Scope and Sequence

Python Floating Islands

Lesson	Purpose	CSTA Standards	CS Concepts	Commands / sample code

1	**Introduction to Python, Agent & outputs**	1A-AP-11
		Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
		
		1B-AP-09
		Create programs that use variables to store and modify data.
		
		1B-AP-15
		Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.
			• Introduction to Python
			• Outputs (say)
			• Variables
				`agent.move("forward")`
				`agent.move("forward")`
				`agent.move("down")`
				`agent.move("right")`
				`agent.destroy("forward")`
				`agent.move("up")`
				`agent.destroy("up")`
				`agent.move("up")`
				`agent.move("left")`
				`agent.move("left")`
				`agent.move("up")`
				`agent.destroy("up")`

2	**Conditional statements**	1B-AP-09
		Create programs that use variables to store and modify data.
		
		1B-AP-11
		Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
			• Concepts of conditions
			• If statements
			• Else statements
			• Nested if/else statements
			• Logical operators
				`if(purity("forward") <= 3):`
				`  deny()`
				`  say("Purity less than or equal to 3!")`
				`else:`
				`  say("Purity is acceptable!")`
				`  accept()`

3	**For loops**	1A-AP-10
		Develop programs with sequences and simple loops, to express ideas or address a problem.
		
		1A-AP-14
		Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
		
		1B-AP-11
			• For loops
			• Nested for loops
			• Break
				`for tunnel in range(0, 3):`
				`  agent.move("forward")`
				
				`  for dig in range(0,3):`
				`  agent.destroy("down")`
				`  agent.move("down")`
				
				`  if(agent.inspect("down") == "gold_ore"):`

		Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.		`agent.destroy("down")`
				
				`for rise in range(0,3):`
				`agent.move("up")`
				`agent.move("forward")`

4	**While loops**	1A-AP-10
		Develop programs with sequences and simple loops, to express ideas or address a problem.
		
		1A-AP-14
		Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
		
		1B-AP-11
		Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
		
		1B-AP-12
		Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
		
		2-AP-12
		Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.
		
		2-AP-13
		Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.
			• While loops
			• Nested while loops
				`while agent.inspect("forward") == "air":`
				`agent.move("forward")`
				`while agent.inspect("down") == "air":`
				`agent.move("down")`
				
				`agent.collect()`
				
				`while agent.position.y != 157:`
				`agent.move("up")`
				
				`agent.place(1,"down")`

5	**Functions**	1B-AP-10
		Create programs that include sequences, events, loops, and conditionals.
		
		1B-AP-11
			• Concept of functions and using functions	`def on_player_travelled(location, mode, distance):`
				`loc = correct_location(location)`
				`agent.teleport(loc)`
				`agent.place(1, "down")`

		Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process. 1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features. 2-AP-14 Create procedures with parameters to organize code and make it easier to reuse.	• Function parameters • Return statements • Basics of events	
6	**Lists**	1A-AP-11 Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions. 1B-AP-09 Create programs that use variables to store and modify data. 1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process. 1B-AP-12 Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features. 1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended. 3A-AP-14 Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.	• Concept of a list/array • Usage of lists • Usage of lists with for loop	

By the end of this course:
The students will

- Have a good grasp of Python syntax
- Gain a good grasp of algorithms, for loops, while loops, variables, lists and functions

CSTA Standards covered

1A-AP-10 : Develop programs with sequences and simple loops, to express ideas or address a problem.
1A-AP-11 : Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
1A-AP-14 : Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

1B-AP-09 : Create programs that use variables to store and modify data.
1B-AP-11 : Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
1B-AP-12 : Modify, remix, or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
1B-AP-15 : Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

2-AP-12 : Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.
2-AP-13 : Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.
2-AP-14 : Create procedures with parameters to organize code and make it easier to reuse.

3A-AP-14 : Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables