Educator Guide

Unit 1
60 minutes
Single Student

Coding with Minecraft:
1- Introduction

THEME OVERVIEW

This unit introduces students to computer science and coding. It provides students with an overview of Minecraft: Education Edition and Code Builder. It will start students with coding experiences and introductory tutorials in MakeCode.
NOTE: If your students have experience with Minecraft: Education Edition and Code Builder, you can skip ahead to Coding with Minecraft: Unit 2 – Events.

LESSON OBJECTIVES

- Learn basic navigation in Minecraft: Education Edition using a keyboard, mouse, and the WASD keys.
- Become familiar with the interface of the game and **MakeCode**
- Be introduced to their Agent and the basic Agent moves using the MakeCode interface
- Begin to understand the concept of Decomposition as students break problems down into codable solutions for the Agent
- Begin to see the importance of Sequencing, putting things in order, so that the Agent can complete its tasks
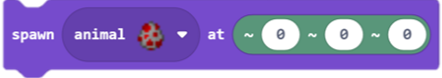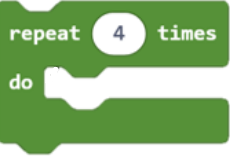
THINGS TO KEEP IN MIND

- 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.

MINECRAFT MECHANICS

C	**C** Summons the Agent and opens the MakeCode interface
T	**T** Opens chat panel in Minecraft for commands to be typed
ESC	**ESC** When a student wants to leave the game, leave chat, or pause the game

CODING BLOCKS

	On chat command Runs the code when the student types the chosen text in the chat window
	Spawn Summons a creature at a given location
	Repeat Runs part of the program the number of times you say

KEY VOCABULARY

Computer Science – the study of computers and algorithmic processes, including their principles, their hardware and software designs, their [implementation], and their impact on society

Minecraft – game-based learning platform with endless creativity and possibilities

Controls – provides the ability to move during game play (will defer based on devices)

MakeCode – the coding program used in-game to create algorithms

LESSON ACTIVITIES

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

Welcome to Coding with Minecraft, a place to learn all about the basic concepts of computer science. We are going to spend time learning these ideas in Minecraft: Education Edition. To help us on our journey, we are going to start off by learning what is computer science. (**slides 1-2**)

Lead a discussion with students about computer science. (**slide 3**)

We are going to use Minecraft throughout this course. What is Minecraft? Minecraft is game-based learning platform with endless creativity and possibilities. (**slide 4**)

Guided Instruction (Teacher Modeling; "We Do")

Activity 1: Exploring in Minecraft

Now, we are going to explore how to play within the game. Have all students log into Minecraft: Education Edition. After students have logged into the platform, show how to use the controls to move in Minecraft. Show the video (**slide 5**) which is appropriate for devices: keyboard or touch.

Follow the instructions to demonstrate the basic functions in Minecraft. (**slide 6**)
- **How to use the controls to move** (keyboard & mouse OR touch controls)
  The video on Slide 5 will cover these concepts. Have students practice moving around.
- **How to look around**
  Explain that while in game, you are looking around the Minecraft world. Everything you see is from the perspective of your player avatar. If you play with other players, or in multiplayer mode, you would see the other player's avatar. There are a lot of things happening in the world that you are not able to control such as weather, mobs walking around, and such.
- **How to open and use your inventory**
  Press "E" to open the inventory. Within the inventory, you will be able to find construction, equipment, items, and nature. Allow students to check out the different blocks and items within each section of the inventory. Then, show students how to add to inventory into their hotbar.
  - o Select an item
  - o Drag and drop into to the desired spot in your hotbar
- **Build and mine**
  Allow students to explore how to stack blocks on top of one another to build something of their choice. Consider the types of materials available. For example, if you are going to build a house—what would you use to create the walls, the door, the windows, and the roof?
  HINT: Try using the keyword search to see if the items already exist.

You should pause after each step and ensure everyone is with you. Answer any questions as they arise. After you provide students with the demonstration, give them time to explore, play, and build within the world.

Activity 2: What is Coding?
Use **Slide 7** to discuss what is coding and then follow up with the questions:
- What do you do with computers?
- What else can computers do?
- How do your parents or family members use computers?

Explain that all of these things are possible because of coding and computer science. Computers, coding, and computer science are part of lives and impact almost everything we do at school and for fun, in our personal and work lives. The possibilities are endless and people who code are figuring out more and more ways for computers to help us. No matter what you want to do in the future, technology and computer science will be a part of it. This course will introduce you to coding and hopefully get you excited about coding—even if you have no desire to become a computer coder/programmer in the future. Knowing how computer work and using computer science skills is for everyone!

Having a coding mindset (**slide 8**) will be important for everyone throughout this course. Review each of the statements.

Activity 3: Introduction to Code Builder

In Minecraft: Education Edition, there is a built-in coding editor called Code Builder. You can access Code Builder by selecting "C" on your device. (**slide 9**)

In Code Builder, you are able to select from 3 different editors: Microsoft MakeCode, Python with Azure Notebooks, or Tynker. For this lesson and the rest of the lessons in Coding with Minecraft, we will be Microsoft MakeCode. The MakeCode image can be found at the top, with the purple puzzle piece. (**slide 10**)

Any time you are starting a new project, you will select the green "new project" button with the + sign on it. (**slide 11**) Then, students will be prompted to name their project. For this part, model and ask students to just type in "SAMPLE PROJECT" into the space and then select the green "create" button to continue. (**slide 12**)

When Code Builder opens their new project, introduce the different components of Code Builder. It is important students know and understand the various names, as there are specific terms for each of these spaces. Moreover, as you continue through the lessons, more computer science terms and vocabulary will be introduced and used regularly. (**slide 13**)

Slides 14-17 will demonstrate how students will be able to switch programming languages. Within Microsoft MakeCode, you can code in Blocks (which is what we will use for the lessons throughout Coding with Minecraft), JavaScript, or Python.

Activity 4: Chicken Rain Tutorial

Instruct students to select the "Home" button (found in the top, left corner) of the Code Builder screen.

We are going to code our first project! Select "Tutorials" and then select "Chicken Rain". Select the "Blocks" version and start the tutorial. (**slide 18**).

You will see this image of Chicken Rain pop-up on your screen. Select "Ok" to continue. (**slide 19**)

Code Builder will support you through the coding activity, "Chicken Rain". There are typically three strategic steps to follow: (**slide 20**)
1. Read the coding task.
2. Use the MakeCode blocks from the toolbox to build your code. Drag and drop the needed blocks into the coding canvas.
3. Press the green arrow to run your code.

In this tutorial, there are multiple steps. You need to pay attention to various steps in order to successfully build your code. (**slide 21**)
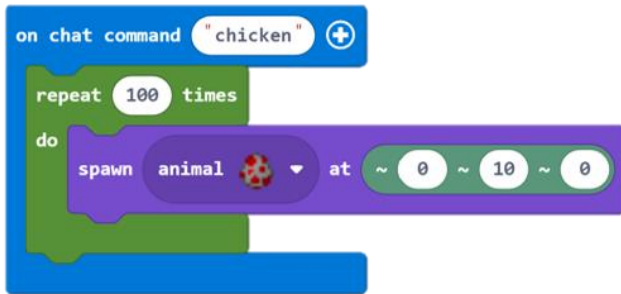
If you are stuck, there are the blue lightbulbs—which are hint buttons. These hints will provide your guidance on how to proceed with the code. However, you should ONLY use the hints if you are truly stuck. The goal is build our your coding skills! (**slide 22**)

Independent Work (Teacher Support; "You Do")
Provide students with the opportunity to go through the coding task, "Chicken Rain". Have students test their code once their program is built. They will need to select the "T" to open the on chat field. Students should type in "chicken" and then press the arrow to run the program. (**slide 23**)
If they are successful, they should have a whole lot of chickens raining from the sky and then running around on the ground! (**slide 24**)

Coding Solution:

Bonus Activity

If students are finished, have them experiment with coding. Have students try to make it rain something else or change the position the "rain" falls.

LESSON CONCLUSION

Upon completion of this lesson, students should be able to answer the following questions: (slides 25-26)

1. What is an on chat command?
   Answer: Code is triggered or happens when you type the appropriate command in the chat window of Minecraft.
2. How do you get to Code Builder?
   Answer: Press "C"
3. How do you add a block to the coding workspace?
   Answer: Select a block from the toolbox drawer; drag and drop into the workspace.
4. What is one reason learning computer science and coding is important?
   Answer: Possible answers include:
   - Teaches us important skills, like creativity, problem solving, critical thinking, etc.
   - It's changing the way we communicate, learn, live, and work.
   - It will help us to be more successful in our future job or career.
5. What are you most excited about learning in this course?
   Answer: Responses will vary by student

These questions can also be used as a formative assessment. A printable version of these questions can be found in the Assessment Guide.

EDUCATIONAL STANDARDS

CSTA Standards
- **2-AP-16** Incorporate existing code, media, and libraries into original programs and give attribution.

ISTE Standards
- **1.4.c** Students develop, test, and refine prototypes as part of a cyclical design process.

UK National Curriculum: Computing - Key stage 3
- Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits

Australian F-10 Curriculum: Digital Technologies - Year 7 and 8
- **(ACTDIP30)** Developing and modifying digital solutions by implementing instructions contained in algorithms through programs

NAME: _____ DATE: _____

CODING WITH MINECRAFT: UNIT 1 FORMATIVE ASSESSMENT

What's an on chat command?	
How do you get to the coding workspace?	
How do you add a block to the coding workspace?	

What is one reasoning learning computer science and coding is important?	
What are you most excited about learning in this course?	