



## What and Why?

Sphero mini robot is a small robot that looks like a ball. You can program the ball to move by using an app on a mobile device or a laptop/computer. You can also add colorful lights and sounds. There are options for coding with Sphero mini. The easiest way is to draw a route for the robot ball in the app. This material focuses on coding with “blocks”. Command blocks determine what happens to the robot. By changing different values on the code blocks you can determine for example speed, power and duration of an action.

Programming and coding develop problem solving skills and promote mathematic/logical thinking. Coding a robot helps you to understand the basics of programming that is used to create for example web platforms and computer/video games. Coding is also a fun and creative activity!



## Sphero Mini Robot



### Think and discuss:

- See the instructional video on using Sphero mini robot. Discuss with the group:
  - What do you need to be able to use Sphero mini robots?
  - Who do you think Sphero mini robots are for? Can beginners use Sphero mini robots? How about advanced coders? How can you adjust the level of coding?
  - What looks easy? What looks difficult?

### 1. *Prepare! Connect and aim*

- Discuss:
  - What do you need to do before you start coding with Sphero mini robot ball? (device, app, connecting, aiming)
  - What do you do if the Sphero Edu app is not installed?
  - Also, learn how to charge the Sphero mini robot.
- Practice how to connect the Sphero mini robot to the device you use for coding.
  - Try different devices with Sphero mini. Can you connect them to the robot?
- Practice how to aim the Sphero mini robot. This means you let the robot know which way is forward, back, right and left.
- Before learning to use command blocks for coding, try the option “Draw” to give the Sphero mini robot instructions to move.

### 2. *How does it work? Command blocks*

- Prepare: Create a route on the floor for practice, using tape or other available material. Make sure to mark also a place to start and an area where to finish.



- Use one example Sphero mini robot and project the process of coding Sphero on the white board. Discuss the process of code Sphero to move through the route with the learners:
  - What should the Sphero mini robot do next?
  - Which command makes it happen?
  - Do we need to edit some values on the block?
  - How do the values affect the action?
- Do the same exercise in pairs:
  - Mark a simple route for Sphero mini robot on the floor.
  - Practice coding with blocks and try to get the Sphero mini robot to move through the route.
  - Extra: Try to add sounds and lights to the code!

### **3. Get creative!**

- Arrange a Sphero race!
  - Ask participants to code their Sphero mini robot to light up with different colours.
  - Set up a track the Sphero mini robots should go through. Use tape for setting up the the track or find other materials: rulers, lego blocks, other available materials!
  - Who is the first to cross the finish line?
- Try painting with a Sphero mini robot ball
  - For this purpose, you can also use the “Draw” option for coding.
  - You need paint, paper and some kind of a box that fits the paper. There will be much less mess when the paper and Sphero are in the box during the painting.





## Lesson plan examples

### Further reading /material: Sphero robot

Activity ideas:

<https://edu.sphero.com/cwists/?active=0&robots=sphero-mini>

You Tube:

[https://www.youtube.com/playlist?list=PLSdn63ba-PIZ\\_fOIoxTmp17CdZ-io7PI5](https://www.youtube.com/playlist?list=PLSdn63ba-PIZ_fOIoxTmp17CdZ-io7PI5)

### Example lesson plans: 5 x 60min

#### Lesson 1 (60 minutes)

#### Goals:

- Introduction get familiar with the device and app,
- learn how to connect and aim the Sphero robot

10min *Think and discuss:*

See the instructional video on using Sphero mini robot. What do you need to be able to use Sphero mini robots? Who do you think Sphero mini robots are for? What looks easy? What looks difficult?



## 1. *Prepare! Connect and aim*

10min

- Discuss:
  - What do you need to do before you start coding with Sphero mini robot ball? (device, app, connecting, aiming)
  - Also, learn how to charge the Sphero mini robot.
  - What do you do if the Sphero Edu app is not installed?

15min

- Practice how to connect the Sphero mini to the device you use for coding.

25min

- Practice how to aim the Sphero mini. This means you let the robot know which way is forward, back, right and left. (There are good visual instructions for this online at <https://edu.sphero.com/cwists/?active=0&robots=sphero-mini> )
- If possible, try different devices to use for coding Sphero mini.
- When you are able to connect and aim the Sphero mini, try the option “Draw” for programming the robot. With this option, you can draw shapes on the device screen that represent the code for Sphero. The Sphero executes the code and creates the same shape by moving.

## Lesson 2 (60 minutes)

### Goals:

- revise connecting and aiming,
- understand the basic principle of programming with command blocks

**Prepare:** Make sure you can connect your coding device to a screen/projector for sharing your coding process example with the participants.

10min Reminder:

Watch again the beginning of the instructional video on Vimeo. Focus on connecting the robot to the coding device and aiming the Sphero robot ball.

Discuss:

- Did you remember how to do it? Is there something you still need to practice?
- You can gather the main points on the white board as a reminder for later when you start working with the robots.

15min Revise: Practice connecting and aiming Sphero robot balls. Those who already remember how to do this can help others to succeed.

15min Continue to watch the instructional video for coding the Sphero robot ball. Pay attention to coding with code blocks. Discuss:

- Have you coded before? Did you use code blocks?
- Explain the basic idea of coding with blocks. Each block is equivalent of a command. A set of commands creates a chain of actions that the robot will perform one after another.

20min Trainer's example of coding with blocks:

1. *How does it work? Command blocks*

- Create a simple route on the floor for practice, using tape or other available material.
- Use one example Sphero and project the process of coding on the white board.
- Discuss the coding process with the learners:
  - What should the Sphero do next? Which command block makes it happen?
  - Do we need to edit some values on the block? How do the values affect the action?



## Lesson 3 (60 minutes)

### Goals:

- practice coding with command blocks

### 15-25min **Reminder:**

Watch again the instructions for coding the Sphero ball by using coding blocks. Remind the learners how it works. If you wish, you can also re-do the example coding process you did during the previous lesson.

35-45min

### **2. *How does it work? Command blocks***

- In pairs, mark a simple route for Sphero mini on the floor.
- Connect and aim a Sphero robot ball
- Practice coding with blocks and try to get the Sphero mini to move through the route.
- If you need help, ask your peers first. If they can't help you, ask your trainer.
- Extra: Try to add sounds and lights to the code!



## Lesson 4 (60 minutes)

### Goals:

- revise coding with blocks,
- practice giving instructions to pupils

### 25min Revision:

#### 2. How does it work? Command blocks

- In pairs, mark a simple route for Sphero mini on the floor.
- Connect and aim a Sphero robot ball
- Practice coding with blocks and try to get the Sphero to move through the route.
- If you have time you can also switch routes with another pair and try their route.
- EXTRA: Get creative! Explore different code blocks and features (movement, lights, sounds).

### 20min Giving instructions

- Practice giving instructions to pupils
  - How would you explain young learners how to use Sphero robot ball?
  - If you wish, you can make your own notes (with pen and paper or digital) about this and bring them with you when you work at school!
- Role play: practice giving instructions with your pair
  - the role of a pupil
    - listen and try to follow the instructions of your pair
    - ask questions
    - at the end you can also give feedback on the instructions, try to be constructive!
  - the role of a DigiCoach (practices giving instructions)
    - try explaining some of the basic features to your pair
    - you can choose one of the following: connecting Sphero to the coding device, aiming the Sphero robot, coding Sphero by using code blocks
    - ask feedback from your pair
  - switch roles





15min Group discussion and/or portfolio work

- How did you find coding with Sphero robot balls?
- Was it easy or difficult?
- What did you learn? What do you still need to practice?
- If you have a portfolio, make an entry about Sphero robot ball and answer the questions there.

**NOTE!** It may take more than 1-2 lessons to learn coding with the blocks and adjusting the values. You can take more time to practice the basics and, even more importantly, giving instructions to young learners. The creative tasks (3.) are there to feed the curiosity of those who are fast learners, show interest towards coding and want to practice and learn more. They can also be used as fun alternative tasks to do when you practice the basics!

## Lesson 5 (60 minutes)

### 3. Get creative!

- Arrange a Sphero race!
  - Ask participants to program their Sphero mini robot to light up with different colours.
  - Set up a track the Sphero mini robots should go through. Use tape for setting up the track or find other materials: rulers, lego blocks, other available materials!
  - Who is the first to cross the finish line?
- Try painting with a Sphero mini robot ball
  - For this purpose, you can also use the “Draw” option for coding.
  - You need paint, paper and some kind of a box that fits the paper. There will be much less mess when the paper and Sphero are in the box during the painting.
- If you are interested in learning to code with Java script, you can also try that feature. Can you find instructions online?

