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Programme Your Future

COMPUTATIONAL THINKING - LESSON SCRIPT

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Lesson information:	Subject:	Biology
	Duration:	2x45 min
	Grade/level:	3rd grade of middle school / 8th grade of primary school
	Age:	15
	Topic:	From seed to seed. From dormant seed to burgeoning seed The whole topic consists of 3 subunits: 1) From dormant seed to burgeoning seed 2) From burgeoning seed to flowering 3) From flowering to dormant seed. On the basis of the cycle of decomposed topics students can see that Biology is a cycle of transitions. These topics are an example of decomposition method "divide and win" (dividing big problems/project into smaller problems/projects) and infinite loop in programming.
The curriculum specifications and requirements:	The core curriculum of Biology for the 3rd educational stage V. Structure and functioning of vegetative organism on the basis of angiospermae plant. Pupil: 5) shows the structure of seed (rind, endosperm, germ) and describes conditions needed in the process of germination (temperature, water, oxygen); Recommended experiences and observations. Pupil: b) checking the influence of chosen factor on the process of germination. Since 2017 the core curriculum of teaching Biology in grades 5th- 8th: 1) Angiospermous plants. Pupil: h) shows the structure of seed (rind, endosperm, germ) and conditions of germination, i) conducts experiments which check the influence of a chosen factor in the process of germination, k) performs observation of phases of development of a plant.	
The aims of the lesson:	Pupil: • Discusses the structure of bean's seed	

	• Analyses a schematic picture of the structure of bean's seed • Names individual elements of the structure of bean's seed • Spreads bean's seed and shows: rind, endosperm, germ • Specifies the experimental problem, conclusion.
Previous knowledge:	• Knows terminology: coating tissue, seed coat, skin, endosperm, nutritional tissue, stem, seed leaf • Knows and understands the term of zygote.
The forms of work:	• individual work, • group work • pair work
The methods of work:	• observation • experimenting • informal discussion • modelling – pupil creates a model of seed • "divide and win" – decomposition method.
Teaching aids:	For teacher: computer with the access to the Internet, interactive board or projector, visualizer, For students: beans's seed, magnifying glasses, envelopes with writings: endosperm, rind, germ, bean's pictures, prepared bean's cultivation (testing and experimental try), pad, the ICT classroom with the access to the Internet (one computer for two students or tablets)
The range of using ICT:	• observation of nature • presenting the knowledge • presenting and processing 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 **5min** 2. The teaching of computational thinking. Stating the problem: ,,How is a bean's seed built?". Pupils discuss which ICT tools can be used to gain information (for example search for information in the Internet, use seeds and present with the use of a visalizer). Pupils watch e-book www.epodreczniki.pl/reader/c/130053/v/latest/t/student-canon/m/ii7vfgFEPJ#ii7vfgFEPJ_d5e201 and see how the inside of a bean's seed is built. Pupils experiment in groups – they cut natural samples of bean's seeds. Then they observe that seed under the magnifying glass. Next they take the descriptions from the envelopes and match them with natural samples of beans. Teacher comes to one of the groups and asks them to give him/her the cut bean's seed. She/he sets it on the pad and shows to everyone with the use of a visualizer as a bigger picture. **30min** 3. Teacher displays the picture of bean on an interactive board/projector www.epodreczniki.pl/reader/c/130053/v/latest/t/student-

canon/m/ii7vfgFEPJ#ii7vfgFEPJ_d5e201 and pupils describe it.
10min

4. Students run an application in Scratch https://scratch.mit.edu/projects/236526488/ and they must find software bugs in the test and correct its. Teacher checks solutions of pupils.

40min

Teacher asks pupils what is needed for the bean's seed to germinate. Pupils must come to the conclusion that the dormant bean's seed in hospitable conditions will develop into burgeoning seed which has anlages of root, leaves and stem. That conclusion ends that lesson and starts another.
5 min

Specific information:
Programs
Links
Etc

Attachments:
Worksheets
Programs
files necessary
Etc

The picture of bean's seed in intersection
www.epodreczniki.pl/reader/c/130053/v/latest/t/student-canon/m/ii7vfgFEPJ#ii7vfgFEPJ_d5e201 or
http://content.epodreczniki.pl/content/womi/54071/classic-980.png

Application in Scratch
https://scratch.mit.edu/projects/236526488/