



MINECRAFT

EDUCATION EDITION

Educator Guide

Single Student

CODING CONCEPT: LOOPS AND NESTED LOOPS

Loops are used in coding as a way to repeat sections of code without having to rewrite the code. **For loops** are used when you want to repeat the code for a certain amount of time. A **nested loop** is a loop within a loop. These are used to repeat a section of code inside another section of code.

For more information on **loops** refer to: <https://curriculum.code.org/csp-18/unit3/9/>

Loops in Minecraft: When coding in Minecraft: Education Edition, **loops** are a very useful tool to help keep your code smaller and more manageable. When you want to code the agent or player to do something for a certain amount of time, use a **for loop**. It will keep you from

[EDUCATION.MINECRAFT.NET](https://education.minecraft.net)

having to repeat code.

OVERVIEW

These learning activities are designed to provide the learner with flexibility and choice in his/her learning.

1. The learner will be introduced to three tutorials that are at three levels of difficulty (Novice, Intermediate and Expert) which are followed by an educational activity where he/she can apply coding skills.
2. Within each tutorial, the learner will have the option of selecting a coding language (Blocks, Javascript or Python).

The learner may choose a tutorial at his/her appropriate difficulty level and language OR choose to complete all tutorials and the educational activity. It will take approximately an hour to complete all the activities.

LESSON STRUCTURE

Novice Tutorial: Spawn Animals

Intermediate Tutorial: Farm

Expert Tutorial: House

Educational Application: The learner is free to engage with activities in Block coding, JavaScript and/or Python and does not need to complete all the activities.

The learner will use **loops** in their code to create his/her own pixel art.

The learner will use loops and nested loops to code their experience within Minecraft: Education Edition.

LEARNING OBJECTIVES

The learner will:

- Learn how to use **for loops** (repeat blocks) in their code.
- Learn how to **nest loops** inside each other.



CODING BLOCKS

Definition	Code
<p>On item used: Runs the code when the student right clicks while holding an item.</p>	<p>Block:</p>  <p>JavaScript: <pre>player.onItemInteracted(IRON_SHOVEL, function () { })</pre> </p> <p>Python: <pre>def item_interacted_iron_shovel(): pass player.on_item_interacted(IRON_SHOVEL, item_interacted_iron_shovel)</pre> </p>
<p>Repeat: Runs part of the code a defined number of times.</p>	<p>Block:</p>  <p>JavaScript: <pre>for (let index = 0; index < 10; index++) { }</pre> </p> <p>Python: <pre>for index in range(10): pass</pre> </p>
<p>Agent till: Tells the Agent to till the soil in a defined direction</p>	<p>Block:</p>  <p>JavaScript: <pre>agent.till(FORWARD)</pre> </p> <p>Python: <pre>mobs.spawn(CHICKEN, pos(0, 0, 0))</pre> </p>



KEYWORDS (OR PHRASES)

For loop: A **for loop** is a type of loop that allows for particular code to be repeated for a specific amount of time. When using blocks in Minecraft, it is the repeat block.

GUIDING QUESTIONS

1. What are things in our life that we **repeat**?
Eating, walking, breathing, etc
2. If I set a song on repeat, what will happen when it gets to the end of the song?
It will start over.
3. What are the reasons we might want to repeat parts of our code when working in Minecraft?
We want to do the same code in a different spot.

TUTORIAL 1: SPAWN ANIMALS (Novice - 5 minutes)

Main objective:

The learner will use **events** and **for loops** to spawn animals when specific **events** happen.

Answer Key:

View the solution at: https://makecode.com/_5cKFx0Wad5Pq

TUTORIAL 2: FARM (Intermediate - 10 minutes)

Main objective:

The learner will code the agent using **for loops** to plant carrots at the farm.

Answer Key:

View the solution at: https://makecode.com/_fc9H0Y1v2WLR

TUTORIAL 3: HOUSE (Expert - 15 minutes)

Main objective:

The learner will use build a house using **for loops**.

Answer Key:

View the solution at: https://makecode.com/_Amid8E6u9VvJ



EDUCATIONAL APPLICATION (15 minutes)

Subject Area: Art

Main purpose of the activity:

The learner will:

- Use **loops** in his/her code to create pixel art.
- Experience various examples of pixel art in the land for additional ideas.
- Use **loops** in their code to create his/her own pixel art.

The learner's challenge is to use **loops** in the creation of pixel art.

Outcome of This Activity:

The learner will have successfully created pixel art through using **for loops** and **nested loops**.

Possible Solution for this Activity:

View sample code online for a pixel art of a Minecraft creeper:

https://makecode.com/_WP27LT7dw8cr

LESSON CONCLUSION/REFLECTION (5 minutes)

Ask the learners about new skills that they have practiced during the activity to reinforce the concepts.

1. What does a **for loop** do?

It repeats the code for a specific number of times.

2. What is a **nested loop**?

It is a loop within a loop.

3. Why do you use **loops**?

Use loops to repeat a certain string of code.

OPPORTUNITIES TO EXTEND THE LEARNING

Minecraft: Education Edition offers many opportunities for teachers and learners to extend and enrich the learning experience beyond this lesson.

- Learners can do an offline activity around for loops at this link:

<https://curriculum.code.org/csf-1718/express/24/>

- Learners can also work through the online puzzles that utilize for loops at this link:

<https://studio.code.org/s/course4/stage/9/puzzle/1>



EDUCATION STANDARDS

NATIONAL CORE ARTS STANDARDS

<https://www.nationalartsstandards.org/>

Anchor Standard #1: Generate and conceptualize artistic ideas and work.

COMPUTER SCIENCE TEACHERS ASSOCIATION (CSTA) COMPUTER SCIENCE STANDARDS K-12 <https://www.csteachers.org/Page/standards>

1A-AP-08: Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.

1A-AP-09: Model the way programs store and manipulate data by using numbers or other symbols to represent information.

1A-AP-10: Develop programs with sequences and simple loops, to express ideas or address a problem.

1A-AP-11: Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

1A-AP-14: Debug, (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

1B-AP-10: Create programs that include sequences, events, loops, and conditionals.

INTERNATIONAL SOCIETY FOR TECHNOLOGY IN EDUCATION (ISTE) STANDARDS FOR STUDENTS <https://www.iste.org/standards/for-students>

5D: Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

