MINECRAFT EDUCATION EDITION

Educator Guide

Block 2 – Lesson 2
45 minutes
Single Student

Mercury and Venus: Reinforcing Loops and Conditionals

THEME OVERVIEW

Tell students: your training is complete and it's time to head to space. Your first stop is Mercury, the planet closest to the Sun. When you have completed your mission on Mercury you will then go to Venus. The advanced space technology of Minecraft will keep you safe as the Agent explores these planets for you. You will be collecting some materials from each of the planets.

LESSON OBJECTIVES

- Follow coding instructions to solve puzzles without usual visual Minecraft support
- Reinforce the use of operators
- Reinforce using conditionals and while loops
- Combine using AGENT DETECT and AGENT INSPECT blocks

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.

START OF LESSON PROCEDURE

Number of Activities: 4
Optional Activity: 1

INTRODUCTION AND LEAD-IN: 5 minutes

Lead-in:

Using the skills introduced to in Lesson 1, students need to utilize the Agent to collect samples from Mercury and Venus using the While Loop, Agent Inspect, Agent Detect, and the If/Else Conditional.

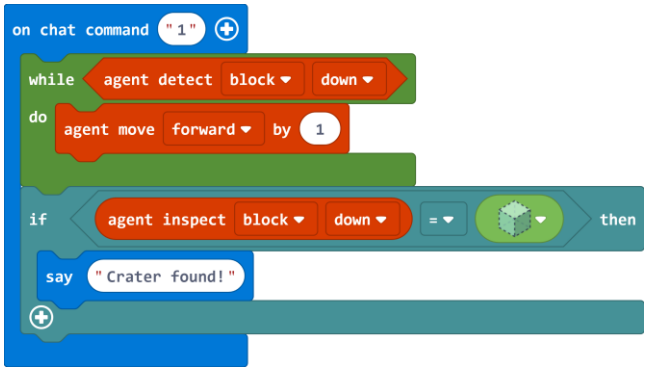
These lessons might seem repetitive but it is done on purpose, as these concepts can be difficult to grasp and by having the students work with Conditionals and Loops repeatedly it will better solidify the concepts. It will also demonstrate to the students the varied and useful ways that Conditionals and Loops can be used in concert with each other.

CODING ACTIVITIES: 30 minutes

Activity 1: Mercury, Finding a Crater

Tell students that they've arrived on Mercury and they need to locate a crater to gather some materials for research. Mercury's atmosphere is inhospitable to humans so they will use the Agent to explore, collect, and deliver our specimens. Therefore, it was vital to learn to use the While Loop because we would not be able to count blocks from the viewing platform. The Agent will do the work by Inspecting and Detecting. Students need to program the Agent to locate the crater.

- Tell students that they will use the Repeat Loop, Detecting each block in front of the Agent until the Agent detects the objective block (Air).
- The Agent is detecting if there is air below or not.
- In each loop, the Agent will tell the student if they have found the "crater". When the Agent has found the crater, the student will be teleported to the Agent.

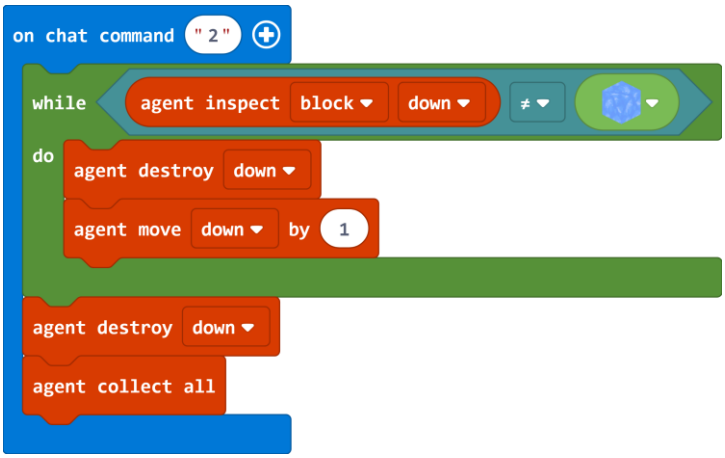


Activity 2: Mercury, Locating a Sample

Time to find samples. Students need to program the Agent to destroy and collect some samples. The environment on Mercury is hostile, that's why students will be utilizing the Agent.

The Agent will need to inspect blocks downward for Blue Ice. If it is not Blue Ice, the Agent will destroy the block and move forward. If it is Blue Ice the Agent will destroy and collect the block. This is another way Conditionals work.

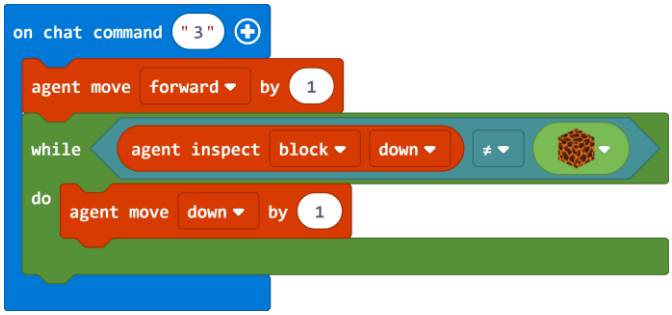
- The Agent will go straight down the crater using a While Loop. Tell students that the While Loop is used because there is no clear understanding of how deep down the Agent needs to move.
- While moving down, the Agent will inspect for Blue Ice. The Agent will continue to Destroy Down while Inspecting until Ice is located.
- When Blue Ice is found, the Agent needs to destroy and collect the block.



After obtaining the Blue Ice students will return to the ship. They need to remove the Blue Ice they found, from the Agent's inventory and place it in the Digitizer. They need to right-click on the Agent and drag the Ice from the Agent's inventory to the hotbar. After that they need to move closer to the Digitizer and right-click on the block of Blue Ice to move it from the hotbar to the Digitizer.
Hint: These instructions can also be found in the world.

Activity 3: Venus, Finding the Surface

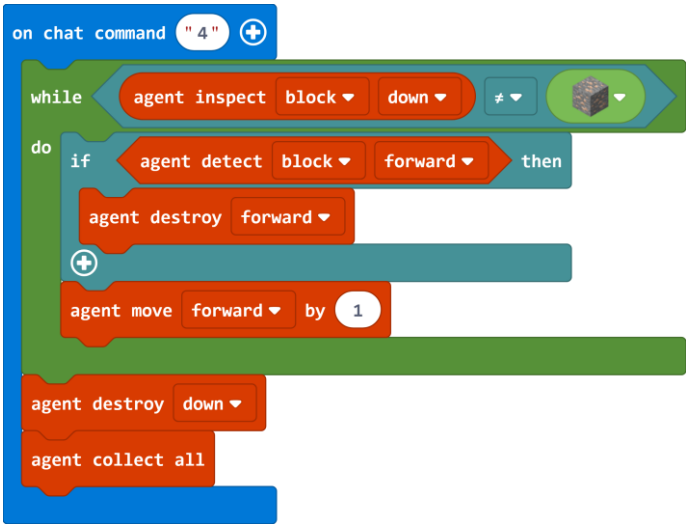
Now that students have retrieved blue ice from Mercury, the next mission is on Venus. The ship is in a habitable zone until the surface can be found. Students need to program the Agent to reach magma.

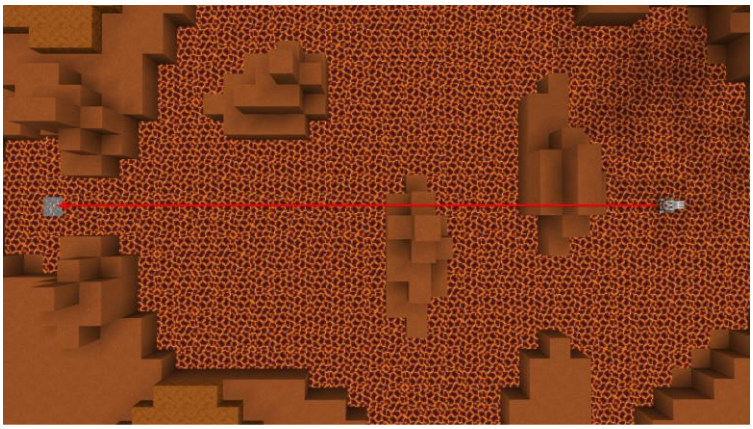


Activity 4: Venus, Helping the Agent

The Agent has located magma blocks that need to be crossed to get to the iron ore on the shore. Once again, due to the fact that there is no possibility of counting blocks, students will use a conditional loop and ensure that the

Agent inspecting the block down. There are obstacles on the Agent's way that it needs to destroy, if it detects them in front. Once the iron ore is reached, the Agent needs to destroy it down and collect the block.





When the Agent has located the iron ore the student will be transported back to the ship to put the iron ore in the digitizer to go in the collection.

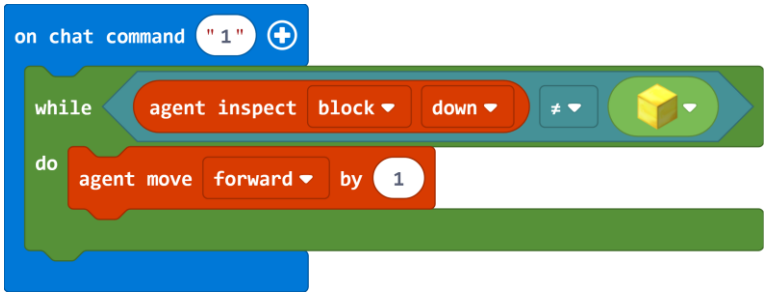
Activity 5: Bonus! Virtual Gathering

The simulation room is now unlocked and available for the students to use. Walking into the room the student will teleport to the surface with scattered objectives and materials for the Agent to gather using the coding skills the student has been practicing. No sample code provided.

LESSON CONCLUSION

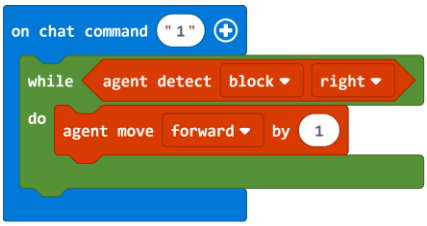
Upon completion of this lesson students should be able to answer the following questions:

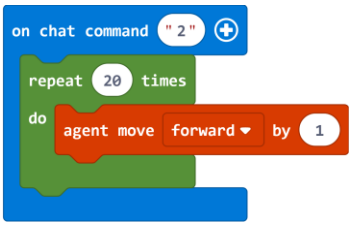
1. Q. Can you read this coding snippet and explain in your own words what it does?



A. While inspecting for blocks down, the Agent needs to move forward until it hits the yellow block underneath.

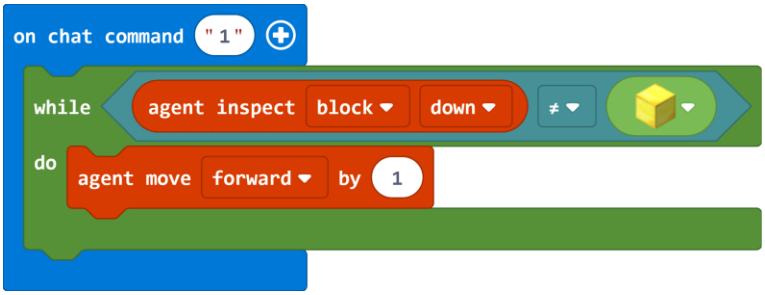
2. Q. What is the difference between these two coding snippets?





A. The first coding snippet uses a conditional loop and the second uses a repeat loop. The first snippet means that while the agent can detect blocks to its right, it needs to move forward. It means that it is unclear for a user, how long the Agent needs to be moving forward. The second scenario needs to repeat 20 times.

3. Q. Do you know how many steps forward does the Agent needs to move forward?



A. No, it is unclear. The Agent will be moving forward until it reaches the gold block.

4. Q. Why are “while loops” useful in coding, you think?

A. Answers may vary. While loops are useful as they will repeat the action until the goal is accomplished or condition is met.

EDUCATION STANDARDS

CSTA K-12	
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.