

Curriculum Framework

Code.org K-5 Curriculum Course 4

LESSON 1: ALGORITHMS - TANGRAMS (UNPLUGGED)		
Objectives	 Tackle the challenge of translating an image into actionable instructions Convey instructions to teammates in order to reproduce an image Analyze the work of teammates to determine whether an outcome was successful 	
Themes	Algorithms, Sequence	
Practices	Creativity, Collaboration, Communication, Persistence, Problem Solving	
Standards	ISTE: 1c, 2d, 4b, 6c CSTA: CT.L1:6.01, CT.L1:6.02, CPP.L1:6.05 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 6 CC Math Standards: 3.G.A.1, 5.G.B.3 CC ELA: L.3.6, L.4.6, L.5.6	
LESSON	LESSON 2: MAZE AND BEE	
Objectives	 Create a program for a given task using sequential steps Count the number of times an action should be repeated and represent it as a loop Analyze a problem and complete it as efficiently as possible Employ conditional statements to assess which actions are correct for a given step 	
Themes	Algorithms, Computing Practice, Programming	
Practices	Persistence, Problem Solving	

	ISTE: 1a, 1c, 4b, 6a, 6c, 6d
	CSTA: CL.L1:3-02, CT.L1:3-01, CT.L2-01, CT.L2-06, CT.L2-08, CT.L2-12, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-05
Standards	NGSS: 3-5-ETS1-2
	CC Mathematical Practices: 1, 2, 5, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6
	CC ELA: L.5.6, L.4.6, L.3.6
LESSON	3: ARTIST - LOOPS REVIEW
Objectives	 Create programs that utilize repetition to create gorgeous designs Use trial and error to recreate detailed designs in proper scale Divide the number of degrees in a circle into even segments Calculate the angles in equilateral and 30 60 90 triangles Decompose a shape into its smallest repeatable sequence
Themes	Loops, Computing Practice, Programming
Practices	Persistence, Problem Solving
	ISTE: 1a, 1b, 1c, 4b, 4d, 6a, 6c, 6d,
	CSTA: CL.L1:3-02, CT.L1:3-01, CT.L2-01, CT.L2-06, CT.L2-08, CT.L2-12, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-05
Standards	NGSS: 3-5-ETS1-2
	CC Mathematical Practices: 1, 2, 4, 5, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6, 4.G.A.1, 4.NBT.B.4, 4.MD.C.5, 5.NBT.B.5
	CC ELA: L.3.6, L.4.6, L.5.6
LESSON	4: VARIABLES IN ENVELOPES (UNPLUGGED)
Objectives	 Identify variables and determine their values Define and call variables in the context of real-life activities Create situations which require the use of variables Utilize teamwork to enrich creative game play
Themes	Variables, Abstraction

ISTE: 1c, 2d, 4b, 6c CSTA: CL.L2-03, CT.L1:6-01, CT.L1:6-02, CPP.L1:6-05 NGSS: 3-5-ETS1-1 CC Mathematical Practices: 2, 6, 7, 8 CC ELA: L.3.6, L.4.6, L.5.6	Practices	Creativity, Collaboration, Communication, Problem Solving
	Standards	CSTA: CL.L2-03, CT.L1:6-01, CT.L1:6-02, CPP.L1:6-05 NGSS: 3-5-ETS1-1 CC Mathematical Practices: 2, 6, 7, 8

LESSON 5: ABSTRACTION WITH MAD GLIBS (UNPLUGGED)

Objectives	 Have the chance to internalize the idea of "abstraction" Combine writing and abstraction to test their own creativity Analyze their day to find differences that they can turn into similarities
Themes	Abstraction, Pattern Matching
Practices	Creativity, Collaboration, Communication, Problem Solving
Standards	ISTE: 1a, 1c, 2d, 4b CSTA: CL.L2-03, CT.L1:6-01, CT.L1:6-02, CT.L2-12 CC Mathematical Practices: 2, 6, 7, 8 CC ELA: L.3.6, L.4.6, L.5.6

LESSON 6: ARTIST - VARIABLES

Objectives	 Create programs that utilize repetition to create gorgeous designs Use trial and error to recreate detailed designs in proper scale Calculate angles by dividing 360 by the number of sides in a polygon Decompose a shape into its smallest repeatable sequence
Themes	Variables, Computing Practice, Programming
Practices	Persistence, Problem Solving

Standards	ISTE: 1a, 1b, 1c, 4b, 6a, 6c, 6d CSTA: CT.L1:3-01, CL.L1:3-02, CT.L2-01, CT.L2-06, CT.L2-12, CPP.L1:6-05, CPP.L1:6-06 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6, 4.NBT.B.4, 4.G.A.1, 4.MD.C.5, 5.NBT.B.5 CC ELA: L.3.6, L.4.6, L.5.6
LESSON	7: PLAY LAB - VARIABLES
Objectives	 Identify the numbers that are responsible for specific elements of a program Create a game that incorporates numerical parameters Replace numbers with descriptive variables
Themes	Variables, , Computing Practice, Programming
Practices	Persistence, Problem Solving
Standards	ISTE: 1a, 1b, 1c, 4b, 6a, 6c, 6d CSTA: CL.L1:3-02, CT.L1:3-01, CT.L2-01, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:3-03, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-08 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 4.NBT.B.4 CC ELA: L.3.6, L.4.6, L.5.6
LESSON 8: FOR LOOP FUN (UNPLUGGED)	
Objectives	 Determine starting value, stopping value, and interval of "for loop" Illustrate the counter values hit each time through a for loop during runtime
Themes	Loops
Practices	Creativity, Collaboration, Communication

Standards	ISTE: 1c, 2d CSTA: CL.L1:3-02, CT.L1:6-01, CT.L1:6-02, CT.L2-01, CT.L2-12, CT.L2-14, CT.L3A-03 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 4.OA.C.5 CC ELA: L.3.6, L.4.6, L.5.6
LESSON	9: BEE - FOR LOOPS
Objectives	 Break one long sequence of steps into shorter looped sequences Use the "for loop" structure to repeat an action a variable number of times each iteration.
Themes	Loops, For Loops , Computing Practice, Programming
Practices	Persistence, Problem Solving
Standards	ISTE: 1a, 1c, 4b, 6a, 6c, 6d CSTA: CT.L1:3-01, CL.L1:3-02, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06 NGSS: 3-5-ETS1-2 Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6, 4.NBT.B.4, 4.OA.C.5 CC ELA: L.3.6, L.4.6, L.5.6
LESSON 10: ARTIST - FOR LOOPS	
Objectives	 Predict the number of steps needed to increment in each for loop iteration Determine start and stop values for multiple for loop examples
Themes	Loops, For Loops, Computing Practice, Programming
Practices	Problem Solving, Programming

	ISTE: 1a, 1b, 1c, 4b, 6a, 6c, 6d
	CSTA: CT.L1:3-01, CL.L1:3-02, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-08
Standards	NGSS: 3-5-ETS1-2
Standards	CC Mathematical Practices: 1, 2, 4, 6, 7, 8
	CC Math Standards: 3.OA.3, 3.MD.C.6, 4.NBT.B.4, 4.MD.C.5, 4.MD.C.7, 4.G.A.1, 4.G.A.2, 5.NBT.B.5, 5.G.A.2
	CC ELA: L.3.6, L.4.6, L.5.6
LESSON 11: PLAY LAB - FOR LOOPS	
Objectives	 Utilize for loops to count from 1 to 100 Count by tens repeatedly using the for loop structure Employ skills from previous lessons to create more difficult looping algorithms
Themes	Loone Fax Loone Computing Practice Dreamming
	Loops, For Loops, Computing Practice, Programming

CSTA: CL.L1:3-02, CT.L1:3-01, CPP.L1:6-05, CPP.L1:6-06, CT.L2-01, CT.L2-06, CT.L2-12,

CT.L2-14, CT.L3A-03

ISTE: 1a, 1c, 6a, 6c, 6d

Standards

NGSS: 3-5-ETS1-2

CC Mathematical Practices: 1, 2, 4, 6, 7, 8

CC Math Standards: 3.OA.3, 4.NBT.B.4

CC ELA: L.3.6, L.4.6, L.5.6

LESSON 12: ARTIST - FUNCTIONS

Objectives

- Identify repeated movements and utilize functions to simplify their program
- Use trial and error to re-create complex patterns
- Break complex tasks into smaller repeatable sections
- Combine simple shapes into complex designs with functions

Practices Persistence, Problem Solving ISTE: 1a, 1b, 1c, 4b, 6a, 6c, 6d CSTA: CL.L1:3-02, CT.L1:3-01, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-08, CT.L2-12, CT.L2-14, CT.L3A-01, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-08 NGSS: 3-5-ETS1-2 Mathematical Practices: 1, 2, 4, 5, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6, 4.NBT.B.4, 4.MD.C.5, 4.MD.C.7, 4.G.A.1, 4.G.A.2, 5.NBT.B.5, 5.G.A.2 CC ELA: L.3.6, L.4.6, L.5.6	Themes	Functions, Computing Practice, Programming
CSTA: CL.L1:3-02, CT.L1:3-01, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-08, CT.L2-12, CT.L2-14, CT.L3A-01, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-08 NGSS: 3-5-ETS1-2 Mathematical Practices: 1, 2, 4, 5, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6, 4.NBT.B.4, 4.MD.C.5, 4.MD.C.7, 4.G.A.1, 4.G.A.2, 5.NBT.B.5, 5.G.A.2	Practices	Persistence, Problem Solving
	Standards	CSTA: CL.L1:3-02, CT.L1:3-01, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-08, CT.L2-12, CT.L2-14, CT.L3A-01, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-08 NGSS: 3-5-ETS1-2 Mathematical Practices: 1, 2, 4, 5, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6, 4.NBT.B.4, 4.MD.C.5, 4.MD.C.7, 4.G.A.1, 4.G.A.2,

LESSON 13: SONGWRITING WITH PARAMETERS (UNPLUGGED)

Objectives	 Locate repeating phrases inside song lyrics Identify sections of a song to pull into a function (chorus) Modify functions to accept parameters Describe how functions and parameters can make programs easier to write
Themes	Functions, Variables
Practices	Creativity, Collaboration, Communication, Problem Solving
Standards	ISTE: 1a, 1c, 2a, 2d, 4b, 4d CSTA: CL.L1:3-02, CT.L2-01, CT.L2-06, CT.L2-07, CT.L2-08, CT.L2-12, CT.L2-14, CT.L3A-01, CT.L3A-03, CPP.L1:6-05 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 3, 6, 7, 8 CC ELA: SL.3.1.D, SL.3.3, Rl.3.1, L.3.6, L.4.6, L.5.6

LESSON 14: ARTIST - FUNCTIONS WITH PARAMETERS

Objectives	 Identify repeated movements and utilize functions to simplify a program Break complex tasks into smaller repeatable sections Combine simple shapes into complex designs with functions Utilize parameters to make one function work for multiple purposes
Themes	Functions, Variables, Computing Practice, Programming
Practices	Persistence, Problem Solving
Standards	ISTE: 1a, 1b, 1c, 4b, 6a, 6c, 6d CSTA: CL.L1:3-02, CT.L1:3-01, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-07, CT.L2-08, CT.L2-12, CT.L2-14, CT.L3A-01, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-08 NGSS: 3-5-ETS1-2 Mathematical Practices: 1, 2, 4, 5, 6, 7, 8 CC Math Standards: 3.OA.3, 3.MD.C.6, 4.NBT.B.4, 4.MD.A.3, 4.MD.C.5, 4.MD.C.7, 4.G.A.1, 4.G.A.2, 5.NBT.B.5, 5.G.A.2 CC ELA: L.3.6, L.4.6, L.5.6

LESSON 15: PLAY LAB - FUNCTIONS WITH PARAMETERS

Objectives	 Identify repeated movements and utilize functions to simplify a program Utilize parameters to make one function work for multiple purposes Adapt their understanding of functions to allow for the use of multiple parameters
Themes	Functions, Variables, Computing Practice, Programming
Practices	Persistence, Problem Solving
Standards	ISTE: 1a, 1b, 1c, 4b, 6a, 6c, 6d CSTA: CT.L1:3-01, CL.L1:3-02, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-07, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06, CPP.L2-08 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 4.NBT.B.4 CC ELA: L.3.6, L.4.6, L.5.6

1	ECCON	16.	DEE	ELINICTIC	LITIM SIM	PARAME'	TEDC
ш.	ESSUN	ID:	BEE -	FUNCTIO	JNS WITH	PARAME	IERS

Objectives	 Edit existing functions to make them work for specific tasks Combine similar functions into a single one by utilizing parameters 		
Themes	Functions, Variables, Computing Practice, Programming		
Practices Persistence, Problem Solving			
Standards	ISTE: 1a, 1c, 4b, 6a, 6c, 6d CSTA: CL.L1:3-02, CT.L1:3-01, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 4.OA.C.5 CC ELA: L.3.6, L.4.6, L.5.6		

LESSON 17: BINARY IMAGES (UNPLUGGED)

Objectives	 Identify methods for encoding images into binary Relate images to a peer using binary encoding Reproduce an image, based on binary code
Themes	Binary
Practices	Creativity, Collaboration, Communication, Persistence, Problem Solving

	ISTE: 1c, 2d, 4b, 4d, 6d			
	CSTA: CL.L1:3-02, CT.L1:6-01, CL.L2-03, CT.L2-06, CT.L2-07, CT.L2-14, CT.L3A-05, CT.L3B-07, CT.L1:6-02			
Standards	NGSS: 3-5-ETS1-2			
	CC Mathematical Practices: 1, 2, 4, 6, 7, 8			
	CC Math Standards: 4.OA.C.5			
	CC ELA: L.3.6, L.4.6, L.5.6			
LESSON 18: ARTIST - BINARY				
Objectives	 Match binary sequences to encoded images Utilize loops and binary code to recreate provided images Identify repeated sequences and break long codes up into smaller chunks that can be looped Create pictures using unique combinations of on and off 			
Themes	Binary, Computing Practice, Programming			
Practices	Persistence, Problem Solving			
	ISTE: 1a, 1b, 1c, 4b, 6a, 6c, 6d			
	CSTA: CL.L1:3-02, CT.L1:3-01, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-07, CT.L2-12, CT.L2-14, CT.L3A-03, CT.L3B-07, CPP.L1:6-05, CPP.L1:6-06			
Standards	NGSS: 3-5-ETS1-2			
	CC Mathematical Practices: 1, 2, 4, 6, 7, 8			
	CC Math Standards: 4.OA.C.5			

CC Math Standards: 4.OA.C.5
CC ELA: L.3.6, L.4.6, L.5.6

LESSON 19: SUPER CHALLENGE - VARIABLES

Objectives

- Create programs that utilize repetition to create gorgeous designs
- Decompose large, difficult puzzles into managable pieces
- Use variables to capture patterns in complex tasks

Themes Variables, Abstraction, Computing Practice, Programming			
Practices	Persistence, Problem Solving		
	ISTE: 1a, 1c, 4b, 6a, 6c, 6d		
	CSTA: CT.L1:3-01, CL.L1:3-02, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06		
Standards	NGSS: 3-5-ETS1-2		
	CC Mathematical Practices: 1, 2, 4, 6, 7, 8		
	CC Math Standards: 3.MD.C.6, 4.NBT.B.4, 4.OA.C.5, 4.MD.C.5, 4.MD.C.7, 4.G.A.1		
	CC ELA: L.3.6, L.4.6, L.5.6		

LESSON 20: SUPER CHALLENGE - FOR LOOPS

Objectives	 Predict the number of steps needed to increment in each for loop iteration Determine how to use a for loop in a way that makes sense for each unique puzzle Decompose large complex problems into smaller pieces 		
Themes	Loops, For Loops, Abstraction, Computing Practice, Programming		
Practices	Creativity, Persistence, Problem Solving		
Standards	ISTE: 1a, 1c, 4b, 6a, 6c, 6d CSTA: CT.L1:3-01, CL.L1:3-02, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 3.MD.C.6, 4.NBT.B.4, 4.OA.C.5, 4.MD.C.5, 4.MD.C.7, 4.G.A.1		
	CC ELA: L.3.6, L.4.6, L.5.6		

LESSON 21: SUPER CHALLENGE - FUNCTIONS WITH PARAMETERS

Objectives	 Look for patterns where they can implement functions Utilize parameters to make a single function work for multiple problems 	
Themes	Functions, Variables, Abstraction, Computing Practice, Programming	
Practices	Creativity, Persistence, Problem Solving	
Standards	ISTE: 1a, 1c, 4b, 6a, 6c, 6d CSTA: CT.L1:3-01, CL.L1:3-02, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 3.MD.C.6, 4.NBT.B.4, 4.OA.C.5, 4.MD.C.5, 4.MD.C.7, 4.G.A.1 CC ELA: L.3.6, L.4.6, L.5.6	
LESSON 22: EXTREME CHALLENGE - COMPREHENSIVE		
Objectives	 Choose from many techniques to find the one that best suits each problem Think critically about what they need to accomplish, given the tools that they have 	

Objectives	 Choose from many techniques to find the one that best suits each problem Think critically about what they need to accomplish, given the tools that they have 		
Themes	Loops, For Loops, Functions, Variables, Computing Practice, Programming		
Practices	s Creativity, Persistence, Problem Solving		
Standards	ISTE: 1a, 1c, 4b, 6a, 6c, 6d CSTA: CT.L1:3-01, CL.L1:3-02, CT.L1:6-01, CT.L2-01, CT.L2-06, CT.L2-12, CT.L2-14, CT.L3A-03, CPP.L1:6-05, CPP.L1:6-06 NGSS: 3-5-ETS1-2 CC Mathematical Practices: 1, 2, 4, 6, 7, 8 CC Math Standards: 3.MD.C.6, 4.NBT.B.4 CC ELA: L.3.6, L.4.6, L.5.6		

