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Programme Your Future

COMPUTATIONAL THINKING - LESSON SCRIPT

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Lesson information:	Subject:	Mathematics
	Duration:	2 x 45 min
	Grade/level:	3rd grade of middle school/3rd educational stage
	Age:	15-16
	Topic:	Creating a model of a sheet of paper in the given scale.

The curriculum specifications and requirements:	The core curriculum of teaching Maths for the 3rd educational stage.
	Point no. 10. Plane figures.
	Pupil:
	    11) Calculates the dimensions of extended or downgraded polygon in the given scale;
	    12) calculates the proportion of areas in similar polygons;
	    13) identifies similar and congruent polygons.

The aims of the lesson:	Pupil:
	    ● can identify similar polygons
	    ● can calculate the similarity scale
	    ● can calculate the dimensions of extended or downgraded polygon in the given scale
	    ● solves a problem with the use of the computer.

Previous knowledge:	There is no section in the core curriculum of teaching Maths for the 2nd educational stage(grades 4-6) concerning similar figures.
The forms of work:	● working in pairs ● individual work
The methods of work:	● inductive method ● prescinding ● modeling ● practical method ● informal discussion ● moderated discussion
Teaching aids:	● the ICT classroom with the access to the Internet (one computer for two students), ● the teacher's computer with projector and interactive board,

	• programming learning tool from scratch.com.
The range of using ICT:	• practising and consolidating the skill of calculating • presenting the data in a graphic way • presenting information

The course of lesson:
   • **Teacher activities**
   • **Pupil activities**
   • **The schedule**
	1. Introduction - organisational activities.
	Greeting the pupils, checking the register, giving the topic of the lesson and introducing the aims of the lesson.
	5 min
	
	2. Stating the problem: create a model of a sheet of paper format A4 in the given scale**.**
	The teacher gives each pair of students a sheet of paper format A4 with the given similarity scale and supplementary questions:
	What is needed to create a model?
	What dependents will be used while creating this model?
	Which qualities of a sheet of paper are needed to do this?
	What is not important? Which qualities are not needed?
	What should be obtained as a solution of the problem?
	5 min
	
	3. Developing the topic of the lesson.
	Students discuss the problem in pairs. Teacher stops the discussion and asks for the answers to the supplementary questions – exercise 1. Next teacher tells students to do all needed measurements and calculations and to draw the model - exercise 2.
	After the practical part teacher asks what kind of mathematical property was used to solve the problem. Teacher expects formulating the general conclusion that similarity of figures is used in modeling. As a summary of teaching the skill of modeling teacher tells students to do exercise 3.
	30 min
	
	4. Coding problem in Scratch program (40 minutes).
	Students create the model of a sheet of paper format A4 in the given scale. We assume that we know the size of sheets of paper format A4 and they are 297 mm x 210 mm. (https://scratch.mit.edu/projects/146568343/#editor) Next students modify the program so that it is possible to draw the model of a sheet of paper in any size (https://scratch.mit.edu/projects/147710158/#editor)
	40 min
	
	5. Evaluation.
	Students test the correctness of their programs by entering any data. Teacher additionally tells students the size of a sheet of paper and the size of the model to check the correctness of programs created by them.
	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**

- Worksheet similarity_scale.pdf
- https://scratch.mit.edu/projects/146568343/#editor
- https://scratch.mit.edu/projects/147710158/#editor