Erasmus+

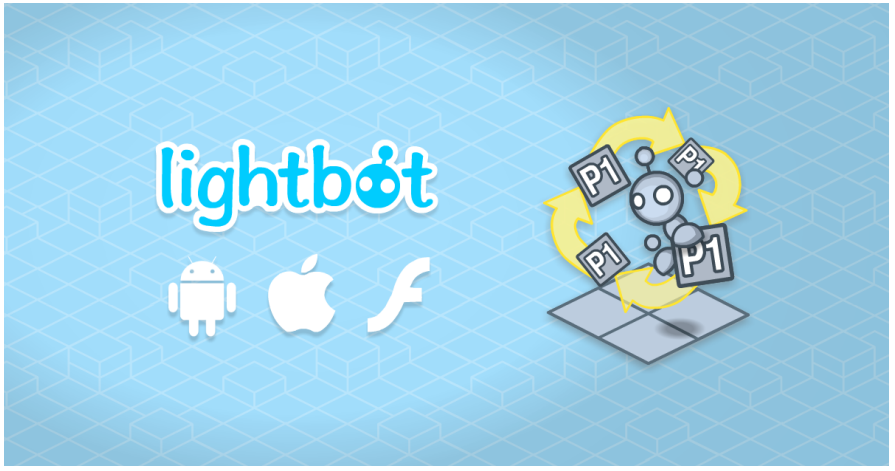
Coding and algorithmic thinking – VEGA Teaching Scenario

Topics: Practising Coding using Lightbot: Code Hour Game

Subject: IT, Mathematic

Age / Grade: 11/12 / grade 5/6

Short description of the online game in this scenario:



Lightbot - Code Hour is meant to introduce students who have no experience whatsoever programming, and is all-ages friendly. Lightbot is a programming puzzle game for mobile devices. It uses game mechanics that are firmly rooted in programming concepts. Lightbot lets players gain a practical understanding of basic concepts like instruction, sequencing, procedures and loops, just by guiding a robot to light up tiles and solve levels. Lightbot - Code Hour features 20 levels. The full version of Lightbot features 50 levels for when you want more of a challenge! Lightbot has been translated to 28 different languages.

Introduction to the scenario

With this scenario we want to support development of so called computational and algorithmic thinking, so important when teaching IT, maths or science. The main subjects of this game are sequencing, procedures and loops. The first levels are very easy, so they can be taught even in lower grades than 5th, but the last levels are definitely for the more advanced students.

The scenario starts from the theoretical introduction, goes through the Lighbot game and finishes with programming real Sphero robots.

Learning outcomes:

The students are able to:

- understand what is an algorithm, sequencing, procedures and loops
- know the basis of programming
- enhance their computational thinking skills

Curriculum: https://podstawaprogramowa.pl/Szkola-podstawowa-IV-VIII/Informatyka

Formative assessment

Number of students: Duration (estimated time/number of lessons):

- number of students: as many as in your class - you just need a proper number of mobile devices with the game installed, for the last lesson, when the class is bigger, you may need to divide it into groups, depending on the number of Sphero robots.
- 3 lessons (3 x 45 minutes)

Prerequisites (necessary materials and online resources):

- One mobile device with Lighbot installed for each student
- your regular teaching materials
- 4-6 Sphero robots with related apps installed on mobile devices.

Before the program begins (preparatory work for teacher):

- Play the game by yourself.
- Install the game on the available mobile devices or ask your students to bring theirs
- Prepare the Sphero robots
- Install the Sphero apps on the available devices or be ready to ask students for their devices on which they can install apps
- Prepare follow-up activities aligned with the curriculum to check the learning outcomes of the gameplay

Lesson one: Theoretical introduction
(45 minutes)

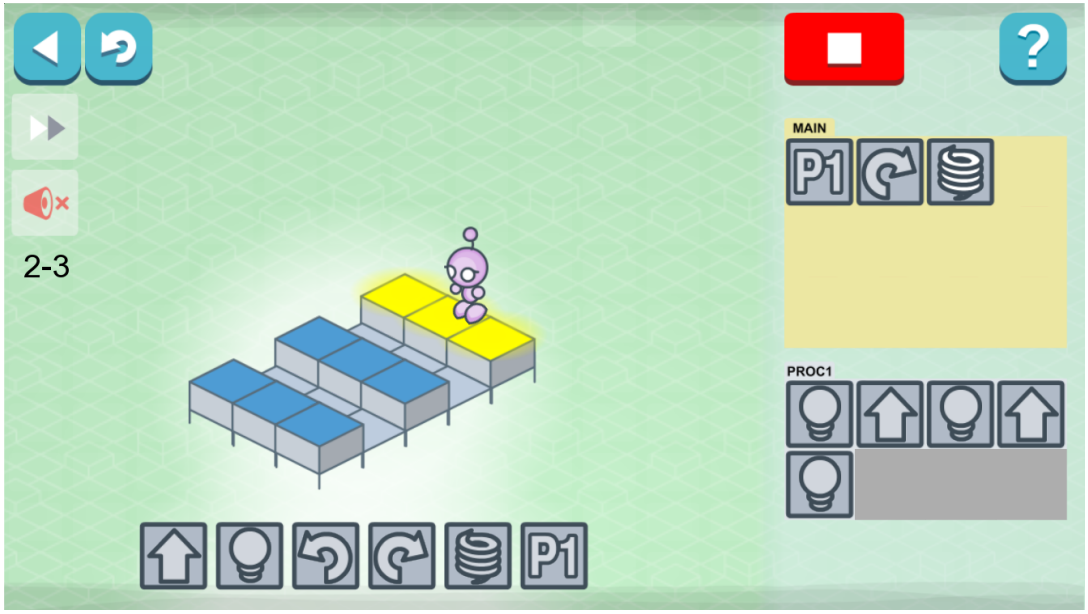
Theory: for the introduction of the key concepts, the teacher introduces a few questions for class discussion. Then, students go through several teacher resources. The key terms required are: sequencing, procedures and loops. The teacher introduces the key theme “algorithm” through an overview of the topic by brainstorming answers to the following questions:

- What is an algorithm?
- Does it take a computer to create an algorithm?
- What are the algorithms we use in our everyday lives?

Students read the definition of algorithm and state their comments: “A list of rules to follow in order to solve a problem. Algorithms need to have their steps in the right order. Think about an algorithm for getting dressed in the morning. What if you put on your coat before your jumper? Your jumper would be on top of your coat and that would be silly! When you write an algorithm the order of the instructions is very important."

Lesson two: Playing the game and debriefing
(45 minutes)

Students play *Lightbot* and try to reach the highest level. The goal of the game is to make students develop programming abilities. They have to, level by level, guide a small robot to switch on the lights. The tasks are getting more and more complex.



After playing the game, students are asked to speak about their game learning experience with a focus on the programming concepts and how their programming choices helped solve problems. They have to transfer all the knowledge acquired in the game to real programming situations. You can use some of the following questions to discuss and share their opinions about their game play experience and how it helped them improve their skills and knowledge area:

- What would you need to learn to improve your game performance?
- What was most fun about the game?
- What was the most challenging part?
- What is an algorithm for you?
- What are the sequencing, procedures and loops?
- What did you use functions for?
- Can you describe the algorithms you used in the game?

Lesson three (optional): Programming physical robot - Sphero
(45 minutes)

In addition, to make this experience even more attractive, you can program the real robots with your students. In order to do so, use the exercises from one of these scenarios: https://edurobots.eu/sphero-bolt-block-programming/ or https://edurobots.eu/sphero-bolt-geometry-and-degrees/