



SPRINGFIELD PUBLIC SCHOOLS
ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY GLOBAL SKILLS

Springfield Public Schools
Springfield, New Jersey 07081

Grade 1 Computer Science

Curriculum Guide

2022

This curriculum may be modified through varying materials, techniques, and strategies as per an individual student's IEP.

Springfield Board of Education
Approved July 25, 2022



**Springfield Public Schools
Springfield, New Jersey**

**Rachel Goldberg
Superintendent of Schools**

**Erica Scudero
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Springfield Board of Education
PO Box 210
Springfield, New Jersey 07081

"Cultivating compassionate and extraordinary learners"

Rachel Goldberg
Superintendent of Schools
(973) 376-1025

Michelle Calas
School Business Administrator/
Board Secretary
(973) 376-1025

Resolution: School Government
Introduced By: Mr. Miller
Seconded By: Mrs. Gamarekian
Adopted: July 25, 2022

Curriculum Adoption

To adopt the following curriculum and courses for the 2022-2023 school year:

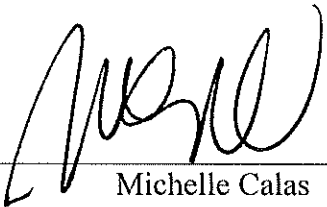
- Revised Elementary Curriculum due to revised state standards.
 - K-5 Social Studies
- Revised Middle School Curriculum due to revised state standards.
 - Grades 6-8 Social Studies
- Revised High School Curriculum due to revised state standards.
 - AP Macroeconomics
 - AP European History
 - AP US Government & Politics
 - AP US History
 - Contemporary Global Studies
 - Diversity Studies
 - Holocaust & Genocide
 - Sociology
 - US History to 1900
 - World History
 - World History Honors
 - 20th Century & Beyond
- Revised Middle School Courses due to new standards in Computer Science
 - PLTW Gateway: Computer Science for Innovators and Makers
 - PLTW Gateway: App Creators
- Revised High School Courses due to new standards in Computer Science
 - Introduction to Java
 - AP Computer Science Principles
 - Advanced Computer Science - Data Structures: Java
- New Elementary Courses
 - Kindergarten Computer Science
 - Grade 1 Computer Science
 - Grade 2 Computer Science
 - Anticipated - moving PLTW Launch down to Grade 3
 - PLTW Launch Grade 4
 - PLTW Launch Grade 5
- New Middle School Elective Course
 - Forensics

- New Elective Courses at FMG
 - Creative Writing
 - Drama/Theater/Playwriting
 - Journalism
 - Mock Trial
 - Model UN
 - Mysteries in History
 - Project Citizen
- New ELA Courses at FMG
 - Accelerated Communication Arts Grade 7
 - Accelerated Communication Arts Grade 8
- New Elective Courses at JDHS:
 - African American Studies

I, Michelle Calas, School Business Administrator/Board Secretary of the Springfield Board of Education, hereby certify that the extract from the minutes of a meeting of the Board of Education duly called and held on July 25, 2022 has been compared by me with the original minute book of said Board of Education, and is a true, complete and exact copy therefor, as far as the same relates to the subject matter referred to said contract.

IN WITNESS THEREOF, I have hereunto set my hand and seal of the Springfield Board of Education, this 26th of July 2022.

SEAL



Michelle Calas
School Business Administrator/Board Secretary



Unit Overview Template

Content Area: Computer Science **Grade Level:** 1 **Unit Title:** Unplugged CS

Unit Summary: Students will explore concepts of computer science using unplugged activities. These unplugged activities include active movement or crafts. These activities support hands-on learning while students learn computer science concepts such as algorithms, loops, and sequences.

Primary Interdisciplinary Connections: *Mathematics*

21st Century Themes **X** Creativity and Innovation **X** Critical Thinking and Problem Solving **X** ICT Literacy

☐ Information Literacy **X** Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy

Unit Rationale: This unit will build on student knowledge of computer science through readings and hands-on activities.

Career Readiness (Standard 9):

9.2.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.

9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).

9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).

9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).

9.4.2.DC.1: Explain differences between ownership and sharing of information.

9.4.2.DC.5: Explain what a digital footprint is and how it is created.

9.4.2.IML.2: Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).

9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).

9.4.2.TL.2: Create a document using a word processing application.

9.4.2.TL.5: Describe the difference between real and virtual experiences.

9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).

Learning Targets

Standards: 8.1.2; 1.MD; RI.1

Content Statements: Computing Systems; Networks and the Internet; Impacts of Computing; Data & Analysis; Algorithms & Programming; Represent and Interpret Data; Reading Informational Text

CPI#: **Cumulative Progress Indicator (CPI):**

8.1.2.CS.2 Explain the functions of common software and hardware components of computing systems.

8.1.2.NI.1 Model and describe how individuals use computers to connect to other individuals, places, information, and ideas through a network.



8.1.2.NI.2	Describe how the Internet enables individuals to connect with others worldwide.
8.1.2.NI.3:	Create a password that secures access to a device. Explain why it is important to create unique passwords that are not shared with others.
8.1.2.NI.4	Explain why access to devices need to be secured.
8.1.2.IC.1	Compare how individuals live and work before and after the implementation of new computing technology.
8.1.2.DA.1	Collect and present data, including climate change data, in various visual formats
8.1.2.DA.3	Identify and describe patterns in data visualizations.
8.1.2.DA.4	Make predictions based on data using charts or graphs.
8.1.2.AP.1	Model daily processes by creating and following algorithms to complete tasks.
8.1.2.AP.4	Break down a task into a sequence of steps.
8.1.2.AP.5	Describe a program's sequence of events, goals, and expected outcomes.
8.1.2.AP.6	Debug errors in an algorithm or program that includes sequences and simple loops.
1.MD.C.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
RI.1.1.	Ask and answer questions about key details in a text.
SEL.PK-12. 2.2	Recognize the skills needed to establish and achieve personal and educational goals.
SEL.PK-12. 4.1	Develop, implement and model effective problem-solving, and critical thinking skills.
SEL.PK-12. 5.2	Utilize positive communication and social skills to interact effectively with others.

Unit Essential Questions:

- What is a computer?
- How do we design our own computers?
- What do computers do?

Unit Enduring Understandings:

- Computers take inputs, give outputs, store data, and process data.
- Computers are made of different parts that have different purposes.
- Computers connect to each other through networks.
- Computers complete tasks through sequences and algorithms.
- Passwords help protect computers by adding a layer of security.
- New computing technology constantly changes the way we live and work.

Unit Learning Targets:

Students will....enhance their knowledge of computer science through readings and hands-on activities.



Evidence of Learning

Summative Assessment: 6 days

Equipment Needed: Hello Ruby, arts and craft supplies

Teacher Resources: Laptop

Formative Assessments:

- Runtime Activity
- Dance Loops Activity
- Peanut Butter and Jelly Algorithms Activity
- Unplugged Activities



Lesson Plans

Lesson	Time Frame
Lesson 1 Ruby's Algorithms	2 hours/2 days
Lesson 2 Ruby's Dance Loops	2 hours/2 days
Lesson 3 Ruby's Big Events	2 hours/2 days

Teacher Notes:

These lessons are based off of the *Hello Ruby: Adventures in Coding* book by Linda Liukas

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

<https://sites.google.com/sfusd.edu/k-2cs/orange/unit-1-unplugged-cs>

<https://www.csunplugged.org/en/topics/>

<https://www.pattan.net/Supports/STEM/computer-science/CS-Teacher-Toolkit/Lesson-Resources>



Lesson Plan 1 Template

Content Area: Computer Science Lesson Title: Ruby's Algorithms Time Frame: 2 hours/2 days

Lesson Components

21st Century Themes

- ☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☐ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections:

ELA, Mathematics

Integration of Technology:

Computer Programming

Equipment Needed:

Hello Ruby book or PDF , projector, connected to a computer (if using the PDF), Map Algorithms Activity, English: simple / extended, Spanish: simple / extended

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - meet Ruby through a reading of the first part of Hello Ruby. - learn about giving precise and specific directions. - practice creating and writing algorithms to complete a variety of tasks.	Lesson Sequence - Engage students by asking them to describe an adventure they have gone on. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. - Invite students to listen to a story about an adventure a little girl named Ruby is about to go on. Tell students that Ruby is going to learn all about computer science during her adventure, and that they are going to	Check student understanding using these discussion questions: - What tasks did you create algorithms for today? - What was challenging about creating algorithms for Ruby today? Review student work based on the following: - Are students able to create an algorithm in the correct sequence to navigate Ruby to each friend? - Are students able to use the “shortcut” by recognizing patterns in the sequence of directions that are given Ruby?



learn right along with her, too!

3. Read Chapters 1-3 (p. 6-23) of Hello Ruby to students, allowing time for students to view the images on each page. You may need to explain a few words to students, such as “cheekily” on p. 11. Be sure to highlight the sequences of directions Ruby follows when getting dressed and putting away her toys as well as the map she creates on p. 20-21.
4. Ask students to recall what happened when Ruby got dressed for school or put away her toys. In both instances, Ruby followed directions exactly as they were given, which resulted in her putting on her dress over her pajamas, and leaving her colored pencils on the floor because they are not “toys”. Explain to students that computers do the same thing: they follow directions exactly as they are given, and they only do what the directions tell them to do.
5. Challenge students to give you directions for completing a simple task, such as moving across the classroom to pick up a book. Invite students to give you one direction at a time, and follow the



directions exactly as given, even if it results in you doing something silly like bumping into a wall or trying to pick up a book with a closed hand. Once you've completed the task, discuss which types of directions worked best, leading students to realize that directions have to be very specific and given in order.

6. Tell students that this is what computer scientists call an algorithm, which are the steps to complete a task. If time permits, challenge students to work with a partner to repeat the above activity, where one person gives the directions and the other one follows them exactly, just as a computer would. You may wish to make these challenges "seated" so students aren't all moving around the room bumping into things! Consider these suggestions: eating lunch, making the bed, brushing your teeth, setting the table, lining up for recess.
7. Tell students it is now their turn to write an algorithm to help Ruby visit her friends. Display the map (p. 80) for students to see, and model how you can write an algorithm using



arrows to lead Ruby from the starting point, over the bridge, to the penguin.

8. If using version 1 of this activity, invite students to create algorithms for Ruby to visit all 4 friends. Begin each algorithm at the starting point, using directional arrows to show the path she would follow. If students finish early, challenge them to write one algorithm that allows Ruby to visit all 4 of her friends, one after another.
9. If using version 2 of this activity, invite students to create algorithms for Ruby to visit all 4 friends. Begin each algorithm at the starting point, using directional arrows to show the path she would follow. Then, show students how to create a “shortcut” to avoid having to write so many of the same arrow in a row, using numbers to show how many times to repeat a command. Have students create this “shortcut” to create new algorithms to visit each friend. If students finish early, challenge them to write one algorithm using the “shortcut” method that allows Ruby to visit all 4 of her friends, one after another.



10. Close out the lesson with a review of what students experienced today, and provide space for student reflection.

Differentiation:

The teacher can scaffold the level of support based on student readiness level. The students can work in partners or small groups and be given respective tasks within the group.

Resources Provided:

- Activity [version 1](#)
- Activity [version 2](#)
- *Hello Ruby* book or PDF



Lesson Plan 2 Template			
Content Area:	Computer Science	Lesson Title:	Ruby's Dance Loops
		Time Frame:	2 hours/2 days
Lesson Components			
<u>21st Century Themes</u>			
☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy ☐ Civic Literacy ☐ Health Literacy			
<u>21st Century Skills</u>			
☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy ☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy			
Interdisciplinary Connections: ELA, Mathematics			
Integration of Technology: Computer Programming			
Equipment Needed: Hello Ruby book or PDF, projector, connected to a computer, Dance Loops cards / activity sheet, glue sticks or tape			

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - learn more about Ruby through a reading of the second part of Hello Ruby. - learn about using loops to repeat a series of steps or tasks. - practice following a loop's instructions and creating their own loops to perform dances.	Lesson Sequence - Engage students by asking them what they remember about Ruby from the previous class. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. Lead students into a brief discussion of the importance of sequence in the directions Ruby gave and received. - Invite students to listen as you continue to tell the story of Ruby, who is about to embark on her	Check student understanding using these discussion questions: - What things did Ruby's friends do that are things computer scientists also do? - What did you use a loop to create today? Review student work based on the following: - Are students able to follow the rules of the loops when performing Ruby's friends' dances? - Are students able to create and loop their own dance sequence, then accurately perform the dance according to the



	big journey to find 5 gems hidden by her father. 3. Read Chapters 4-5 (p. 24-37) of Hello Ruby to students, allowing time for students to view the images on each page. You may need to explain a few words to students, such as “solemnly” on p. 25. Be sure to highlight how the penguins work together to solve a big problem, each doing a small task to create a raft (p. 29), as well as when Ruby uses a loop to solve the problem of making a ladder to reach the gem (p. 35). Tell students that these are both things that computer scientists do when they make games, art, and music on computers. 4. Use this slidedeck to introduce Ruby and her friends’ signature dance moves. Have students practice each dance once through, then click on the slide to reveal the loop (in orange) and the new instructions that students should follow to properly do this dance. 5. Be sure to do at least Ruby’s dance to prepare students for the activity that follows. If time permits, allow students to have a turn setting the parameters for each dance loop (such as	sequence and number of times it should loop?
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changing “3” to another number in Ruby’s dance, or repeating Penguin’s dance until a student shouts “hooray!”)

6. Tell students it is now their turn to create a signature dance using a loop. Use the slidedeck to help students visualize the materials they will receive; use this slide if you are giving 6 dance move options to students, and use this slide if you are giving them 12 dance move options.
7. Distribute the Dance Loops activity sheet (see note below) and an assortment of dance cards for students to glue onto their template in the sequence they want them performed. Then, invite students to decide how many times their loop should repeat by writing that number in the white box at the top of the loop.
8. Encourage students to try out their dance numerous times before they glue the dance cards to the template. Once they have glued their dance cards, ask students to practice their dance, following both the sequence and the number of times they should loop the dance. Then, invite students to share their dances with a partner, a table group, or the entire class,



	encouraging the others to dance along. 9. Close out the lesson with a review of what students experienced today, and provide space for student reflection.	
Differentiation: Provide students with a copy of the slide to customize which dance cards students will receive. Depending on your class, you may wish to only use the first page of dance cards, or select only a few that you know students will be successful with. You may opt to pre-cut the Dance Loops activity sheet in half (the tall way) so that each student has one template, or let one student use both templates to create a second dance. Or, consider letting partners share a sheet, each creating their own dance on their own side of the sheet.		
Resources Provided: • Activity sheet • Dance cards • Slidedeck		



Lesson Plan 3 Template

Content Area: Computer Science Lesson Title: Ruby's Big Events Time Frame: 2 hours/2 days

Lesson Components

21st Century Themes

☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☐ Health Literacy

21st Century Skills

☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections:

ELA, Mathematics

Integration of Technology:

Computer Programming

Equipment Needed:

Hello Ruby book or PDF, projector, connected to a computer, Universal Remote Control handout, crayons, markers, and/or colored pencils

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - learn more about Ruby through a reading of the third part of Hello Ruby. - learn about using events which cause something to happen. - practice using events to make their peers perform simple actions.	Lesson Sequence - Engage students by asking them what they remember about Ruby from the previous class. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. Lead students into a brief discussion of how Ruby used a loop to first create a ladder, and then to perform a dance. - Invite students to listen as you continue to tell the story of Ruby, who is continuing along on her	Check student understanding using these discussion questions: - What things did Ruby's friends do that are things computer scientists also do? - What did you cause to happen using events (buttons on the remote) today? Review student work based on the following: - Are students following along with the actions being triggered by the different events - or buttons - on the remote control?



	big journey to find 5 gems hidden by her father. 3. Read Chapters 6-7 (p. 38-51) of Hello Ruby to students, allowing time for students to view the images on each page. You may need to explain a few words to students, such as “sheepishly” on p. 42. Be sure to highlight how the boss fox has to give commands to instruct the other foxes on what to do (this is like events), and how the robots are using a recipe (like an algorithm) over and over again to make a wide variety of cupcakes (like a loop). Tell students that these are all things that computer scientists do when they make games, art, and music on computers. 4. Use the slidedeck to introduce how events are like remote control buttons that can be pressed to cause something to happen. Starting with the first button, invite a student to suggest something to happen when that button is pressed, then ask the entire class to perform that action when that button is pressed. Add a second button, and use both buttons to trigger students to perform the two different actions.	• Are students able to create their own events that trigger something to happen, then accurately use the events they created to command others?
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- Then add the third button in the same manner. Invite students to be the person that controls when the buttons are pressed.
5. Tell students it is now their turn to create a remote control that will use events to control their classmates. Use the slidedeck to help students visualize the remote they will be creating; use this slide to give them an example of what it might look like, and use this slide to show students the blank template.
 6. Distribute the Universal Remote Control activity sheet (cut the sheet in half so that each student receives only 1 remote) and an assortment of colored pencils or crayons. Invite students to color each button a different color, and then write the action someone will perform when that button is pressed on the lines next to the button.
 7. Encourage students to keep the actions next to each button simple to understand and quick to perform. When students are done, invite them to share their remote controls with a partner, a table group, or the entire class, encouraging the others to follow along and perform the actions



	when a button on the remote is pressed. 8. Close out the lesson with a review of what students experienced today, and provide space for student reflection.	
Differentiation: Google Drawings template can be used for the Universal Remote Control		
Resources Provided: • Slidedeck • Example slide • Activity sheet		



Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson *Strongly*, *Moderately* or *Weakly* meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	x		
Allow for student choice	x		
Provide scaffolding for acquiring targeted knowledge/skills		x	
Integrate global perspectives	x		
Integrate 21st century skills	x		
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills	x		
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills	x		
Are varied to address different student learning styles and preferences	x		
Are differentiated based on student needs	x		
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	x		
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	x		
Provide opportunities for student reflection and self- assessment	x		
Provide data to inform and adjust instruction to better meet the varying needs of learners	x		

Curriculum Design Template

Content Area: Computer Science	Grade Level: 1	Unit Title: Unplugged CS
Created: June 2022	Board Approved on:	Type Here



Unit Overview Template

Content Area:	Computer Science	Grade Level:	1	Unit Title:	Bee-Bots
Unit Summary: Students will work with Bee-Bots by programming them to complete simple tasks. This bee-shaped robot is used as a tool for teaching sequencing, estimation, problem-solving, and students created activities. By doing so, they will gain fluency with planning, testing, and debugging programs of increasing complexity.					
Primary Interdisciplinary Connections: <i>Mathematics</i> 21st Century Themes ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☒ ICT Literacy ☐ Information Literacy ☒ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy					
Unit Rationale: In this unit, students will learn to program Bee-Bots using sequences of simple commands. By doing so, they will gain fluency with planning, testing, and debugging programs of increasing complexity.					
Career Readiness (Standard 9): 9.2.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job. 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a). 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3). 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive). 9.4.2.DC.1: Explain differences between ownership and sharing of information. 9.4.2.DC.5: Explain what a digital footprint is and how it is created. 9.4.2.IML.2: Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10). 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1). 9.4.2.TL.2: Create a document using a word processing application. 9.4.2.TL.5: Describe the difference between real and virtual experiences. 9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).					

Learning Targets

Standards: 8.1.2; 1.MD; RI.1	
Content Statements: Computer Systems; Data & Analysis; Algorithms & Programming; Measurement and Data; Reading Informational Text	
CPI#:	Cumulative Progress Indicator (CPI):
8.1.2.CS.1	Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.
8.1.2.CS.2	Explain the functions of common software and hardware components of computing systems.



8.1.2.CS.3	Describe basic hardware and software problems using accurate terminology.
8.1.2.DA.2	Store, copy, search, retrieve, modify, and delete data using a computing device.
8.1.2.AP.1	Model daily processes by creating and following algorithms to complete tasks.
8.1.2.AP.2	Model the way programs store and manipulate data by using numbers or other symbols to represent information
8.1.2.AP.3	Create programs with sequences and simple loops to accomplish tasks.
8.1.2.AP.4	Break down a task into a sequence of steps
8.1.2.AP.5	Describe a program's sequence of events, goals, and expected outcomes
8.1.2.AP.6	Debug errors in an algorithm or program that includes sequences and simple loops.
1.MD.C.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
RI.1.1.	Ask and answer questions about key details in a text.
SEL.PK-12. 2.2	Recognize the skills needed to establish and achieve personal and educational goals.
SEL.PK-12. 4.1	Develop, implement and model effective problem-solving, and critical thinking skills.
SEL.PK-12. 5.2	Utilize positive communication and social skills to interact effectively with others.

Unit Essential Questions:

- How do we program Bee-Bots using sequences?
- How do we use Bee-Bots to tell a story?
- How do we debug a Bee-Bot's program?
- How do we delete data on a Bee-Bot?

Unit Enduring Understandings:

- Bee-Bots can be programmed to complete a sequence of moves.
- Tasks can be broken down into a sequence of steps.
- Bee-Bots' hardware and software allow students to complete a series of tasks.

Unit Learning Targets:

Students will....learn to program Bee-Bots using sequences of simple commands.



Evidence of Learning

Summative Assessment: 6 days

Equipment Needed: Bee-Bots, mats, activity cards

Teacher Resources: Laptops

Formative Assessments:

- Applying sequences to Bee-Bots
- Debugging Bee-Bots
- Using Bee-Bots to represent words or numbers



Lesson Plans

Lesson	Time Frame
Lesson 1 Bug Dance!	2 hours/2 days
Lesson 2 Drawing Numbers and Letters	2 hours/2 days
Lesson 3 Life Cycle Sequences	2 hours/2 days

Teacher Notes:

The lessons were designed to support groups of about 4 students per Bee-Bot.

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

<https://sites.google.com/sfusd.edu/k-2cs/orange/>

<https://www.csunplugged.org/en/topics/>

<https://www.pattan.net/Supports/STEM/computer-science/CS-Teacher-Toolkit/Lesson-Resources>



Lesson Plan 1 Template

Content Area: Computer Science Lesson Title: Bug Dance! Time Frame: 2 hours/2 days

Lesson Components

21st Century Themes

- ☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☐ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections:

ELA, Mathematics

Integration of Technology:

Computer Programming

Equipment Needed:

Bug Dance book, Bee-Bots, 1 for each group of 4 students, yellow Bee-Bot Command Cards (1 set per, Bee-Bot being used) small / large, Bee-Bot team roles lanyards (Driver and Navigator only)

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - be introduced to or review the functions of a Bee-Bot robot. - program their Bee-Bot with a synchronized class dance. - program their Bee-bot with an original small group dance.	Lesson Sequence - Engage students by asking them what they remember about Bee-Bots. If this is their first experience with Bee-Bots, ask them to describe what they see when the teacher holds up a Bee-Bot. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. - Tell students that they are going to teach their Bee-Bot to dance today! First, they are going to listen to a story about a	Check student understanding using these discussion questions: - What did you learn/remember about the Bee-Bot today? - How did you work with your group so that everyone got a turn to program the Bee-Bot's dance? Review student work based on the following: - Are students able to recreate the Bug Dance sequence both with the command cards and with the Bee-Bot's programming buttons? - Are students able to create their own dance



	group of bugs that learned a dance together in PE class, and how some of them struggled to get the steps just right - but when they persevered, they succeeded and were very proud of their accomplishment! 3. Read aloud all of Bug Dance, by Stuart J. Murphy, allowing time for students to view the images on each page and reflect on the process the centipede goes through to learn the dance. 4. After reading, direct students' attention to the dance sequence printed in both the front and the back of the book or on this slidedeck. Follow these steps to have students perform the dance sequence: Ask students to read the dance sequence out loud, one step at a time. Ask students to read and perform the dance sequence out loud, one step at a time. Ask students to silently read and perform the dance sequence to themselves, one step at a time. 5. Use just one cycle of the dance sequence first before asking students to repeat the entire sequence 4 times and adding in the ending part. It's okay if the dance	sequences and successfully program them into the Bee-Bot using only the commands the Bee-Bot knows?
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isn't perfect; this part of the lesson is intended to familiarize students with the physicality of the dance movements before they program their Bee-Bot with it.

6. Introduce or review the yellow command cards as a way for students to plan the program for a Bee-Bot before pressing any of Bee-Bot's buttons. Use these 2 slides to show students how each part of the Bug Dance can be represented with a yellow command card. You may wish to make note of the difference between "moving left" (from the original dance) and "turning left" (using the Bee-Bot cards) in this modified dance.
7. Divide students into 6 groups and distribute 1 yellow Navigator lanyard and 1 green Driver lanyard to each group. Students should work together to recreate the Bug Dance from memory using yellow command cards, with only the Navigator touching and arranging the cards with the input of other group members. When they are done, have them check their work with the provided slide. Then, the Driver should program the Bee-Bot with the dance sequence while the



- Navigator calls out each step, one at a time, and the other group members observe for accuracy.
8. If the dance is not successful, students should pass their lanyards on to the person next to them and begin again to recreate the Bug Dance with their Bee-Bots. Once the dance is successful, students should move on to the next part of the lesson.
 9. In the remaining time, students can continue rotating the two job roles, with the Navigator creating a dance sequence with the yellow command cards and the Driver programming it into the Bee-Bot.
 10. Additionally, groups may wish to pair up to create a synchronized dance, or you may wish to have all 6 Bee-Bots perform the Bug Dance altogether. Consider having students program all 4 iterations of the dance sequence into the Bee-Bot, then finding a creative way to program “wiggle left, wiggle right, do the bug dance every night”.
 11. Close out the lesson with a review of what students experienced today, and provide space for student reflection.

Differentiation:

Students can shorten or lengthen the sequence to adjust the difficulty level.



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Resources Provided:

- [Slidedeck](#)
- [Slide](#) to check student work



Lesson Plan 2 Template			
Content Area:	Computer Science	Lesson Title:	Drawing Numbers and Letters
		Time Frame:	2 hours/2 days
Lesson Components			
<u>21st Century Themes</u>			
☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy ☐ Civic Literacy ☐ Health Literacy			
<u>21st Century Skills</u>			
☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy ☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy			
Interdisciplinary Connections: ELA, Mathematics			
Integration of Technology: Computer Programming			
Equipment Needed: Bee-Bots, 1 for each group of 4 students, Number Cards / Letter Cards [tabloid size], yellow Bee-Bot Command Cards (1 set per Bee-Bot being used) small / large, Bee-Bot team roles lanyards (Driver and Navigator only)			

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - decompose a larger “problem” into smaller parts to more easily solve it. - incrementally write programs to trace over numbers with their Bee-Bot. - record their program using command cards, making the creation of a larger program visible.	Lesson Sequence - Engage students by asking them what they were able to program their Bee-Bots to do in the last lesson. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. - Tell students that they are going to teach their Bee-Bots how to count from 0 to 9 today! Show students the printed number cards so they can identify each number,	Check student understanding using these discussion questions: - How did you use the command cards today? Was it easy or hard to use them to plan your Bee-Bot’s program? - How did you work with your group so that everyone got a turn to program the Bee-Bot? Review student work based on the following: - Are students able to cooperatively and collaboratively trace the large numbers using one step increments?



explaining that these numbers might look a little different than the ones they are used to reading and writing (because of the 90° angles).

3. Let students know that teaching the Bee-Bots these numbers is a challenging task, so they will have to use decomposition, which is something computer scientists use to break down a problem into smaller pieces. Invite students to gather around for a demonstration of how you will decompose one of the number cards using the 3-button sequence. Select a number of moderate challenges to decompose, such as 0, 2, or 5, and place the Bee-Bot in a convenient starting location along the solid black line. Demonstrate how you will press only three buttons - first the blue X to clear the program, then an orange arrow to direct the Bee-Bot, then the green GO to move the Bee-Bot - to move just one segment of the number. Allow multiple students to try out the 3-button sequence to incrementally move the Bee-Bot along the solid black line of the number

- Are students able to record the moves they are programming the Bee-Bot to make so they can write out a single program that would allow the Bee-Bot to trace the entire number?



until the Bee-Bot reaches the end.

4. Divide students into 6 groups, giving each group 1 Bee-Bot, 1 set of large number cards, and 1 green Driver lanyard. Invite one student to wear the Driver lanyard first, which means they are the only student to touch the buttons on the Bee-Bot, and another student to select the number for the group to teach the Bee-Bot. Students should then use the 3-button sequence to incrementally trace the number, passing around the Driver lanyard after each student's 3-button turn until the Bee-Bot reaches the end of the solid black line. Allow a different student to select a number and repeat this process with every student programming one small increment of the program.
5. After students have had success with tracing 2-3 different numbers, distribute 1 yellow Navigator lanyard and 1 set of yellow command cards. Select the student seated after the Driver to be the Navigator, who selects the yellow card that corresponds with the orange button the Driver presses and lines the card up to record the sequence



the Bee-Bot follows to trace the number. Students continue to pass around both the Driver and Navigator lanyards as they rotate jobs. Turns should happen quickly so that all students are engaged in the activity.

6. When students complete the program for a number, the next Driver gets to place the Bee-Bot back at the start of the number and enter the entire program into the Bee-Bot (starting with the blue x and ending with the green GO), guided by the Navigator, so students can observe how all of the smaller parts of the program combine to create one program that traces the entire number. If an error (bug) is present, students can attempt to locate the bug, then rotate jobs again and reenter the entire sequence into the Bee-Bot.
7. Allow students to continue this process for the remaining time, incorporating the letter cards if students need an additional challenge.
8. Close out the lesson with a review of what students experienced today, and provide space for student reflection.



Differentiation:

This lesson could be repeated on a different day with the letter cards as this is great practice in breaking down larger “problems”.

Even though the Designer and Debugger lanyards are not being used, this lesson should still incorporate the idea of those jobs in allowing a student to select the number to trace and asking students to observe both the Navigator and Driver for accuracy. as they perform their roles.

Resources Provided:

- [3-button sequence](#)



Lesson Plan 3 Template			
Content Area:	Computer Science	Lesson Title:	Life Cycle Sequences
		Time Frame:	2 hours/2 days
Lesson Components			
<u>21st Century Themes</u>			
☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy ☐ Civic Literacy ☐ Health Literacy			
<u>21st Century Skills</u>			
☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy ☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy			
Interdisciplinary Connections: ELA, Mathematics			
Integration of Technology: Computer Programming			
Equipment Needed: Bee-Bots, 1 for each group of 4 students, yellow Bee-Bot Command Cards (1 set per Bee-Bot being used) small / large, Bee-Bot mats, 1 per robot used, Life Cycle mat cards (4, 5, or 6 cards per set), Bee-Bot team roles lanyards (Driver, Navigator, and Designer only)			

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - decompose a larger “problem” into smaller parts to more easily solve it. - incrementally write programs to navigate their Bee-Bot to the different stages of a butterfly, frog, and/or pumpkin life cycle. - record their program using command cards, making the creation of a larger program visible.	Lesson Sequence - Engage students by asking them how computer scientists tackle large problems, such as tracing the entire number/letter with the Bee-Bot (answer: using decomposition, or breaking a problem down into smaller pieces). You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. - Tell students that they are going to teach their	Check student understanding using these discussion questions: - How did you work with your group so that everyone got a turn to program the Bee-Bot? - What is your favorite job to perform (driver, navigator, designer)? Why? Review student work based on the following: - Are students able to cooperatively and collaboratively navigate the life cycle of a butterfly/frog/pumpkin



	Bee-Bots about the life cycle(s) of a butterfly, frog, and/or pumpkin today! Their job is to decompose the problem of figuring out the correct sequence of the 4, 5, or 6 parts of the life cycle, then program the Bee-Bot to navigate to each part in order. 3. Begin by reviewing one (or more, as time permits) life cycle(s) using this slidedeck or other classroom/literature resources you have available. 4. Show students one of the sets of life cycle mat cards, and demonstrate placing them under the transparent plastic sheet of the Bee-Bot mat, in a slightly-scrambled arrangement such as the example on the next page. You might consider using one mat for two groups of students, using an arrangement like the second example below. 5. Remind students that teaching the Bee-Bots these life cycles is a challenging task, so they will have to use decomposition, which is something computer scientists use to break down a problem into smaller pieces. Invite students to gather around for a review of how you	using one step increments? • Are students able to record the moves they are programming the Bee-Bot to make so they can write out a single program that would allow the Bee-Bot to navigate the entire life cycle at once?
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will decompose the path of a life cycle using the 3-button sequence. Place the Bee-Bot on a blank space, then demonstrate how you will press only three buttons - first the blue X to clear the program, then an orange arrow to direct the Bee-Bot, then the green GO to move the Bee-Bot - to move just one segment towards the first step of the life cycle. Allow multiple students to try out the 3-button sequence to incrementally move the Bee-Bot to each stage of the selected life cycle.

6. Divide students into 6 groups, giving each group 1 Bee-Bot, 1 mat with one set of life cycle cards preset underneath the clear plastic, and 1 green Driver lanyard. Invite one student to wear the Driver lanyard first, which means they are the only student to touch the buttons on the Bee-Bot. Students should use the 3-button sequence to incrementally navigate to each stage of the life cycle, passing around the Driver lanyard after each student's 3-button turn until the Bee-Bot reaches the end of the life cycle.
7. After students have had success with one round, distribute 1 yellow



	Navigator lanyard, 1 set of yellow command cards, and 1 red Designer lanyard. 8. Select one student to wear the Designer lanyard, instructing that student to rearrange the life cycle cards underneath the clear plastic sheet to design a new challenge for the group. After this is completed, the Designer can continue to participate as a Driver/Navigator, and then - as time permits - can pass the Designer lanyard to the next student in line so that s/he can design the next challenge. 9. Select the student seated after the Driver to be the Navigator, who selects the yellow card that corresponds with the orange button the Driver presses and lines the card up to record the sequence the Bee-Bot follows as it navigates to each stage of the life cycle. Students continue to pass around both the Driver and Navigator lanyards as they rotate jobs. Turns should happen quickly so that all students are engaged in the activity. 10. When students complete the program for a life cycle, the next Driver gets to place the Bee-Bot back	
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at the start and enter the entire program into the Bee-Bot (starting with the blue x and ending with the green GO), guided by the Navigator, so students can observe how all of the smaller parts of the program combine to create one program that traces the entire number. If an error (bug) is present, students can attempt to locate the bug, then rotate jobs again and reenter the entire sequence into the Bee-Bot.

11. Allow students to continue this process for the remaining time, having students use a new set of life cycle sequence cards if they need an additional challenge.
12. Close out the lesson with a review of what students experienced today, and provide space for student reflection.

Differentiation:

Teachers can create new mat cards if different life cycles are being studied.

Even though Debugger lanyards are not being used, this lesson should still incorporate the idea of those jobs by encouraging students to observe both the Navigator and Driver for accuracy as they perform their roles.

Resources Provided:

- Life Cycle [slidedeck](#)
- [3-button sequence](#)



Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson *Strongly*, *Moderately* or *Weakly* meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	X		
Allow for student choice	X		
Provide scaffolding for acquiring targeted knowledge/skills	X		
Integrate global perspectives	X		
Integrate 21st century skills	X		
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills	X		
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills	X		
Are varied to address different student learning styles and preferences	X		
Are differentiated based on student needs	X		
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	X		
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	X		
Provide opportunities for student reflection and self- assessment	X		
Provide data to inform and adjust instruction to better meet the varying needs of learners	X		

Curriculum Design Template

Content Area: Computer Science	Grade Level: 1	Unit Title: Bee-Bots
Created: June 2022	Board Approved on:	



Unit Overview Template

Content Area: Computer Science **Grade Level:** 1 **Unit Title:** ScratchJr

Unit Summary: Students will use the block coding programming application ScratchJr to create real computer algorithms and programs. Students will apply all their previous knowledge to create algorithms and programs, model processes, use numbers and symbols to represent information, create programs with sequences and loops, and debug algorithms and programs.

Primary Interdisciplinary Connections:

[21st Century Themes](#) **x** Creativity and Innovation **x** Critical Thinking and Problem Solving **x** ICT Literacy
☐ Information Literacy **x** Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy

Unit Rationale: In this unit, students will learn a series of concepts and skills that are applied in the creation of games that students will be familiar with. Through these lessons, students will learn how to express their own ideas in a way that a computer can understand. Using the ScratchJr app, children can create their own interactive collages, animated stories, games, and other programs. ScratchJr is a developmentally appropriate programming language designed specifically for children aged five through seven by teams at Tufts University and MIT.

Career Readiness (Standard 9):

- 9.2.2.CAP.1: Make a list of different types of jobs and describe the skills associated with each job.
- 9.4.2.CI.2: Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
- 9.4.2.CT.2: Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
- 9.4.2.CT.3: Use a variety of types of thinking to solve problems (e.g., inductive, deductive).
- 9.4.2.DC.1: Explain differences between ownership and sharing of information.
- 9.4.2.DC.5: Explain what a digital footprint is and how it is created.
- 9.4.2.IML.2: Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).
- 9.4.2.TL.1: Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
- 9.4.2.TL.2: Create a document using a word processing application.
- 9.4.2.TL.5: Describe the difference between real and virtual experiences.
- 9.4.2.TL.6: Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).

Learning Targets

Standards: 8.1.2; 1.MD; RI.1

Content Statements: Computer Systems; Data & Analysis; Algorithms & Programming; Measurement and Data; Reading Informational Text

CPI#: **Cumulative Progress Indicator (CPI):**



8.1.2.CS.1	Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences.
8.1.2.CS.2	Explain the functions of common software and hardware components of computing systems.
8.1.2.CS.3	Describe basic hardware and software problems using accurate terminology.
8.1.2.DA.2	Store, copy, search, retrieve, modify, and delete data using a computing device.
8.1.2.AP.1	Model daily processes by creating and following algorithms to complete tasks.
8.1.2.AP.2	Model the way programs store and manipulate data by using numbers or other symbols to represent information
8.1.2.AP.3	Create programs with sequences and simple loops to accomplish tasks.
8.1.2.AP.4	Break down a task into a sequence of steps
8.1.2.AP.5	Describe a program's sequence of events, goals, and expected outcomes
8.1.2.AP.6	Debug errors in an algorithm or program that includes sequences and simple loops.
RI.1.1.	Ask and answer questions about key details in a text.
1.MD.C.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
SEL.PK-12.2.2	Recognize the skills needed to establish and achieve personal and educational goals.
SEL.PK-12.4.1	Develop, implement and model effective problem-solving, and critical thinking skills.
SEL.PK-12.5.2	Utilize positive communication and social skills to interact effectively with others.

Unit Essential Questions:

- How do you use each block on the ScratchJr app?
- How do you model processes using ScratchJr?
- How do you store and manipulate data on ScratchJr?
- How do you create programs with sequences and simple loops on ScratchJr?
- How do you debug errors on ScratchJr?

Unit Enduring Understandings:

- Block coding languages have students apply all major computer science concepts.
- Simple loops and sequences can be programmed into ScratchJr.
- ScratchJr can be used to tell stories and communicate ideas.

Unit Learning Targets:

Students will....express their own ideas in a way that a computer can understand by using a block coding language.



Evidence of Learning

Summative Assessment: 6 days

Equipment Needed: iPads, ScratchJr app

Teacher Resources: iPad, ScratchJr app, laptop

Formative Assessments:

- Student created block coding programs using ScratchJr
- Debugging activities



Lesson Plans

Lesson	Time Frame
Lesson 1 Dance Party	1 hour/1 day
Lesson 2 The Big Event	1 hour/1 day
Lesson 3 Old Macdonald's Farm	1 hour/1 day

Teacher Notes:

These lessons were designed to support students working individually and in pairs, with 1-2 tablets per pair.

The mini-lessons work best when you are able to project ScratchJr onto a larger screen; consider using AirPlay if using iPads and an Apple TV, a laptop app such as Reflector to display the iPad screen on your computer (which can then be projected on a larger screen), or a specific iPad dongle to connect directly to the classroom projector.

Curriculum Development Resources/Technology Resources:

Click the links below to access additional resources used to design this unit:

<https://sites.google.com/sfusd.edu/k-2cs/orange/>

<https://www.csunplugged.org/en/topics/>

<https://www.pattan.net/Supports/STEM/computer-science/CS-Teacher-Toolkit/Lesson-Resources>



Lesson Plan 1 Template

Content Area: Computer Science Lesson Title: Dance Party Time Frame: 1 hour/day

Lesson Components

21st Century Themes

- ☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☐ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections:

ELA, Mathematics

Integration of Technology:

Computer Programming

Equipment Needed:

Tablets: 1-2 per pair of students

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - learn about appropriate tablet usage as they explore/review using ScratchJr. - use blue motion and purple looks blocks to create sequences of instructions to achieve simple objectives.	Lesson Sequence - Engage students by asking them to review the rules and procedures for using Bee-Bots in computer science class. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. - Connect the rules and procedures established for Bee-Bots with the rules students will use when handling tablets or Chromebooks to use ScratchJr. Consider co-creating a list of rules and procedures with the students that can then be	Check student understanding using these discussion questions: - What is one success you had while programming in ScratchJr today? - What were you able to make your cat (or other character) do today? Review student work based on the following: - Are students able to create a simple program by snapping together blue motion and purple looks blocks to achieve a desired outcome? - Are students able to add additional elements from the medium and spicy challenges to further



	displayed in the classroom each time devices are used for ScratchJr. 3. Unplugged Mini-Lesson: Program the Teacher Students will be responsible for verbally directing their teacher to special destinations in the classroom (e.g., to a bookcase or a closet). The instructions the students give to the teacher must be specific. For example, students should not simply say, “Move forward.” They should instead say, “Move forward ____ steps.” When sequences of instructions do not work (perhaps because the number of steps taken were incorrect), students should alter their instructions. After the activity is over, discuss how important it is to be specific and how important order is in programming. 4. ScratchJr Mini-Lesson: Demonstrate/review how to open the ScratchJr app and tap the + (plus sign) to create a new project. Next, demonstrate or review how to move a blue motion block down to the scripts area, tapping on it to make the cat move on the stage. Add a second blue motion block, different	enhance their ScratchJr program?
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from the first, modeling how to snap the block onto the first block, then tapping the first block to make the cat follow the both move blocks' directions, one after the other, on the stage above. Add additional blue motion blocks, and ask students to read out what the program will make the cat do before you run it. Point out that the script will run from left to right, just like when reading a book. Demonstrate/review how to change categories to the purple looks blocks, where students will find blocks to make the character grow, shrink, show, and hide.

5. Independent / Paired Student Work: Prompt students to work individually or in pairs to create a dance party in ScratchJr using the blue motion and purple looks blocks.
6. Project Guidelines: All students should be able to complete the mild project guidelines. If time allows, challenge them to complete the medium and/or spicy guidelines.
Mild Make the cat dance by creating a script with 3+ motion blocks
Add a background
Add a second character
Medium



	Use 5+ motion blocks. Make the cat grow or shrink, hop, and/ or become invisible Add a sound, or record your own Spicy! Add a title with text (“Dance Party!”) Program the second character to dance Use the turn block 7. Share Out: Close out the lesson with a review of what students experienced today, and provide space for student reflection.	
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Differentiation:

Students can choose the difficulty level based on readiness level.

Resources Provided:

- <https://sites.google.com/sfusd.edu/k-2cs/orange/>



Lesson Plan 2 Template

Content Area: Computer Science Lesson Title: The Big Event Time Frame: 1 hour/day

Lesson Components

21st Century Themes

- ☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☐ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections:

ELA, Mathematics

Integration of Technology:

Computer Programming

Equipment Needed:

Tablets: 1-2 per pair of students, ScratchJr Simon Says game (optional)

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - learn about using the green flag block to begin a sequence of programming blocks. - program multiple characters to perform actions at the same time when triggered by the green flag using the programming concept parallelism.	Lesson Sequence - Engage students by asking them to share what they remember about one of the ScratchJr programming blocks they used last class. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. - Unplugged Mini-Lesson: ScratchJr Simon Says Part 1: Single Moves Introduce or remind students about the green flag, which triggers a	Check student understanding using these discussion questions: - What is one success you had while programming in ScratchJr today? - What were you able to make your cat (or other character) do today? Review student work based on the following: - Are students able to coordinate the actions of multiple characters using the green flag block to start each program? - Are students able to add additional elements from the medium and spicy challenges to further



	program to begin in ScratchJr. 3. Print and shuffle the “single moves” pages from the ScratchJr Simon Says deck. You may wish to establish how students should move for each blue motion and purple looks block before the game (Up, Down, Left, Right, Hop, Grow, Shrink, Hide, Show). Play the game just as you would Simon Says, where the green flag block acts as the leader saying “Simon Says” and students should perform the action that follows the green flag. If students perform the action that is not preceded by a green flag, they can be considered “out” for that round. 4. ScratchJr Mini-Lesson: Select the “city” or “suburbs” background to use the road in it. 5. Demonstrate how to remove the cat (long press on the cat, then click X) and add a car character. 6. Co-create a program to make the car move across the road, when the green flag is clicked, using a blue motion block and adjusting the input. You might also choose this opportunity to demonstrate how to use the purple “shrink” block	enhance their ScratchJr program?
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	to make the car smaller by tapping the block, but not including it in the actual program. 7. Add a second car character on the other side of the screen. Add only a blue motion block at first, showing students how tapping on the block triggers only one car to move. Add a green flag block, then show students how tapping the green flag above the stage triggers both cars to move at the same time. 8. Independent / Paired Student Work: Prompt students to work individually or in pairs to create a project in ScratchJr in which 2 or more characters move at the same time when the green flag is clicked. 9. Project Guidelines: All students should be able to complete the mild project guidelines. If time allows, challenge them to complete the medium and/or spicy guidelines. Mild Add a background Use 2 characters Start both programs with a green flag block Use 3+ blue motion and purple looks blocks, using inputs when appropriate Medium Add more characters triggered by the green flag	
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	Use 2 green flag blocks for one character to do 2 things at once, like move forward and turn, or move while a recording plays Spicy! Use orange wait blocks to time one character to wait as another character crosses its path 10. Share Out: Close out the lesson with a review of what students experienced today, and provide space for student reflection.	
Differentiation: Students have the ability to choose difficulty based on readiness level.		
Resources Provided: • ScratchJr Simon Says		



Lesson Plan 3 Template

Content Area: Computer Science Lesson Title: Old Macdonald's Farm Time Frame: 1 hour/day

Lesson Components

21st Century Themes

- ☐ Global Awareness ☒ Financial, Economic, Business and Entrepreneurial Literacy
☐ Civic Literacy ☐ Health Literacy

21st Century Skills

- ☒ Creativity and Innovation ☒ Critical Thinking and Problem Solving ☐ Information Literacy
☐ Life and Career Skills ☐ Communication and Collaboration ☐ Media Literacy ☒ ICT Literacy

Interdisciplinary Connections:

ELA, Mathematics

Integration of Technology:

Computer Programming

Equipment Needed:

Tablets: 1-2 per pair of students, ScratchJr Simon Says game (optional)

Goals/Objectives	Learning Activities/ Instructional Strategies	Formative Assessment Tasks
Students will: - create an animated project with multiple multimedia elements in ScratchJr. - program multiple characters to perform actions at the same time when triggered by the green flag.	Lesson Sequence - Engage students by asking them to share what they used the green flag to do when programming in ScratchJr last class. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class. - Unplugged Mini-Lesson: ScratchJr Simon Says Part 2: Multiple Moves - Remind students about the green flag, which triggers a program to begin in ScratchJr.	Check student understanding using these discussion questions: - What is one success you had while programming in ScratchJr today? - What were you able to make your cat (or other character) do today? Review student work based on the following: - Are students able to coordinate the actions of multiple characters using the green flag block to start each program? - Are students able to add additional elements from the medium and spicy challenges to further



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| | <ol style="list-style-type: none">4. Print and shuffle the “multiple moves” pages from the ScratchJr Simon Says deck. You may wish to establish how students should move for each blue motion and purple looks block before the game (Up, Down, Left, Right, Hop, Grow, Shrink, Hide, Show). Play the game just as you would Simon Says, where the green flag block acts as the leader saying “Simon Says” and students should perform the action that follows the green flag. If students perform the action that is not preceded by a green flag, they can be considered “out” for that round.5. ScratchJr Mini-Lesson: Select the “farm” background, then add the barn character using the grow/shrink blocks to make it the correct size.6. Demonstrate/review how to remove the cat (long press on the cat, then click X) and add a chicken character.7. Co-create a program for the chicken to hop when the green flag is clicked. Demonstrate what happens when you change the input on the blue hop block.8. Add a blue “go home” block to the program to make the chicken return | enhance their ScratchJr program? |
|--|---|----------------------------------|



	to its starting point. Encourage students to add this block to all of the characters they program on their farm. 9. If time permits: demonstrate how to create a sound recording for the chicken, either including the green block in the program, or creating a parallel program to make the chicken cluck while it is moving. 10. Independent / Paired Student Work: Prompt students to work individually or in pairs to create a project in ScratchJr about the animals on Old Macdonald's Farm. 11. Project Guidelines: All students should be able to complete the mild project guidelines. If time allows, challenge them to complete the medium and/or spicy guidelines. Mild Add a background Remove the cat and add 3+ characters Start all programs with a green flag block Use blue motion and purple looks blocks, using inputs when appropriate Medium Use the green block to add a recorded animal sound for 1 or more characters	
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Use the paint editor to
add your face to one of
the characters

Spicy!

Use the paint editor to
draw your own character
to add to your farm

12. Close out the lesson with
a review of what students
experienced today, and
provide space for student
reflection.

Differentiation:

Students can choose project difficulty based on readiness level.

Resources Provided:

- [ScratchJr Simon Says](#)



Lesson Reflection

Reflect on the lesson you have developed and rate the degree to which the lesson *Strongly*, *Moderately* or *Weakly* meets the criteria below.

Lesson Activities	Strongly	Moderately	Weakly
Are challenging Strongly and require higher order thinking and problem solving skills	X		
Allow for student choice	X		
Provide scaffolding for acquiring targeted knowledge/skills	X		
Integrate global perspectives	X		
Integrate 21st century skills	X		
Provide opportunities for interdisciplinary connection and transfer of knowledge and skills	X		
Foster student use of technology as a tool to develop critical thinking, creativity and innovation skills	X		
Are varied to address different student learning styles and preferences	X		
Are differentiated based on student needs	X		
Are student-centered with teacher acting as a facilitator and co-learner during the teaching and learning process	X		
Provide means for students to demonstrate knowledge and skills and progress in meeting learning goals and objectives	X		
Provide opportunities for student reflection and self- assessment	X		
Provide data to inform and adjust instruction to better meet the varying needs of learners	X		

Curriculum Design Template

Content Area: Computer Science	Grade Level: 1	Unit Title: ScratchJr
Created: June 2022	Board Approved on:	



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ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS

IEP AND 504 ACCOMMODATIONS AND MODIFICATIONS FOR EARLY CHILDHOOD AND ELEMENTARY SCHOOL STUDENTS:

Large print textbooks
Textbooks for at-home use
Additional time for assignments
Review of directions
Use of mnemonics
Have student restate information
Concrete examples
Adaptive writing utensils
Support auditory presentations with visuals
Use of a study carrel
Assistance in maintaining uncluttered space
Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
Space for movement or breaks
Study sheets and teacher outlines
Extra visual and verbal cues and prompts
Math sheets with highlighted instructions
Graph paper to assist in organizing or lining up math problems
Use of computers and calculators
Books on tape
Graphic organizers
Quiet corner or room to calm down and relax when anxious
Preferential seating
Alteration of the classroom arrangement
Reduction of distractions
Answers to be dictated
Hands-on activities
Use of manipulatives
No penalty for spelling errors or sloppy handwriting
Follow a routine/schedule
Alternate quiet and active time
Teach time management skills
Rest breaks
Verbal and visual cues regarding directions and staying on task
Agenda book and checklists
Adjusted assignment timelines
Visual daily schedule



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**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Untimed tests
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book tests
Read test and directions to student
Provide study outline prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator and/or number line for math tests
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS MODIFICATIONS:



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GLOBAL SKILLS**

Breaks between tasks
Cue expected behavior
Daily feedback to student
Have contingency plans
Use de-escalating strategies
Use positive reinforcement
Use proximity/touch control
Use peer supports and mentoring
Model expected behavior by adults
Have parent sign homework
Have parent sign behavior chart
Set and post class rules
Chart progress and maintain data



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GLOBAL SKILLS

IEP AND 504 ACCOMODATIONS AND MODIFICATIONS FOR MIDDLE AND HIGH SCHOOL STUDENTS:

Large print textbooks
Textbooks for at-home use
Additional time for assignments
A locker with adapted lock
Review of directions
Review sessions
Use of mnemonics
Have student restate information
Provision of notes or outlines
Concrete examples
Adaptive writing utensils
Support auditory presentations with visuals
Weekly or bi-weekly home-school communication
Space for movement or breaks
Study sheets and teacher outlines
Extra visual and verbal cues and prompts
Lab and math sheets with highlighted instructions
Graph paper to assist in organizing or lining up math problems
Use of tape recorder for lectures
Use of Interactive notebook
Use of a scribe
Use of computers and calculators
Books on tape
Graphic organizers
Quiet corner or room to calm down and relax when anxious
Preferential seating
Alteration of the classroom arrangement
Reduction of distractions
Answers to be dictated
Hands-on activities
Ability to type all assignments
Follow a routine/schedule
Teach time management and organizational skills
Rest breaks
Verbal and visual cues regarding directions and staying on task
Agenda book and checklists
Daily check-in with case manager or special education teacher
Adjusted assignment timelines
Visual daily schedule



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**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Varied reinforcement procedures
Immediate feedback
Work-in-progress check
Personalized examples

TESTING AND ASSESSMENT ACCOMMODATIONS AND MODIFICATIONS:

Answers to be dictated
Frequent rest breaks
Additional time
Oral testing
Choice of test format (multiple-choice, essay, true-false)
Alternate ways to evaluate (projects or oral presentations instead of written tests)
Accept short answers
Open-book or open-note tests
Read test and directions to student
Provide study guides prior to tests
Highlight key directions
Test in alternative site
Use of calculator
Extra credit option
Pace long-term projects
Preview test procedures
Simplified test wording; rephrased test questions and/or directions

GENERAL ACCOMMODATIONS AND MODIFICATIONS:

Allow outlining, instead of writing for an essay or major project
Use of alternative books or materials on the topic being studied
Computerized spell-check support
Word bank of choices for answers to test questions
Provision of calculator for math tests
Film or video supplements in place of reading text
Reworded questions in simpler language
Projects instead of written reports
Highlighting important words or phrases in reading assignments
Modified workload or length of assignments/tests
Modified time demands



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**ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21ST CENTURY
GLOBAL SKILLS**

Pass/no pass option
Modified grades based on IEP

BEHAVIOR ACCOMMODATIONS FOR STUDENTS:

- Breaks between tasks
- Cue expected behavior
- Daily feedback to student
- Have contingency plans
- Use de-escalating strategies
- Use positive reinforcement
- Use proximity/touch control
- Use peer supports and mentoring
- Model expected behavior by adults
- Have parent sign homework
- Set and post class rules
- Chart progress and maintain data



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GLOBAL SKILLS

Accommodations and Modifications for ESL Students

- Give tests orally
- Give instructions/directions in writing and orally
- Assign a peer tutor, same language or English speaking
- Allow use of bilingual/translation dictionary
- Provide summaries of text or study guides of particular chapters
- Allow errors in speaking
- Allow errors in writing
- Accept writing in first language
- Highlight key vocabulary
- Reduce amount of work required
- Assess comprehension through demonstration or other alternative means (gestures, drawings)
- Rephrase questions, directions, and explanations
- Reduce multiple choices on assessments
- Provide study guides and/ or outlines
- Shorten reading assignments
- Allow extended time for test/project completion
- Use of audio books
- Use of graphic organizers
- Use reduced text, so that print is not dense
- Use visuals/pictures throughout lesson/unit/assignment
- Adapt homework to reflect language proficiency/home support
- Adapt homework to reflect home support
- Provide hands-on activities and explanations
- Allow extended time to answer questions, and permit drawing, as an explanation
- Use of translation dictionaries to locate words in the native language
- Use anecdotal records and portfolio of work as forms of assessment
- Use story retellings to assess comprehension