Computer Science

CS Endeavors 6

A+ COLLEGE READY

A+ EDUCATION PARTNERSHIP

A Program of the A+ Education Partnership
In partnership with the Alabama State Dept. of Education

CS Endeavors 6

Course Overview

1ST -9 WEEKS
Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) may be taught in any order. Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

2ND -9 WEEKS
Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) may be taught in any order. Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

3RD -9 WEEKS
Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) may be taught in any order. Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

4TH -9 WEEKS
Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) may be taught in any order. Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

NOTE: **Units** (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) **may be taught in any order.** Although if you choose to complete both Block Coding Units we suggest they be completed in order) **Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.**

STANDARDS CHECKLIST				
ALCOS	**Block Coding 1**	**Block Coding 2**	**Algorithms**	**The Internet of Things**
6.R1				
6.R2				X
6.R3				
6.R4	X	X		
6.R5				X
6.R6	X	X		X
6.1	X	X	X	
6.2	X	X	X	
6.3	X	X		
6.4	X	X	X	
6.5	X	X	X	
6.6	X	X	X	
6.7	X	X		X
6.8	X	X		
6.9				
6.10				
6.11				
6.12				

STANDARDS CHECKLIST				
ALCOS	**Block Coding 1**	**Block Coding 2**	**Algorithms**	**The Internet of Things**
6.13				X
6.14				
6.15				X
6.16				X
6.17				
6.18				
6.19				
6.20				
6.21				
6.22				
6.23				X
6.24				
6.25				
6.26				
6.27				
6.28				X
6.29				
6.30	X	X		X

Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) **may be taught in any order.** Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

UNIT NAME: Block Coding 1	RECOMMENDED TIME FRAME:9 WEEKS

UNIT OVERVIEW

This unit provides students with a basic understanding of block coding and introductory coding concepts.

BC1.Day 1: Introducing Scratch
BC1.Day 2: Exploring Scratch
BC1.Day 3: Creating with Scratch
BC1.Days 4 - 5: Exploring Events
BC1.Days 6-8: Creating with Events
BC 1.Days 9-10: Debug It!
BC1.Days 11-12: Exploring with Animation
BC1.Days 13-15: Creating with Animation
BC1.Day 16: Creature Construction
BC1.Days 20-22: Creating with Conditional Loops
BC1.Days 23 - 24: Introduction to Coordinates
BC1.Days 25 - 26: Build-A-Band
BC1.Days 27-28: Exploring with Decomposition by Sequence
BC1.Days 29-31: Decomposition by Sequence
BC1.Days 32-33: Exploring with One-Way Synchronization
BC1.Days 34-36: One-Way Synchronization
BC1.Days 37-38: Introducing Two-Way Synchronization with Wait Blocks
BC1.Day 39: Exploring Two-Way Synchronization with Wait Blocks
BC1.Day 40: Exploring Two-Way Synchronization with Message Passing
BC1.Days 41-42: Creating with Two-Way Synchronization
BC1.Day 43: Introducing Variables
BC1.Day 44: Exploring Variables
BC1.Day 45: Exploring Variables as Inputs
BC1.Day 46-47: Creating with Variable
BC1,Extra: Score
BC1.Extra: Extensions

STANDARDS

AL DLCS

6th Grade

6.R4 Identify and employ appropriate troubleshooting techniques used to solve computing or connectivity issues.

6.R6 Produce, review, and revise authentic artifacts that include multimedia using appropriate digital tools.

6.1 Remove background details from an everyday process to highlight essential properties.

6.2 Define a process as a function.

6.3 Create pseudocode that uses conditionals.

6.4 Differentiate between flowcharts and pseudocode.

6.6 Identify steps in developing solutions to complex problems using computational thinking.

6.7 Describe how automation works to increase efficiency.

6.8 Create a program that initializes a variable.

6.30 Discuss and apply the components of the problem-solving process.

RESOURCES

CSD Student Block Coding 1 Unit Progress Monitoring Template

UNIT NAME: Block Coding 2 Unit	RECOMMENDED TIME FRAME: 9 WEEKS

UNIT OVERVIEW

Block Coding 2 helps students develop more advanced coding skills and algorithms.

BC2.Day 1: Exploring Custom Events
BC2.Day 2: Modifying Custom Events
BC2.Days 3-5: Creating with Custom Events
BC2.Days 6-7: Debugging 1
BC2.Day 8-9: Exploring Complex Conditionals with Operators
BC2.Day 10: Exploring Complex Conditionals with Nested Conditionals
BC2.Days 11-12: Creating with Complex Conditionals
BC2.Days 13-14: Exploring Input Variables
BC2.Days 15-16: Exploring If-Then-Else Conditional Statements - Student Project
Student Project
BC2.Days 17-19: Creating with Input Variables and If-Then-Else Conditionals
Days BC2.20-21: Exploring Decomposition by Purpose
BC2.Day 22: Exploring Adding to Decomposed Code
BC2.Days 23-25:Creating with Decomposition by Purpose
BC2.Days 26 - 27: Creating Clones
BC2.Days 28 - 30: Games with Clones (Continued)
BC2.Day 31: Exploring Initialization
BC2.Days 32-33: Creating with Initialization
BC2.Days 34-36: Using Lists in Scratch
BC2.Days 37 - 38: Debugging 2
BC2.Days 39 - 41: Scratch Coding Cards
BC2.Days 42 - 44: Scratch Coding Cards Part 2
BC2.Day 45: Exploring State
BC2.Day 46: Exploring Changes in State
BC2.Days 47 - 48:Creating with State

STANDARDS

AL DLCS

6th Grade

6.R4 Identify and employ appropriate troubleshooting techniques used to solve computing or connectivity issues.

6.R6 Produce, review, and revise authentic artifacts that include multimedia using appropriate digital tools.

6.1 Remove background details from an everyday process to highlight essential properties.

6.2 Define a process as a function.

6.3 Create pseudocode that uses conditionals.

6.4 Differentiate between flowcharts and pseudocode.

6.6 Identify steps in developing solutions to complex problems using computational thinking.

6.7 Describe how automation works to increase efficiency.

6.8 Create a program that initializes a variable.

6.30 Discuss and apply the components of the problem-solving process.

RESOURCES

StudenBlock Coding 2 Unit Progress Monitoring Document

UNIT NAME: Algorithms Unit	RECOMMENDED TIME FRAME: 9 WEEKS

UNIT OVERVIEW

Students will experience algorithms through various activities where the focus will be on kinaesthetic learning while developing their coding skills.

Alg.Days 1 - 2: Introduction to Problem Solving and Computational Thinking
Alg.Day 3: Decomposition and Abstraction Part-Whole-Part
Alg.Day 4: Abstraction and Algorithms Robotic Arm
Alg.Day 5: Decomposing and Abstracting a Mars Story
Alg.Day 6: Decomposition and Abstraction: Mars Travel Story Parts of Speech
Alg.Days 7: Abstraction - Represent Visually
Alg.Days 8: Intro to Sequencing Algorithms
Alg.Day 9: Create Your Own Sequence Algorithm
Alg.Day 10: Sequencing Algorithms - Representing with Flowcharts
Alg.Day 11: Introduction to Functions
Alg. Day 12: Representing Functions in Flowcharts
Alg.Days 13-14: Functions and Rover Exploration
Alg.Day 15: Intro to Iteration Algorithms
Alg.Day 16: Representing Repeat Loops with Flowcharts
Alg.Days 17: Create Dance Algorithm with Repeat Loop
Alg.Day 18: Iteration Algorithms - Boolean Conditions
Alg.Day 19: Iteration Algorithms - Repeat Until
Alg.Day 20: Iteration - Repeat Until Flowchart
Alg.Day 21: Intro to Selection Algorithm Using IF...Then Pseudocode
Alg.Day 22: Selection Algorithm Using IF....Then Flowcharts
Alg.Day 23: Selection Algorithm Using IF...Else Pseudocode
Alg.Day 24: Selection Algorithm Using If...Else Flowcharts
Alg.Day 25: Create Selection Algorithm - Collecting and Processing Samples
Alg.Days 26-27: Sorting Algorithms
Alg.Day 28: Sorting Networks
Alg.Day 29: Binary Search
Alg.Day 30: Minimal Spanning
Alg.Days 31-32: Revisiting Mars Simulation with Scratch Blocks
Alg.Day 33: Exploring Sequence Algorithms in Scratch
Alg.Day 34: Exploring Iteration Algorithms in Scratch
Alg.Day 35: Exploring Selection Algorithms in Scratch
Alg.Day 36: Tracing to Understand Scratch Code
Alg.Days 37-38: Use Scratch Blocks to Program Sequence Algorithms (Unplugged)
Alg.Days 39-40: Use Scratch Blocks to Code Iteration Algorithms (Unplugged)
Alg.Days 41-42: Use Scratch Blocks to Code Selection Algorithms (Unplugged)
Alg.Days 43-45: Use Scratch Commands to Code a Mars Rover Game (Unplugged)

STANDARDS

AL DLCS

6th Grade

6.1 Remove background details from an everyday process to highlight essential properties.

6.2 Define a process as a function.

6.4 Differentiate between flowcharts and pseudocode.

6.5 Identify algorithms that make use of sequencing, selection or iteration.

6.6 Identify steps in developing solutions to complex problems using computational thinking.

6.7 Describe how automation works to increase efficiency.

RESOURCES

Student Algorithms Unit Progress Monitoring Document

UNIT NAME: The Internet of Things Unit	RECOMMENDED TIME FRAME: 9 WEEKS

UNIT OVERVIEW

The Internet of Things (IoT) has far reaching impacts. Students will discover what is included in the Internet of Things, examine the ethics and implications of IoT and some areas of daily life where the IoT has a role.

IoT.Days 1-3: Introduction/History of The Internet of Things
IoT.Day 4: IoT Devices / Smart Homes
IoT.Day 5-7: IoT Devices / Smart Home Debate
IoT.Day 8: IoT Devices / IoT & IIoT
IoT.Days 9-10: IoT Devices / Retail
IoT.Days 11-13: IoT Devices / Assistive Technology
IoT.Days 14-15: IoT Devices / Obstacle Course
IoT.Day 16: IoT Devices / Agriculture
IoT.Days 17-18: IoT Devices / Healthcare
IoT.Day 19: IoT Devices / Smart Clothes
IoT.Day 20: IoT Devices Test
IoT.Days 21-23: IoT Devices Project
IoT.Days 24-26: IoT Devices Project Cont.
IoT.Days 27-29: Are Smartphones IoT Devices?
IoT.Days 30-32: Problem Solving with Big Data
IoT.Days 33-35: AI and Machine Learning
IoT.Days 36 -37: IoT Privacy and Security
IoT.Days 38-40: The Future of IoT Begins Now! Part 1
IoT.Days 41-43: The Future of IoT Begins Now! Part 2
IoT.Days 44-45: The Future of IoT Begins Now! Part 3 (Finale)

STANDARDS

AL DLCS

6th Grade

6.R2 Recognize and demonstrate age-appropriate responsible use of digital devices and resources as outlined in school/district rules.

6.R5 Locate and curate information from digital sources to answer research questions.

6.R6 Produce, review, and revise authentic artifacts that include multimedia using appropriate digital tools.

6.7 Describe how automation works to increase efficiency.

6.13 Define personal privacy, digital footprint, and open communication.

6.15 Identify emerging technologies in computing.

6.16 Communicate and/or publish collaboratively to inform others from a variety of backgrounds and cultures about issues and problems.

6.23 Discuss how digital devices may be used to collect, analyze, and present information.

6.28 Define assistive technologies and state reasons they may be needed.

6.30 Discuss and apply the components of the problem-solving process.

RESOURCES

CSD Student Internet of Things Unit Progress Monitoring Template

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Scope and Sequence

Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) **may be taught in any order.** Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

BC1 Unit Block Coding 1

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	BC1.Day 1: Introducing Scratch	BC1.Day 2: Exploring Scratch	BC1.Day 3: Creating with Scratch	BC1.Days 4 - 5: Exploring Events	
WEEK 2	BC1.Days 6-8: Creating with Events			BC 1.Days 9-10: Debug It!	
WEEK 3	BC1.Days 11-12: Exploring with Animation		BC1.Days 13-15: Creating with Animation		
WEEK 4	BC1.Day 16: Creature Construction	BC 1.Days 17-19: Exploring with Conditional Loops			BC1.Days 20-22: Creating with Conditional Loops
WEEK 5	BC1.Days 20-22: Creating with Conditional Loops		BC1.Days 23 - 24: Introduction to Coordinates		BC1.Days 25 - 26: Build-A-Band
WEEK 6	BC1.Days 25 - 26: Build-A-Band	BC1.Days 27-28: Exploring with Decomposition by Sequence		BC1.Days 29-31: Decomposition by Sequence	
WEEK 7	BC1.Days 29-31: Decomposition by Sequence	BC1.Days 32-33: Exploring with One-Way Synchronization		BC1.Days 34-36: One-Way Synchronization	

WEEK 8	BC1.Days 34-36: One-Way Synchronization	BC1.Days 37-38: Introducing Two-Way Synchronization with Wait Blocks	BC1.Day 39: Exploring Two-Way Synchronization with Wait Blocks	BC1.Day 40: Exploring Two-Way Synchronization with Message Passing
WEEK 9	BC1.Days 41-42: Creating with Two-Way Synchronization	BC1.Day 43: Introducing Variables	BC1.Day 44: Exploring Variables	BC1.Day 45: Exploring Variables as Inputs

Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) **may be taught in any order.** Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

BC2 Unit Block Coding 2

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	BC2.Day 1: Exploring Custom Events	BC2.Day 2: Modifying Custom Events	BC2.Days 3-5: Creating with Custom Events		
WEEK 2	BC2.Days 6-7: Debugging		8-9: Exploring Complex Conditionals with Operators		BC2.Day 10: Exploring Complex Conditionals with Nested Conditionals
WEEK 3	BC2.Days 11-12: Creating with Complex Conditionals		BC2.Days 13-14: Exploring Input Variables		BC2.Days 15-16: Exploring If-Then-Else Conditional Statements - Student Project
WEEK 4	BC2.Days 15-16: Exploring If-Then-Else Conditional Statements - Student Project	BC2.Days 17-19: Creating with Input Variables and If-Then-Else Conditionals			BC2.20-21: Exploring Decomposition by Purpose
WEEK 5	BC2.20-21: Exploring Decomposition by Purpose	BC2.Day 22: Exploring Adding to Decomposed Code	BC2.Days 23-25:Creating with Decomposition by Purpose		
WEEK 6	BC2.Days 26 - 27: Creating Clones		BC2.Days 28 - 30: Games with Clones (Continued)		

WEEK 7	BC2.Day 31: Exploring Initialization	BC2.Days 32-33: Creating with Initialization	BC2.Days 34-36: Using Lists in Scratch	
WEEK 8	BC2.Days 34-36: Using Lists in Scratch	BC2.Days 37 - 38: Debugging 2	BC2.Days 39 - 41: Scratch Coding Cards	
WEEK 9	BC2.Days 39 - 41: Scratch Coding Cards	BC2.Days 42 - 44: Scratch Coding Cards Part 2		BC2.Day 45: Exploring State

Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) **may be taught in any order.** Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

ALG Unit Algorithms

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	Alg.Days 1 - 2: Introduction to Problem Solving and Computational Thinking		Alg.Day 3: Decomposition and Abstraction Part-Whole-Part	Alg.Day 4: Abstraction and Algorithms Robotic Arm	Alg.Day 5: Decomposing and Abstracting a Mars Story
WEEK 2	Alg.Day 6: Decomposition and Abstraction: Mars Travel Story Parts of Speech	Alg.Days 7: Abstraction - Represent Visually	Alg.Days 8: Intro to Sequencing Algorithms	Alg.Day 9: Create Your Own Sequence Algorithms	Alg.Day 10: Sequencing Algorithms - Representing with Flowchart
WEEK 3	Alg.Day 11: Introduction to Functions	Alg. Day 12: Representing Functions in Flowcharts	Alg.Days 13-14: Functions and Rover Exploration		Alg.Day 15: Intro to Iteration Algorithms
WEEK 4	Alg.Day 16: Representing Repeat Loops with Flowcharts	Alg.Days 17: Create Dance Algorithm with Repeat Loop	Alg.Day 18: Iteration Algorithms - Boolean Conditions	Alg.Day 19: Iteration Algorithms - Repeat Until	Alg.Day 20: Iteration - Repeat Until Flowchart
WEEK 5	Alg.Day 21: Intro to Selection Algorithm Using IF...Then Pseudocode	Alg.Day 22: Selection Algorithm Using IF....Then Flowcharts	Alg.Day 23: Selection Algorithm Using IF...Else Pseudocode	Alg.Day 24: Selection Algorithm Using If...Else Flowcharts	Alg.Day 25: Create Selection Algorithm - Collecting and Processing Samples

WEEK 6	Alg.Days 26-27: Sorting Algorithms	Alg.Day 28: Sorting Networks	Alg.Day 29: Binary Search	Alg.Day 30: Minimal Spanning
WEEK 7	Alg.Days 31-32: Revisiting Mars Simulation with Scratch Blocks	Alg.Day 33: Exploring Sequence Algorithms in Scratch	Alg.Day 34: Exploring Iteration Algorithms in Scratch	Alg.Day 35: Exploring Selection Algorithms in Scratch
WEEK 8	Alg.Day 36: Tracing to Understand Scratch Code	Alg.Days 37-38: Use Scratch Blocks to Program Sequence Algorithms (Unplugged) Algorithms (Unplugged)	Alg.Days 39-40: Use Scratch Blocks to Code Iteration	
WEEK 9	Alg.Days 41-42: Use Scratch Blocks to Code Selection Algorithms (Unplugged) Alg.Days	43-45: Use Scratch Commands to Code a Mars Rover Game (Unplugged)		

Units (Block Coding 1, Block Coding 2, Algorithms, The Internet of Things) **may be taught in any order**. Although if you choose to complete both Block Coding Units we suggest they be completed in order) Each unit can be taught stand alone or combined to be a 9 week, semester or year long course.

IoT Unit Internet of Things

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
WEEK 1	IoT.Days 1-3: Introduction/History of The Internet of Things			IoT.Day 4: IoT Devices / Smart Homes	IoT.Day 5-7: IoT Devices / Smart Home Debate
WEEK 2	IoT.Day 5-7: IoT Devices / Smart Home Debate		IoT.Day 8: IoT Devices / IoT & IIoT	IoT.Days 9-10: IoT Devices / Retail	
WEEK 3	IoT.Days 11-13: IoT Devices / Assistive Technology			IoT.Days 14-15: IoT Devices / Obstacle Course	
WEEK 4	IoT.Day 16: IoT Devices / Agriculture	IoT.Days 17-18: IoT Devices / Healthcare		IoT.Day 19: IoT Devices / Smart Clothes	IoT.Day 20: IoT Devices Test
WEEK 5	IoT.Days 21-23: IoT Devices Project			IoT.Days 24-26: IoT Devices Project Cont.	
WEEK 6	IoT.Days 24-26: IoT Devices Project Cont.	IoT.Days 27-29: Are Smartphones IoT Devices?			IoT.Days 30-32: Problem Solving with Big Data
WEEK 7	IoT.Days 30-32: Problem Solving with Big Data		IoT.Days 33-35: AI and Machine Learning		
WEEK 8	IoT.Days 36 -37: IoT Privacy and Security		IoT.Days 38-40: The Future of IoT Begins Now! Part 1		
WEEK 9	IoT.Days 41-43: The Future of IoT Begins Now! Part 2			IoT.Days 44-45: The Future of IoT Begins Now! Part 3 (Finale)	