Educator Guide

Python 101 - Lesson 1

45-60 minutes

All That Syntax

PYTHON COMMAND STRUCTURE AND SYNTAX

EDUCATION.MINECRAFT.NET

THEME OVERVIEW

In this lesson, you will need to help a software development company called CodingMine. They have created software, but there are all kinds of bugs within the software. The CEO of the company needs the students' help. The problem has become widespread in many pieces of code that they wrote. The students need to write down Minecraft Python commands using the correct syntax and find and correct errors in other already existing pieces of code.

LESSON OBJECTIVES

By the end of the lesson, students will:

- Understand what a computer language is
- Define an algorithm
- Recognize Minecraft Python command syntax structure
- Differentiate the syntax when declaring strings or numbers
- Identify how to correct syntax errors

THINGS TO KEEP IN MIND

- Remind students that there may be more than one solution for each of the activities.
- Encourage students (and demonstrate if needed) how to take a screenshot of the coding solutions and include their explanations.

KEY VOCABULARY

Syntax – A set of rules used to create programing language structure

Syntax Error – A computer's way of saying that the computer code is incorrect and cannot run

Command Group – The first part of a python coding command, referred to as the 'player' part

Command Name – The second part of a python coding command, referred to as the 'say' part

String – A piece of text in quotes within the code.

CODING CONCEPTS

- **Computer Languages**

  To instruct a computer to do something, you need to talk to it in a language it understands, just like people. There are many computer languages; some of the ones used the most, which they may have heard of, are C++, Python and JavaScript. Most computer languages, although they are all slightly different, use the same coding concepts.

- **Algorithms**
  When computers read code written in a computer language, they read it as an algorithm. An algorithm is a list of commands that the computer reads and carries out one after the other. The order in which the commands are given to the computer is important. For example, when you are making a cake in real life, if you have a recipe and you follow it in the correct order, you will make a delicious cake. If you make it in the wrong order, it wouldn't come out correctly, even though all the ingredients are the same. An algorithm is like a recipe and can seem complicated, but it is just a set of small steps being carried out in the right order.
- **Python**
  Python is a language that is used to communicate with a computer to make it carry out certain tasks. Python is a powerful programming language that can be used in many situations, from making web applications and data analysis to programming artificial intelligence. More specifically, in this course the students will be using a modified version of Python, MakeCode Python, created so that it can be used within Minecraft.
- **Syntax**
  Syntax (in a programming language) is a set of rules that are used to create the programming language structure, in a similar way that grammar is used to create the structure of sentences in normal language. A software developer must follow this structure to make his or her code run correctly. MakeCode Python also has a defined set of rules (the syntax) that the students will have to follow.
- **MakeCode Python command structure**
  Every command while programming using MakeCode Python is made from specific parts. Let us take one command as an example:

  ```
  player.say()
  ```

  Here we can see that the command is made from two parts. The first part is the player part, and the second part is the say part. The player part is commonly called a class in Python; however, in Minecraft Python in this course, we will be calling it the **command group**. This is because it can be thought of as a box where many different commands are kept. The say part is one of the actual commands, in that specific box, and is commonly called a method or function in Python. In MakeCode Python, we call it **command name**. The general structure of a command in MakeCode Python would be the **command group** followed by the **command name**, separated by a dot. At the end of every command there is a pair of parentheses where we input parameters to make the command do exactly what we want.

```
command_group.command_name()
```

- **String**
  Explain to the students that a string is a piece of text in quotes " ", an example of this would be:
  "Hello"
  You can use other characters such as numbers inside the quotes. However, these numbers would not have any mathematical value, and would just be read by Python as text.

LESSON ACTIVITIES

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

Today, we will start a new computer science unit called, "Python 101". We are going to transition over to using MakeCode Python, a text-based coding language. (**slide 1**)

Review the lesson objectives with students. (**slide 2**)

Define the important vocabulary with students. (**slide 3**)

You will need to help a software development company called CodingMine by finding and fixing all the bugs in the software they create. The CEO of the company really needs the student's help for this project. The problem has become widespread in many pieces of code that they wrote. The students need to write down Minecraft Python commands using the correct syntax and find and correct errors in other already existing pieces of code. (**slide 4**)

Explain the concept of syntax to students. (**slide 5-6**)

Guided Instruction (Teacher Modeling; "We Do")

Demonstrate how to locate and find the Python 101 lesson, "All that Syntax" from the in-game library. Showcase the spawn point for students and then explain that they will start their lesson by talking to the NPC, the CEO of CodingMine. (**slides 7-9**)

All students should log into Minecraft: Education Edition at this point and replicate these exact steps so you can complete the first activity together.

Activity 1: What is Right? (Slides 10-19)
(Hint: The students will have to talk by right clicking on the non-player-character {NPC} to start an activity)
Objective: Check Each Code for Accuracy

Explanation:
"You will need to figure out which of the commands on the computer monitors is written correctly. You will do this by checking each of the commands in the coding window `[c]` to find the one that works. When you find the correct one, you will need to press the mouse button on the right side of the small computer monitor where that command is shown. There should be no syntax errors shown when a correct piece of code is run, and the command should show the word "Hi" in the chat.
Go over to the first computer with the blue on the desk by the entrance. Write out the code that code that is written on the monitor in the coding window:

```
player(say)Hi
```

Run the code by clicking on the big green arrow button to check if it is correct. If it is, press the mouse button. If it is not, close the coding window by clicking on the 'x' in the top right-hand corner and try the other 3 pieces of code on the remaining monitors.

The code on computer monitor number 3, the monitor where there is a lamp on the table, they will see that it is the correct code. After they click the mouse button next to the monitor, Activity 1 will be complete, and the door to the next Activity will open. When the mouse button, next to any other monitor is pressed, bugs will appear and you will keep trying until you find the correct code.

Code snippets:

```
Monitor 1: player(say)Hi
```

```
Monitor 2: player.say“Hi”
```

```
Monitor 3: player.say(“Hi”) (correct)
```

```
Monitor 4: say()
```

Independent Work (Teacher Support; “You Do”)

Activity 2: What is Missing? (Slides 20-24)

Objective: Find the Missing Syntax Blocks and Fill in

Explanation:

“The programmer has asked for your help, as he cannot find out what syntax blocks are missing from the commands on the monitors. There are syntax blocks in the chest in the middle of the room. Use these blocks to fill in the missing syntax of the commands. You can also check different solutions for each of the commands on the coding window.”

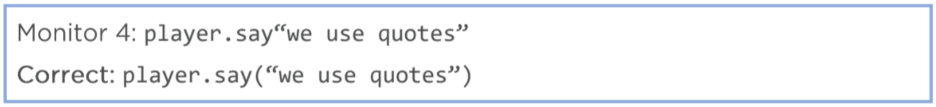
Tell the students that they should check if the commands on the monitors work correctly by using the say command from the player group on the left side of the coding window. Once the students have correctly placed each syntax block, they will have completed Activity 2 and the door to the next Activity wil open.

Code snippets:

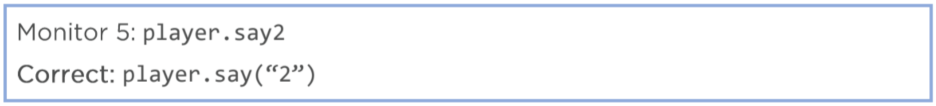
```
Monitor 1: player.say“To show”)
Correct: player.say(“To show”)
```

```
Monitor 2: player.say(“text on)
Correct: player.say(“text on”)
```

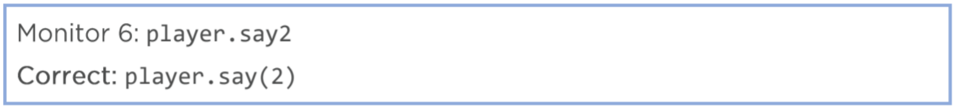
```
Monitor 3: player.say(the screen)
Correct: player.say(“the screen”)
```


Monitor 4: `player.say“we use quotes”`

Correct: `player.say(“we use quotes”)`


Monitor 5: `player.say2`

Correct: `player.say(“2”)`


Monitor 6: `player.say2`

Correct: `player.say(2)`

Activity 3: What is the Correct Number? (Slides 25-29)
Objective: Find the Correct Sum and Choose it

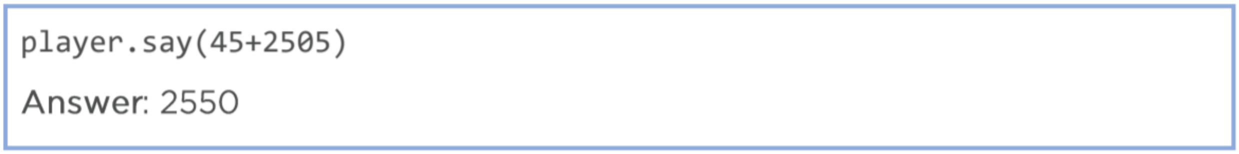
“ *Try and solve the sum below in your heads and see how long it takes.”*
(2+6) *(4-2)

The goal is to demonstrate the advantage of using a computer when they solve the same sum using code.

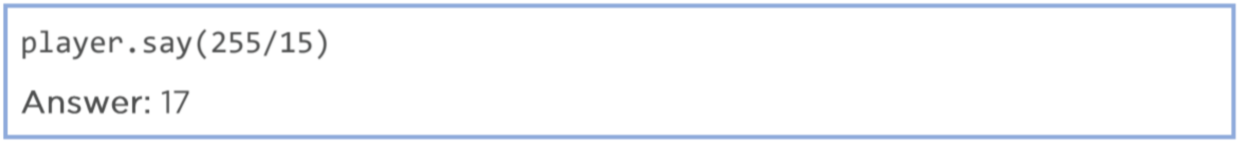
Explanation:
The data scientist has asked for your help to find out what the correct answer for three sums. Once you find the correct answer, you should choose it, by pressing the correct button, from one of three given possibilities under each monitor.
Use the Say command to calculate the sums on the monitors and show them in chat. Select the answer under the monitors.

When the students have selected each answer correctly, Activity 3 and the lesson is complete.

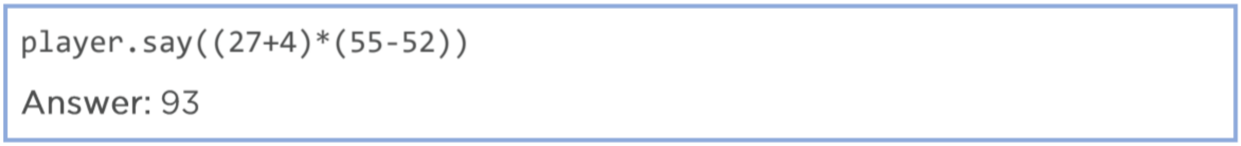
Code Snippets:


```
player.say(45+2505)
```

Answer: 2550


```
player.say(255/15)
```

Answer: 17



```
player.say((27+4)*(55-52))
```

Answer: 93

LESSON CONCLUSION

Ask students about the skills that they have learned during the lesson to reinforce the concepts learned. (**slides 30-31**)

1. What command do we use if we want to show a piece of text or a mathematical value in the chat?
   Answer: The player.say() command
2. Do we use quotes when we want to show a piece of text in the chat?
   Answer: Yes
3. Are numbers used with or without quotes if we want to use their numerical value?
   Answer: Without
4. What syntax do we place around the parameters of a command?
   Answer: Parenthesis ()

These questions are also available as a printable handout at the end of this document. They can be used as a formative assessment for this lesson's learning objectives.

EDUCATIONAL STANDARDS

United States: CSTA

- **3A-AP-13** Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests.

United States: ISTE

- **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.

Australian F-10 Curriculum: Digital Technologies (Year 9 and 10)

- Recognising that different algorithms can solve a problem with different trade-offs (ACTDIP040)

UK National Curriculum: Computing (Key Stage 4)

- Develop and apply their analytic, problem-solving, design, and computational thinking skills

NAME: ________________________________ **DATE:** ____________________

PYTHON 101: LESSON 1 FORMATIVE ASSESSMENT

What command do we use if we want to show a piece of text or a mathematical value in the chat?	
Do we use quotes when we want to show a piece of text in the chat?	
Are numbers used with or without quotes if we want to use their numerical value?	
What syntax do we place around the parameters of a command?	