

## LEARNING TO CODE

<b>THEME</b>	Programming geometrical figures
<b>FORMAT</b>	Pairs or individual (in computers)
<b>PREPARATION TIME</b>	30 minutes
<b>ACTIVITY LENGHT</b>	2h15 – 3 hours (3-4 classes of 45 minutes)
<b>DIFFICULTY LEVEL</b>	Average

## PEDAGOGIC GOALS

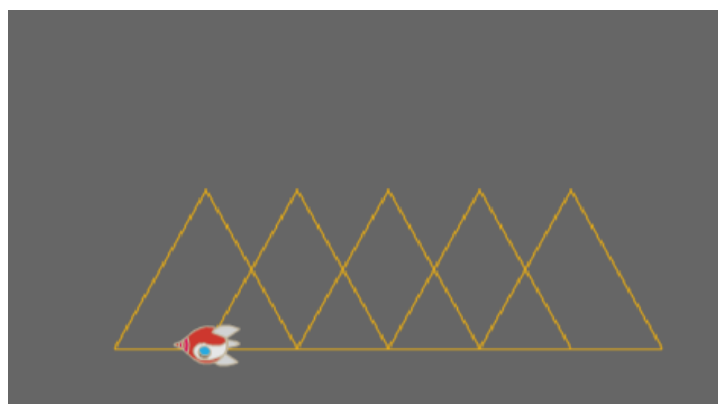
Scratch is a great tool for working with geometry concepts in a contextualized and meaningful way for students. Using the motion and pen blocks to create drawings, it is possible to test hypotheses and reflect on various ideas related to geometry.

The activity has as specific objectives:

- Understand geometric concepts from new perspectives
- Use programming as a way of building ideas
- Test hypotheses and reflect on the results of experiments

## NECESSARY MATERIALS

- Computer with Internet connection (one computer for each pair of students)
- Microworld previously prepared



## LEARNING TO CODE

### Preparation:

Open the link to the project [bit.ly/microgeometria](https://bit.ly/microgeometria) and look at the available blocks. Then, experiment with creating new shapes and designs in the micro world by combining the blocks, and imagine relationships with aspects of geometry studied in the classroom.

If you prefer, you can adapt the micro world by remixing the project at [scratch.mit.edu/projects/169942305/](https://scratch.mit.edu/projects/169942305/). In this case, choose the blocks you want to keep and drag new blocks to the script area (for more information on creating a micro world, see the lesson plan available in Lesson 3).

**Tip:** If you create a new micro world and ask your students to save their projects at the end of the lesson, you can see all the projects they created in your remix tree.

### Leading the activity:

At the beginning of the first class, introduce the idea of a programming procedure, showing your students (if possible with the help of a projector) how to create a new block in Scratch. To do this, in the “More Blocks” category, click on the “Create a block” button, giving it the name “square”, for example.

Draw a square on the blackboard and collectively reflect on how to draw a square using Scratch programming: first we need to use the pen tool, then walk and rotate 90 ° four times. Create this set of instructions collectively, under the “Define square” block and test. Then, reflect on how the repeat block can be used to optimize the program and test the square design again, now with the repeat block.

Then present the micro world that will be used in class.

- On the computer, ask students to log in to Scratch and then open the link [bit.ly/microgeometria](https://bit.ly/microgeometria) (or the micro world you created). Encourage them to test ideas and reflect on the observed results - so it is important that adequate time is provided for conducting the activity.
- At the beginning of the activity, suggest that students look at the program and try to understand what happens when we click on the letter a. Give them time to think, formulate hypotheses and test.
- Then ask them to create a triangle below the “Define triangle” block.
- Finally, propose that each pair choose a simple figure and try to draw it using the available geometric shapes. For this, they can also create new geometric shapes.

### Discussion and reflection:

At the end of the class, students can present the created drawings to the rest of the class. You will find that the levels of complexity of the projects will be quite different from each other. So, encourage them to share the project not as something finalized, but as a process of developing ideas.

During the presentations, encourage them to develop their ideas, explaining the programming behind the drawings, and to make connections with learning geometry.

### References

[Example of Scratch project with geometrical forms](#)

### Credits:

Cassia Fernandez (LSITec/USP)