3 maze and a small object (a toy shaped like a little person) as a class (sitting in a circle) to direct the headteacher using an algorithm to his office. The children then practised this same activity in pairs practising using their position, direction and movement language.

	The children were then introduced to a new maze where their class teacher (myself) had "lost" the teaching assistant around the school. The children were set the task to create an algorithm to reunite the teachers of their classroom. The high high and some middle ability children had a picture of the maze in their books and had to complete a written algorithm. The lower and some middle ability children worked in two small groups on the carpet using an A3 picture of the maze and a small object (a toy shaped like a little person).
Types of assessment	The higher and some middle ability children wrote their algorithms in their books and drew on the maze using arrows to show direction. The lower and some middle ability children were assessed through observation
Materials and tools	A3 pictures of mazes and small objects (small toy shaped like a little person). Picture of a maze stuck in the higher and some middle ability children's books and word mat for the position, direction and movement language such as forwards, backwards, left and right (so they could focus on the maths learning and not worry about the spelling).
Timing and learning environment	The task was completed in the classroom with all 27 children. The higher and some middle ability children were on their tables assisted by the class TA and the lower and some middle ability children were on the carpet in two small groups with the teacher.
Why do you consider this practice is innovative?	The children were able to apply their knowledge to a "real life situation" of someone being "lost". Being able to describe position and direct someone is an important skill. The children have been using their position, direction and movement vocabulary in all different situations in their days since the lesson. They are able to be more clear about where something is, what they are describing on the board and also when trying to explain something to the teachers regarding position, direction and movement.
Where did you find it? Internet address	The maths lesson was influenced by a maths mastery plan but majority of the lesson ideas were teacher influenced as I wanted to make it more relevant to them including their class teachers.

Partner/country: UK Derek Hewie

Title :	Getting started with drons
Target group	Primary School 8-11 years old /secondary
Content/ Subject areas (*taged with modules*):	Computing
Learning objectives / competences	To be able to program a robotic device
Description of the activity	Children shown drone and asked to predict text of coding instruction. (What do you think the code would look like for different movements?)

	Children asked to use pseudocode to code a path for the drone across the classroom. Children test each other's code. Children work in small groups to complete three different drone moves. .
Description of the process teaching/ learning strategies used	. Teacher uses live demonstrations and guided practice to help children to write the code before they test it. Those children who are confident are able to move on to the next challenge and then demonstrate to others what they have to do. Children demonstrate their understanding of the code by completing independient challenges
Types of assessment	Assessment of skills through observation
Materials and tools	Swift Playgrounds iOS app and Parrot Mini Drones
Timing and learning environment	'Unplugged' tasks were completed in the classroom with all 30 children. Coding with the drones was carried out with groups of 4-8 children.
Why do you consider this practice is innovative?	First step towards coding Drones independently. Drones are real world devices, used in a variety of settings. We will be able to set up replica situations such as disaster zones and get the children to code the drones to navigate through these.
Internet address	Apple Education


STEP BY STEP

Partner/country: Italy

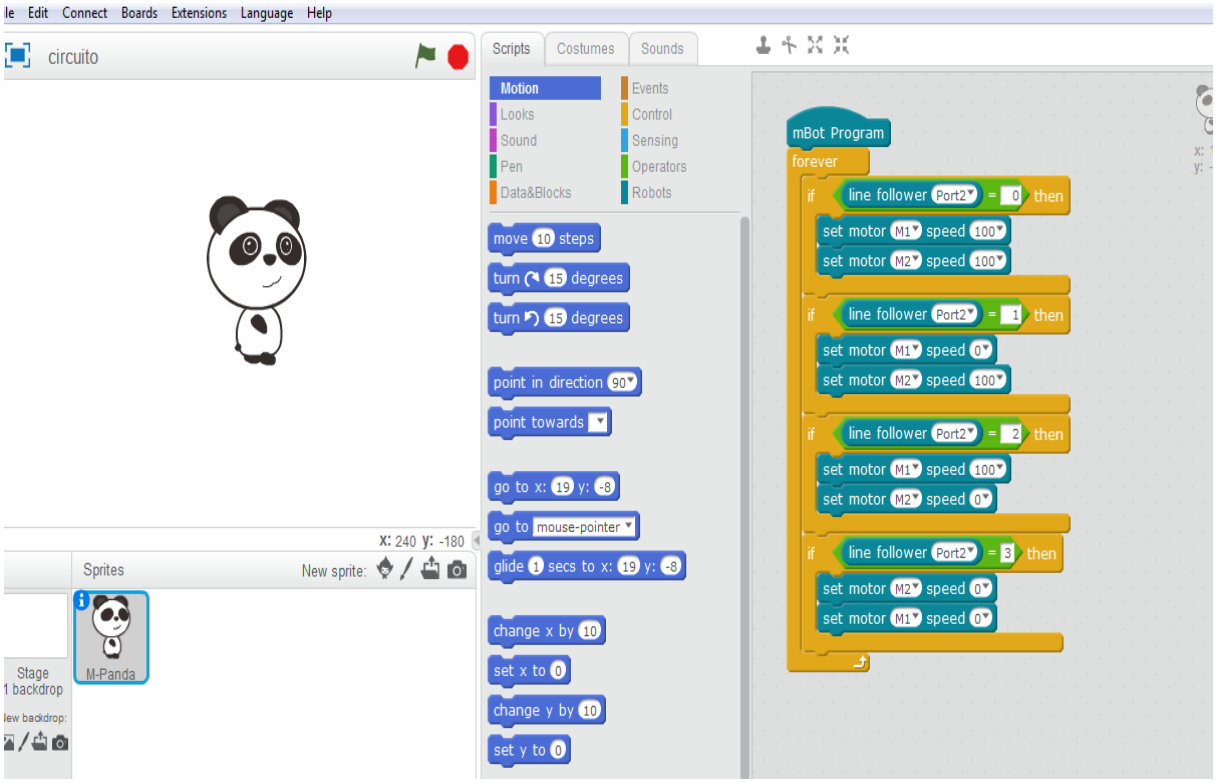
Title:	. **Duel between Cody and Roby**
Target group	Primary School 8-11 years old /secondary
Content/ Subject areas (*taged with modules*):	Italian Mathematics Geography Computational thinking
Learning objectives / competences	Consolidate laterality and spatial orientation concepts. Develop attention, concentration and motivation. Stimulate creative thinking. Enhance decision-making skills, sense of responsibility, and self-esteem

	This lesson gives students the opportunity to practice the four arts of computational thinking (decomposition, pattern matching, abstraction, and algorithms) in one cohesive activity.
Description of the activity	The class is divided into small teams. A team called (Cody) the programmer, "programs" a path and passes it to the other team, called (Roby) his robot, who has to run it. The challenge is repeated inverting the roles between the two teams
Description of the process teaching/ learning strategies used	Cooperative learning and enhancement of intellectual diversity. You will learn by playing, starting from the instructions for sequencing blocks: forward, turn right, turn left, repeat. With these games, it will be for children to physically identify themselves in the code that follows the code lines or in the programmer who writes them and dictates them.
Types of assessment	Verifications will be carried out with systematic observation of behaviors and listening to their reasoning
Materials and tools	Cards, pawns, chessboard to print and all instructions to play. Timing and learning environment
Timing and learning environment	2 hours
Why do you consider this practice is innovative?	The game is based on unplugged code-like activities, which will teach children how to use, decode, choose, combine instructions that, placed in a logical order, will allow you to trigger cognitive processes in a fun way.
Internet address	codemooc.org/codyroby

Students training in the belended mobility in Italy

Título	Coding with Mblock – Robot MBOT
Proposed by	María Pazos, Milagros Trigo
Target group	Primary School 10-11 years old /secondary
Content/ Subject areas (taged with modules):	Natural sciences , music....
Learning objectives / competences	1. To learn by working in teams 2. To promote in students entrepreneurship 3. To implement in students creativity 4. To learn coding using Mblock 5. To be able to communicate knowledge using multimedia resources. Competences: Students will implement their pleasure of demostrate an hypotese , find evidences , extract conclusions Students will be able to create practical information Creativity Digital competence (coding) Learning to learn
Description of the activity	All students are trained to use Scratch, After 3 months of training we ask students to create their own videogame. They should draw up a the scenario and create the videogame. It's a kind of gide about the videogame. description and how to play
Description of the process teaching/ learning strategies used	Students learn coding Students learn coding and how to to aply it in real tasks. Describe their hypotese Students find evidences Student define their conclusions
Types of assessment	Self assessment and pair assessment, observation sheet
Materials and tools	Mblock to programme

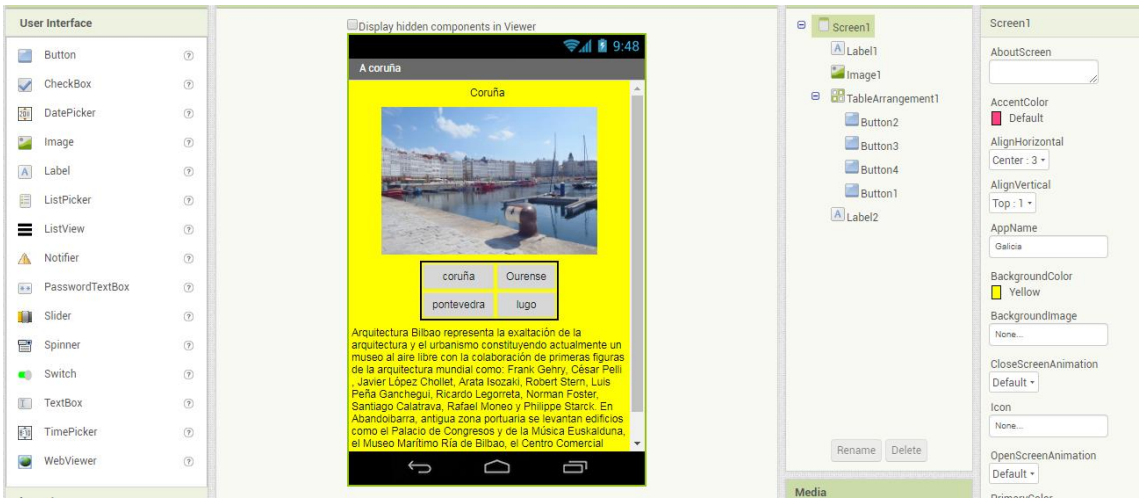
Timing and learning environment	50m to programme a circuit and 2 hours to implement science project
Why do you consider this practice is innovative?	Because is very motivating for students, becuse it brings students the posibility of problem solving and learn to build their own learning, To learn sciences based on evidences
	enlace



Partner/country: SPAIN

Title:	. We create our Apps
Proposing teacher	Milagros Trigo
Target group	Primary School 10-11 years old /secondary
Content/ Subject areas (*taged with modules*):	Language,Maths, History, Literature...Coding
Learning objectives / competences	1.Students will be able to select the relevant information. 2. Students will be able find out the relevant data of a writer. 3. Students will get greater attention capacity, more autonomy, and will show greater pleasure for the discovery of new concepts through work with coding Competences: Students will implement their pleasure of reading Students will be able to create practical information for other students Creativity Digital competence (coding) Learning to learn
Description of the activity	Students look for information about their region

Description of the process teaching/ learning strategies used	Students learn coding Students learn coding and how to to apply it in real tasks. Learn to use App inventor which is very useful for lots of application Students learn to communicate their knowledge using media
Types of assessment	Self assessment and pair assessment, observation sheet
Materials and tools	App inventor and infotmation about the topic
Timing and learning environment	2 hours
Why do you consider this practice is innovative?	Because is very motivating for students, becuse it brings students to communicate knowledge and learn to build their own learning. Coding leart with App inventor is very useful for robotics
Where did you learnt it	In a Comenius Project We developed different uses at our school.



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ROAD TO SCHOOL With Lego and We Do

SPACE-TIME-SPEED RELATIONSHIP

It's about check the relationship between speed, space and time to know which path is the shortest when we want to reach a destination or how to save fuel.

First we prepare a plan that represents the path from school to school. We can follow two paths; One long and one short. The long road is a highway, with a speed limit 10m and without obstacles or stops. The short road is a road with speed limit 6 and a traffic light with a duration of 5 seconds.

What is it about?

It's about knowing which way we'll get to school faster.

We can also go deeper to see how fast the vehicle should go on each route to minimize the consumption of gasoline.

1st STEP

• We prepare the plan and make a scale; 1: 10000 (10cm = 1Km).

2nd STEP

• We formulate hypotheses from the question Which path will be faster?

Discuss the issue for a few minutes and move on to check.

3rd STEP

• Open the application and create a new project.

4th STEP

• We build the vehicle following the instructions.

5th STEP

• We schedule the first tour; power 10 (100 km / h)

• We start it and register the time.

• We record the data.

6th STEP

• We schedule the second tour; power 6 (60 km / h) adding the stop at the traffic light.

• We start it and tegister time.

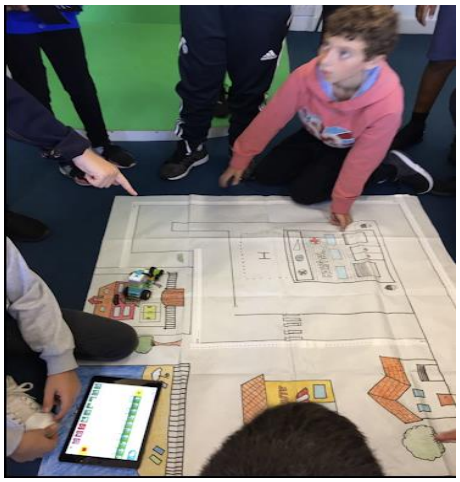
• We record the data.

STEP 7

• We elaborate the conclusions.

• Analysis and development of the formula V = E / T

Teacher : María Pazos



With Lego and We Do

we also Implemented these projects:

The Wheel ...

Collecting supplies,

The spy robot

WORKS FOR OLDER ONES

ROBOTICS ServoMotorFlag

SmartCar Robot

TrafficLight

This is a *Manual* to show our point of vew on how to integrate Robotics, Coding and Computational thinking in the curricula and also a selection of the activities the four schools produced

You have also some other activities in other partner languages in the project website.

STEP BY STEP TEAM