Project STEM: Computer Science Explorations 1 Curriculum Overview Tables

Block A: Getting Started and Motion in Scratch

Unit	Lesson	Title	Content	Topic(s)
0	1	Why Does Computer Science Matter?	Students discuss their understanding of computer science and its significance, followed by a coding challenge.	CS Fundamentals
0	2	What is a Computer Program?	An unplugged activity where students encode and decode messages, simulating computer program execution.	Programming Concepts
0	3	Growth Mindset	Exploration of growth mindset in the context of learning computer science, coupled with a challenging activity.	Learning Skills in CS
0	4	Pair Programming	Introduction to pair programming through an online activity to understand collaborative coding norms.	Collaborative Coding
0	5	Welcome to Scratch	Students are introduced to Scratch, creating, sharing, and adding their first project to the class studio.	Introduction to Scratch
1	1	Events and Responses	Learning about events and responses in programming with a Scratch project.	Event Handling in Scratch
1	2	Animate a Name	Students animate the letters of their name in Scratch, relating animation to computer science.	Basic Animation in Scratch
1	3	Exploring the XY Grid	Focus on the XY coordinate grid in Scratch to control sprite movement.	Coordinates & Movement in Scratch
1	4	Magic Room Cleaner	Creation of a program simulating a room cleaner for learning initialization and parallelism.	Sequence & Parallelism in Scratch
1	5	Mid-Unit Recap and Debugging	Review of concepts learned with practical application in debugging Scratch programs.	Debugging Strategies in Scratch
1	6	A-MAZE-ing Scratch!	Navigating a fish through progressively difficult mazes in Scratch.	Creating Mazes in Scratch

1	7	Dance Party	Utilizing broadcasting and receiving blocks in Scratch for a sprite dance party.	Interactive Animation in Scratch
1	8	Creating a Virtual Pet Part 1	Beginning of a two-part project to create an interactive virtual pet in Scratch.	Creating Interactive Projects in Scratch
1	9	Creating a Virtual Pet Part 2	Completion of the virtual pet project, advancing in Scratch programming.	Creating Interactive Projects in Scratch
1	10	Unit Recap and Debugging	Comprehensive review and debugging of Scratch programs to consolidate learning.	Scratch Programming Review

Block B: Animation and Games

Unit	**Lesson**	**Title**	**Content**	**Topic(s)**
2	1	Introduction to Loops (Unplugged)	An offline dance activity to understand algorithms and loops.	Understanding Loops
2	2	Exploring Animation	Exploring frame rates and animations in Scratch using sprite costumes.	Animation Techniques in Scratch
2	3	Effects in Animation	Learning to use loops for creating special effects in Scratch animations.	Animation Effects in Scratch
2	4	Vector Animation	Differentiating between vector and bitmap graphics in Scratch animations.	Vector Graphics in Scratch
2	5	Mid-Unit Recap and Debugging	Mid-unit review and debugging of Scratch animation programs.	Debugging Animation in Scratch
2	6	Sound Board	Creating a Scratch project to control animations with sound and environmental factors.	Sound in Scratch Animations
2	7	Sound Party	Learning about Scratch's Sound Editor and incorporating sounds in programs.	Sound in Scratch Animations
2	8	Storytelling With Sound Part 1	Planning an animated scene in Scratch with storyboarding and sound selection.	Storytelling and Sound in Scratch

2	9	Storytelling With Sound Part 2	Bringing the storyboard to life in Scratch, integrating loops, sound, and animation.	Storytelling and Sound in Scratch
2	10	Unit Recap and Debugging	End-of-unit review and practical application of debugging in Scratch.	Scratch Animation Review
3	1	Conditionals	Introduction to if-then and if-then-else statements in Scratch through conditional activities.	Conditional Logic in Scratch
3	2	Race to the Finish I	First part of a project to create a "Race to the Finish" game in Scratch, starting with pseudocode.	Game Development in Scratch
3	3	Race to the Finish II	Completing the racing game with Scratch programming based on the planned pseudocode.	Game Development in Scratch
3	4	Dance Battle	Learning if-then-else statements by programming a dance battle game in Scratch.	Interactive Games in Scratch
3	5	Mid-Unit Recap and Debugging	Mid-unit review and debugging Scratch games to reinforce learned concepts.	Debugging Game Logic in Scratch
3	6	Bounce	Exploring collision detection and creating a bouncing sprite game in Scratch.	Advanced Game Mechanics in Scratch
3	7	IF-then-ELSE	Deepening understanding of boolean operators and conditionals in Scratch through a scavenger hunt.	Advanced Game Mechanics in Scratch
3	8	Line Follower	Creating a computer simulation in Scratch where a sprite follows a path using environmental input.	Simulations and Presentations in Scratch
3	9	Slideshow	Combining conditionals with broadcasting and receiving blocks to create a digital storytelling project.	Simulations and Presentations in Scratch

Block C: Interactive Games and Storytelling

Unit	Lesson	Title	Content	Topic(s)
4	1	Operators (Unplugged)	Learning about boolean operators through offline activities involving cards and conditions.	Understanding Operators
4	2	Rocket Launch	Creating a Scratch game using boolean operators to determine rocket launch conditions.	Conditional Logic in Scratch Games
4	3	Let's Chat!	Students create chatbot programs in Scratch to learn about user input and conversation simulation.	User Interaction in Scratch
4	4	Translator	Using Scratch's text-to-speech and translate extensions to build a simple language translation program.	User Interaction in Scratch
4	5	Mid-Unit Recap and Debugging	Mid-unit review of concepts with debugging of Scratch programs focusing on boolean logic.	Debugging Interactive Games in Scratch
4	6	My Maze Controls	Starting a multi-day maze game project in Scratch, setting up the maze and controls using boolean logic.	Complex Game Development in Scratch
4	7	My Maze Conditionals	Adding boolean conditional tests in the maze game to navigate the sprite through the maze.	Complex Game Development in Scratch
4	8	My Maze Incentives	Enhancing the maze game with collection objectives and scoring using variables.	Complex Game Development in Scratch
4	9	My Maze Challenges	Finalizing the maze game by adding complexity and unique elements, drawing on previous content.	Complex Game Development in Scratch
4	10	Unit Recap and Debugging	End-of-unit review and debugging Scratch programs, emphasizing boolean operators and game logic.	Review of Interactive Games in Scratch
5	1	Data and Variables (unplugged)	Students play offline rounds of Mad Libs-style games to learn about variables.	Variables and Data Types
5	2	Mad Libs	Creating a Mad Libs-style program in Scratch to understand variables and user input.	Game Design and Variables
5	3	Improve the Games	Learning about game design and enhancing an existing game using variables.	Game Design and Variables
5	4	Multiplication Game	Building a multiplication practice game in Scratch, using variables for storing answers and scores.	Practical Application of Variables

5	5	Mid-Unit Recap and Debugging	Mid-unit review and debugging Scratch projects to reinforce learning about variables.	Debugging and Review
5	6	Flappy Cat I	Starting a two-day project to create a "Flappy Cat" game, focusing on background movement and game design.	Game Development
5	7	Flappy Cat II	Completing the "Flappy Cat" game by adding complex interactions and user input elements.	Interactive Game Programming
5	8	Lists	Learning about lists in Scratch, modifying a project for grocery item selection and cost calculation.	Data Structures
5	9	Quiz	Building a quiz game in Scratch, introducing the concept of indexes and pairing in lists.	Data Structures
5	10	Unit Recap and Debugging	End-of-unit review and practical application of debugging in Scratch, focusing on variables and lists.	Debugging and Review

Block D: Art and Artificial Intelligence

Unit	**Lesson**	**Title**	**Content**	**Topic(s)**
6	1	Introduction to Procedures	Students start learning about procedures (functions) through a series of offline activities.	Introduction to Functions
6	2	Stamp	Using the stamp tool in Scratch to create spiral art via procedures.	Artistic Programming with Functions
6	3	Animation Cycles I	Programming custom blocks for sprite movements using procedures in Scratch.	Animation and Custom Functions
6	4	Animation Cycles II	Completing a project with advanced custom blocks for sprite animation cycles in Scratch.	Advanced Animation Techniques
6	5	Mid-Unit Recap and Debugging	Reviewing learned concepts and debugging Scratch programs focusing on procedures.	Debugging and Review
6	6	Pen Art	Introduction to the pen tool in Scratch for drawing shapes, considering properties like color and thickness.	Creative Coding with Pen Tool
6	7	Shape Maker I	Building a shape-creating program in Scratch, using user input for the number of shape sides.	Interactive Art and User Input

6	8	Shape Maker II	Enhancing the shape maker project with user input validation to prevent errors.	Advanced Programming Techniques
6	9	Generative Art	Using algorithms in Scratch to create generative art following predetermined rules.	Algorithmic Art
6	10	Unit Recap and Debugging	Comprehensive review and debugging of Scratch art projects, focusing on procedures and creativity.	