Overview: Introduction to Coding Extension Lesson	
Unit Title: Introduction to Coding	
Theoretical Framework: Constructivism Theory, Theory of Experiential Learning	
Source: www.code.org | **Minecraft Hour of Code Hero's Journey** https://studio.code.org/s/hero/lessons/1/levels/1	
Unit Theme: Basic Coding	
Integration Pathway: Symbols, Coding, Planning, Algebraic Expressions	
Problem-Solving Task: Use the proper inputs to perform necessary outputs and complete tasks for each level	
Unit Objectives: 1. The learner will investigate technological innovations 2. The learner will employ technologies to solve a simulated or real-world problem	
Common Core State Standards **TECHNOLOGY:** 1. **5.1.4** Use online simulations, games, and interactive sites to visualize content-related concepts (e.g., fractions, adaptation, cycles). 2. **5.5.2** Manage and troubleshoot (i.e., use a variety of tutorials) hardware components and operating systems effectively - Configure technological equipment for presentation independently. **MATHEMATICS:** 1. **5.OA.A.2** - Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.	
Discipline 1: Technology	**Discipline 2:** Mathematics
Desired Unit Results	
Six As of Project-Based Learning	
1. Authenticity	• Students will use critical thinking and problem solving-skills to solve a simulated or real-world problem
2. Academic Rigor	• Students will be exposed to multiple coding blocks to determine the necessary inputs required to perform the proper outputs to complete tasks
3. Applied Learning	• Students will recall block coding experienced at STARBASE Guam and apply their knowledge and skills to complete tasks

4. Active Exploration	● Students may independently code their character as they progress through levels. Students may further explore alternative types of coding beyond blocks
5. Adult Relationships	● Professionals and enthusiasts within the field of coding may be invited to the classroom to discuss their experiences with students to make connections with learning relative to the real world
6. Assessment	● Students will be provided with a rubric for formative, summative, culminating, performance, and student choice assessments ○ Students will be provided with exit tickets to demonstrate their learning at different proficiency levels ○ Students will be provided with a summative test at the end of the unit to identify their proficiency levels ○ Students will demonstrate their understanding of topics in coding ○ Observation

Essential Questions

These questions will help students discover the natural connections among the specific discipline fields:

1. What is an input?
2. What is an output?
3. What types of technology can you think of that can improve our way of life?
4. How can inputs and outputs be used to make these improvements?

Learners will know:	**Learners will be skilled at:**
1. Terminology such as input, output, coding 2. How to plan routes for navigation using inputs and outputs 3. How to apply coding using inputs and outputs 4. How to find a bug (coding error) 5. How to debug (fix a coding error)	1. Block coding 2. Using inputs 3. Observing outputs 4. Debugging

Evidence of Learning

Evaluative Criteria	**Assessment Evidence**
1. Rubric with performance indicator 2. Observation 3. Completion of levels/tasks	● Formative: Exit ticket ● Formative: Performance Assessment ● Summative: End of unit with varying questions related to proficiency levels ● Culminating/Performance: Use of block coding to complete levels/tasks ● Other Evidence (student choice): Student will choose type of media for presentation

Lesson Plan 1
Summary of Key Learning Interactions and Instruction

Lesson 1: Introduction to Navigation and Mapping

Learning Objectives
1. The learner will investigate technological innovations
2. The learner will employ technologies to solve a simulated or real-world problem

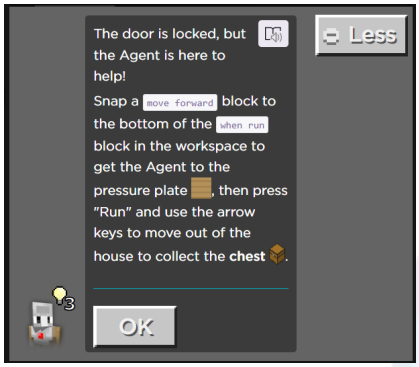
Terms:
Input - Command or line of code given to a robot or machine to perform an action
Output - Action performed by a robot or machine created by inputs
Bug - Program or coding error
Debugging - Finding and fixing a program or coding error
Symbol - An image that represents a function used in coding, such as directional arrows
Loop - A coding block used to repeat a set number of times until a condition is met

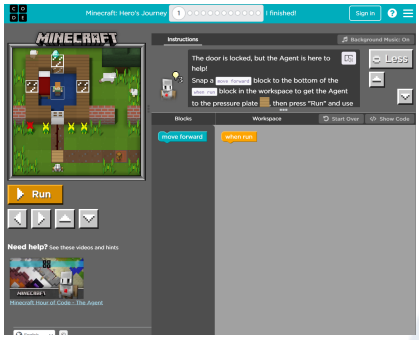
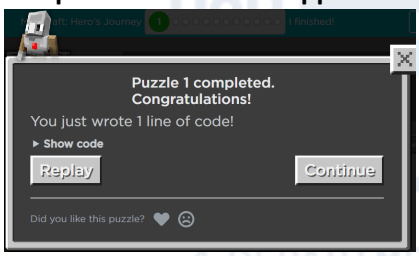
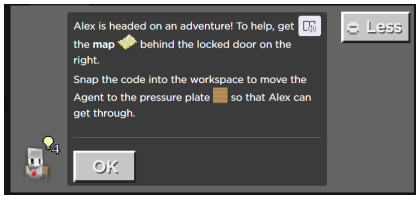
Formative Assessment:
1. *Exit ticket* - students will be provided with an exit ticket at the end of lesson to identify input and output
2. *Performance Assessment*
3. *Utilize block coding* - use inputs to complete tasks
4. *Observation*

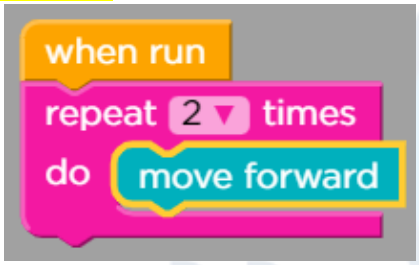
Summative Assessment:
1. Students will complete as many levels as possible to use inputs to get proper outputs using code.org provided link and demonstrate an understanding of how inputs and outputs are utilized

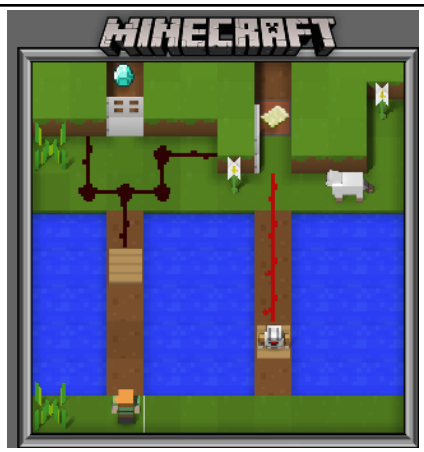
Interactions/Activities	**Differentiation**	**Materials/ Resources**	**Field Experiences/ Adult Relationships**
Description: Students will be asked to apply their learned knowledge and skills of basic	**Intervention:** Review input and output. Decrease amount of steps required	N/A	Using directions to determine how these are

coding for moving forward, backward, left, and right **Steps:** *Whole group:* Ask students to direct you from one side of the classroom to the opposite end. Observe how many steps are needed and how many different directions are required	**Extension:** Ask groups of students (2-4) to independently move from one end of the room to the other and identify the steps required		useful in navigation and moving between points
Description: Recall block coding assignment for moving in different directions. **Steps:** Have students recall the types of coding used to move the Lego Spike. *Ask*: What was the first block needed in order for the Lego Spike to move? Students should respond by setting the motors. If not, guide students toward thinking about how vehicles work and what allows it to start and move.	**Intervention:** Think-Pair-Share (Connections to Experience)	● N/A	Recalling basic movements using block coding for Lego Spike
Description: Prompt students to open their laptops and connect to code.org https://studio.code.org/s/hero/lessons/1/levels/1. Website may be preset or students can enter the address on their own.	**Intervention:** Heterogeneous Grouping (Connections to Experience)	● Laptop ● Internet connection	Use of technology to experience simulations
Description: Students will use Minecraft simulation to further their understanding and demonstration of block coding **Steps:** Have students choose a character Steve or Alex	**Intervention:** Heterogeneous Grouping (Connections to Experience)	● Laptop ● Internet connection	Use of technology to experience simulations

			
Description: Read instructions to determine tasks required by level  **Steps:** Have students read tasks allowed, paying close attention to symbols and inputs determined. Once complete, clarify tasks with students. PRESS OK.	**Intervention:** Heterogeneous Grouping (Connections to Experience) Students may use hints found at this link: https://studio.code.org/s/hero/lessons/1/levels/1#	• Laptop • Internet connection	Use of technology to experience simulations
Steps: Complete the first three levels with students to guide them through actions. With the mouse of the trackpad, drag the teal *move forward* block and connect it to the orange *run* block. Then, press *Run* on the left side of the screen.  **LEVEL 1**	**Intervention:** Heterogeneous Grouping (Connections to Experience) Students may use hints found at this link: https://studio.code.org/s/hero/lessons/1/levels/1#	• Laptop • Internet connection	Use of technology to experience simulations

Steps: Use directional keys to move the character forward. *Ask* What direction does each arrow tell our character to move? Tell students to pay close attention to the direction their character is facing and choose the down facing arrow (5 times), right facing arrow (5 times) for their character to move forward until it reaches the chest.  Directional arrows 	**Intervention:** Heterogeneous Grouping (Connections to Experience) Students may use hints found at this link: https://studio.code.org/s/hero/lessons/1/levels/1#	• Laptop • Internet connection	Use of technology to experience simulations
Completion Screen will appear  Press Continue to move on to the next level	**Intervention:** Heterogeneous Grouping (Connections to Experience) Students may use hints found at this link: https://studio.code.org/s/hero/lessons/1/levels/1#	• Laptop • Internet connection	Use of technology to experience simulations
Steps: Continue to read instruction screens with students until they are ready to continue levels independently.  	**Intervention:** Heterogeneous Grouping (Connections to Experience) Students may use hints found at this link: https://studio.code.org/s/hero/lessons/1/levels/1#	• Laptop • Internet connection	Use of technology to experience simulations

Steps: Use the *repeat* block and connect to *when run*.  Insert the *move forward* block in the *repeat* block. Ask students to recall Loops during their Mars Rover activity at STARBASE Guam and what the function of the block was used for.  *Run* program and observe what the character does. *Ask* if our character opens the door to get our map? Students will then use the arrow keys to move their character toward the map. Optional: Show Repeat Loops video https://youtu.be/uDouqRBBwYM	**Intervention:** Heterogeneous Grouping (Connections to Experience) Students may use hints found at this link: https://studio.code.org/s/hero/lessons/1/levels/1#	• Laptop • Internet connection	Use of technology to experience simulations

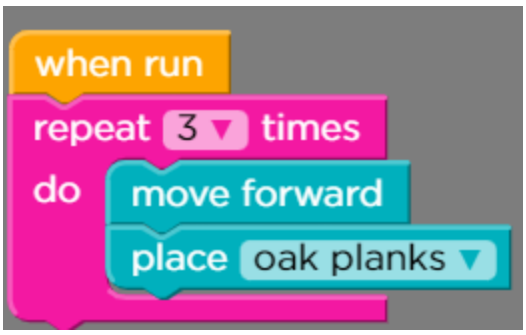
 Levels will scaffold as students move through levels			
Level 3  Use loop + move forward blocks to move character 4 spaces. *Ask* students what would happen if they chose a number less than four. Use directional arrows to move characters to the compass. **Allow students to work independently after Level 3 with assistance as needed.**	**Intervention:** Heterogeneous Grouping (Connections to Experience) Students may use hints found at this link: https://studio.code.org/s/hero/lessons/1/levels/1#	• Laptop • Internet connection	Use of technology to experience simulations
See solutions for Level 4-11 on Pages 10-14			

FORMATIVE ASSESSMENTS

Exit Ticket
CHOOSE ONE and EXPLAIN: What is an input? What is an output?

Performance Assessment		
1. What is an input?	Performance Level 1	**Rubric (scaled for each question)** **Performance Indicator, insert appropriate verb and task for each level of measurement** **4 - Is able to identify _____ and can explain beyond concept taught** **3 - Can explain _____ without assistance** **2 - Can explain _____ with some assistance** **1 - Can identify _____, requiring assistance** **0 - Non-Performance**
2. What is an output?	Performance Level 1	
3. Circle One. A program error is called a Bug Input Debugging	Performance Level 2	
4. Circle One. Finding and fixing a program error is called Spotting Debugging Bugging	Performance Level 2	
5. Draw four types of SYMBOLS that can be used for coding	Performance Level 3	
6. What is a LOOP?	Performance Level 3	
7. In your own words, or by drawing, demonstrate what a FUNCTION is	Performance Level 4	
8. If your FUNCTION is set to move your character forward 4 times, how many FUNCTION blocks will you need for your character to move 12 blocks?	Performance Level 4	

SOLUTIONS	
Level 4 Solution:  **Use directional arrows to move character to item**	
Level 5 Solution:  **Use directional arrows to move character to item**	
Level 6 Solution:	



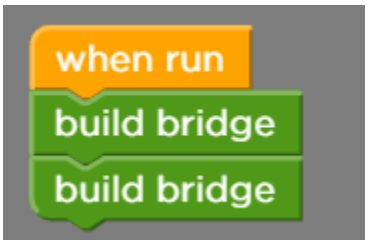
Use directional arrows to move character to item

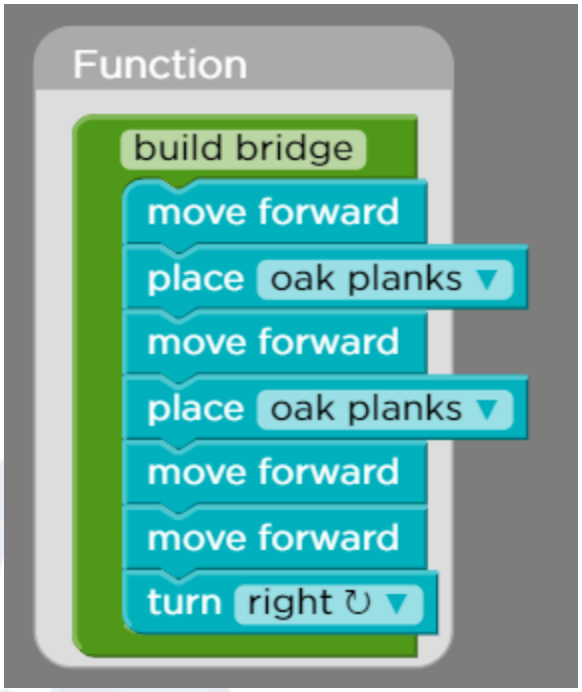
Level 7 Solution:

Use directional arrows to move character to item

Level 8: Functions

https://youtu.be/iBmzp4a_2N4





Explain to students a function is used as a preset, and that we can create a command for one block to perform any tasks. For example, the function block on Level 8 tells the character exactly what to do to build a bridge. Then have students look to the green block in the Blocks column and ask how many blocks they see. Students will say 1, and that is because the function, no matter how many commands we have, allows us to only use one block.

Ask students to locate the torch and identify how many bridges they will need. Students will say 2, which means they will need 2 build bridge blocks.

Level 9 Solution:

<table>
<tr>
<td> 
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<td></td>
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<tr>
<td>Level 10 Solution:
 

Use directional arrows to move character to item. Character will collect flint and steel as it moves along the tracks.</td>
<td>Emphasize use of loops and functions to compete the task</td>
</tr>
<tr>
<td>Level 11 Solution</td>
<td></td>
</tr>
</table>

	
Level 12: FREEPLAY Have students create their own functions to explore the Minecraft world and extend their coding knowledge, skills, and abilities	

Reference:

Code.org (2022). *Minecraft: A Hero's Journey. https://studio.code.org/s/hero/lessons/1/levels/1*