



MINECRAFT

EDUCATION EDITION

Educator Guide

Block 1 - Lesson 4

45 minutes

Single Student

Pandas Protected Habitat: Loops and Nested Loops

THEME OVERVIEW

Tell students that one of the responsibilities with the Animal Research Center (ARC) is to help animals find safe places to live. In this lesson, a panda recently wandered into a town and refuses to leave. As the town expands, it's encroaching on the panda's natural habitat. Explain to students that they need to coax the panda out of town, relocate it, and protect its new habitat.

CODING OBJECTIVES

By the end of Lesson 4 the students will have learned more about **Loops** and **Nested Loops**.

THINGS TO KEEP IN MIND

- Students are given a radio in the first slot of their hotbar. This item allows students to reset the coding activity.
- Remind students there may be more than one solution for each of the activities.
- When using a while loop, to stop code from running students need to press C again, this will deactivate the coding.
- Use the Handout to capture students' learning: ask students to take a screenshot of the coding snippet and write the explanation of what the code does (this can be used as homework).

KEYWORDS

Loop - a structure that repeats a set of instructions (algorithms) until it is told to stop.

Nested Loop - A loop within a loop

START OF LESSON PROCEDURE

Number of Activities: 4

LESSON REVIEW: 5 minutes

Recap of what was taught in the previous lesson: Students learned about algorithms, sequencing, pattern recognition, and loops.

1. Q. What does **Agent detect** do?
A. Agent can determine if an item is around.
2. Q. What is a **Conditional**?



- A. a statement that tells a program to do different actions depending on whether a condition is true or false.
- 3 Q. What is it called when we repeat code over and over?
 - A. A loop.
- 4. Q. True or False? Can the Agent hold its own inventory?
 - A. True

LESSON INTRODUCTION AND LEAD-IN: 5 minutes

Coding Practice – Loops and Nested Loops:

In our previous lesson we learned about using loops, while detecting certain blocks. We are going to continue to work with loops and learn how to be even more efficient by placing a loop within a loop. This is called *nested loops* and helps complete complex actions quickly and efficiently.

Lead-in:

Tell students that they are in a town and they need to help the panda get out of the town and relocate to a safe protected space to live.

We will be concentrating on becoming more comfortable and confident in using loops. And taking that a step further we will be **nesting loops**. All this entails is putting a loop within a loop to accomplish two repeating tasks at the same time. Or another way of putting it, doing two things at the same time.

CODING ACTIVITIES: 30 minutes

Activity 1: Secure the area

Tell students that they need to find a new home for panda. They need to follow the road to the end, as there seems to be a clearing there that would be safe place for the panda. Tell students that they need to secure an area that would be safe for the panda.



Explain to students that they need to program the Agent to place fence to keep people out of the area and to protect the pandas.

```
on chat command "1" +
  agent set block or item bamboo count 64 in slot 1
  repeat 17 times
  do
    agent place right
    agent destroy forward
    agent move forward by 1
```

Activity 2: Bamboo Border

Tell students that they need to program the Agent to plant some bamboo in the enclosure for the panda. It will serve two purposes; one, it will provide food for the panda and two, as it grows tall it will provide cover.

Tell students that we will still use loops to do this task, but it will require more than one loop. They need to give the Agent a stack of 64 pieces of bamboo, which is enough for two sides of our border. As there are 4 sides of the border, they need to repeat the same activity twice.

```
on chat command "1" +
  agent set block or item bamboo count 64 in slot 1
  repeat 16 times
  do
    agent place down
    agent move forward by 1
  agent turn right
  repeat 16 times
  do
    agent place down
    agent move forward by 1
  agent turn right
```

Activity 3: Bamboo hideaway

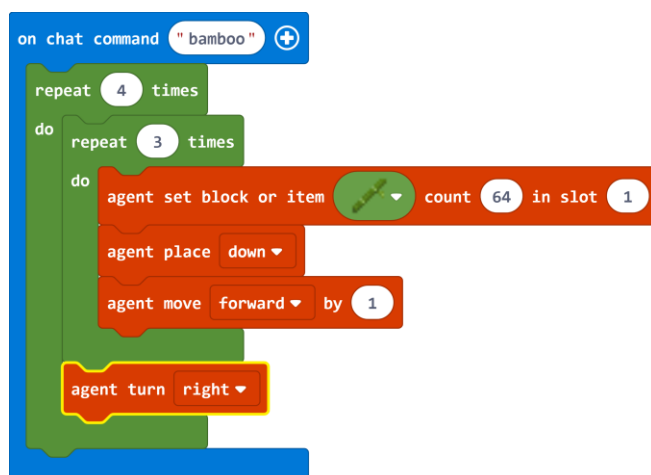
Tell students that they need to program the Agent to make an even smaller bamboo hideaway for the panda, so it will have somewhere to eat and feel safe. The sand patch looks like a great spot for it.

This activity would require the use of nested loops. A nested loop is simply doing 2 things at the same time. Looking back at the code from the previous activity, the same thing got repeated several times. Explain to students that they need to place bamboo on the sand and there are 2 actions they need to think about: **Placing bamboo** in a line and **Agent turn right**.



Use this opportunity to introduce an unplugged activity and using the pseudo code write the code for the activity to practice using nested loops.

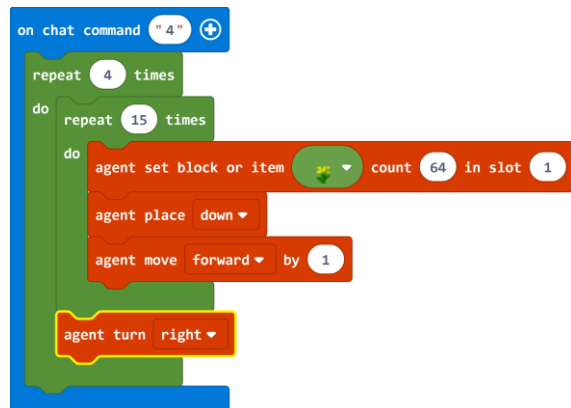
Here is some thinking process: What are the steps? Think about the first loop. What is something we need to do repeatedly for the same number of times? Turn right at each corner. The second loop—the Agent needs to place bamboo along the sides of the sand. What blocks of code will the Agent use? How many stalks of bamboo will the Agent use?



```
on chat command "bamboo"
  repeat 4 times
    do
      repeat 3 times
        do
          agent set block or item bamboo count 64 in slot 1
          agent place down
          agent move forward by 1
        do
          agent turn right
```

Activity 4: Make it pretty

Now students need to program the Agent to plant some flowers to make it a happy area for the panda to live in. This activity also requires the use of nested loops.



```
on chat command "4"
  repeat 4 times
    do
      repeat 15 times
        do
          agent set block or item flower count 64 in slot 1
          agent place down
          agent move forward by 1
        do
          agent turn right
```

Bonus Activity: How Efficient Is A Loop?

As a bonus activity, we suggest looking at the code that was used for Activities 3 and 4. Ask students using the pseudo-code to write out what those activities would look like in code if they did not use loops. Ask students if loops make coding more efficient or less efficient. (More efficient)



LESSON CONCLUSION: 5 minutes

Ask the students about the skills that they have learned during the lesson, to reinforce the concepts.

1. Q. What is the name of block we use to make loops?
A. Repeat.
2. Q. What is a nested loop?
A. A loop inside a loop that causes the Agent to do two things at once.
3. Q. True or False. It's important to know the sequence of events before building a loop.
True.
4. Q. What is the difference between a repeat loop and a conditional loop?
A repeat loop repeats the action a certain number of time. A conditional loop repeats the action while the condition is met.

REFERENCES:

- <https://sciencing.com/pandas-endangered-animals-5176027.html>
- <https://www.worldwildlife.org/species/giant-panda#threats>
- <https://animalfactguide.com/animal-facts/giant-panda/>

EDUCATION STANDARDS - LESSON 3

| CSTA K-12 | |
|-----------|---|
| 1A-AP-09 | Model the way programs store and manipulate data by using numbers or other symbols to represent information. |
| 1A-AP-12 | Develop plans that describe a sequence of events, goals, and expected outcomes. |
| 1A-AP-14 | Debug, (identify and fix) errors in an algorithm or program that includes sequences and simple loops. |
| 1B-AP-08 | Compare and refine multiple algorithms for the same task and determine which is the most appropriate. |
| 1B-AP-10 | Create programs that include sequences, events, loops, and conditionals. |
| 1B-AP-11 | Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process. |
| ISTE | |



| | |
|----|--|
| 3D | Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions. |
| 4A | Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems. |
| 5C | Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving. |

