



## Educator Guide

Block 1 – Lesson 4

60 minutes

Single Student

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# Panda's Protected Habitat Loops and Nested Loops

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

## THEME OVERVIEW

One of the responsibilities of the Animal Research Center (ARC) is to help animals find safe places to live. In this lesson, a panda recently wandered into a town. The panda refuses to leave. The town is expanding and encroaching on the panda's natural habitat. Students will need to coax the panda out of the town, relocate it, and protect its new habitat.

## LESSON OBJECTIVES

By the end of the lesson, students will:

- Use the coding concepts of loops and nested loops to complete tasks
- Test and debug their code
- Embrace a coding mindset

## 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 that there may be more than one solution for each of the activities.
- When using a while loop, students will need to press "C" again to deactivate the code (i.e., stop the code).
- Ask students to take a screenshot of their coding snippet and write an explanation of what the code does. (This can also be used as a homework assignment.)

## KEY VOCABULARY

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

**Nested Loop** – a loop within a loop

## LESSON ACTIVITIES

### Lesson Review

Briefly review the learning from the previous lesson (Slide 1).

Students learned about algorithms, sequencing, pattern recognition, and loops.

Ask the student the following questions:

1. What does **Agent detect** block do?  
Answer: Agent can determine if an item is around
2. What is a conditional?

Answer: A statement that tells a program to do different actions depending on whether a condition is true or false

3. What is it called when we repeat code over and over?

Answer: A loop

4. TRUE OR FALSE: The Agent can hold its own inventory.

Answer: True

### Direct Instruction (Teacher-Led; "I Do")

Welcome back to Coding Fundamentals! (Slide 2)

Review the learning objectives with students. (Slide 3)

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 (Slide 4). This is called a nested loop and helps us to complete complex actions quickly and efficiently.

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

We will be concentrating on becoming more and more comfortable and confident in using loops. We will take it a step further by using nested loops. This will involve us putting a loop within a loop to accomplish two repeating tasks at the same time.

### Guided Instruction (Teacher Modeling; "We Do")

#### Activity 1: Secure the Area (Slides 5-12)

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

Students will need to program the Agent to place a 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

```

## Independent Work (Teacher Support; "You Do")

### Activity 2: Bamboo Border (Slide 13-16)

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 taller, it will provide cover for the panda.

The students will need to use loops to complete 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 the border. As there are four sides of the border, they will 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 (Slides 17-21)

Now 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.

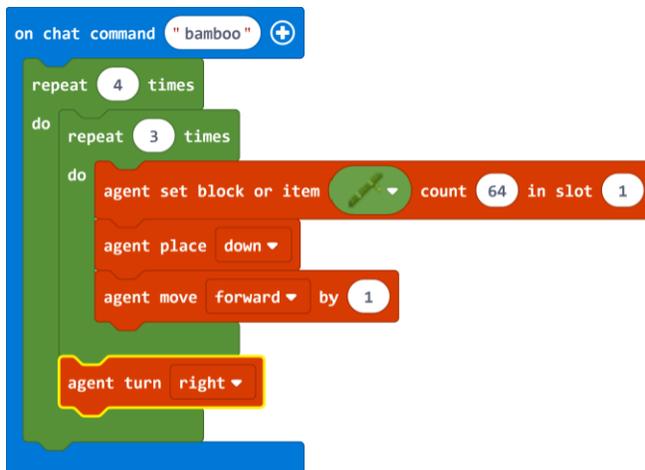
This activity would require the use of nested loops. A nested loop is simply doing two things at the same time. Looking back at the code from the previous activity, the same thing got repeated several times. Explain to students that they need to place bamboo on the sand and there are 2 actions they need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

**Placing bamboo** in a line and **Agent turn right**.

Use this opportunity to use pseudocode for the activity to practice using nested loops.

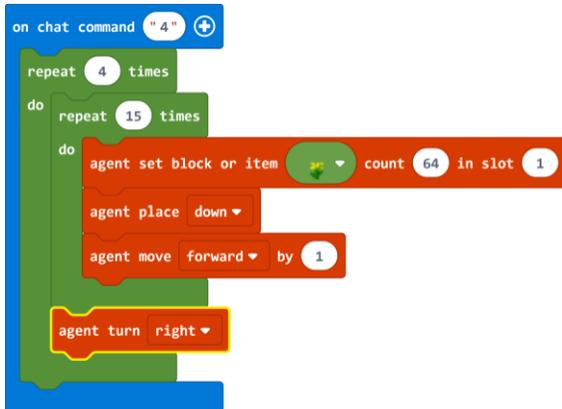
Here is the thinking process:

- 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?



#### Activity 4: Make It Pretty (Slides 22-24)

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.



### Bonus Activity: How Efficient is a Loop? (Slide 25)

As a bonus activity, we suggest looking at the code that was used for Activities for 3 and 4. Ask students using the pseudocode 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. (The answer is more efficient)

## LESSON CONCLUSION

(Slides 26-27)

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

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

These questions can also be used as a formative assessment. The formative assessments can also be found as a separate document that can be printed out.

## **REFERENCES**

<https://sciencing.com/pandas-endangered-animals-5176027.html>

<https://www.worldwildlife.org/species/giant-panda#threats>

<https://animalfactguide.com/animal-facts/giant-panda/>

**NAME:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**PANDA'S PROTECTED HABITAT: FORMATIVE ASSESSMENT**

What is the name of the block we use to make loops?	
What is a nested loop?	
<b>TRUE OR FALSE:</b> It's important to know the sequence of events before building a loop.	
What is the difference between a repeat loop and a conditional loop?	

## **EDUCATIONAL STANDARDS**

### **UNITED STATES: CSTA**

- **1B-AP-08** Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
- **1B-AP-09** Create programs that use variables to store and modify data.
- **1B-AP-10** Create programs that include sequences, events, loops, and conditionals.
- **1B-AP-11** Decompose (break down) problems into smaller, more manageable subproblems to facilitate the program development process.
- **1B-AP-15** Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

### **UNITED STATES: ISTE**

- **3D** Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.
- **1.5.a** Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
- **5C** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

### **AUSTRALIA: DIGITAL TECHNOLOGIES (YEAR 3 AND 4)**

- **(ACTDIP019)** Following, modifying and describing the design of a game involving simple algorithms represented diagrammatically or in English
- **(ACTDIP018)** Experimenting with different ways of representing an instruction to make a repetition, for example loops in a flowchart diagram or using a 'REPEAT' statement
- **(ACTDIP020)** Planning and implementing a solution using a visual programming language, for example designing and creating a simple computer game involving decisions and repetitions, suitable for younger children, that requires user input to make selections, taking into account user responses
- **(ACTDIP020)** Experimenting with different ways of instructing to make choices and repeat instructions

### **UK NATIONAL CURRICULUM: COMPUTING (KEY STAGE 2)**

- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- Use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs