

The image is a dark blue background with a repeating pattern of faint, light blue icons representing various STEM fields: rockets, light bulbs, gears, musical notes, infinity symbols, stars, and tools like a wrench and screwdriver. In the upper right corner, the 'photon' logo is displayed in white, with a small orange robot head icon above the 'o'. The central focus is a large, stylized white robot head with two large, light blue oval eyes and a black triangular sensor on its chin with a grid of red dots. The robot is wearing a black graduation cap with a gold tassel and two light blue cylindrical sensors on its head. Below the robot, the text 'PHOTON'S LESSON PLANS A' is written in a large, white, sans-serif font.



"Programming teaches you how to think"

**Steve Jobs**



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## Dear Teacher!

We have prepared a set of lesson plans for conducting classes with the Photon robot so that you can get the most out of the lessons with your pupils. These lesson plans are designed based on the guidelines of the **core curriculum introduced by the Ministry of Education**.

**This publication consists of three levels: A, B and C.** Each of them is tailored to the age and skills of the children at each grade. There are 10 lesson plans for each level. Each teaches you how to conduct and develop your own lessons using the robots.

To control Photon, you will need the **Photon EDU application**, which can be downloaded for free from the GooglePlay store (on Android mobile devices) and the AppStore (on iOS mobile devices). The application was developed to work with a large group of children.

Special codes included in this publication give access only to the necessary functions used in a given scenario. In each lesson, we learn more about the robot's capabilities, which means that Photon is developing together with your pupils.

Cooperating with teachers from all over the world, we are constantly trying to broaden the database of lesson plans.

**If you would like to share your ideas on using Photon at school or in kindergarten, please contact us by e-mail at [edu@photonrobot.com](mailto:edu@photonrobot.com)** (in English or Polish). All additional lesson plans will be available on our website **[www.photonrobot.com](http://www.photonrobot.com)** in the **Education** tab.

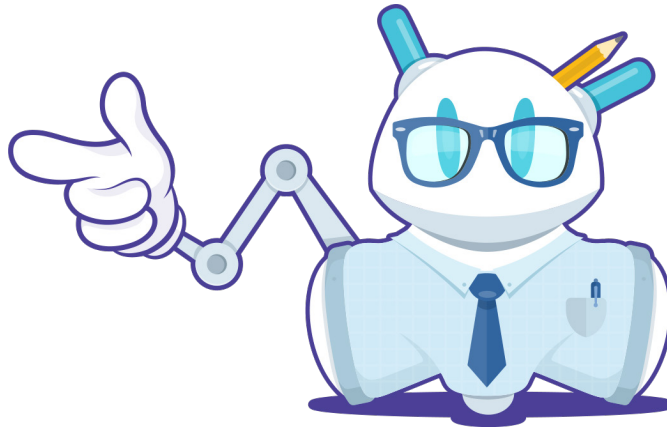
We wish you fruitful play with Photon and lots of smiles on your children's faces!

The **Photon** team



**PRINTABLE PDF ATTACHMENTS AVAILABLE**  
**AT: [www.photonrobot.com/lesson\\_plans/](http://www.photonrobot.com/lesson_plans/)**





## The approach is important!



We know that not every child will become a programmer, but the knowledge of technology will help children in their adult life and future career.



Programming develops logical thinking and teaches creativity and how to find solutions to problems.



Programming is not the goal we are pursuing. It is a tool that we want to use in children development.

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**Realise the full potential of your Photon!**  
**The only limit is your imagination and imagination has no limits...**

### 1. Light sensor

Photon can distinguish between light and dark!

### 2. Touch sensor

Touch Photon's forehead and it will feel it..

### 3. Range sensor

Photon detects obstacles up to 100 centimetres away!

### 4. Communication with other robots

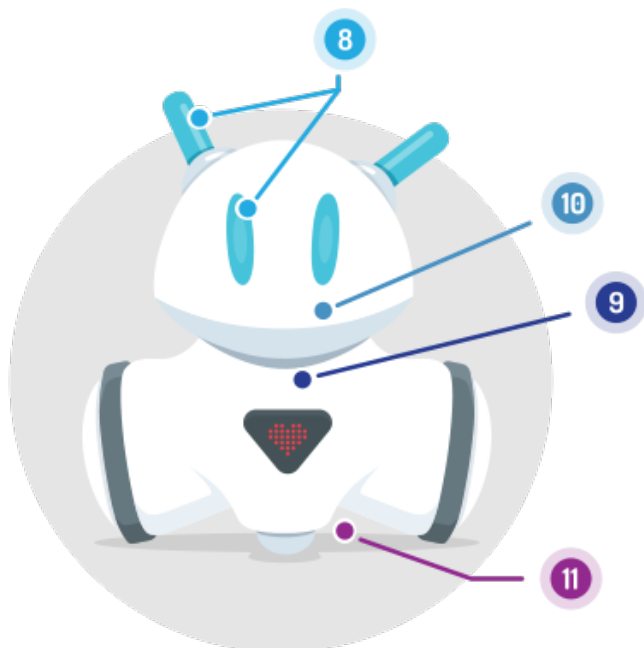
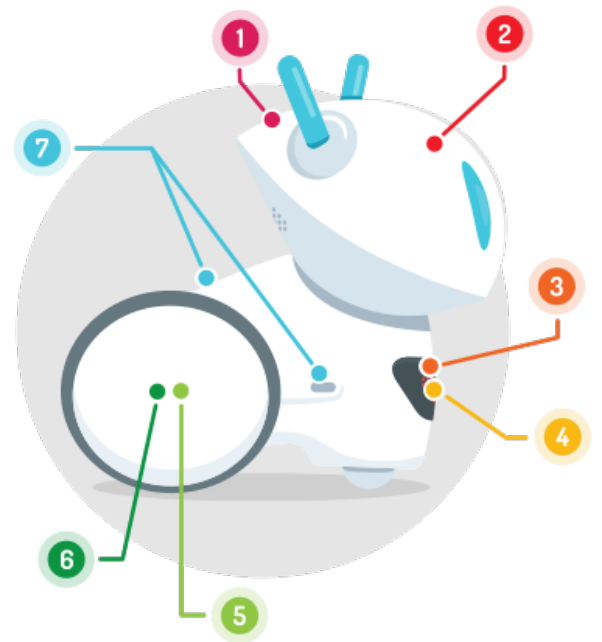
Photon is able to communicate with other Photons.

### 5. Distance measure

Photon measures the distance travelled in centimetres.

### 6. Angle measure

Photon can also rotate with very high accuracy.



### 7. Magnetic attachments

Additional accessories increase its abilities.

### 8. LED backlit eyes and antennae

Photon can change the colour of its eyes and antennas, independently!

### 9. Speaker

Photon communicates in its own, emotional way.

### 10. Sound sensor

Reacts to loud sounds such as clapping, stomping or shouting..

### 11. Surface contrast sensors

Using four contrast sensors, Photon detects the colour of surface it moves on..

## Dear teacher,

All scenarios presented in this publication are based on an educational mat with a checkerboard. In order to help you prepare scenarios we have designed a dedicated educational mat with this pattern. This educational mat is available for sale on our website: <https://photonrobot.com/product/education-mat/>



Graphics on the mat have a universal meaning and were designed to help you with the scenarios. In many cases the images on the mat could help you create your own additional scenarios without the need to print out separate placeable icons. This mat gives you many possibilities, allows using symbols, colors, directions, illustrations, and coordinates in your scenarios.

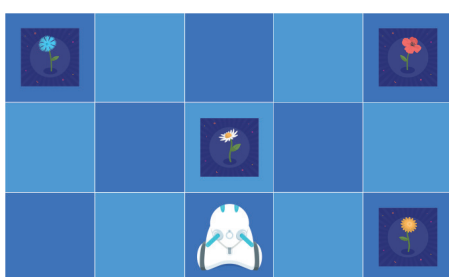
Scenarios presented in this publication were designed with a 4x6 mat in mind. Attachments in the sample scenarios are only guidance on the mat size, and are to help indicate the number of required fields and how to spread the attachments.

### Sample:

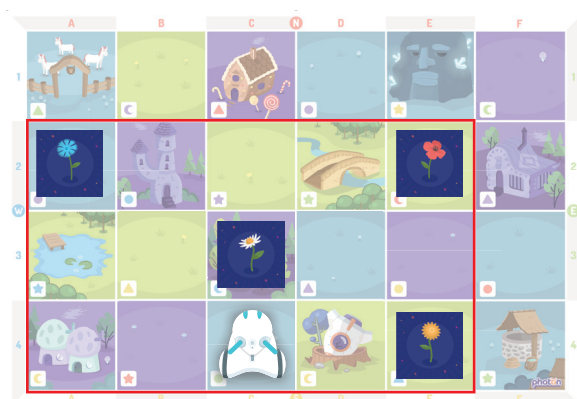
#### BOUQUET FULL OF FLOWERS

„Teacher (...) **Lay down the educational mat and place icons of previously discussed flowers.** Ask children to create flower bouquets to brighten up the room.”

#### MAT IN THE SCENARIOS



#### THE DEDICATED MAT





ACCESS CODE - LEVEL A:



LEVEL A

**LEVEL A** is targeted at kindergarten children.

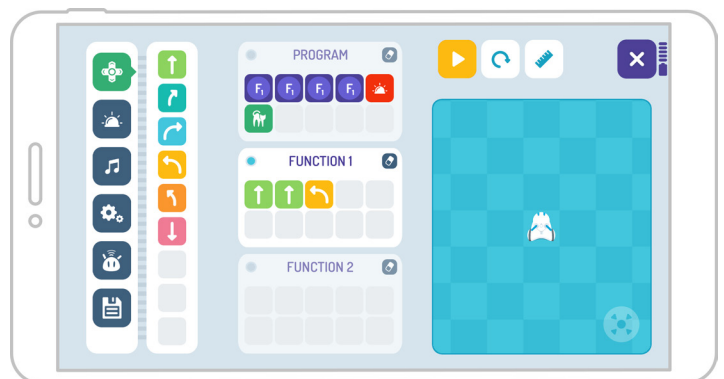
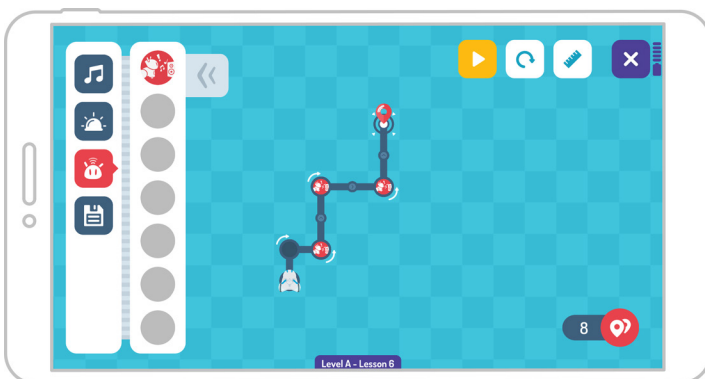
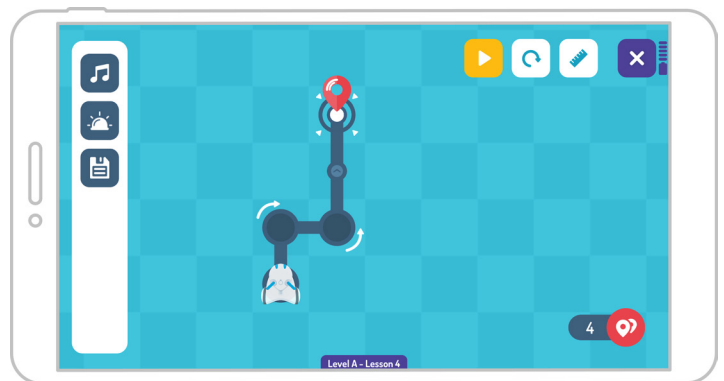
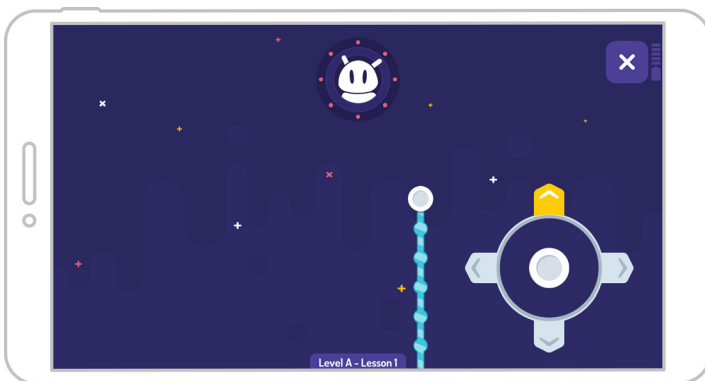
It was developed based on programming interfaces **Photon Draw** and **Photon Badge**.

The above-mentioned **programming interfaces** are just a way of communicating with Photon. They are based on months of tests and analyses of the motor and perception skills of children of the target age.

At this stage, children learn how to program the robot's movements, make sounds and change the colour of its eyes and antennae. They also learn the function feature and how to use it to shorten the program. In addition, they discover how sensors work, which makes it possible for Photon to interact with the environment.



Good luck!



## ● PHOTON DRAW

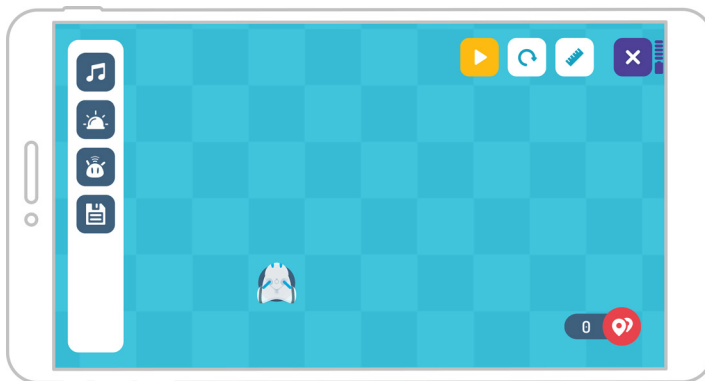
ACCESS CODE - PHOTON DRAW:



The **Photon Draw** interface was designed with the youngest children in mind. Even 3-4 year olds are able to program Photon by simply drawing a path with their finger on a tablet.

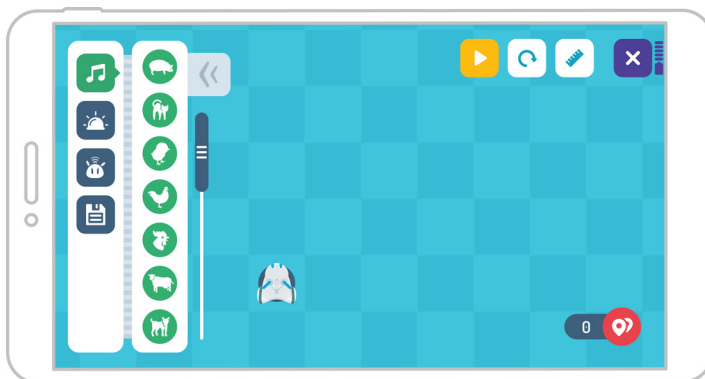
This interface helps children to:

- Develop motor skills,
- Develop spatial awareness,
- Understand the logic of „step by step” events.



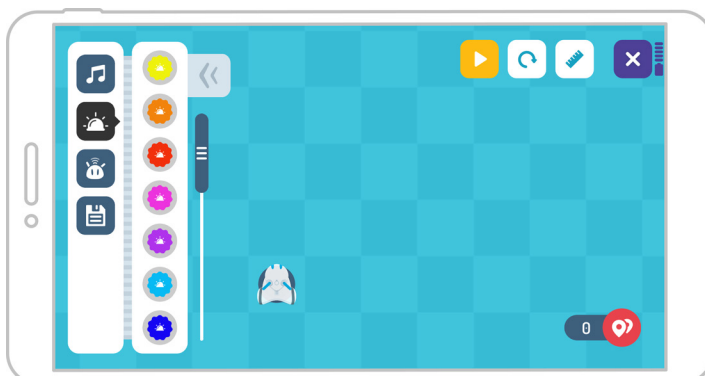
### Main Screen

The concept of programming was simplified here to drawing the robot's path with a finger.



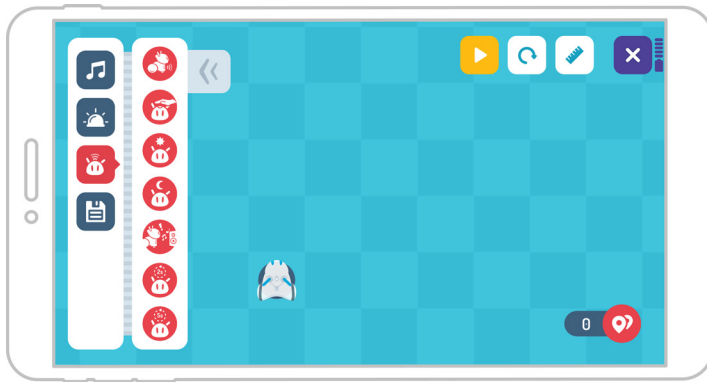
### Making sounds

Simply drag a sound from the side panel and place it at any point on any route.



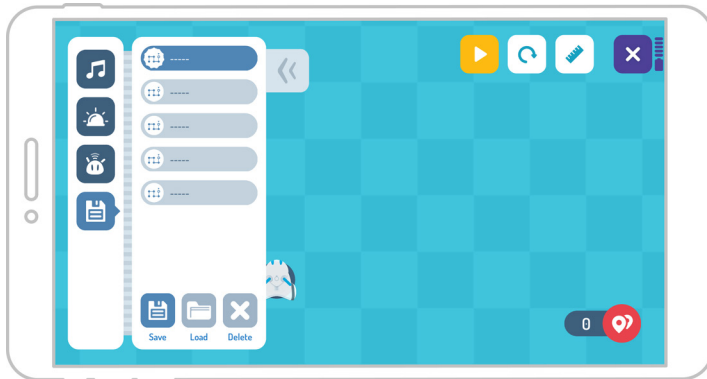
### Changing colours

You can apply Photon's color change on any existing route by simply dragging a color from the side panel and placing it at any point on the route.



### Interactions

You can make use of Photon's sensors simply by dragging one of the sensor icons onto any existing route.



### Saving programs

Each programming interface allows you to save your created programs.

Your saved programs are stored for as long as our application is installed on your tablet.

## PHOTON BADGE

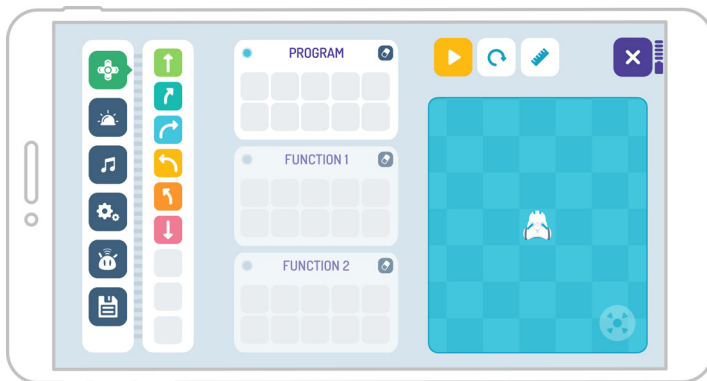
ACCESS CODE - PHOTON BADGE:



The **Photon Badge** interface was designed for children who are able to understand more complex logical sequences. To create a program, the children only need to arrange simple instructions represented by special symbols.

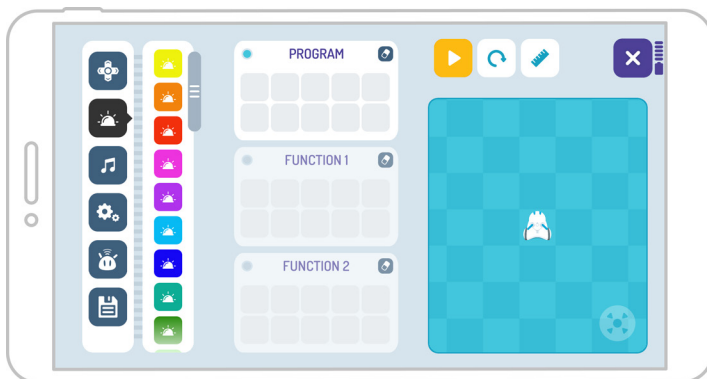
This interface helps children to:

- Develop spatial imagination,
- Learn to plan and predict,
- Develop algorithmic programming skills (repeatability of activities).



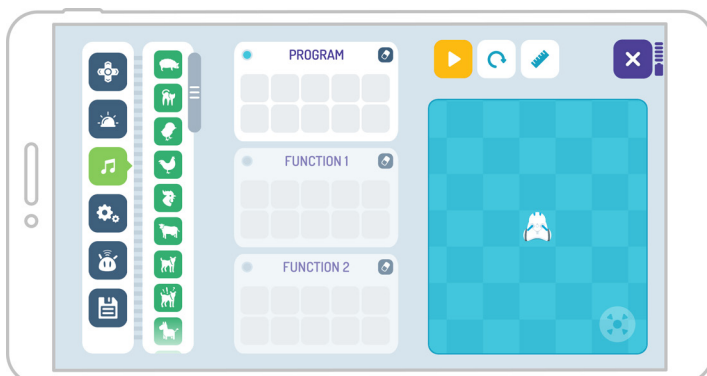
### Main Screen

The children can program Photon simply by dragging available symbols into the appropriate place on the main function screen or the auxiliary function screens.



### Changing colors

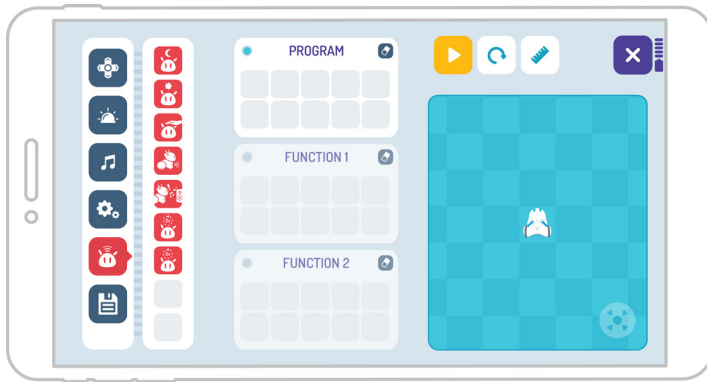
To use a color simply touch one of the visible color icons.



### Making sounds

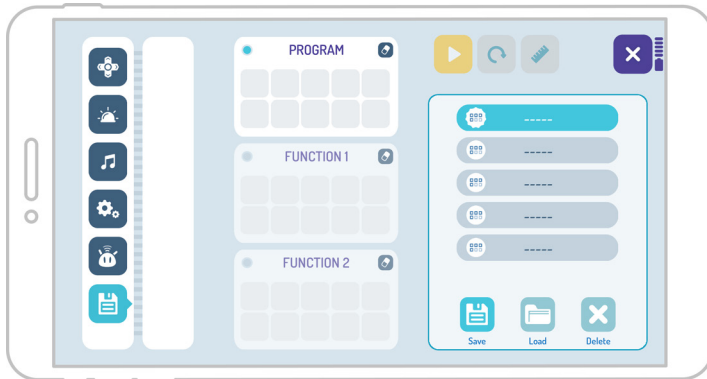
Sounds can be added in the very same way as colors.





### Interactions

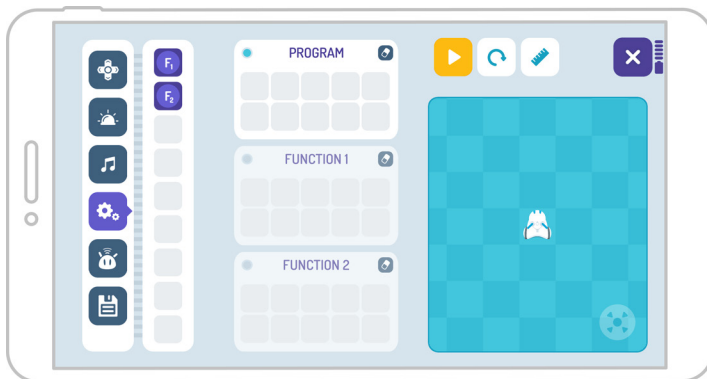
To make use of a specific sensor simply touch its icon. You can choose from the following sensors: ambient light (light/dark), touch, distance, and sound, as well as from the following time delay options: 2 and 5 seconds.



### Saving programs

Each programming interface allows you to save your created programs.

Your saved programs are stored for as long as our application is installed on your tablet.

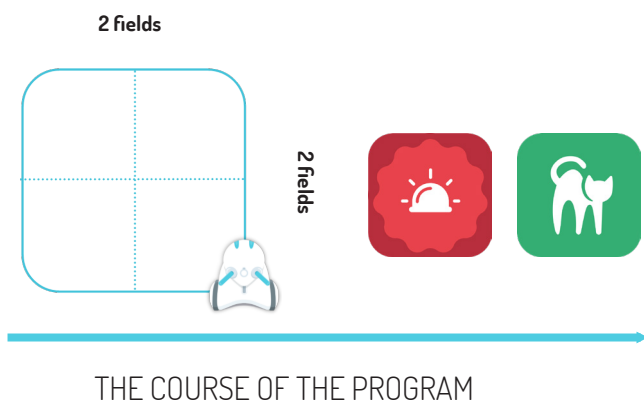


### Function

Function allows to reuse any part of a program several times.

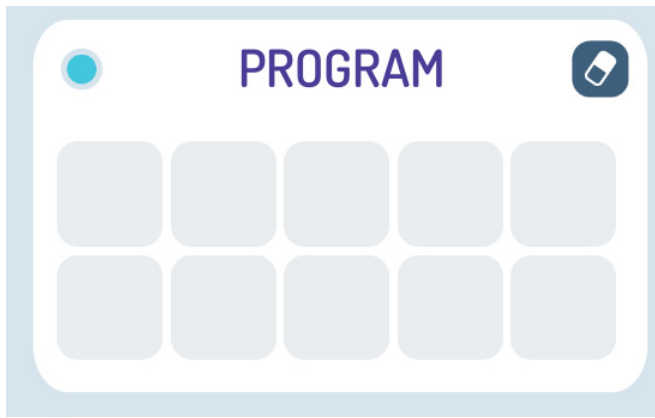
### Function usage example:

The F1 and F2 icons are shortcuts to Function 1 and Function 2 screen. Adding F1 icon to a program informs the robot to perform a specific task, i.e. a program placed in the Function 1 screen. The same rule applies to the use of F1, F2 icons.



### Task:

Photon has to travel the „square” route of the length of two fields, always turning left; then, it should change the colour of its antennae to red and make the sound of a cat.



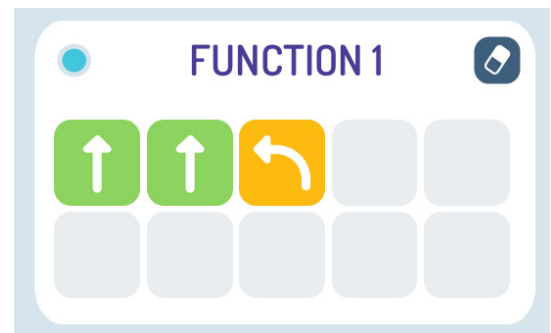
In the main program, we have 10 boxes available. It is not enough to perform the task! Therefore, we have to make use of the function capabilities.

### PROGRAM:

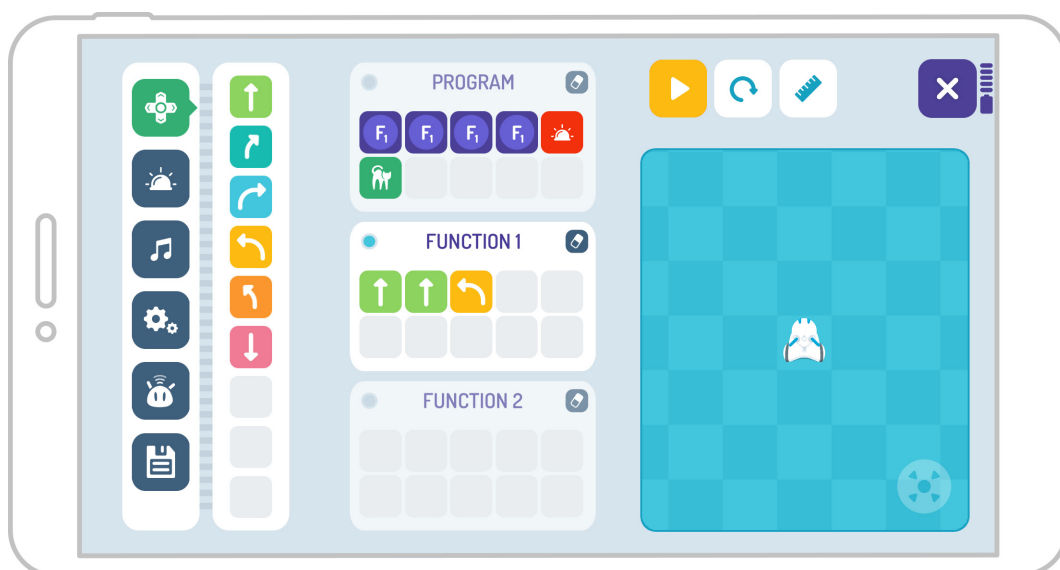


**Step 1.** Firstly, we should find actions that are repeated. In the case of a square, these are two moves forward and a left turn. If Photon performs these instructions 4 times (move forward 2 times and turn left) it will travel a square-shaped route.

**Step 2.** We put these instructions in Function 1:



**Step 3.** Then, we enter it into the main program, and, at the end, we add the change of antennae colour to green and a cat sound instructions.





**Subject:** „Meet Photon” – an introduction to our educational robot used to teach basic programming to children.

**Aims:**

- To stimulate cause-and-effect thinking,
- To familiarise children with the classroom,
- To teach left from right,
- To learn to use modern technology safely,
- To practice patience and to control emotions.

**Educational aids:**

- Photon the Robot,
- Tablet,
- Letter to the children,
- Icons of asteroids or cones,
- 4 large arrow icons or chalk/markers to draw arrows on a blackboard/whiteboard,
- Coloring books – Photon's story,
- Plasticine, paints, colored pencils, pastels, markers.

**Sample scenario:**

**OUR ROOM**

You should name the zones and briefly explain how to use them. Ask the children how they would imagine playing there. Prepare the mystery box with a bow on top in one of the play zones. Ask one child to open the box. The mystery box should contain: Photon the robot, a tablet and a letter:

“Hello, my name is Photon.

I came to planet Earth from a galaxy far, far away... Unfortunately, on the way here, my rocket collided with an asteroid. I had to land in emergency mode, but still it was a rough landing. What's worse, after landing I lost my memory and don't remember much from my past. But, I am more than happy to learn more about you and the games children play on planet Earth. Will you help me to learn new things?”

After reading this letter, present the main screen of the tablet to the children. There should be a “joystick” represented by four control arrows.

**LET'S TEACH THE ROBOT HOW TO MOVE**

Ask the children to stand in a row. Take the leading position in the row. Attach the following arrows: “up”, “right”, “down”, “left” to your blackboard. Ask the children to move in different directions as you instruct them. When you touch the right arrow, everyone turns right and goes one step (to the right); when you touch the down arrow on the board, everybody goes backwards without turning, etc.



**Note:** Depending on the free space in your room, you might need to divide the class into smaller groups.

## AVOIDING ASTEROIDS

Ask the children: What do we need to teach Photon so that he does not collide with celestial bodies in space in the future? What must he learn? The answer: proper movement. Say to the robot:

Photon, we want you to be able to avoid obstacles in the future, so that you do not bump into asteroids anymore. We will teach you how to avoid them.

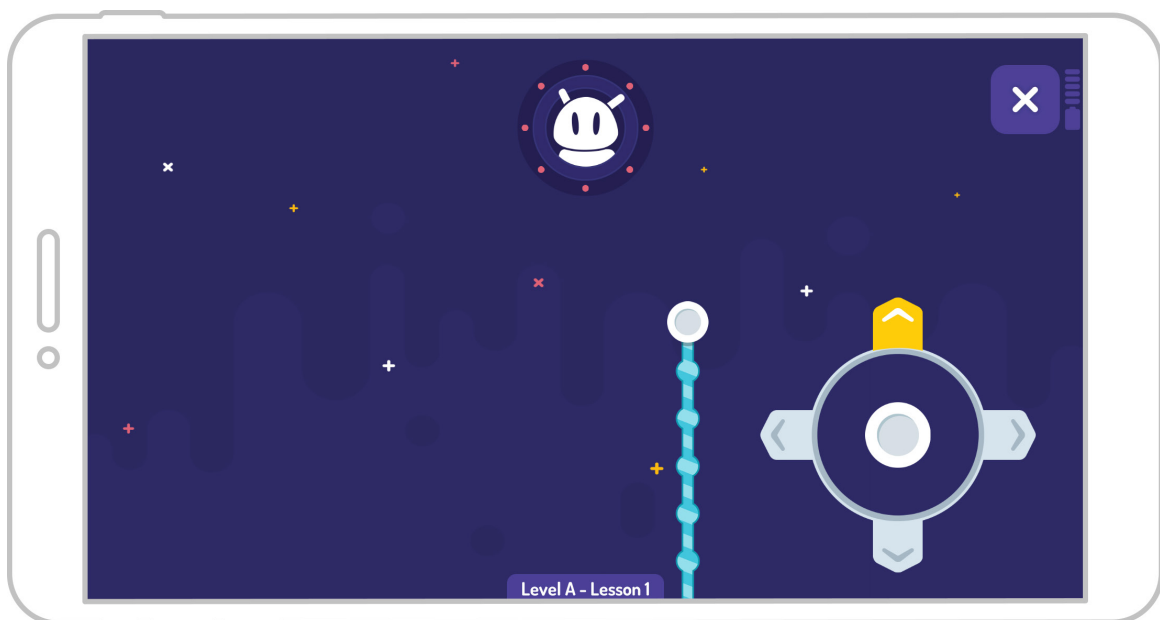
Put images of asteroids (cones) on the floor so that the children can slalom Photon around them. Each child should receive a chance to control Photon on a short distance between the cones. You could actively engage the children in this play by asking them to stand in the middle and pretend to be asteroids, i.e. have them play the obstacles to avoid.

## PHOTON'S STORY

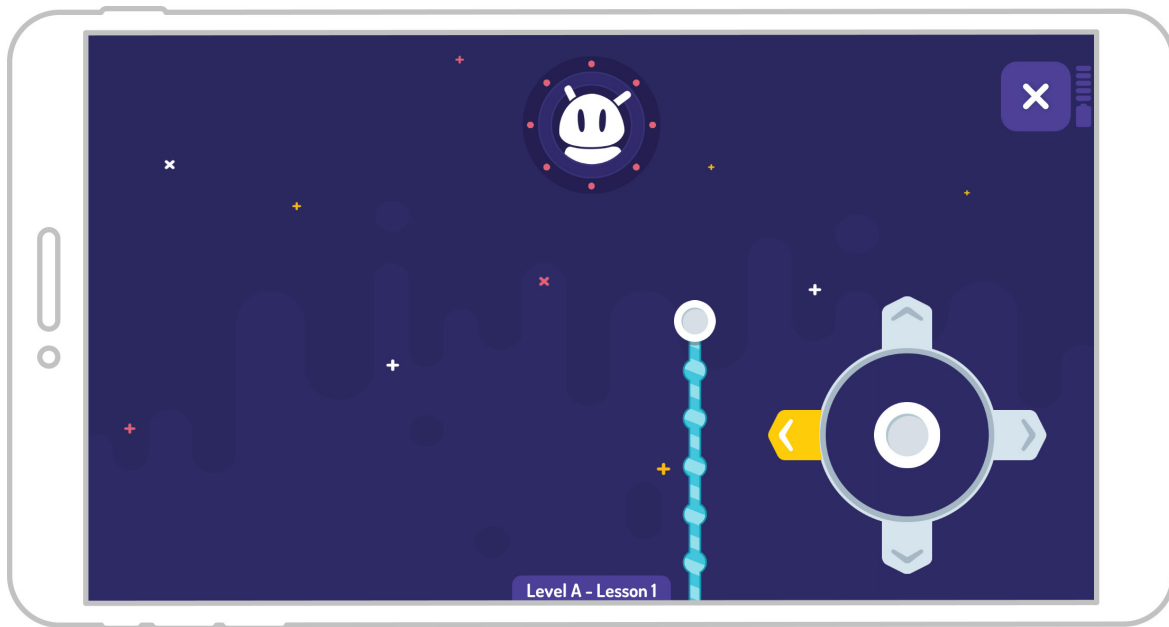
Coloring comic book. At the end of this exercise ask the children to colour the comic book depicting Photon's space travel story. The Children could also try to tell Photon's story by being creative with plasticine, paints, colored pencils, pastels, or markers.

### Sample program:

Forward movement:

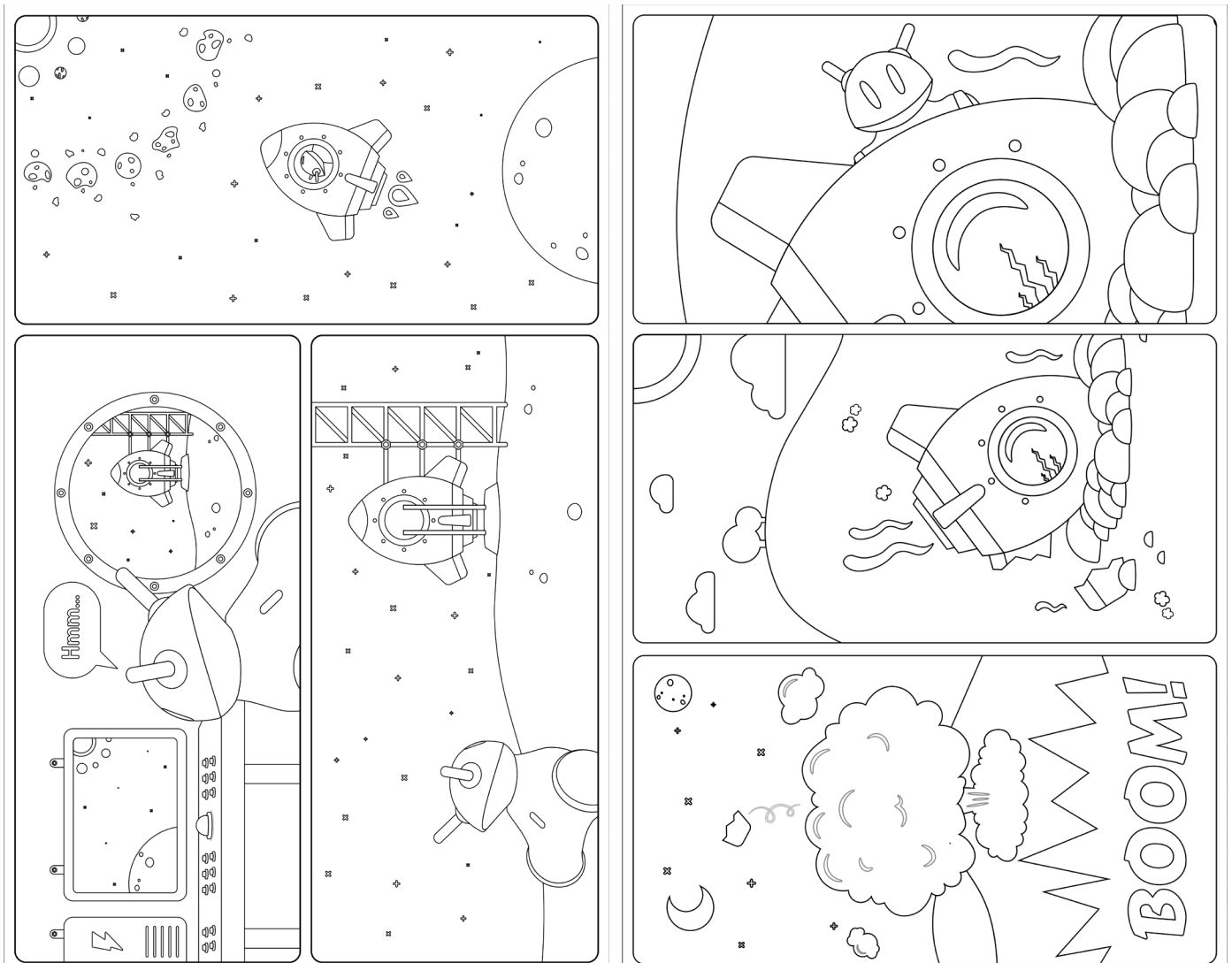


Left rotation:



**Attachments:**

## PHOTON'S STORY

Printable pdf attachments available at: [www.photonrobot.com/lesson\\_plans/](http://www.photonrobot.com/lesson_plans/)



**Subject:** „The beauty of the forest” – consolidation of basic information on plants and forest animals using Photon.

**Aims:**

- To learn how to use modern technologies safely,
- To practice top-down attention and concentration,
- To introduce the concept of a „conscious rest”,
- To help children with hearing-visual-motor coordination,
- To help in building longer, grammatically correct sentences,
- To teach telling left from right.

**Educational aids:**

- Photon the Robot,
- Educational mat,
- Tablet,
- Trays with flour or A4 sheets of white paper and a green poster paint,
- Any icons related to forests, e.g. images of animals: wild boar, deer, mushrooms, raspberry, fern, pine (large icons to be spread on the mat and a set of small icons handed over for each child),
- Audio recordings with the sounds of the forest.

**Sample scenario:**

**THE TREE**

Provide children with trays and some flour or sheets of white paper with a drop of poster paint. Ask the children to draw a tree according to the example prepared earlier. Then ask a few selected children to describe their tree to other students.

Ask the children:

- Where do most of the trees grow? (forest)
- What types of trees grow in forests? (pine, birch, oak, hornbeam, ash, lime tree, elm etc.)
- What forest animals do you know? (boar, deer etc.)
- What kind of wild but edible plants/fruit can you find in forests? (nuts, raspberries, blueberries, wild strawberries)



**Note:** This activity aims to teach small children how to „draw” with their fingers on a tablet.

**LET'S DRAW A FOREST TRAIL**

Lay out the educational mat and place the following forest related icons on it: wild boar, roe deer, mushroom, raspberry, poplar, pine. Each child should have a mat and a set of icons laid out in front of them. Ask one of the children to randomly select 3 icons. Ask the child to arrange them in any order and not to show it to others. Hand over your tablet to the child. Ask the child to plan robot's route from the first to the third icon (the robot should move in the same order as icons are set). The rest of the children should closely observe the robot's movements and mark its route on the mat, i.e. by subsequently putting down icons (starting from the left).

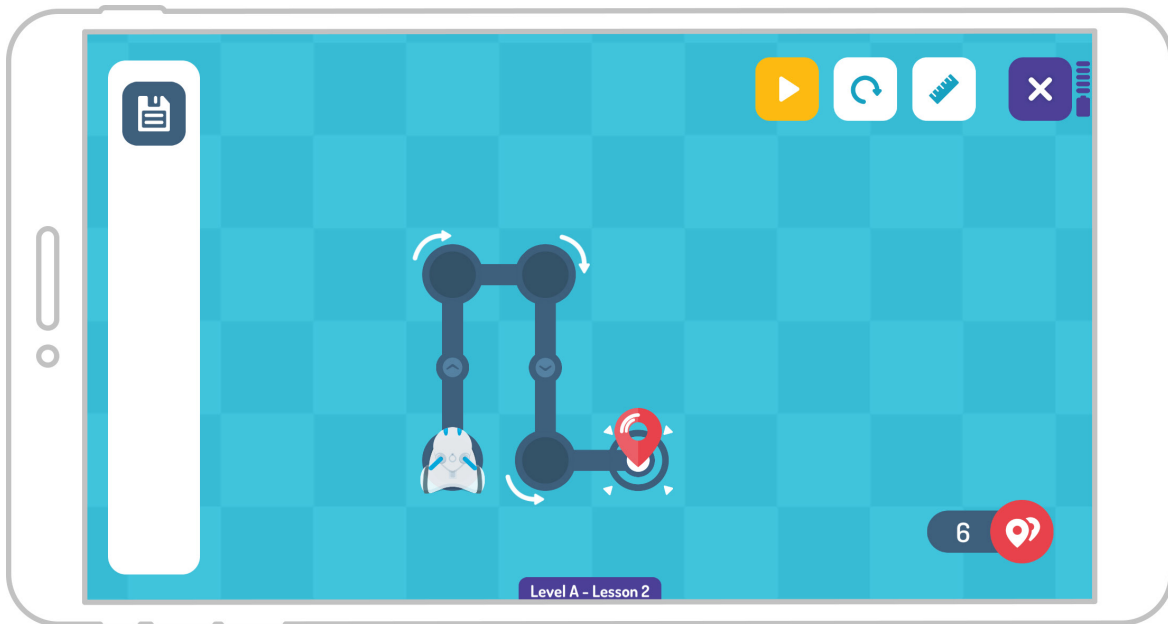
## RESTING IN THE FOREST

Relaxation while listening to forest sounds played from a CD.

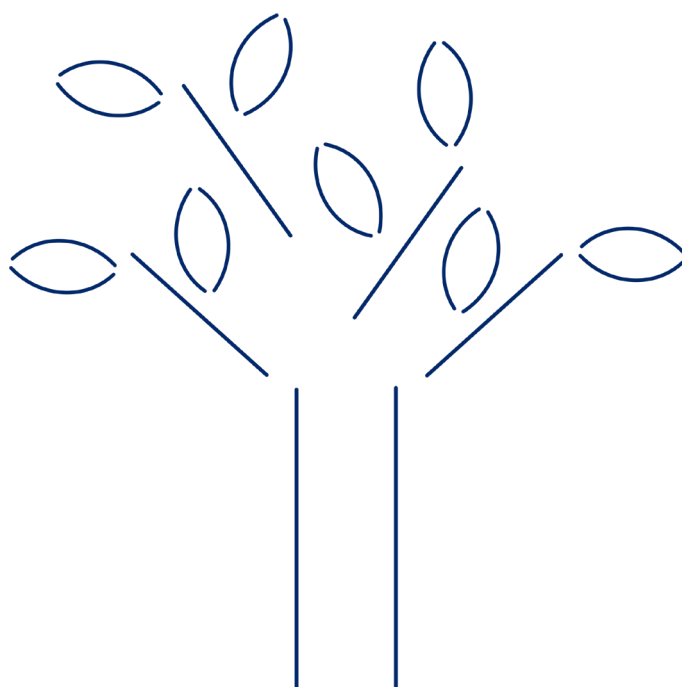
**Sample program:**

### LET'S DRAW A FOREST TRAIL

Drive through the icon of wild boar, deer and pine:

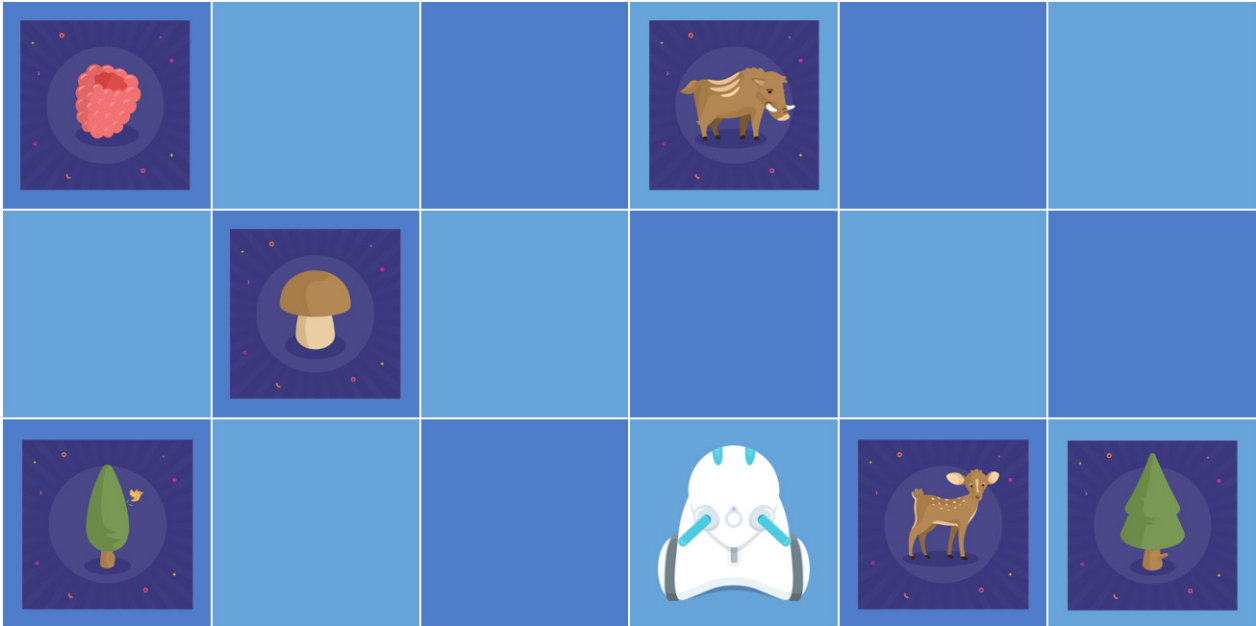


## THE TREE



Attachments:

LET'S DRAW A FOREST TRAIL







**Subject:** „Autumn in the orchard” – consolidation of information about fruit trees using Photon.

**Aims:**

- To develop interest in nature,
- To teach left from right,
- To improve reflexes,
- To learn to use ordinal numbers,
- To develop counting skills,
- To develop pre-reading skills,
- To learn to use modern technology safely,
- To practice concentrating and memorising,
- To exercise the orbicularis oris muscle and strong exhale.

**Educational aids:**

- Photon the Robot,
- Tablet,
- Colored circles (fruits): navy – 6 pieces, yellow – 6 pieces, red – 6 pieces, green – 6 pieces,
- Captions „ORCHARD”, „PANTRY”,
- Four 1-liter jars,
- Yellow and red pieces of paper,
- Straw for each child,
- Colored adhesive tape.

**Sample scenario:**

**PHOTON IN THE ORCHARD**

Ask children to close their eyes. Tell children a story.

Imagine that Photon went for a stroll in an orchard. Until now, Photon had thought that all trees and fruits were green. This trip to the orchard was a huge eye-opener. Trees were dotted with many different colours.

**Program the robot to change its ear colour to red then ask the children to open their eyes.** What do you think Photon saw on the tree? Which of the fruits is red? (cherries, apples)

**Ask the children to close their eyes again.** Let's go back to the orchard again. Our Photon went further into the orchard in search of other colours. After a while, in the next row of trees, Photon saw a lot of colourful dots. This time Photon saw ...(**Ask the children to open their eyes again. They will see navy blue ears = plums.**)

**Ask the children to close their eyes again.** Photon was very happy to learn something new. The robot learned from the farmer that another surprise awaits in the row of trees on the right. Look now at what fruit Photon saw this time. (**Check that the children have opened their eyes and see yellow ears**)

What do you think? Which fruit trees grew in this row? (pears, apples, apricots)

## FRIUT

Put a stamp or place a sticky dot on each child's hand. The dots should be in the following four colours: (green – apple, yellow – pear, blue – plum, red – cherry). Ask the children to sit down in a circle and tell them the following rhyme:

„In my garden I have a tree,  
full of... apples... as nice as they can be.”

Tell them that, as “apples” were mentioned in the rhyme, the children with a green dot on their hand should quickly get up, run around the other children and sit back in the same place. Explain that each time the rhyme is spoken, they must listen for the fruit named and the children with the matching colour must do the exercise. Demonstrate so that all the children understand what they have to do and explain that the fastest one gets the tablet and the chance to program the robot. Photon should move around and change the colour to the one visible on the child's hand. Repeat the rhyming game to involve all other colours. This should be repeated several times so that all the children understand and get to have fun.

## FRUIT IN THE PANTRY

Place 6 circles in 4 different colors in 4 rows. Place a row of 6 green circles – apples, a row of 6 yellow circles – pears, 6 blue circles – plums, and 6 orange circles – oranges. Next to the circles (representing fruits) place the following caption „ORCHARD”. In another part of the room place 4 jars. Call this place a „PANTRY”.

Divide children into teams of 3 programmers. When programmers secretly create a program on the tablet the rest should closely watch the color change and count robot's „steps”.

- Hand over your tablet to the first programmer. The child should choose any colored circle on the screen. If it is blue (plum), Photon's ears should be programmed to become blue etc.
- The second programmer should program robot's movements: specify a number of „steps” (from 1 to 6) and a change of direction after each „step”.
- The third child should run the newly created program.

Ask the “audience” to watch the robot closely. They will be picking fruit to be carried over from the orchard to the pantry. For example, if Photon's ears went blue and it made 4 “steps”, a child from the audience should pick up plum #4 from the row (counting from the left). The game should be repeated with the other teams. The child picking up the “fruit” should say a sentence with the ordinal number in it, e.g. “I am going to carry over the fourth plum to the pantry”.



**Note:** Explain to the children that the pieces of fruit have to be counted from the left and are numbered. So, if the second plum is already in the box in the pantry, the remaining plums are still labelled as the first, the third, the fourth, the fifth and the sixth. While programming movements (numbers of steps), ask the children to add a change of direction after each “step”, otherwise if the robot actions all “steps” in the same direction, there is no visible pause after each step

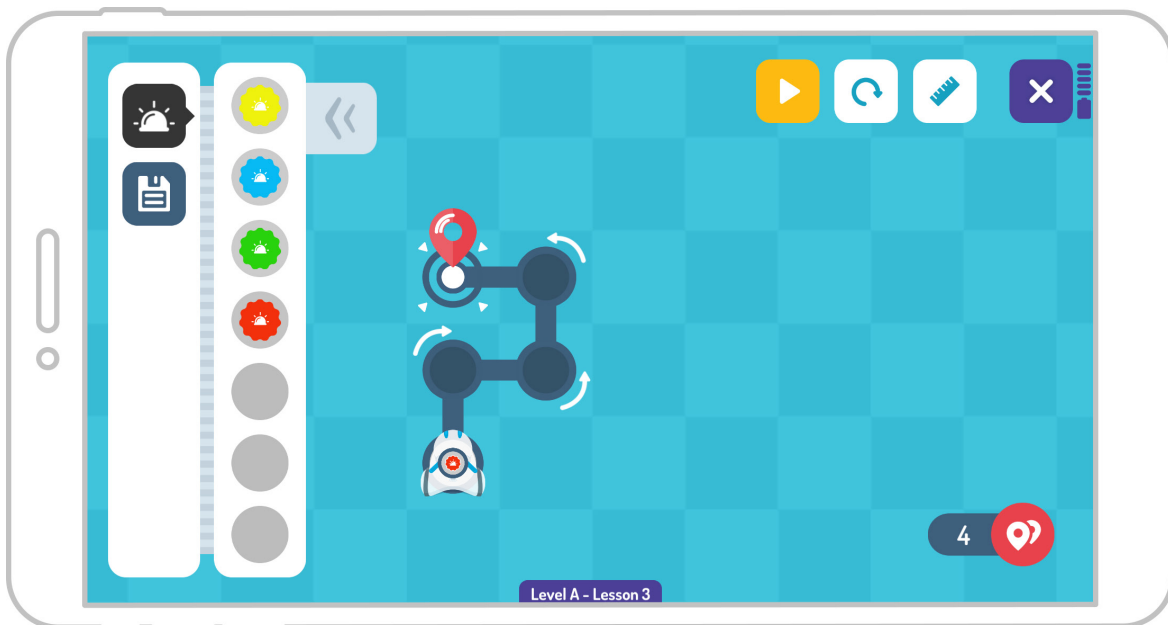
## WIND IN THE ORCHARD

Provide each child with a straw and a small piece of coloured paper. Ask the children to form coloured balls from the given pieces of paper. One group of children should be provided with red paper – apples, and the other one with yellow paper – pears. Place coloured tape on the floor to divide the teams. Ask the children to sit down. When you say Start, the children should start blowing away their paper balls across the floor in the direction of the opposing team. The balls should cross the middle line and land on the other side. Say Stop and count the remaining fruit on each side. The winning team is the team with the lowest numbers of fruit on their side.

### Sample program:

#### FRUIT IN THE PANTRY

Changing robot's ears color to red and adding movement in 4 directions:



### Attachments:

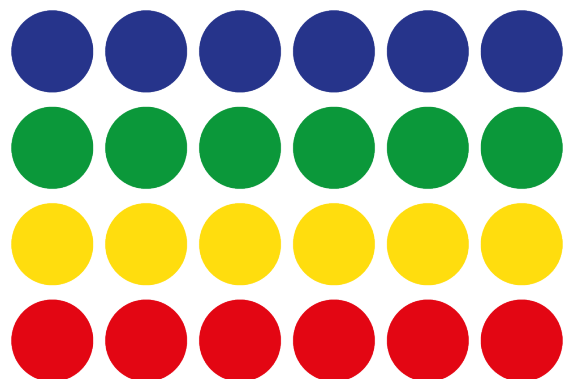
#### FRUIT IN THE PANTRY



## ORCHARD



## PANTRY





**Subject:** „Emotions” – recognizing and naming emotions with Photon, the educational robot

**Aims:**

- To learn to describe emotions,
- To learn to distinguish experiencing emotions from acting under their influence,
- To build grammatically correct sentences,
- To learn to express emotions with facial expressions,
- To learn nonverbal communication,
- To learn to use modern technology safely.

**Educational aids:**

- Photon the Robot,
- Educational mat,
- Tablet,
- Box,
- A light chiffon shawl for every child,
- Pictures illustrating different emotions.

**Sample scenario:**

**IT IS UNBELIEVABLE**

Put the pictures depicting different emotions on the board. Ask the children to describe the emotions in each picture. Ask them to describe the characteristic facial features that allow us to tell what kind of emotion is being expressed, i.e. happiness, fear, sadness, boredom and anger. Then ask the children to match specific sounds with the different emotions.

Explain that emotions are our strong feelings about certain situations, moods, or relationships with others. Emotions are neither good nor bad. Everyone has the right to express emotions, to be happy or angry. However, the most important thing is to know what we do with our emotions and how to express them without hurting people around us.

**I AM SAD WHEN...**

Lay down the educational mat. Place the previously used pictures of emotions on the mat. Ask the children to program the robot to drive over to each picture in order to learn and better understand human emotions. After starting the program, each child should finish the following sentence: “I am happy when ... (I get presents)”, etc.



**Note:** The children can program the robot to move and change colour to the one they think is assigned with a particular emotion.

## EMOTIONAL MIME

Ask one of the children to stand in front of you, a few metres away from you. Suggest playing a mime – a person who expresses feelings only with facial expressions and gestures. Program the robot using the new function – assigning sounds. Photon should drive towards the child, stop and express its emotions with a sound. The child should then guess this emotion and demonstrate it with a gesture. After the first run, show the children how the new function works on the tablet. Ask them to pair up and face each other. One child from each pair should program the robot and the other one play the mime. Time this activity. At the end of your planned time, ask the children to swap roles so that each child has the same amount of time in the opposite role.

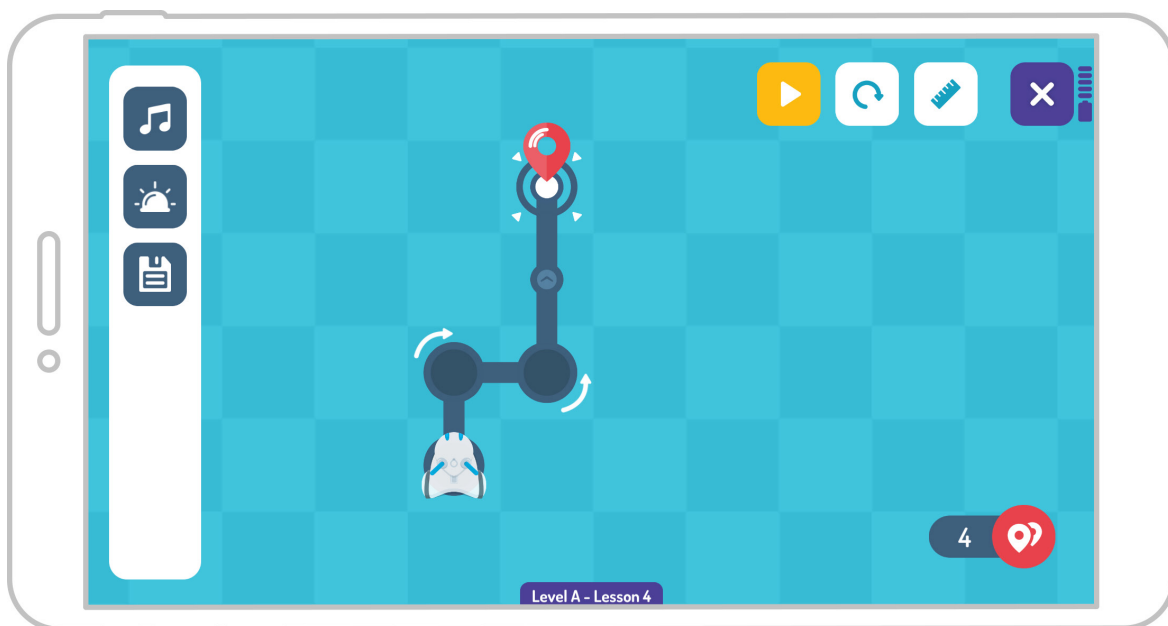
## SHAWLS

Ask the children to take one shawl each from a box. Ask them to show emotions by playing with the shawl. When you say “happiness”, the children could start to toss the shawl up with happiness, hug it or wave to you. When you say “anger”, they could throw it, jump on it or try to overstretch it. When you say “fear”, they could show a trembling shawl in their hands. When you say “boredom”, they could drag the shawl behind them in a lethargic manner. When you say “sadness”, they could gently toss it away and watch it slowly fall, or lie still on the floor covering themselves. It all depends on the imagination of children taking part.

### Sample program:

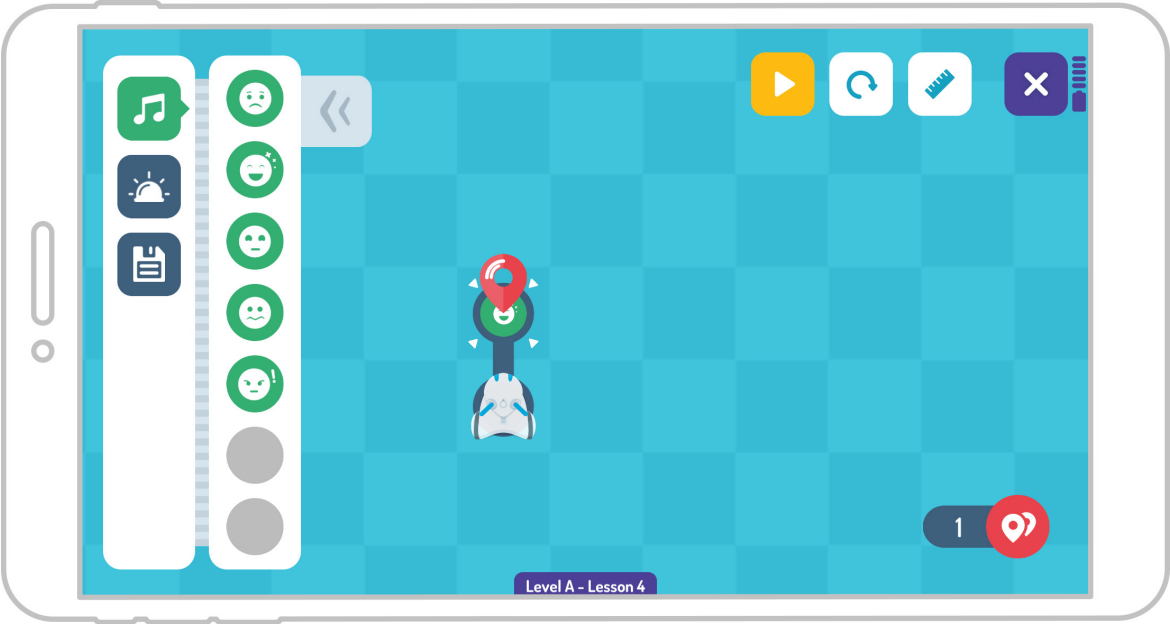
#### I AM SAD WHEN...

the route to the emotions:



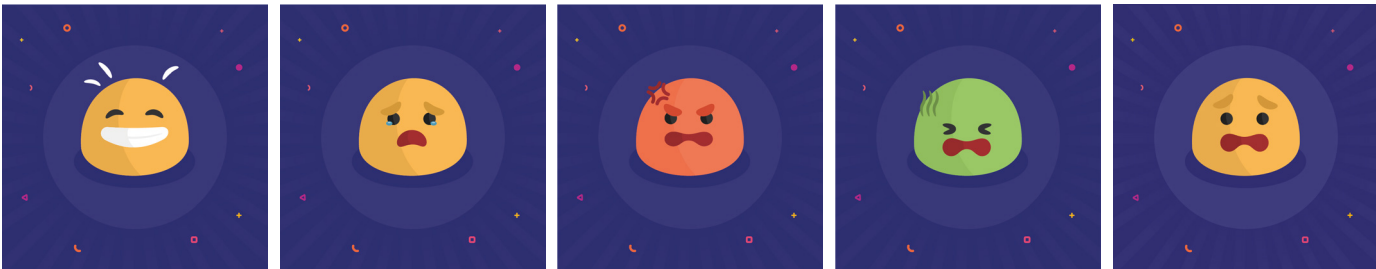
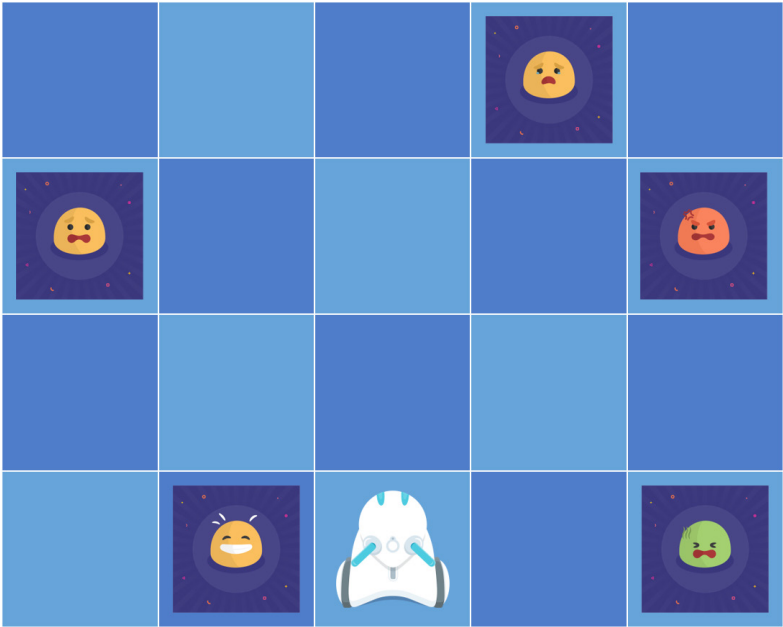
EMOTIONAL MIME

forward movement and sound:



Attachments:

I AM SAD WHEN...





**Subject:** „BirthdayParty” – experimenting with sounds using Photon, the educational robot.

**Aims:**

- To learn to use modern technology safely,
- To learn about birthday party traditions,
- To develop an auditory sensitivity and auditory competence,
- To practice listening and motor coordination,
- To practice following rules,
- To encourage ending unfinished stories.

**Educational aids:**

- Photon the Robot,
- Educational mat,
- Tablet,
- Balloons,
- Marker for writing on the balloons,
- Pea seeds,
- Rice grain,
- Wooden beads,
- Funnel.

**Sample scenario:**

**A BIRTHDAY PARTY**

Take an inflated balloon and draw eyes, nose and a smile on it. Start telling the following story to the children:

Far, far away, in a beautiful castle, a small balloon was floating up by a crystal chandelier. The balloon was hung on a piece of string together with other balloons, and was admiring a group of children laughing and dancing as they celebrated the princess's birthday. Suddenly, as new guests entered the ballroom, a gush of strong wind rushed through the open castle gates. The wind whistled, whirled and snatched the balloon. The beautiful ballroom was left behind and the balloon flew into a dark, starry night...

At this point the teacher interrupts the story, passes the balloon to the next child sitting in the circle. Now the child with the balloon continues the interrupted story, and at a certain logical point interrupts it again to pass the balloon to the next child who should continue the story. At the end, when all had a chance to speak, encourage children to talk about their experiences of celebrating different Birthday Parties.

**THE BALLOON ORCHESTRA**

Divide the children into 4 teams. Provide each team with balloons. Provide all but one team with the items to fill their balloons with. Give different items (peas, rice, wooden beads) to different teams. Ask the children to fill their balloons, inflate them and tie them up. Help them to do this. Ask the team with no filling to simply inflate their balloons but not to tie them. They have all now created musical instruments. Tell the children to create a “carnival orchestra”. The children with the filled balloon should try to make different sounds by simply shaking, tapping and stroking the balloons. The children in the team with the empty balloons should make sounds by stretching the mouthpieces of the balloons. By slowly letting the air out they will make a lot of whinnying and squeaky sounds.

## WHAT MUSIC DOES OUR ROBOT LIKE?

Lay down the educational mat. Ask 10 children to stay by the mat with their musical instruments. The other children should program the robot in turns. Ask the children to program Photon to make a sound after passing by each of the musical instruments. By playing a sound, Photon would be telling us whether the sounds created by the given “instrument” appeals to him, scares him or makes him angry. The first child should discover by now that an emotion icon (🤨) has appeared on the screen. All the children should try to guess its meaning. Explain to the children what the sound sensor is. Create a program using the following logic: use the sound sensor (ask a child to make some noise with their balloon), add movement towards the child who used the “instrument”, the robot plays a selected sound.

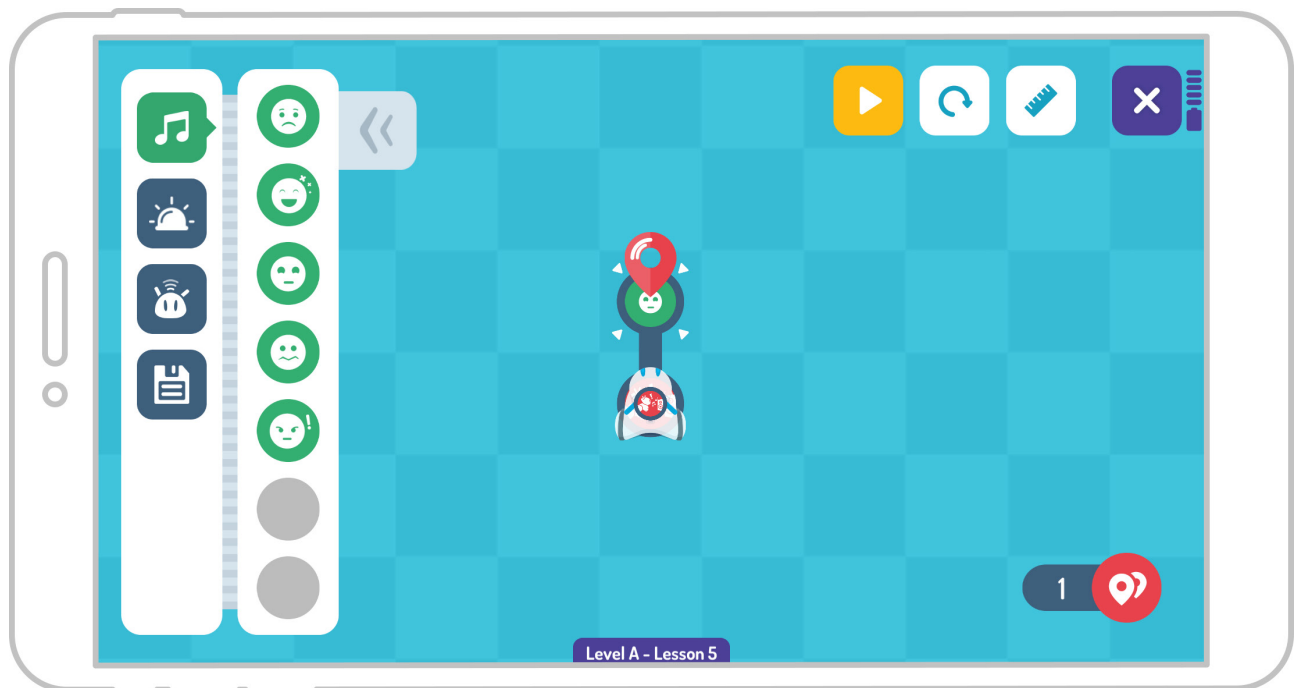


**Note:** Please explain that every time the robot stops, it is expecting to hear a sound and only one selected sound at a time. So only one child at a time should make a noise.

### Sample program:

## WHAT MUSIC DOES OUR ROBOT LIKE?

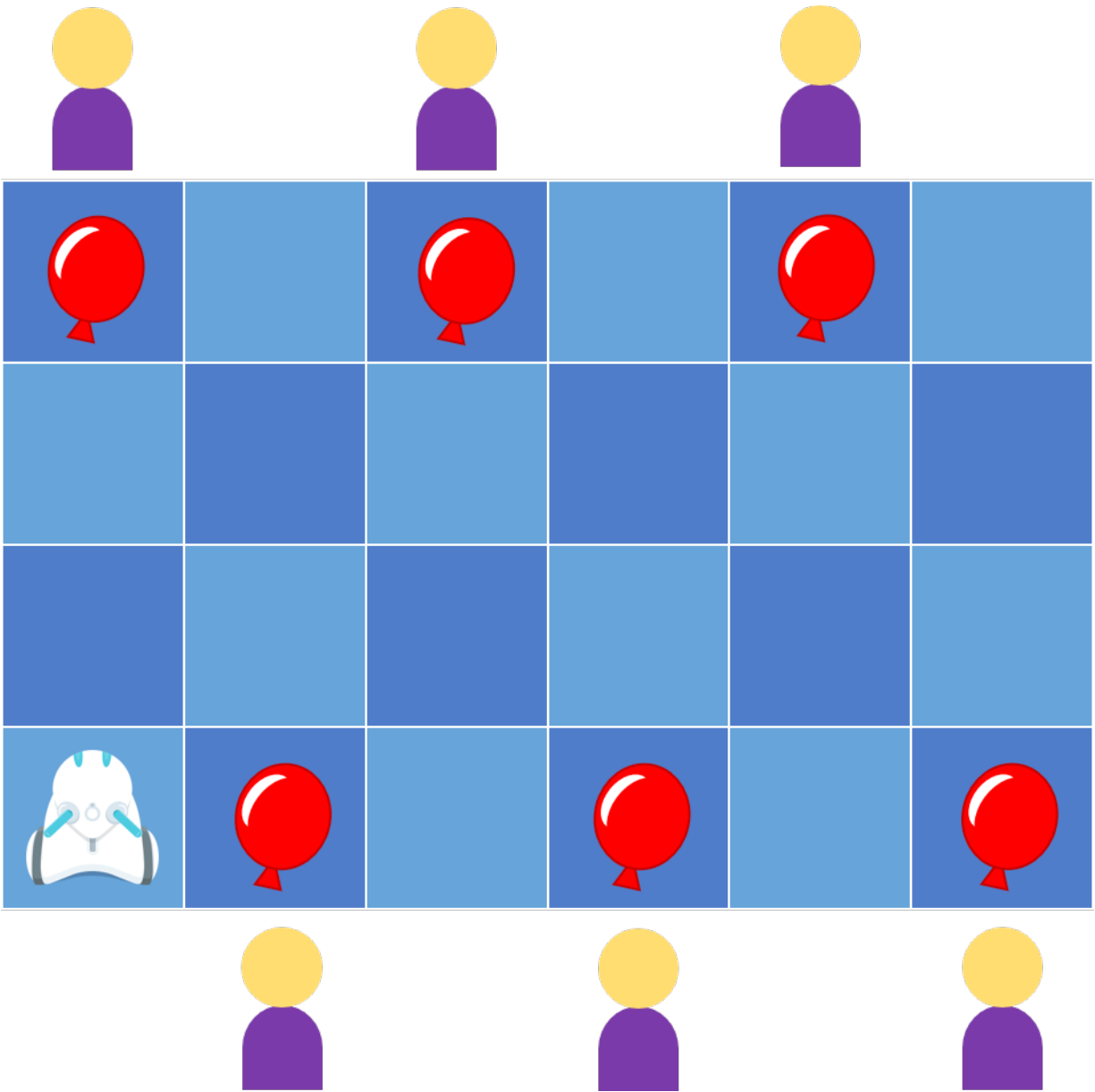
Robot approaching the first child:





Attachments:

THE BALLOON ORCHESTRA





**Subject:** „Our Little Friends” – learning about pets with the use of Photon, the educational robot.

**Aims:**

- To learn to use modern technology safely,
- To learn to care about the pets,
- To develop spatial awareness,
- To practice visual and auditory perception,
- To improve counting skills.

**Educational aids:**

- Photon the Robot,
- Tablet,
- Educational mat,
- Images of mice (x5),
- Captions: START, FINISH.

**Sample scenario:**

**CAT CATCHES MICE**

Spread the images of the mice around the mat. Ask the children to pair up. The children should plan a route which helps the cat to catch exactly 2 or 3 or 4 or 5 mice on the way to the finish line. In addition, Photon should change its colour to the colour of their choice. Before you program each mouse, use the sound sensor to move on. The children should program the robot together as a team of two. Immediately before running the program, one child from each pair should stand a bit closer to the mat. When the robot stops in front of a mouse, the child closest to the mat should imitate a mouse. Making the sound should trigger the robot to continue the program.

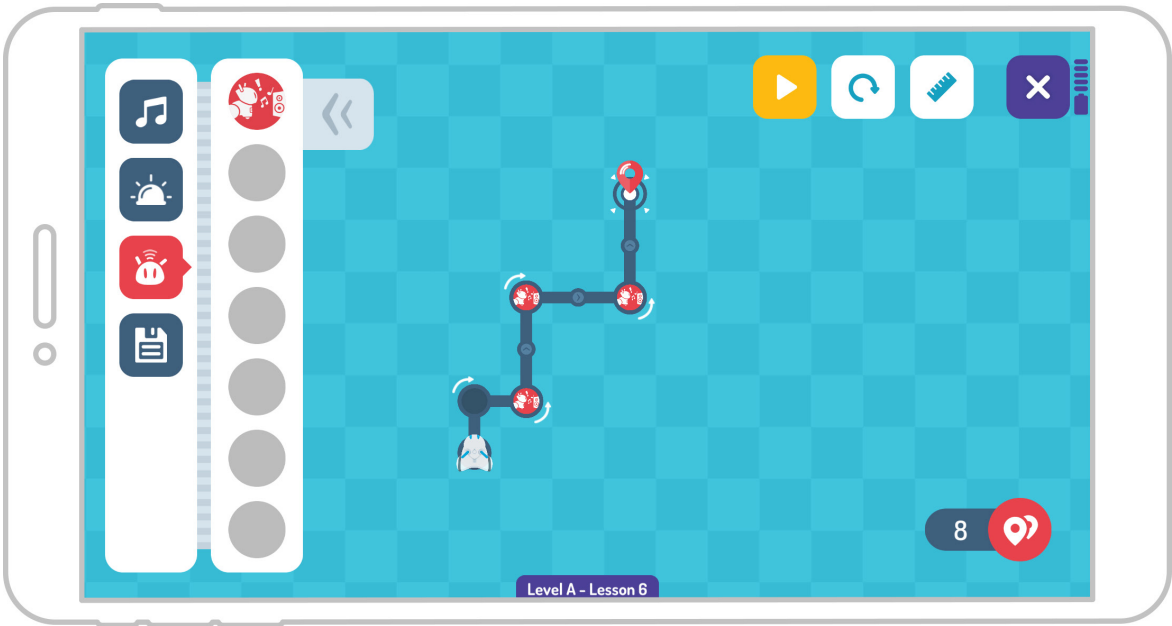
**PET IN A TUNNEL**

Ask the children to stand astride in a line, one after another, in order to create a tunnel between their legs. One of the children should stand up with the tablet and program Photon so that it moves forward in the tunnel, up to 3 “steps”, and then makes the sound of a cat or dog. After stopping and making the sounds in the tunnel, the children from the back of the line (those behind the robot) should run to a designated place in the room and pretend to be the animal they heard. The child who is now at the beginning of the line takes the place of the programming child. Continue the game.

Sample program:

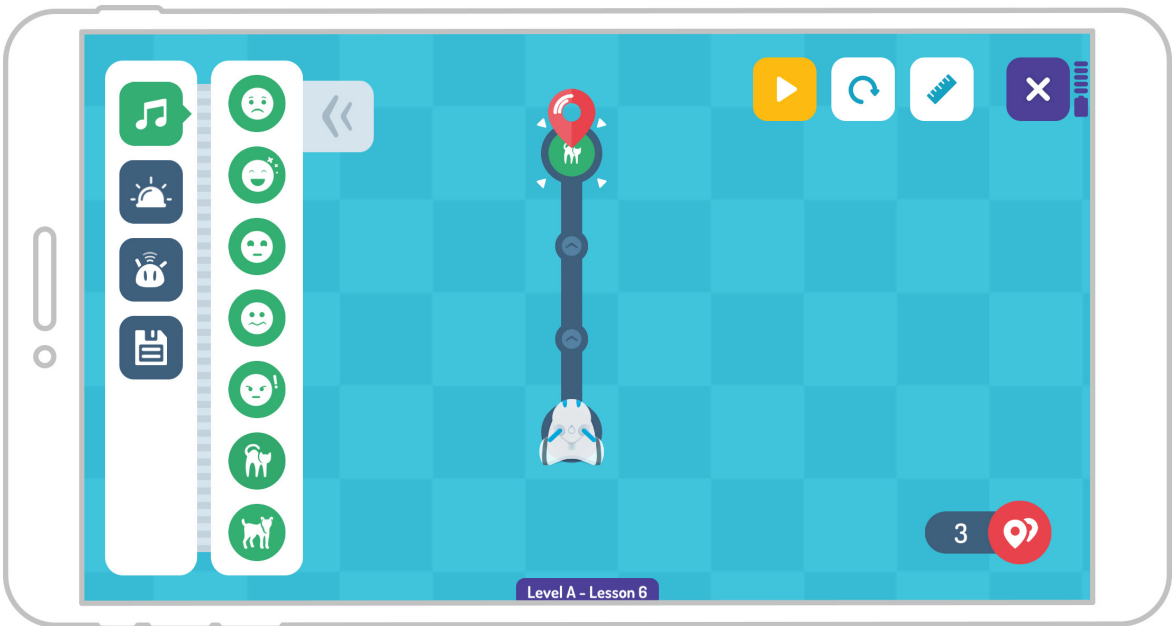
CAT CATCHES MICE

Creating a route and using the sound sensor:



PET IN A TUNNEL

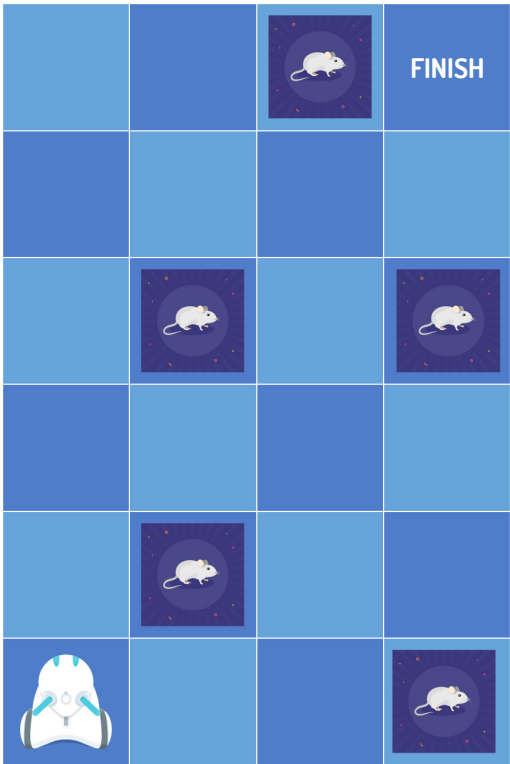
Creating a route and playing sounds in the last stage.



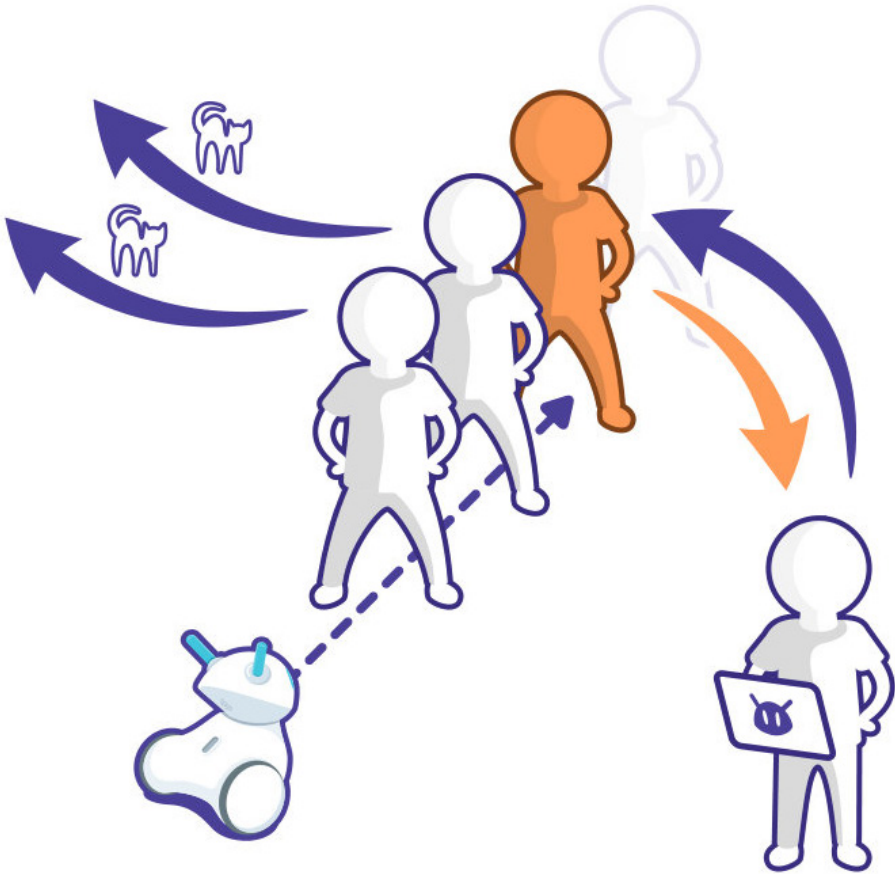
Attachments:



CAT CATCHES MICE



PET IN A TUNNEL





**Subject:** „The Spring is coming” – consolidation of knowledge on the changes taking place in nature during Spring with the use of Photon, the educational robot.

**Aims:**

- To learn to use modern technology safely,
- To learn to understand proverbs,
- To create word associations with specific concepts,
- To translate visual sequences into motor sequences,
- To practice top-down attention and memorization,
- To improve hand-eye coordination,
- To develop concentration and auditory perception skills.

**Educational aids:**

- Photon the Robot,
- Tablet,
- Educational mat,
- Printed symbols of arrows,
- Printed weather symbols: sun, rain, storm, snow.

**Sample scenario:**

**SPRING IS THE TIME OF THE YEAR...**

**„Spring is the time of the year, when it is summer in the sun, and winter in the shade.”**

**Charles Dickens**

Ask the children if they have ever been on holiday to a cold country. What was it like? Was it windy? Did it snow? Ask the children if they have heard a thunderstorm. What was it like? What was the rain like? Were they frightened? Read the proverb again and ask the children to explain its meaning. Once the children understand the proverb, hang printed arrows on the board and explain their meaning. Ask the children to focus on the weather characteristics. Explain the rules of the game to the children. On words:

„storm” – they should take a step forward,  
„snow” – turn to the right,

„sun” – step back,  
„rain” – turn to the left.

Ask children: „Can we compare spring to soup? Yes, we can, because weather in spring is a mixture of sun, rain and sometimes snow, all mixed together like vegetables in a soup. Please stand in front of me in a row. I will now be preparing soup. I am adding some sun, then the storm to the pot. I am adding two pinches of snow and three teaspoons of rain,„

Initially it is difficult for children to turn without taking a step. After the first correctly performed sequence, choose a child to help you prepare the soup. Perform the movement sequence, as directed, together with the rest of the group.



**Note:** The arrow symbols are taken from the application and are supposed to introduce the children to the new programming interface.

### SIGNS OF SPRING

Ask six children to sit around the educational mat. Give one of them the robot and tell them to turn their back to the others. Ask another child to say one word associated with SPRING. The child holding Photon has to identify the speaker by his/her voice. The guessing child cannot say aloud who he/she thinks it is. Ask this child to put Photon on the mat and program its way to the identified person. If the guess is correct, choose another pair of children. Again, appoint the speaker and the guesser. Continue the game.

### SPRING WAKES UP NATURE TO LIFE

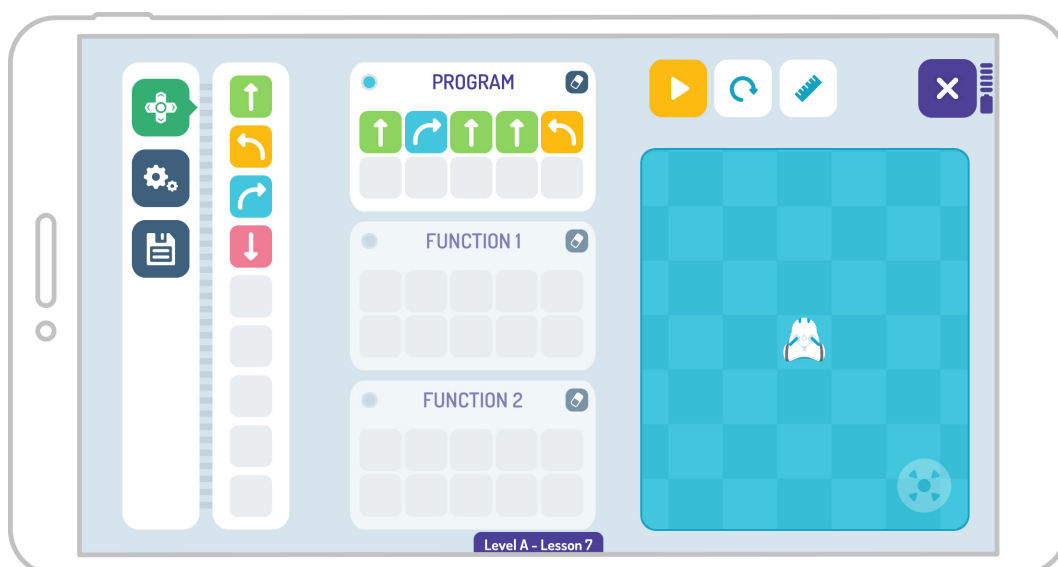
Ask the children to stand in a circle, and you stand in the middle. Take Photon and stretch out your hands in front of you. Tell the children that today Photon will become an assistant of the Lady Spring, whose task it is to wake up hibernating animals and bring plants back to life. Turn around with Photon and point at a child of your choice. Ask the child to use mime the following:

A bear waking up from sleep  
Leaves bursting out of buds and appearing on trees  
Birds coming back from warm regions of the world  
Frogs waking up and jumping for joy  
Sun gently warming up our faces  
Flowers turning towards the sun  
Children have fun playing in the playground.

### Sample program:

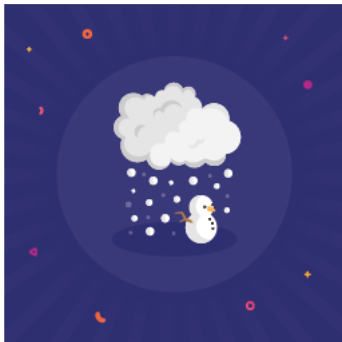
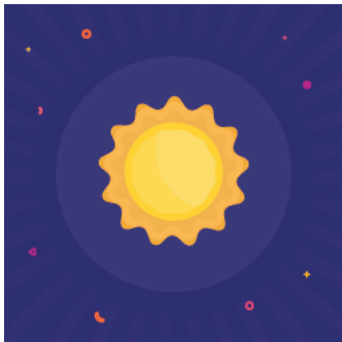
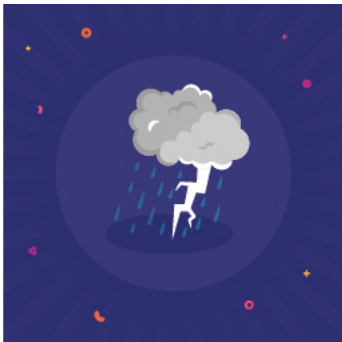
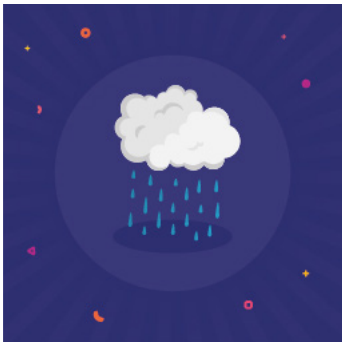
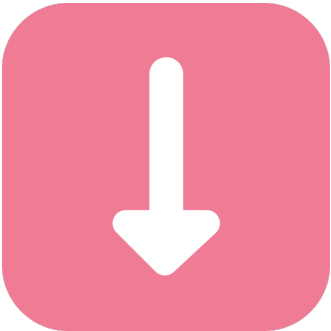
#### SIGNS OF SPRING

robot's path to the „speaker“:



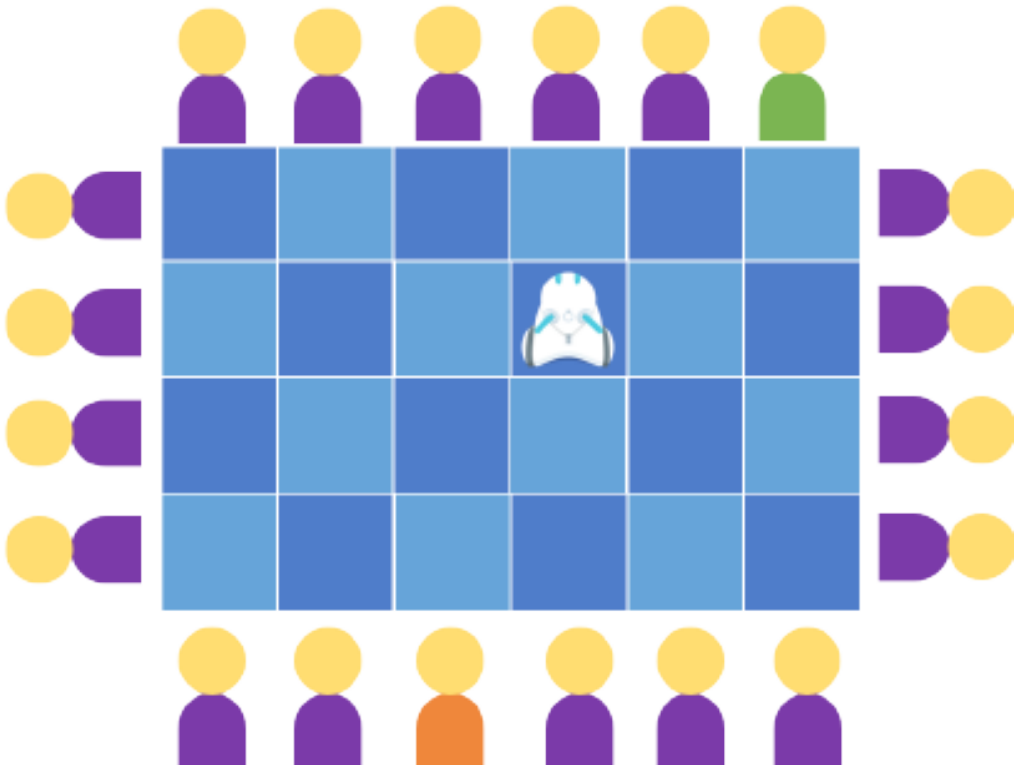
Attachments:

SPRING IS THE TIME OF THE YEAR



SIGNS OF SPRING

FLOWER





**Subject:** „Flowers of the world” – learning names and appearances of common flowers using Photon, the educational robot.

**Aims:**

- To learn to use modern technology safely,
- To practice patience and to control emotions,
- To introduce atlases and encyclopedias as sources of reliable information,
- To learn to breath evenly and develop mindfulness,
- To learn how to work in a team.

**Educational aids:**

- Photon the Robot,
- Tablet,
- Atlases and encyclopedias,
- Images of regional and international flowers.

**Sample scenario:**

**THE RAINBOW MEADOW**

Show children an atlas of flowers, individual pictures or put up a board with a flowery field (e.g. tulips in Amsterdam, lavender, daffodils, frangipani, orchids, sunflowers, etc.) It is important to present flowers in seven colours. Ask the children to shout out the colours of the flowers they see. Example: red (poppy), yellow (daffodil/sunflower), green (orchid), blue (forget-me-not), purple (lavender), orange (Jerusalem artichoke), pink (frangipani). You can help with naming flowers and adding colours. Ask the children to pair up to teach Photon colours and flowers. Ask one child to say the name of one flower and to show it on a picture. Select another child to program Photon's colour change to the mentioned colour.

**BOUQUET FULL OF FLOWERS**

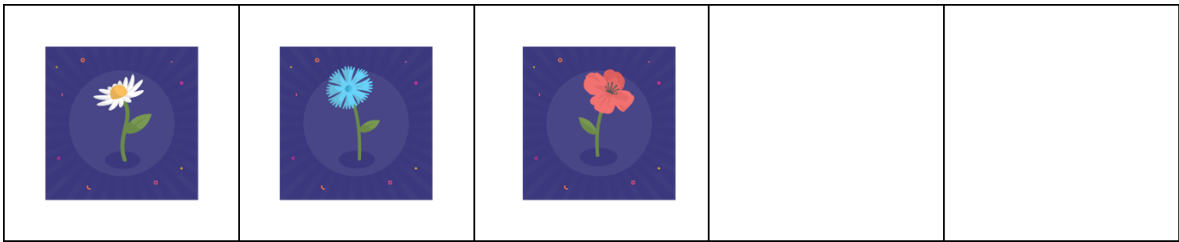
Divide the children into 3 teams of 3 and 4 teams of 4. Lay down the 5x3 educational mat and icons of previously discussed flowers. Ask the children to create bouquets to brighten up the room.

Teams will draw colourful cards. Depending on what colour they get, they will receive different combinations of pictures they see on the mat. Each person in the team should program Photon's path from one flower to the next. The last person from the team should also program a colour change to the one you have drawn. While Photon passes the flowers, the team should loudly name the flowers being collected for the bouquet (e.g. poppy, rose, frangipani) and then the colour. On completion of the route, the team should present their task card to others in order to verify their program.



poppy, bluebottle, chamomile – red  
bluebottle, poppy, chamomile – orange  
chamomile, bluebottle, poppy – yellow  
sow-thistle, bluebottle, chamomile, poppy – green  
poppy, sow-thistle, chamomile, bluebottle – blue  
chamomile, poppy, bluebottle, sow-thistle – indigo  
poppy, bluebottle, sow-thistle, chamomile – purple

Examples of team tasks:



**Note:** Please adjust the picture sequence to the number of children in the group. This task was designed for 25 children.

TINY FROG ON A MEADOW

Mindfulness Based Stress Reduction (MBSR) game Ask the children to sit comfortably on the floor. Tell them to close their eyes and imagine sitting in a colourful, fragrant meadow or field like the ones they saw in the pictures.

Apart from us in this colourful meadow with flowers and juicy green grass, there is someone else ... a tiny frog. (Significantly slow down your speech). The frog is a unique animal. Frogs can jump very far, but also can sit still and calm. The frog knows exactly what is happening around it, but does not rush and does not move. It is very calm and sits still. It breathes slowly. It does not get tired. It does not get crazy ideas right away. It sits calmly and breathes. You can see how the frog’s belly rises and falls. When the frog inhales air, its stomach becomes slightly larger. When it exhales, its stomach shrinks. It goes up and down. Just like your tummy. Close your eyes. Focus on your breathing. Put your hand on your stomach. Do not open your eyes. Feel how you breathe. Your belly is rising and falling. You are calm. If a frog can do it, then you can do it too. All we have to do is to focus on breathing ... Oh yes, great. You are focused like this little frog. You know that a lot is happening around, but you focus on not reacting. Breathe peacefully. In a moment, you will hear a bell. It will be a sign that we can return to our usual activities. Congratulations! You are as calm as a little frog. (The bell goes off)

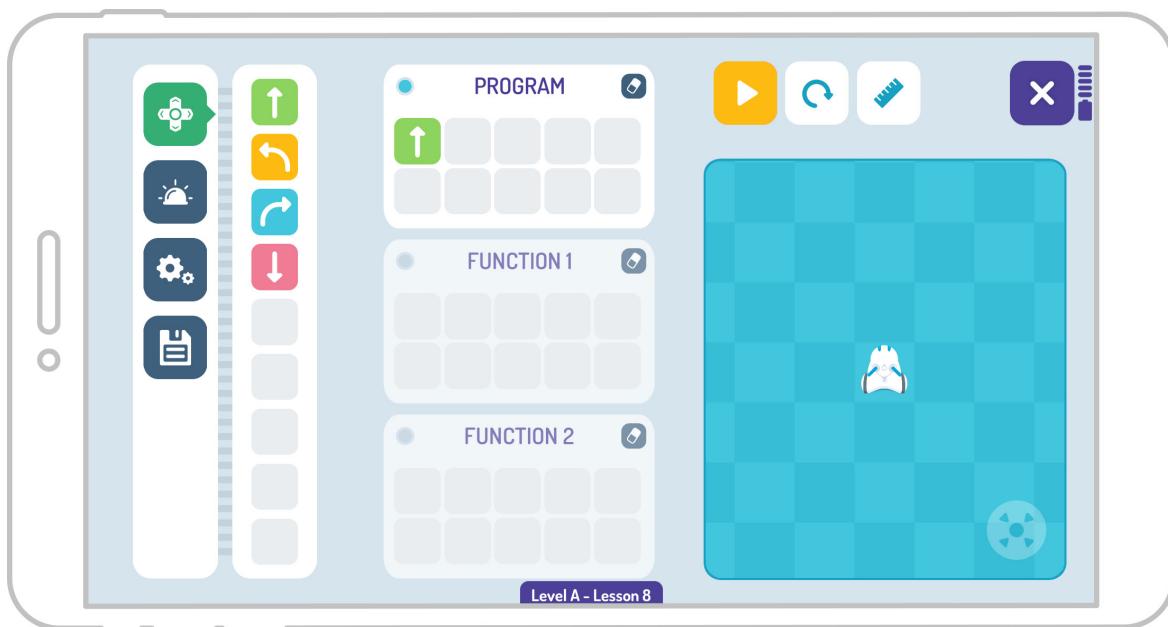


**Note:** This exercise is based on a relaxation method from the book “Sitting Still Like a Frog: Mindfulness Exercises for Kids” written by Eline Snel.

**Sample program:**

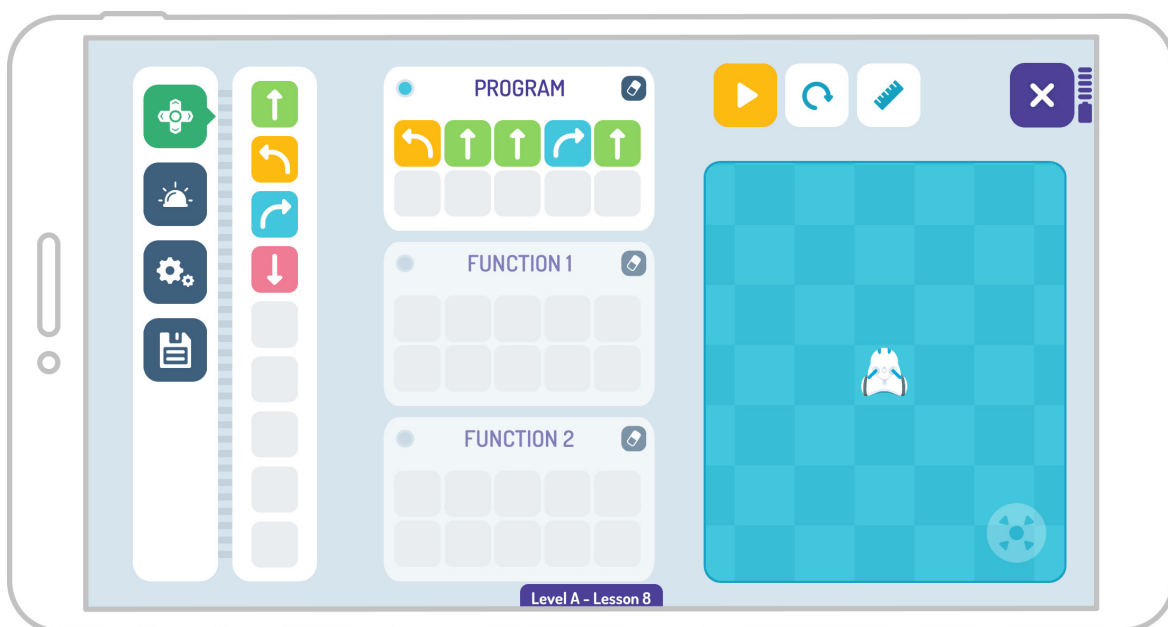
### BOUQUET FULL OF FLOWERS

the first child:



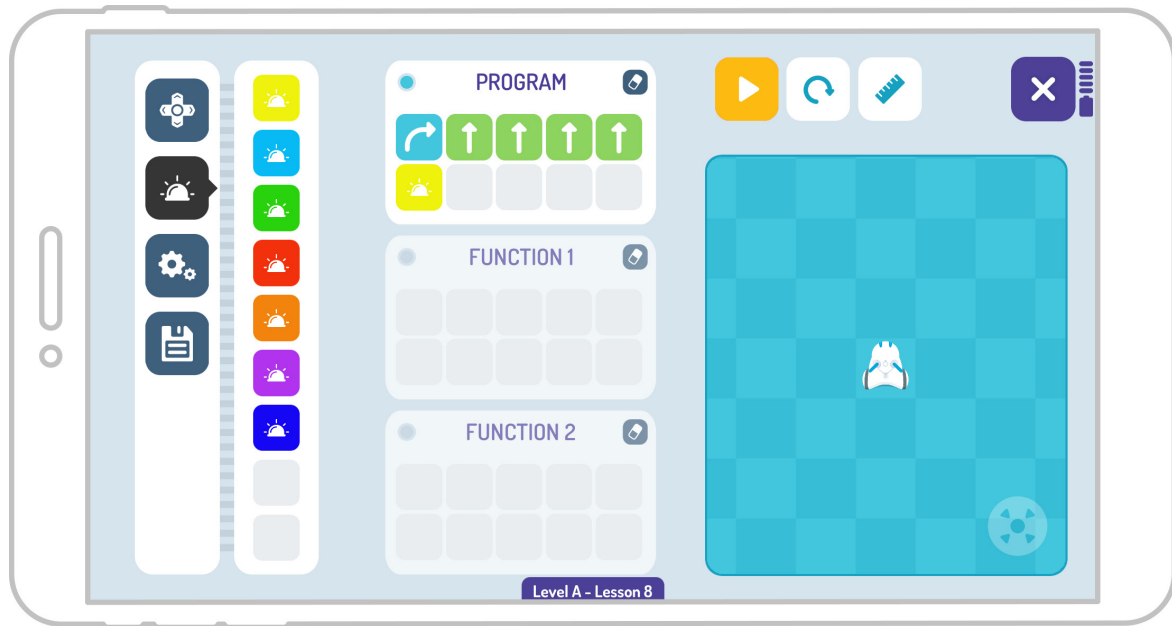
### BOUQUET FULL OF FLOWERS

the second child:



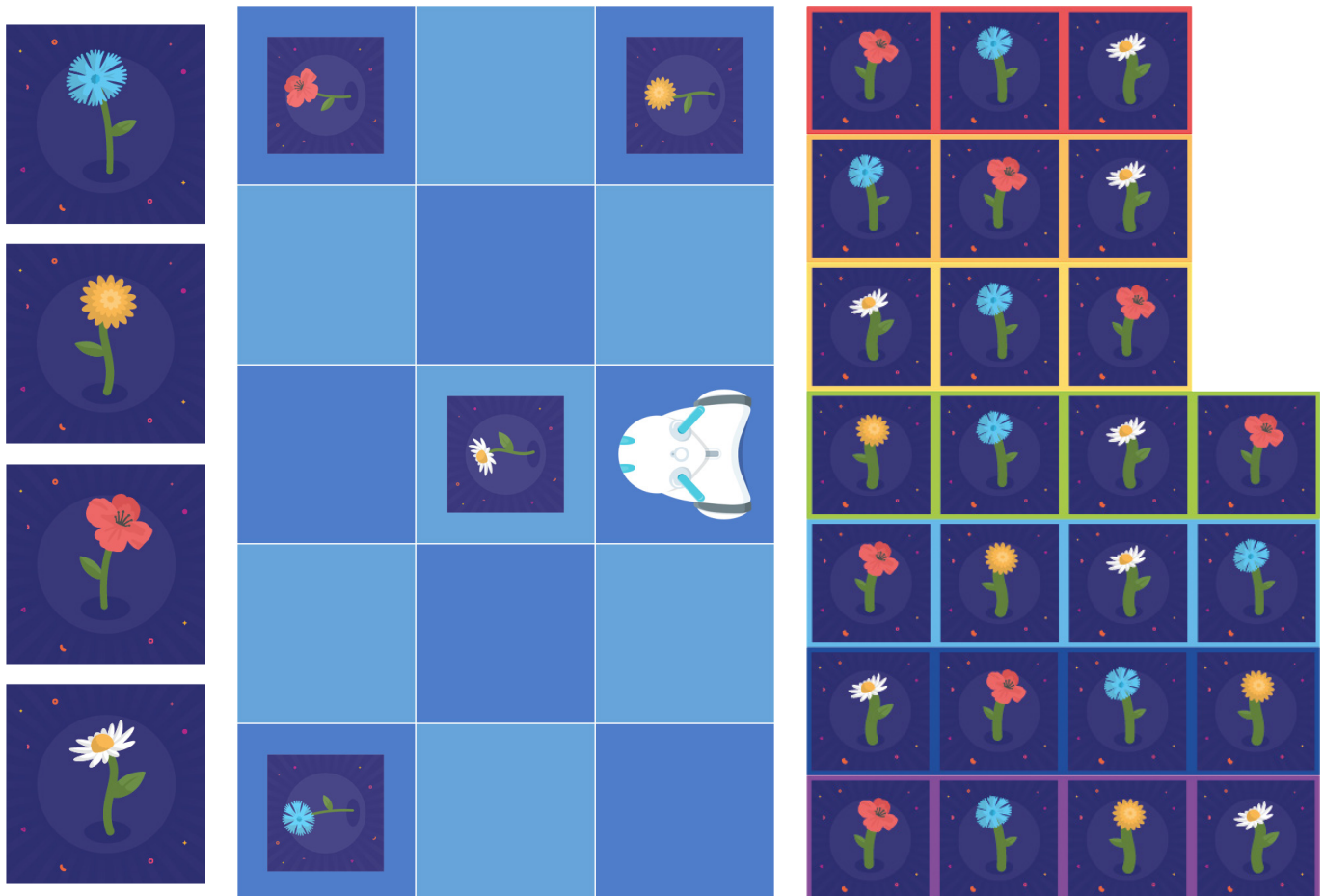
## BOUQUET FULL OF FLOWERS

the third child:



Attachments:

## BOUQUET FULL OF FLOWERS





**Subject:** „The countryside” – consolidation of knowledge of farm animals with the help of Photon, the educational robot.

**Aims:**

- To learn to use modern technologies safely,
- To learn about farm animals: horse, cow, pig, sheep, hen,
- To learn new vocabulary by naming animal shelters,
- To practice fine motor skills,
- To translate auditory representations into movement representations,
- To further practice visual sequences,
- To learn how to consciously control the kinesthetic reactions of the body,
- To practice patience and to control emotions.

**Educational aids:**

- Photon the Robot,
- Tablet,
- A4 sheets of white paper for each child, coloured pencils.

**Sample scenario:**

**ON THE FARM**

Ask the children to stand in a circle, and you stand in the middle. Turn around and point at a specific child. Ask them to pretend to be an animal of your choice. The children on the right and left of the selected child must come together to create a figure representing the mentioned animal.

**Hen:** The child standing in the middle should rest their hands on their hips with their elbows sticking out to form wings. The children on either side squat and pretend to be chicks. All of them cackle.

**Horse:** Ask the child standing in the middle to stretch both arms behind their back. Ask the two children on either side to stand in a row (shoulder to shoulder) behind the centre person and join their hands with the hands of the centre person standing in front of them. They have made a horse-drawn carriage. Ask the front person to neigh.

**Cow:** Ask the child standing in the middle to get on all fours. The children on either side should imitate cow horns and put one each on each side of the centre person's head (to make a horn, join together the index and middle finger). Ask the child in the middle to moo.

If the centre child or the children on either side do not react quickly enough or forget to take part in creating a figure of the animal or make a mistake, they will be excluded from the game. After a few runs, engage Photon to this activity. Program the robot so it drives over to a child and makes a sound of an animal for movement interpretation. At the end, explain that Photon learned something new today – animal sounds.



**Note:** Practise this activity several times before introducing the elimination aspect of it .

### PIGSTY, STABLE OR A COWSHED

Divide the children into five teams. Provide each child with a sheet of white A4 paper and some coloured pencils. Ask the children to draw one farm animal each on the provided piece of paper. Each team should draw a different animal: the first one – pigs, the second – horses, and the others – sheep, chickens and cows. Put the first 5 drawings on the floor and arrange them into some sort of a road. The animals should be arranged in the following repeated sequence: sheep, cow, horse, pig, hen. Tell the children the sequence so that they can arrange the rest of the drawings by themselves, i.e. each child adds their own drawing to the paper road.

### PIGSTY, STABLE OR A COWSHED

Ask a selected child to program Photon to drive along a part of the road (up to 3 lengths). Wherever Photon stops, it should make a sound of an animal from the drawing where it stopped. When the robot stops on a drawing of a hen, choose a child to describe its appearance, diet, name of shelter, etc. The information cannot be repeated. Give Photon to this child, as they will have to create the next program.



**Note:** If the road ends, but not all children have yet participated in the game, turn Photon around and continue back down the path.

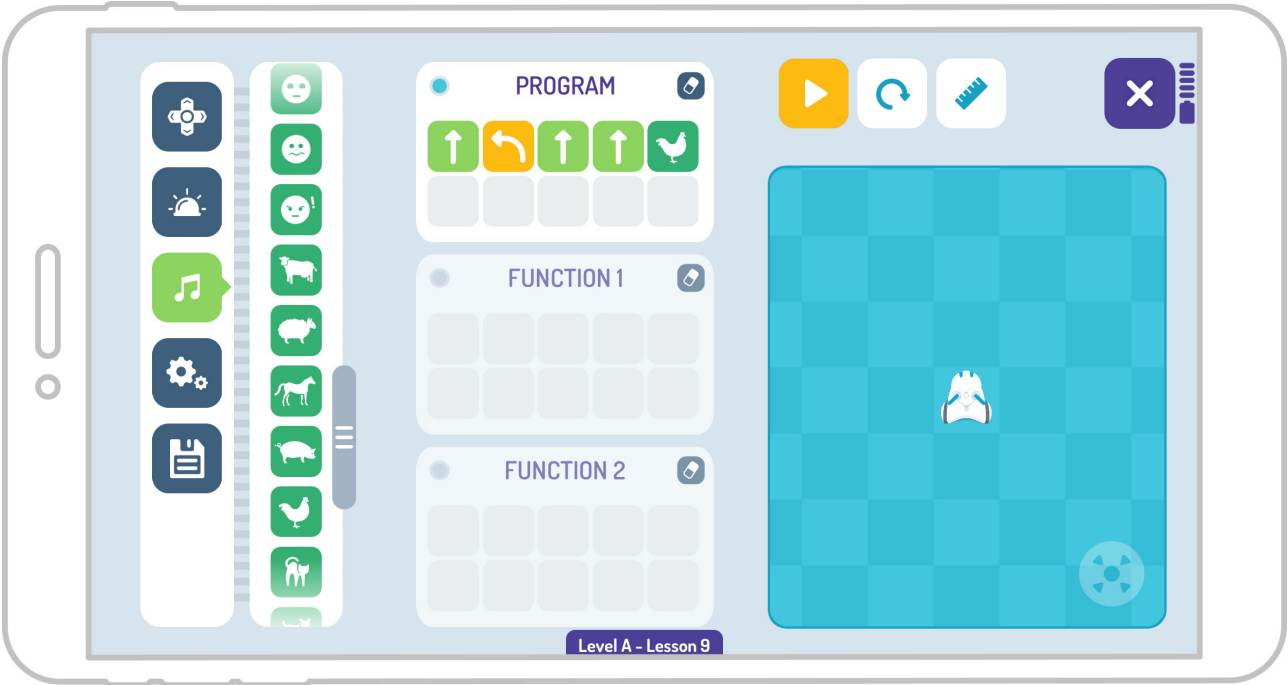
### THE FOX AND CHICKEN

Ask the children to stand in a row. Choose one child to pretend to be a fox and stand at a considerable distance from the rest of the group. The child playing the fox has to stand with their back to the other children. The rest of the group plays chicken and try to sneak up on the fox, step by step, like when measuring lengths of objects with foot spans. When the fox turns around to face the children, everyone freezes and says the rhyme presented below, and tries to stay still. Whoever moves during the recitation goes back to the starting line (the judges here are you and the fox). The chicken who first reaches the fox takes over the role.

Freeze, the fox is crouching up,  
Whoever moves, will be snatched up.

Sample program:

PIGSTY, STABLE OR A COWSHED:





**Subject:** „I have my rights” – teaching children their rights in a game with Photon, the educational robot.

**Aims:**

- To learn to use modern technologies safely,
- To learn to talk about personal observations,
- To practise careful listening,
- To recognize differences in appearance,
- To encourage friendly gestures towards classmates,
- To practice patience and to control emotions.

**Educational aids:**

- Photon the Robot,
- Tablet,
- Portraits of children from different parts of the world,
- Recording of the song „We’ve All Got Rights” by Unicef UK.  
Music and Lyrics: Paul Parry: [https://youtu.be/LN\\_70HXxd5Y](https://youtu.be/LN_70HXxd5Y)

**Sample scenario:**

**EVERYONE IS DIFFERENT**

Hang portraits of children from different parts of the world in a separate part of the room. Ask the children to follow you to “the gallery” to admire the exhibits. Tell them to look closely at the portraits and ask for their observations. Then with a mirror in your hand, approach each child and ask them to describe their appearance, eye colour, hair colour, hair length, height, etc. At the end, create a description of Photon’s appearance and character.

**PHOTON LIKES TO BE PETTED**

Ask the children to sit around the educational mat. Tell them that Photon loves to be stroked on the head. When the children start to stroke Photon, secretly program the robot and utilise the touch sensor. Ask a child to touch Photon’s head. Explain the robot’s new abilities to the children. Ask them to pair up. One child should program Photon, and the other one should activate the program by patting Photon on the head.



**Note:** Each program should contain up to five reactions. The children can choose any sounds and colours they like.

## GOODBYE

Ask the children to pair up, stand opposite each other, and create two circles – internal and external. Now show the children how people greet each other in other parts of the world, e.g. say Hello in Japanese (“Kon’nichi wa”), or present the Thai greeting “wai” (slight bow with palms pressed together to your chin in a prayer-like fashion). The inner circle should move to the right to face the next child. Tell the children to perform the next task.

Samples:

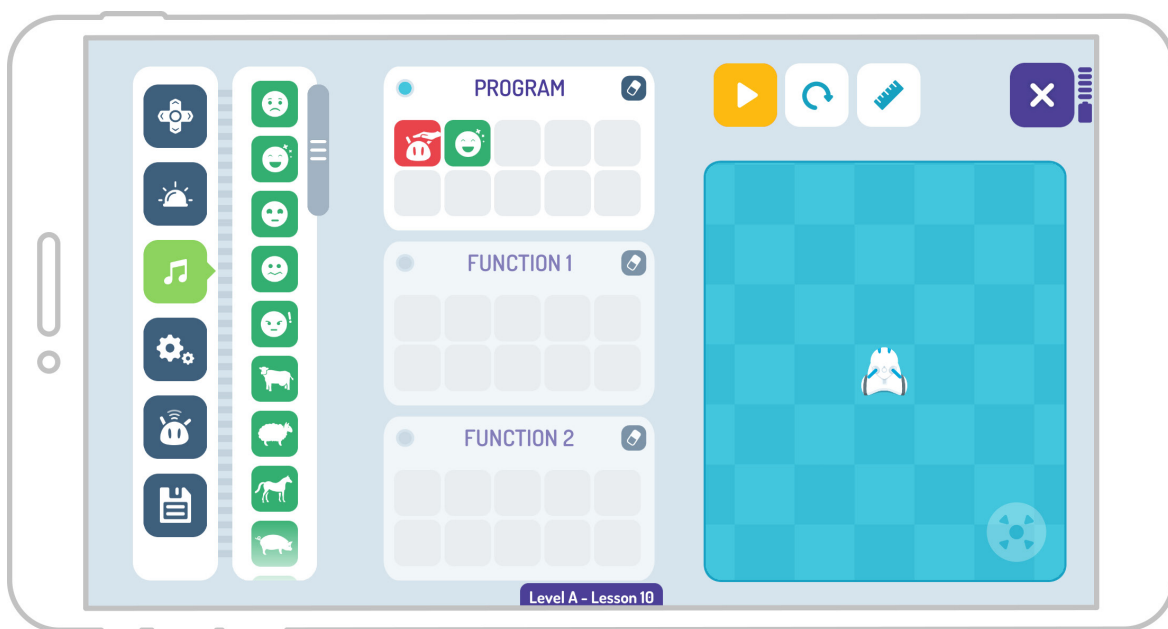
Now we are saying Hello in Spanish: Hola.

Now we are saying Hello the American way: high five and a low five.

Now we are saying Hello in Greek: pat each other on the back.

At the end, children say goodbye to Photon in a new way learned today or invented by themselves.

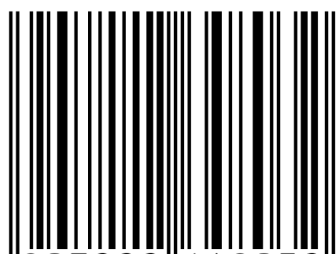
## PHOTON LIKES STROKING







**Thank you** for learning together!



5 907222 648032



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