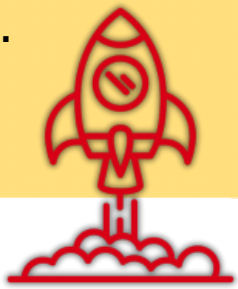
Unplugged Activity

Title: Do You Want to Be a Processor?

Educational level: 3rd cycle of primary education.
Curricular areas: Natural Science.
Timing: One or two lessons.



Summary

The activity consists of two stages. In the first collaborative stage, students must compose a code using Scratch blocks. In the second stage, which will serve as “debugging,” the group, working cooperatively, must simulate the multitasking process executed by a computer.

In this second part, each student must assume a task performed by the computer. One student will be the processor, three students will be the variables, another will be the loop, and a third will be the screen or audio interface, all directed by the processor. Each of them will be responsible only for their role, just as the components of a computer do. A real simulation of this second stage is included in the attached resources.

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Unplugged Activity

Aims

- Develop basic technological skills and begin using them for learning, fostering a critical mindset towards their functioning and the messages they receive and create.
- Develop habits of individual and team work, effort, and responsibility in study, as well as attitudes of self-confidence, critical thinking, personal initiative, curiosity, interest, and creativity in learning, and an entrepreneurial spirit.

Key competencies to develop: mathematical competence and competence in science, technology, and engineering, digital competence, personal, social, and learning to learn competence, and entrepreneurial competence.

How do we do it?

1. We begin by explaining the objective of this activity, which will last one lesson. The goal is to simulate the functioning of a processor.
2. Students should be divided into groups of 5. Distribute the blocks provided in the resources. There are two sizes: A4 and A3. The blocks are sufficient to solve the program.
3. Students, working collaboratively, must solve the program “Teach the Processor to Multiply Using Only Addition.” To do this, they will use the blocks distributed by the teacher. The teacher will explain that they need to create a program that performs any multiplication of two values without using the multiplication operation. The numbers to be multiplied can be written into the program.

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4. Once they are convinced that the program works, they will cooperatively distribute the tasks: one student will be the processor and give instructions, another student will be the multiplicand variable, another will be the multiplier variable, another will be the result variable, and another will be the screen or audio interface. An additional student can be added as the counter for the iterations of the “repeat” loop; otherwise, “processor” will keep count.

5. At the end (debugging), they will be able to check if the program works.

6. Once they confirm that the program works for any two values, they will present it to the class by performing a simulation.

Suggestions

This activity can be extended to additional lessons by proposing other tasks with different programming blocks.

You can choose to share extra blocks so that students can select the ones that suit them best. This way, each group can create a different program. Blank variable blocks can be provided for students to name the variables as they wish.

The teacher will not give instructions on how to solve the program. The aim is not for all groups to design the same program but to learn to solve challenges with the tools available to them.

The number of students in each group can be increased by creating tasks such as the loop counter, etc.

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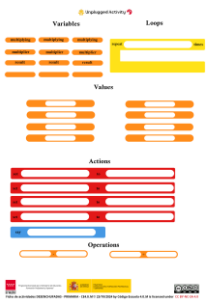
Resources

- **Human:** Teacher, students
- **Material:** See the resources section.

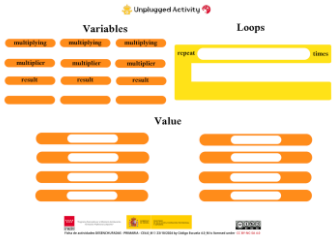
Space: Classroom, groups of five or more students.

Type of activity: challenge.

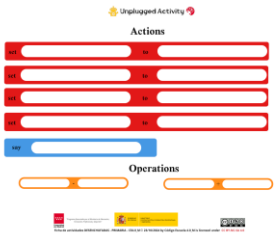
[Program]



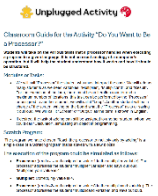
[Blocks A4]



[Blocks A3 superior]



[Blocks A3 inferior]



[Classroom guide]

[Cover image]

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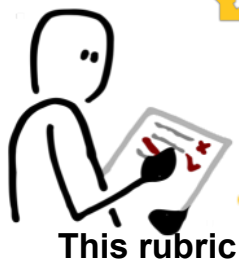

What have we learned?

This rubric assesses the group's collective work.

Assessment Criteria	4 Excellent	3 Very good	2 Satisfactory	1 Needs improvement
Use the programming blocks and create the program	Use the blocks correctly and with the minimum number of steps.	Use the blocks correctly, but with a number of steps greater than the minimum.	Use the blocks with some errors.	Does not understand how to use the blocks to solve the challenge.
Collaborative Work (First Task: Programme Design)	Everyone has collaborated equally.	They have collaborated separately by forming subgroups.	Not all members have collaborated.	
Cooperative Work (Second Task: Programme Processing)	They have completed their tasks synchronously.	They have interfered with each other's tasks but have completed the task.	They have interfered with each other and, as a result, have not correctly completed the programme simulation task.	

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Computational Thinking

Logic (prediction and analysis): thinking to make predictions, solve problems and make decisions based on available information.

Algorithms (steps and rules): is a step-by-step process that solves a problem or completes a task.

Decomposition (breaking down into smaller parts): breaking down problems into smaller and more manageable parts, which are easier to understand and solve.

Abstraction (delete unnecessary details): simplifying things in a problem hiding unnecessary details or aspects to focus on those which are relevant and essential.

More information

Program

Blocks A4

Blocks A3 superior

Blocks A3 inferior

Classroom guide

Cover image

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