Erasmus+
Programme Your Future

COMPUTATIONAL THINKING - LESSON SCRIPT

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Lesson information:	Subject:	Mathematics
	Duration:	4 sessions x 50 minutes
	Grade/level:	3th grade of secondary school (students born in 2002)
	Age:	14
	Topic:	Areas and perimeters of plane figures

The curriculum specifications and requirements:

BLOCK I: PROCESSES, METHODS AND ATTITUDES IN MATHEMATICS

This block refers to the skills involved in solving problems: analysis, modelling, revision, checking solutions, use of IT, etc.

BLOCK III: GEOMETRY

1.2. Management of relations between angles and lines to solve geometrical problems.

2.1. Calculation of area and perimeter of polygons and circles.

The aims of the lesson:

Pupil:

- identify the parameters that define the most usual plane figures
- remember the formulas that must be used to calculate areas and perimeters in each case
- understand how a computer program works

Previous knowledge:

Pupil knows:

- names and formulas of the most usual plane figures
- pythagorean theorem

The forms of work:

- individual work
- group work

The methods of work:

- guided solution of easier problems
- problem splitting in smaller problems
- brainstorms
- graphical analysis

Teaching aids:

- Computer classroom with access to the Internet (one computer for each student).
- Moodle platform, that is a Learning Management System (LMS), used to provide students with links, worksheets, examples, and extra

	resources. ● Teacher computer with projector and interactive board. ● Activities from web pages: code.org and ligthbot.com. ● Program learning tool, from scratch.com.
The range of using ICT:	● Getting data from external user ● Calculations ● Presenting numerical, textual and graphical information
The course of lesson: ● **Teacher activities** ● **Pupil activities** ● **The schedule**	1. Introduction Greeting the pupils, checking registry, explaining the aim of the activity, asking what they know about programming, and formulas of areas and perimeter do they remember. Explaining the activity. **5 min** **2.** Getting used with programming What is a programme? What are pseudocode and flowcharts? How to go from one to another? The teacher shows on interactive whiteboard "Att.1 - Pseudocode to Flowchart examples", and explains the examples. The teacher distributes copies of "Att.2 - Pseudocode – Activities" among pupils to work in pairs: • all of them try to solve Activity 1. • each pair chooses one item (or more) in Activity 2. The items are ordered by difficulty (first is the easiest; last one may be very difficult for them). The pupils are told to go to code.org web page to perform some activities. They will use simple programming structures in a way very similar to how those structures are used in Scratch: https://studio.code.org/s/course3/stage/2/puzzle/1 http://lightbot.com/flash.html **80 min** 3. First steps with Scratch Pupils are told to go to the Scratch web page (https://scratch.mit.edu) and they create an account. The programming environment is shown and explained. The teacher distributes among pupils copies of "Att.3 - Plane figures worksheet" and the activity is explained. The teacher shows how to solve the case of the square: area and perimeter of a square. Parameters involved. How to make it interactive. How to draw it. This guided example is used to show how to work with Scratch. Pupils follow the instructions working individually. **15 min** 4. Pupil's turn. The teacher shows in the interactive whiteboard "Att.4 - Plain figures - explanation". Pupils, in groups of four, with two computers for each group, implement interactive scratch programmes to calculate area and perimeter of: • rectangle, • isosceles triangle, • circle, • rhombus,

	• isosceles trapezium, • regular hexagon. Simultaneously, teacher checks if formulas are used properly, as well as program algorithms. One of the programmes created by pupils can be run at: https://scratch.mit.edu/projects/140417215/ **90 min** 5. Evaluation. The programs produced by students are analysed and checked by themselves, so they can compare their solutions. After that, teacher must collect the programs and revise if the concepts are properly applied. **10 min**
Specific information: • **Programs** • **Links** • **Etc**	• Scratch programming environment, from M.I.T.: https://scratch.mit.edu • Offline scratch editor can be downloaded at: https://scratch.mit.edu/scratch2download/
Attachments: • **Worksheets** • **Programs** • **files necessary** • **Etc**	Att.1 - Pseudocode to Flowchart – Examples.pdf Att.2 - Pseudocode – Activities.pdf Att.3 - Plane figures worksheet.pdf Att.4 - Plain figures – explanation.pptx https://scratch.mit.edu/projects/140417215/