Computers 7

Unit 1 (Sequencing)

Estimated Unit Time Frames	Big Ideas	Essential Questions	Concepts (Know)	Competencies (Do)	Lessons/ Suggested Resources	Vocabulary	Standards/ Eligible Content
9 Days	Sequence is the most foundational concept in programming, and everything we learn moving forward will build on this concept. Computers can only carry out tasks that are in the correct sequence. Computers are MACHINES and they have to do things the way they	Think about how we would get the bird to the pig using arrows. How do we use these blocks instead?	Students will develop sequential algorithms to move a bird from one side of a maze to the pig on the other side. To do this, they will stack code blocks together in a linear sequence, making them move straight, turn left, or turn right.	SWBAT Identify and locate bugs in a program. SWBAT Translate movements into a series of commands.	Express Course Code.org: Lesson 1 Programming with Angry Birds	Algorithm - A list of steps to finish a task. Bug - Part of a program that does not work correctly. Debugging - Finding and fixing problems in an algorithm or program. Sequencing - Putting commands in the correct order so computers can read the commands.	1A-AP-09: Model the way programs store and manipulate data by using numbers or other symbols to represent information. 1A-AP-11: Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.

	were built to do them.						
	Sequence is the most foundational concept in programming, and everything we learn moving forward will build on this concept. Computers can only carry out tasks that are in the correct sequence. Computers are MACHINES and they have to do things the way they were built to do them.	How do you fix something that isn't working? Do you follow a specific series of steps?	Students will encounter pre-written code that contains mistakes. They will need to step through the existing code to identify errors.	SWBAT Modify an existing program to solve errors. SWBAT Predict where a program will fail. Reflect on the debugging process in an age-appropriate way.	Express Course Code.org: Lesson 2 Debugging In Maze	Bug - Part of a program that does not work correctly. Debugging - Finding and fixing problems in an algorithm or program.	1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information. 1A-AP-11 - Decompose (break down) the steps needed to solve a problem into a precise sequence of instructions.
	Sequence is the most foundational concept in programming, and everything we learn moving forward will	How can a computer navigate instructions and order?	Students will continue to develop their understanding of algorithms and debugging	SWBAT Develop problem solving and critical thinking skills by reviewing debugging practices. SWBAT Order movement	Express Course Code.org: Lesson 3 Collecting Treasure with Laurel	Algorithm - A list of steps to finish a task. Program - An algorithm that has been coded into something	1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information. 1A-AP-11 - Decompose (break down) the steps needed to solve a

	build on this concept. Computers can only carry out tasks that are in the correct sequence. Computers are MACHINES and they have to do things the way they were built to do them.			commands as sequential steps in a program. Represent an algorithm as a computer program.		that can be run by a machine. Programming - The art of creating a program.	problem into a precise sequence of instructions.
	Sequence is the most foundational concept in programming, and everything we learn moving forward will build on this concept. Computers can only carry out tasks that are in the correct sequence. Computers are MACHINES	How would you code a computer to draw that shape? What order do the instructions need to be in?	Students will take control of the Artist to complete drawings on the screen.	SWBAT Break complex shapes into simple parts. SWBAT Create a program to complete an image using sequential steps.	Express Course Code.org: Lesson 4 Creating Art with Code	None	1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information. 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.

	and they have to do things the way they were built to do them.						

Unit 2 (Sprites)							
Estimated Unit Time Frames	Big Ideas	Essential Questions	Concepts (Know)	Competencies (Do)	Lessons/ Suggested Resources	Vocabulary	Standards/ Eligible Content
9 Days	Sprites provide a flexible and efficient method of creating animation and visual elements in video games and other computer graphics applications. Sprites consists of a bitmap image or a series of images that are combined to create an animation and can be thought of as a separate	What blocks would we need to connect to make the tumbleweed spin? What would happen if we told the sprite to begin two behaviors at once? Will the sprite ever stop these behaviors on its own? If we want the sprite to stop a behavior when we click it, how might we do that?	Students will program a simple animated underwater scene in this skill-building lesson	SWBAT Create new sprites and assign them costumes and behaviors. SWBAT Define "sprite" as a character or object on the screen that can be moved and changed.	Express Course Code.org: Lesson 5 Swimming Fish in Sprite Lab Students will program a simple animated underwater a scene in this skill-building lesson. In this skill-building lesson, students will work through a series of programming levels on the computer, finishing with an open-ended "free play" task where they can build whatever they like. Students will write programs and learn about the two	Behavior - An action that a sprite performs continuously until it's told to stop. Sprite - A graphic on the screen with a location, size, and appearance.	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.

	entity that exists within a larger scene, such as a video game world.				concepts at the heart of Sprite Lab: sprites and behaviors.		
	Sprites provide a flexible and efficient method of creating animation and visual elements in video games and other computer graphics applications. Sprites consists of a bitmap image or a series of images that are combined to create an animation and can be thought of as a separate entity that exists within a larger scene, such as a video game world.	What were the most interesting choices you were able to make with these apps? Was there ever a time you wished you could change something in the app but were not given the choice?	Students will work through a series of programming levels on the computer, finishing with an open-ended "free play" task where they can build whatever they like.	SWBAT Create an animation using sprites and behaviors. SWBAT Create new sprites and assign them costumes and behaviors.	Express Course Code.org: Lesson 6 Making Sprites Students will program a simple animated underwater a scene in this skill-building lesson. In this skill-building lesson, students will work through a series of programming levels on the computer, finishing with an open-ended "free play" task where they can build whatever they like. Students will write programs and learn about the two concepts at the heart of Sprite Lab: sprites and behaviors	Algorithm - A list of steps to finish a task. Behavior - An action that a sprite performs continuously until it's told to stop. Program - An algorithm that has been coded into something that can be run by a machine. Sprite - A graphic on the screen with a location, size, and appearance.	1B-AP-10 - Create programs that include sequences, events, loops, and conditionals. 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.

Unit 3 (Events)							
Estimated Unit Time Frames	**Big Ideas**	**Essential Questions**	**Concepts (Know)**	**Competencies (Do)**	**Lessons/ Suggested Resources**	**Vocabulary**	**Standards/ Eligible Content**
9 Days	Event-driven programming is a great approach for building complex systems. Event-driven programming is a powerful paradigm that promotes loose coupling and efficient communicatio n between components in software systems. By using event-driven interfaces, developers can design flexible and modular systems that respond to events and	What happened when you were told to clap but you were already marching in place? What happens if you are told to begin two different behaviors at once?	Students will work through a series of programming levels on the computer, finishing with an open-ended “free play” task where they can build whatever they like	SWBAT Create an interactive animation using events. SWBAT Develop programs that respond to timed events. SWBAT Develop programs that respond to user input.	Express Course Code.org: Lesson 7 Sprites in Action In this skill-building lesson, students will work through a series of programming levels on the computer, finishing with an open-ended “free play” task where they can build whatever they like. Students will write programs that respond to timed events and user input. Students will create an interactive Virtual Pet that looks and behaves how they wish in this mini-project lesson. Students will use Sprite Lab's "Costumes" tool to customize their pet's	Algorithm - A list of steps to finish a task. Event - An action that causes something to happen.	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-12 - Modify, remix or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.

	trigger appropriate actions				appearance. They will then use events, behaviors, and other concepts they have learned to bring their project to life.		
	Event-driven programming is a great approach for building complex systems. Event-driven programming is a powerful paradigm that promotes loose coupling and efficient communicatio n between components in software systems. By using event-driven interfaces, developers can design flexible and modular systems that respond to events and trigger	Do you remember what an event is? Do you remember what behavior is? Can you remember some of the behaviors you have used ? What do they do?	Students will use Sprite Lab's "Costumes" tool to customize their pet's appearance.	SWBAT Create an interactive virtual pet using events, behaviors, variables, and custom art. Program solutions to problems that arise when designing a virtual pet, like feeding it or monitoring its happiness.	Express Course Code.org: Lesson 8 Virtual Pet with Sprite Lab	Behavior - An action that a sprite performs continuously until it's told to stop. Event - An action that causes something to happen.	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. 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-13 - Use an iterative process to plan the development of a program by including others' perspectives and considering user preferences.

	appropriate actions						
	Event-driven programming is a great approach for building complex systems. Event-driven programming is a powerful paradigm that promotes loose coupling and efficient communicatio n between components in software systems. By using event-driven interfaces, developers can design flexible and modular systems that respond to events and trigger appropriate actions		Students will program an interactive dance party.	SWBAT creates dance animations with code Develop programs that respond to timed events Develop programs that respond to user input.	Express Course Code.org: Lesson 9 Dance Party In this skill-building lesson, students will program an interactive dance party.	Event - An action that causes something to happen. Program - An algorithm that has been coded into something that can be run by a machine. code - to write code, or to write instructions for a computer.	1B-AP-09 - Create programs that use variables to store and modify data. 1B-AP-10 - Create programs that include sequences, events, loops, and conditionals.

Unit 4 (Loops)							
Estimated Unit Time Frames	**Big Ideas**	**Essential Questions**	**Concepts (Know)**	**Competencies (Do)**	**Lessons/ Suggested Resources**	**Vocabulary**	**Standards/ Eligible Content**
9 Days	Using loops is an important skill in programming because manually repeating commands is tedious and inefficient.	How did loops make your program easier to write? Think of something that repeats over and over again. What might the program for that look like?	Students will be learning about loops and how to implement them in Blockly code.	SWBAT Breaks down a long sequence of instructions into the largest repeatable sequence. Employ a combination of sequential and looped commands to reach the end of a maze. Identify the benefits of using a loop structure instead of manual repetition.	Express Course Code.org: Lesson 10 Loops with Rey and BB-8. Students will be learning about loops and how to implement them in Blockly code. With the Code.org puzzles, students will learn to add instructions to existing loops, gather repeated code into loops, and recognize patterns that need to be looped. It should be noted that students will face puzzles with many different solutions. This will open up discussions on the various ways to solve puzzles with advantages and	Loop - The action of doing something over and over again. Repeat - To do something again.	1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information. 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 in a precise sequence of instructions. 1A-AP-14 - Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.

					disadvantages to each approach.		
	Using loops is an important skill in programming because manually repeating commands is tedious and inefficient.	What was the coolest shape or figure you programmed today? Draw it out! What is another shape or figure you would like to program? Can you come up with the code to create it?	Students will build on top of their own work and create amazing artifacts.	SWBAT differentiates between commands that need to be repeated in loops and commands that should be used on their own. Identify the benefits of using a loop structure instead of manual repetition.	Express Course Code.org: Lesson 11 Mini-Project Sticker Art Students will be learning about loops and how to implement them in Blockly code. With the Code.org puzzles, students will learn to add instructions to existing loops, gather repeated code into loops, and recognize patterns that need to be looped. It should be noted that students will face puzzles with many different solutions. This will open up discussions on the various ways to solve puzzles with advantages and disadvantages to each approach.	Loop - The action of doing something over and over again. Repeat - To do something again.	1A-AP-09 - Model the way programs store and manipulate data by using numbers or other symbols to represent information. 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.
	Using loops is an important skill in	What is a nested loop?	Students will learn to recognize patterns within	SWBAT Break complex tasks into	Express Course Code.org: Lesson 12 Nested Loops in Maze	Command - An instruction for the computer.	1B-AP-11 - Decompose (break down) problems into smaller,

	programming because manually repeating commands is tedious and inefficient.	Can you draw a puzzle that would use a nested loop? Try coding the solution to your own puzzle.	repeated patterns to develop these nested loops.	smaller repeatable sections. Identify the benefits of using a loop structure instead of manual repetition. Recognize large repeated patterns as made from smaller repeated patterns.	Students will be learning about loops and how to implement them in Blockly code. With the Code.org puzzles, students will learn to add instructions to existing loops, gather repeated code into loops, and recognize patterns that need to be looped. It should be noted that students will face puzzles with many different solutions. This will open up discussions on the various ways to solve puzzles with advantages and disadvantages to each approach.	Many commands put together make up algorithms and computer programs. Loop - The action of doing something over and over again. Repeat - To do something again.	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.
	Using loops is an important skill in programming because manually repeating commands is	When do you use a loop? When do you use a nested loop? How would the code for your snowflake look different if you	Students will make their own decisions when it comes to creating designs for repetition.	SWBAT Break apart code into the largest repeatable sequences using both loops and nested loops. Describe when a loop, nested loop,	Express Course Code.org: Lesson 13 Snowflakes with Elsa and Ana Students will be learning about loops and how to	Loop - The action of doing something over and over again. Repeat - To do something again.	1B-AP-11 - Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process. 1B-AP-13 - Use an iterative process to plan

	tedious and inefficient.	only used one loop? No loops? Can you draw out an example?		or no loop is needed. Recognize the difference between using a loop and a nested loop.	implement them in Blockly code. With the Code.org puzzles, students will learn to add instructions to existing loops, gather repeated code into loops, and recognize patterns that need to be looped. It should be noted that students will face puzzles with many different solutions. This will open up discussions on the various ways to solve puzzles with advantages and disadvantages to each approach.		the development of a program by including others' perspectives and considering user preferences.

Unit 5 (Conditionals)							
Estimated Unit Time Frames	**Big Ideas**	**Essential Questions**	**Concepts (Know)**	**Competencies (Do)**	**Lessons/ Suggested Resources**	**Vocabulary**	**Standards/ Eligible Content**
9 Days	Conditions allow us to control what the program does and	Draw something else you could have built in this	This set of puzzles will work to solidify and build on the knowledge of loops, and	SWBAT Define circumstances when certain parts of a program should run and	Express Course Code.org: Lesson 14 Looking Ahead with Minecraft	Condition - Something a program checks to see if it is true	1B-AP-10 - Create programs that include sequences, events, loops, and conditionals.

	perform different actions based on these “if, then” logic statements. What makes computer programs great is the ability to interact with a user- this is only possible with conditions that direct this type of interaction.	minecraft world. Can you draw a scene where someone is using a conditional?	introduce conditionals.	when they shouldn't. Determine whether a conditional is met based on criteria.	This set of puzzles will work to solidify and build on the knowledge of loops, and introduce conditionals. By pairing these two concepts together, students will be able to explore the potential for creating fun and innovative programs in a new and exciting environment.	before allowing an action. Conditionals - Statements that only run under certain conditions.	
	Conditions allow us to control what the program does and perform different actions based on these “if, then” logic statements. What makes computer programs great is the ability to interact with a	What conditionals did you use in your code today? What are some other conditionals a bee might use?	Students will practice using conditionals in their programs. The if / else blocks will allow for a more flexible program.	SWABT Solve puzzles using a combination of looped sequences and conditionals. Translate spoken language conditional statements into a program.	Express Course Code.org: Lesson 15 If/Else with Bee This set of puzzles will work to solidify and build on the knowledge of loops, and introduce conditionals. By pairing these two concepts together, students will be able to explore the potential for creating fun and innovative programs in a new	Conditionals - Statements that only run under certain conditions.	1B-AP-11 - Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.

	user- this is only possible with conditions that direct this type of interaction.				and exciting environment.		
	Conditions allow us to control what the program does and perform different actions based on these "if, then" logic statements. What makes computer programs great is the ability to interact with a user- this is only possible with conditions that direct this type of interaction.	What is the difference between a while loop and a normal repeat loop? Give an example of a puzzle where you would use a while loop, but not use a repeat loop. Can you give an example of a puzzle where you would use a repeat loop, but not a while loop.	Students continue to deepen their knowledge of loops, they will come across problems where a command needs to be repeated, but it is unknown how many times it needs to be repeated.	SWBAT Distinguish between loops that repeat a fixed number of times and loops that repeat as long as a condition is true. Use a while loop to create programs that can solve problems with unknown values.	Express Course Code.org: Lesson 16 While Loops in Farmer This set of puzzles will work to solidify and build on the knowledge of loops, and introduce conditionals. By pairing these two concepts together, students will be able to explore the potential for creating fun and innovative programs in a new and exciting environment.	Condition - Something a program checks to see if it is true before allowing an action. Loop - The action of doing something over and over again. Repeat - To do something again. While Loop - A loop that continues to repeat while a condition is true.	1B-AP-11 - Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
	Conditions allow us to control what the program does and perform	Can you draw a scene where someone is using a conditional?	Students will be able to explore the potential for creating fun and innovative programs in a new	SWBAT Define circumstances when certain parts of a program should run and	Express Course Code.org: Lesson 17 While Loops in Farmer This set of puzzles will work to solidify and	Condition - Something a program checks to see if it is true before allowing an action.	1B-AP-10 - Create programs that include sequences, events, loops, and conditionals.

	different actions based on these “if, then” logic statements. What makes computer programs great is the ability to interact with a user- this is only possible with conditions that direct this type of interaction.		and exciting environment.	when they shouldn't. Determine whether a conditional is met based on criteria.	build on the knowledge of loops, and introduce conditionals. By pairing these two concepts together, students will be able to explore the potential for creating fun and innovative programs in a new and exciting environment.	Conditionals - Statements that only run under certain conditions.	