Scratch Programming Curriculum - Level 2

This curriculum outlines 45 sessions designed for students advancing their skills in Scratch programming. The modules cover advanced foundational concepts, string and motion manipulation, custom blocks and lists, extensions for enhanced creativity, and dedicated game development.

Module 1: Advanced Scratch Foundations (12 Sessions)

This module builds upon basic Scratch knowledge, introducing more complex mathematical concepts and fundamental programming constructs essential for dynamic projects.

Session	Topic	Description
1	Understanding Math Concepts	Explore various mathematical operations and their application in Scratch for accurate sprite positioning and calculations.
2	Event Handling	Deep dive into different types of events and how to effectively manage interactions and triggers within Scratch projects.
3	Control and Sensing	Master advanced control structures and sensing blocks to create interactive and responsive programs.
4	Working with Clones	Learn to create and manage multiple copies of sprites for complex animations and game mechanics.
5	Mini Project 1	Apply learned concepts to develop a small, independent Scratch project.
6	Creating STEM Project	Design and implement a Scratch project that integrates Science, Technology,

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		Engineering, and Math principles.
7	Exploring Operators in Scratch	Understand the various categories of operators available in Scratch and their uses.
8	Relational Operators	Learn how to use operators to compare values and make conditional decisions in code.
9	Logical Operators	Explore the use of AND, OR, and NOT operators to combine conditions for more sophisticated logic.
10	Advanced Operators	Discover additional useful operators for more complex programming tasks.
11	Combining Expressions and Operators	Practice combining different types of operators and expressions to achieve desired outcomes.
12	Mini Project 2	Develop a second mini-project, incorporating advanced operators and expressions.

Module 2: Strings & Motion (10 Sessions)

This module focuses on manipulating text (strings) and creating realistic and engaging motion for sprites, including advanced scrolling techniques and physics-based movements.

Session	Topic	Description
13	Creating STEM Project	Develop another STEM-focused project, integrating concepts of string and motion.

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14	Strings in Scratch	Introduce the concept of strings (text) in Scratch and basic string handling.
15	String Manipulation	Learn to join, split, and extract parts of strings for dynamic text displays.
16	Date and Time in Scratch	Explore how to work with date and time information within Scratch projects.
17	Sensing Stage and Other Sprite Properties	Understand how to detect and respond to properties of the stage and other sprites.
18	Scrolling a Backdrop in Scratch	Implement basic scrolling effects for backdrops to create continuous environments.
19	More with Scrolling a Backdrop	Advance scrolling techniques, including parallax scrolling and continuous looping backdrops.
20	Jumping and Gravity	Simulate realistic jumping and gravity effects for sprites.
21	Giving Speed to the Sprite	Control the speed and velocity of sprites for more dynamic movement.
22	Mini Project 3	Create a mini-project showcasing advanced string manipulation and motion.

Module 3: Custom Blocks & Lists (8 Sessions)

This module introduces the power of custom blocks for code organization and reusability, along with the fundamental data structure of lists for storing and managing multiple items.

Session	Topic	Description
23	My Blocks	Learn to create custom blocks to organize and simplify complex scripts.
24	More on My Blocks	Explore advanced uses of custom blocks, including parameters and recursion.
25	Lists	Understand the concept of lists as a way to store and manage multiple pieces of data.
26	List Manipulation	Learn to add, delete, insert, and replace items within a list.
27	More with Lists	Explore additional list operations, such as checking for item presence and getting list length.
28	Using Multiple Lists	Work with multiple lists simultaneously to manage diverse data sets.
29	Sorting Using List	Implement sorting algorithms to arrange items in a list.
30	Mini Project 4	Develop a mini-project utilizing custom blocks and list functionalities.

Module 4: Extensions & Creativity (8 Sessions)

This module delves into various Scratch extensions, enabling students to explore new functionalities and enhance the creativity and interactivity of their projects.

Session	Topic	Description
31	Pen Extension	Introduce the Pen extension for drawing lines and shapes with sprites.

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32	Teaching Geometry Using Pen	Apply the Pen extension to teach and visualize geometric concepts.
33	Use of Stamp Command in Pen Extension	Explore the stamp command to create duplicates of sprites as part of a drawing.
34	Music Extension	Discover the Music extension to add sounds, instruments, and rhythm to projects.
35	Text to Speech	Learn to use the Text to Speech extension to make sprites speak.
36	Translate Extension	Explore the Translate extension for translating text within projects.
37	Video Sensing	Understand how to use video sensing to detect motion from a webcam.
38	Mini Project 5	Create a mini-project that creatively incorporates one or more Scratch extensions.

Module 5: Game Development (7 Sessions)

The final module focuses on applying all learned concepts to design and build comprehensive games, culminating in a multi-part final project.

Session	Topic	Description
39	Game Building – Part 1	Begin the process of designing and coding a game, focusing on core mechanics.
40	Game Building – Part 2	Continue developing the game, adding more features and levels.

Session	Topic	Description
41	Game Building – Part 3	Further refine and expand the game, incorporating advanced techniques.
42	Game Building – Part 4	Finalize game mechanics, add scoring, and implement win/loss conditions.
43	Final Project – Part 1	Start working on a substantial final game project, outlining design and initial coding.
44	Final Project – Part 2	Continue developing the final project, focusing on complex interactions and user experience.
45	Final Project – Part 3	Complete the final project, adding polish, debugging, and preparing for presentation.