Unit Title: Building Blocks of a Program **Stage 1: Desired Results** Standards & Indicators: 2020 NJSLS – Computer Science and Design Thinking 8.1.12.CS.2: Model interactions between application software, system software, and hardware. • 8.1.12.CS.3: Compare the functions of application software, system software, and hardware. 8.1.12.IC.2: Test and refine computational artifacts to reduce bias and equity deficits 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms. 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects. 8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. **Career Readiness, Life Literacies and Key Skills** Standard **Performance Expectations Core Ideas** 9.4.12.CI.3 Examine challenges that may exist in the Gathering and evaluating adoption of new ideas. knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking. Multiple solutions often exist to 9.4.12.CT.2 Develop multiple solutions to a problem and evaluate short- and long-term effects solve a problem. to determine the most plausible option. Assess digital tools based on features such 9.4.12.TL.1 Digital tools differ in features, as accessibility options, capacities, and capacities, and styles. Knowledge utility for accomplishing a specified task of different digital tools is helpful (e.g., W.11-12.6.). in selecting the best tool for a given task. **Central Idea/Enduring Understanding: Essential/Guiding Question:** What structures are needed in order to perform this Java programs use several structures such as loops, conditionals, arrays, and variables of specific task? How will they be mapped out? different types in order to perform functions. **Content:** Skills(Objectives): Students will Algorithms Understand the concept of an algorithm Data types Implement simple algorithms in Java using Variables selection and iteration structures String Manipulation

Conditionals Loops Arrays		•	Be able to trac uses simple str	e and find flaws in Java code that ructures
Interdisciplinary Connection As students learn program both science, math, literate	ons: nming concepts, they we and computer science	vill deve e.	lop projects tha	t demonstrate their proficiency in
	Stage 2: As	sessr	nent Evider	ice
Performance Task(s): Programs at the end of ea One final project One exam per unit	ch lesson	Other Evidence: • Online assignments • Exit Tickets • Class discussions • Quizzes		
	Stage 3	: Lea	rning Plan	
Learning Opportunities/St	rategies:	<u>Resou</u>	rces:	
Learning Opportunities/Strategies: At the beginning of each unit, there will be a class discussion on an example of new code. Deciphering what this code does, how to read it, and different types if there are any. Depending on the topic, visual aids may be created Students will take class time to practice using this code both on computer and on paper. At the end of each unit, students will turn in projects, notes, and quizzes on each topic.		<ul> <li>Resources: <ul> <li>A guide to Programming in Java by Beth Brown</li> <li>CodeHs - several Java sections from site and compiler</li> </ul> </li> <li>LGBT and Disabilities Resources: <ul> <li>LGBTQ-Inclusive Lesson &amp; Resources by Garden State Equality and Make it Better for Youth</li> <li>LGBTQ+ Books</li> </ul> </li> <li>DEI Resources: <ul> <li>Learning for Justice</li> <li>GLSEN Educator Resources</li> <li>Supporting LGBTQIA Youth Resource List</li> <li>Respect Ability: Fighting Stigmas, Advancing Opportunities</li> <li>NJDOE Diversity, Equity &amp; Inclusion Educational Resources</li> <li>Diversity Calendar</li> </ul> </li> </ul>		
*Please note: Teachers wl	no have students with 5	504 plan	s that require cu	arricular accommodations are to
refer to Struggling and/or	Special Needs Section	for diff	erentiation	
High-Achieving Students	On Grade Level Students	Strug	giing Students	Special Needs/ELL
<ul> <li>Projects/lessons</li> </ul>	<ul> <li>Projects/less</li> </ul>	•	Projects/less	Any student requiring further

ons designed

to the style

accommodations and/or

modifications will have them

individually listed in their 504 Plan

designed to the

style that

ons

designed to

the style that

	matches the		matches the		that matches	or IEP. These might include, but
	student.		student.		the student.	are not limited to: breaking
•	Students are	•	Projects are	•	Projects are	assignments into smaller tasks,
	encouraged to		designed to		designed to	giving directions through several
	explore various		allow		allow	channels (auditory, visual,
	tools and		students to		students to	kinesthetic, model), and/or small
	options to		design their		design their	group instruction for
	extend their		project		project	reading/writing
	knowledge		around their		around their	
	beyond what		own		own interest.	ELL supports should include, but
	was presented in		interest.	•	Adjusted/sh	are not limited to, the following::
	the classroom	•	Rubrics are		ortened	Extended time
	and to apply		structured to		assignment	Provide visual aids
	these techniques		reward		if needed.	Repeated directions
	in their projects		students	•	One on one	Differentiate based on proficiency
•	Rubrics are		who apply		help as	Provide word banks
	structured to		new		needed	Allow for translators, dictionaries
	reward students		techniques			
	who apply new	•	Students are			
	techniques		encouraged			
•	Students are		to			
	encouraged to		collaborate			
	collaborate with		with peers			
	peers to explore		to explore			
	and apply new		and apply			
	techniques		new			
			techniques			

#### Unit Title: Object Oriented Organization

### Stage 1: Desired Results

#### Standards & Indicators: 2020 NJSLS – Computer Science and Design Thinking

8.1.12.CS.2: Model interactions between application software, system software, and hardware. •

8.1.12.CS.3: Compare the functions of application software, system software, and hardware.

8.1.12.IC.2: Test and refine computational artifacts to reduce bias and equity deficits

8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.

8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

8.1.12.AP.6: Create artifa independent but interrela	ects by using procedures ted programs.	within a program, cor	nbinations of data and procedures, or
	Career Readiness,	Life Literacies and Key	/ Skills
Standard	Performance I	Expectations	Core Ideas
9.4.12.CI.3	Examine challenges that may exist in the adoption of new ideas.		Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.
9.4.12.CT.2	Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option.		Multiple solutions often exist to solve a problem.
9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).		Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.
Central Idea/Enduring Understanding: Java uses objects, functions, and classes in order to organize code and allow one programmers code to be easily read and used by others, while also defining properties and behaviors of the program.		Essential/Guiding Question: How must I organize my code in order to create objects or reference another programmers code?	
Content: Methods Classes Inheritance		<ul> <li><u>Skills(Objectives)</u>:</li> <li>Students will: <ul> <li>Learn to organize a class by using methods</li> <li>Learn how to call upon another class in their code</li> </ul> </li> </ul>	
Recursion Objects		<ul> <li>Learn how to create objects from their own classes</li> <li>Learn how to call a method within itself to create a recursive method</li> </ul>	
Interdisciplinary Connections: As students learn programming concepts, they will develop projects that demonstrate their proficiency in			

both science, math, literacy and computer science.

Stage 2: Assessment Evidence			
Performance Task(s):	Other Evidence:		
Programs at the end of each lesson	• Online assignments		
One final project	• Exit Tickets		
One exam per unit	Class discussions		
	• Quizzes		

Stage 3	: Learning Plan
Learning Opportunities/Strategies: At the beginning of each unit, there will be a class discussion on an example of new code. Deciphering what this code does, how to read it, and different types if there are any. Depending on the topic, visual aids may be	<ul> <li><u>Resources:</u></li> <li><u>Resources:</u></li> <li>A guide to Programming in Java by Beth Brown</li> <li><u>CodeHs</u> - several Java sections from site and compiler</li> </ul>
created Students will take class time to practice using this code both on computer and on paper.	<ul> <li>LGBT and Disabilities Resources:</li> <li>LGBTQ-Inclusive Lesson &amp; Resources by Garden State Equality and Make it Better for Youth</li> <li>LGBTQ+ Books</li> </ul>
At the end of each unit, students will turn in projects, notes, and quizzes on each topic.	<ul> <li>DEI Resources:</li> <li>Learning for Justice</li> <li>GLSEN Educator Resources</li> <li>Supporting LGBTQIA Youth Resource List</li> <li>Respect Ability: Fighting Stigmas, Advancing Opportunities</li> <li>NJDOE Diversity, Equity &amp; Inclusion Educational Resources</li> <li>Diversity Calendar</li> </ul>

### Differentiation

\*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
<ul> <li>Projects/lessons</li> </ul>	<ul> <li>Projects/less</li> </ul>	<ul> <li>Projects/les</li> </ul>	Any student requiring further
designed to the	ons designed	sons	accommodations and/or
style that	to the style	designed to	modifications will have them
matches the	that matches	the style	individually listed in their 504 Plan
student.	the student.	that	or IEP. These might include, but
• Students are	<ul> <li>Projects are</li> </ul>	matches the	are not limited to: breaking
encouraged to	designed to	student.	assignments into smaller tasks,
explore various	allow	<ul> <li>Projects are</li> </ul>	giving directions through several
tools and	students to	designed to	channels (auditory, visual,
options to	design their	allow	kinesthetic, model), and/or small
extend their	project	students to	group instruction for
knowledge	around their	design their	reading/writing
beyond what	own interest.	project	
was presented in	• Rubrics are	around their	ELL supports should include, but
the classroom	structured to	own	are not limited to, the following::
and to apply	reward	interest.	Extended time
	students who		Provide visual aids

<ul> <li>these techniques in their projects</li> <li>Rubrics are structured to reward students who apply new techniques</li> <li>Students are encouraged to collaborate with peers to explore and apply new techniques</li> </ul>	<ul> <li>apply new techniques</li> <li>Students are encouraged to collaborate with peers to explore and apply new techniques</li> </ul>	<ul> <li>Adjusted/sh ortened assignment if needed.</li> <li>One on one help as needed</li> </ul>	Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries
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### Unit Title: Beyond Java

### Stage 1: Desired Results

**Standards & Indicators:** 2020 NJSLS – Computer Science and Design Thinking

8.1.12.CS.2: Model interactions between application software, system software, and hardware. •

8.1.12.CS.3: Compare the functions of application software, system software, and hardware.

8.1.12.IC.2: Test and refine computational artifacts to reduce bias and equity deficits

8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.

8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.

Career Readiness, Life Literacies and Key Skills			
Standard	Performance Expectations	Core Ideas	
9.4.12.CI.3	Examine challenges that may exist in the adoption of new ideas.	Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.	

9.4.12.CT.2 9.4.12.TL.1	Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option. Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task		Multiple solutions often exist to solve a problem. Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful
	(e.g., W.11-12.6.).		in selecting the best tool for a given task.
Central Idea/Enduring Understanding: Java is just one of many programming languages, with many pros and cons. Programmers will use other languages in order to get different tasks completed		<b>Essential/Guiding Question</b> : Given this kind of problem, what language should I use, and why?	
<u>Content</u> :	• 	Skills(Objectives):	
Programs for Java C#/C++ VBA Python		<ul> <li>Students will:</li> <li>The differences between different programming languages</li> <li>How to determine what language to use for what kind of program.</li> <li>Why different operating systems in certain languages.</li> </ul>	
Interdisciplinary Connections: As students learn programming concepts, they wi		Il develop projects tha	t demonstrate their proficiency in
	Stage 2: Ass	sessment Evider	nce
Performance Task(s): Programs at the end of each lesson One final project One exam per unit		Other Evidence: • Online assignments • Exit Tickets • Class discussions • Quizzes	
	Stage 3	: Learning Plan	
Learning Opportunities/St	rategies:	Resources:	
At the beginning of each unit, there will be a class discussion on an example of new code. Deciphering what this code does, how to read it, and different types if there are any. Depending on the topic, visual aids may be created		<ul> <li><u>Resources:</u></li> <li>A guide to Pr</li> <li><u>CodeHs</u> - sev compiler</li> </ul>	ogramming in Java by Beth Brown eral Java sections from site and
		LGBT and Disabilities I <u>LGBTQ-Inclusi</u> <u>State Equality</u>	Resources: ive Lesson & Resources by Garden and Make it Better for Youth

Students will take class time to practice using this code both on computer and on paper.	LGBTQ+ Books DEI Resources:
At the end of each unit, students will turn in projects, notes, and quizzes on each topic.	<ul> <li>Learning for Justice</li> <li>GLSEN Educator Resources</li> <li>Supporting LGBTQIA Youth Resource List</li> <li>Respect Ability: Fighting Stigmas, Advancing Opportunities</li> <li>NJDOE Diversity, Equity &amp; Inclusion Educational Resources</li> <li>Diversity Calendar</li> </ul>

#### Differentiation

\*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
<ul> <li>Projects/lessons designed to the style that matches the student.</li> <li>Students are encouraged to explore various tools and options to extend their knowledge beyond what was presented in the classroom and to apply these techniques in their projects</li> <li>Rubrics are structured to reward students who apply new techniques</li> <li>Students are encouraged to collaborate with peers to explore and apply new</li> </ul>	<ul> <li>rojects/lesso ns designed to the style that matches the student.</li> <li>Projects are designed to allow students to design their project around their own interest.</li> <li>Rubrics are structured to reward students who apply new techniques</li> <li>Students are encouraged to collaborate with peers to explore and apply new techniques</li> </ul>	<ul> <li>Projects/les sons designed to the style that matches the student.</li> <li>Projects are designed to allow students to design their project around their own interest.</li> <li>Adjusted/sh ortened assignment if needed.</li> <li>One on one help as needed</li> </ul>	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries
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### Pacing Guide

Course Name	Resource	Content Standards
<ul> <li>UNIT 1 (36 Days)</li> <li>Data types and Variables</li> <li>Conditionals (if-statements)</li> <li>Iterations (loops)</li> <li>Arrays and Lists</li> </ul>	CHAPTERS 3 & 4: (10 Days) 5: ( 5 Days) 8: (14 Days) 6 & 10: ( 7 Days)	8.1.12.CS 2-3 8.1.12 IC. 2 8.1.12.AP 1 8.1.12.AP.5-6
<ul> <li>UNIT 2 (27 Days)</li> <li>Methods and Classes</li> <li>Objects</li> <li>Recursion and Inheritance</li> </ul>	CHAPTERS 7 & 8: (17 Days) 9 & 13: (10 Days)	8.1.12.CS 2-3 8.1.12 IC. 2 8.1.12.AP 1 8.1.12.AP.5-6
<ul> <li>UNIT 3 (26 Days)</li> <li>Java Final</li> <li>Differences between languages</li> <li>Project in different language</li> </ul>	CHAPTERS* N/A: (9 Days) N/A: (7 Days) N/A: (10 Days) *Other online resources will be utilized during this unit.	8.1.12.CS 2-3 8.1.12 IC. 2 8.1.12.AP 1 8.1.12.AP.5-6
Total: 89 Days		