

**Summit Public Schools
Summit, New Jersey**

**Grade Level / Content Area: Mathematics
Length of Course: $\frac{1}{2}$ Academic Year**

Curriculum: Introduction to Java Programming

Developed By
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Course Description: This elective course serves as a direct follow up to the “Introduction to Computer Science” course and introduces to students the Java programming language. Over the course of the semester students will develop strong Java programming skills through a series of programming and written assignments. Students who complete this course with a B- or higher will be prepared to take an AP Computer Science course.

Topics that will be taught include a wide variety of techniques that include if/else, while loops, for statements, arrays, and strings. They will have practical experience in use of variables and methods as well as basic problem solving. In addition, students will learn about the basics of object oriented programming.

Anticipated Timetable for Intro to Java Programming

Quarter Three - Greenfoot

Unit 0 – Introduction to Programming

Topic	Time Frame
Class Introduction and Overview of Greenfoot Program	1
Pre-Assessment & Introduce Notes	1
Project #0	1
Total	3

Unit 1 – Custom Methods

Topic	Time Frame
Introduce Notes and Allow for Practice/Exploration	1
Project #1	2
Total	3

Unit 2 – Data Types and Control Structures

Topic	Time Frame
Introduce Notes and Allow for Practice/Exploration	2
Project #2	3
Review Project #2 and Efficiency Techniques	1
Project #3	8
Total	14

Unit 3 – Methods and Return Types

Topic	Time Frame
Introduce Notes and Allow for Practice/Exploration	1
Project #4	6
Total	7

Unit 4 – Parameters

Topic	Time Frame
Introduce Notes and Allow for Practice/Exploration	2
Project #5	7
Practice & Review	2
Quiz #1	1
Total	12

Unit 5 – For Loops

Topic	Time Frame
Introduce For Loops Notes	1
Introduce Nested For Loops Notes & Practice	1
Project #6 (Partner Project)	4
Total	6

Unit 6 – Introduction to Arrays

Topic	Time Frame
Introduce Notes and Allow for Practice/Exploration	2
Project #7	7
Review Key Methods as A Class To Go Efficiency	1
Total	10

Unit 7 – Introduction to Strings

Topic	Time Frame
Introduce Notes and Allow for Practice/Exploration	2
Project #8	8
Review Key Methods as A Class To Go Efficiency	1
Practice & Review	2
Quiz #2	1
Total	14

Unit 8 – Introduction to Strings

Topic	Time Frame
Introduce Notes and Allow for Practice/Exploration	2
Project #8	8
Review Key Methods as A Class To Go Efficiency	1
Practice & Review	2
Quiz #2	1
Total	14

***Timeline is flexible to include more or less time on particular projects. Allow for students to explore and work through trouble-shooting their errors.**

* Extension: This is worth 10% of overall grade so students have the opportunity to go above and beyond to challenge their skills. This is an opportunity for the more advanced students to showcase their abilities, by doing work that is beyond typical A material.

Unit 0: Introduction to Programming

Standard
Big Ideas: <i>Course Objectives / Content Statement(s)</i> - Students will learn how to create and write their first program. - Students will learn the 4 core Wombat methods (walk, turnLeft, pickLeaf, placeLeaf) and how/where to use them. - Students will learn how to properly format their code for readability. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language.

9.3.IT-PRG.3 Analyze system and software requirements to ensure maximum operating efficiency.
 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

Career-Ready Practices

CRP1: Act as a responsible and contributing citizen and employee.
 CRP2: Apply appropriate academic and technical skills.
 CRP3: Attend to personal health and financial well-being.
 CRP4: Communicate clearly and effectively and with reason.
 CRP5: Consider the environmental, social and economic impacts of decisions.
 CRP6: Demonstrate creativity and innovation.
 CRP7: Employ valid and reliable research strategies.
 CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
 CRP9: Model integrity, ethical leadership and effective management.
 CRP10: Plan education and career paths aligned to personal goals.
 CRP11: Use technology to enhance productivity.
 CRP12: Work productively in teams while using cultural global competence.

Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i>	Enduring Understandings <i>What will students understand about the big ideas?</i>
- How is a line of Java code structured? - What is a syntax error? - What is the who/what relationship of each line of code?	Students will understand that... - Error messages occur as the result of a mistake in syntax or logic. - Each line of code must indicate who is doing the action and what they are doing. - There is sequential order of how the program runs each line of code.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to write valid lines of Java code. - Be able to identify basic syntax errors. - Be able to compile and run their own code. - Be able to identify what a method is.	Introduce how to call a pre-made/inherited method and where to type in their code so that students can simply click the “run” or “act” button. Instructional Strategies: - Individual work - In-class programming time with assistance from teacher
Differentiation	Assessments
Extension offered for 10% of overall grade.* Technology Integration: Greenfoot Program Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning	Formative Assessment: Teacher will walk around the room and touch base with each student at least once during the course of the project.

them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	Summative Assessment: Project 0 – Getting Started – Make the wombats pick up all the leaves in the world by using the commands we practiced in the notes.
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Unit 1: Custom Methods

Standard	
Big Ideas: <i>Course Objectives / Content Statement(s)</i> - Students will learn how to write their own Wombat methods utilizing the four main methods. - Students will learn how to properly format a method's code. - Students will learn how to identify when creating a method is necessary. - Students will understand the vocabulary used to describe a method signature and will only be working with void return types for this lesson. Standards: 9.3.IT-PRG.1 Analyze customer software needs and requirements. 9.3.IT-PRG.6 Program a computer application using the appropriate programming language. 8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. CRP10: Plan education and career paths aligned to personal goals. CRP11: Use technology to enhance productivity. CRP12: Work productively in teams while using cultural global competence.	
Essential Questions	Enduring Understandings
<i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i> - What is the difference between what I'm telling it to do and what I want it to do? - When is it required to make a method as opposed to simply writing code? - What are the parts of a method signature?	<i>What will students understand about the big ideas?</i> Students will understand that... - Methods are used to help simplify code and make it more readable. - They should code DRY (Don't Repeat Yourself). - Good code formatting is essential. - Comments are essential, both single line and multi-lined.

Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to format code (brackets, variables naming, spacing, etc.) - Be able to successfully utilize all 4 main Wombat methods. - Be able to create useful comments so that another programmer can read their code and get the general idea of their intended method.	Introduce how/where to create custom methods. Use this as a chance to briefly talk about classes and objects. Talk about comments – how and where to write them and what makes it useful. Start with creating a turnRight method as a class. Instructional Strategies: • Individual work with help from peers • In-class programming time with assistance from teacher
Differentiation	Assessments
Extension offered for 10% of overall grade.* Technology Integration: Greenfoot Program Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	Formative Assessment: Teacher will walk around the room and touch base with each student at least once during the course of the project. Summative Assessment: Project 1 – Custom Methods – Make the wombat efficiently pick up all the leaves in the world by creating custom methods to avoid repetitious code.

Unit 2: Data Types and Control Structures

Standard
Big Ideas: <i>Course Objectives / Content Statement(s)</i> • Students will learn the basic primitive data types of the Java language. • Students will be able to create and utilize variables of all primitive data types. • Students will learn basic math (+, -, *, /, %) using number variables. • Students will learn how to structure an if/else block with Boolean operators like && and . • Students will learn basic conditional structures like if/else, while loop, and do while loop. • Students will practice with truth tables. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language. 9.3.IT-PRG.9 Perform software maintenance and customer support functions. 8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.

Career-Ready Practices

CRP1: Act as a responsible and contributing citizen and employee.

CRP2: Apply appropriate academic and technical skills.

CRP3: Attend to personal health and financial well-being.

CRP4: Communicate clearly and effectively and with reason.

CRP5: Consider the environmental, social and economic impacts of decisions.

CRP6: Demonstrate creativity and innovation.

CRP7: Employ valid and reliable research strategies.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9: Model integrity, ethical leadership and effective management.

CRP10: Plan education and career paths aligned to personal goals.

CRP11: Use technology to enhance productivity.

CRP12: Work productively in teams while using cultural global competence.

Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i>	Enduring Understandings <i>What will students understand about the big ideas?</i>
• Which parts of an if/else block are required and which are optional? • How does the computer know whether to run the if or the else portion of your code? • What is the key difference between the while and the do while loop? When would be best to use one versus the other? • How can you make a multi-conditional or nested conditional control structure. • How is / different from % and when should they be used?	Students will understand that... • Java math has the same basic rules as regular math but only utilizing integers. • All if statements will either run the code in the if block or the else block. • All conditionals must evaluate to true or false, no matter how complicated they are.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to create as many of their own methods as they need and identify when it is appropriate to do so. - Be able to use if statements or loops to prevent their wombat from breaking.	Introduce the notes with data types and conditional control structures. Students should practice these skills by having a few small tasks to complete in class and compare with a partner. Instructional Strategies: • Individual work with help from peers • In-class programming time with assistance from teacher
Differentiation	
Extension offered for 10% of overall grade.* Technology Integration: BlueJ/repl.it and	
	Assessments

Greenfoot Program Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	Formative Assessment: Teacher will walk around the room and touch base with each student at least once during the course of the project. Summative Assessment: Project 2 – Data Types– Create specifically written methods that allow for practice and use of various variables and conditional control structures. Project 3 – Conditionals – Students will help a Wombat traverse the world, focusing on efficiency as part of the solution.
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Unit 3: Method and Return Types

Standard	
Big Ideas: <i>Course Objectives / Content Statement(s)</i> - Students will learn how to write a method with a return type of Boolean. - Students will practice with both Wombats and number manipulations. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language. 9.3.IT-PRG.9 Perform software maintenance and customer support functions. 8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible. 8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs. Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. CRP10: Plan education and career paths aligned to personal goals. CRP11: Use technology to enhance productivity. CRP12: Work productively in teams while using cultural global competence.	
Essential Questions	Enduring Understandings
<i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i> What does it mean for a method to return something and how do I use that information?	<i>What will students understand about the big ideas?</i> Students will understand that... - A Boolean method must return true or false. - That method must be present in a conditional in

• What is the difference between a working solution and a strong/efficient solution? • How can I identify when a problem is fully solved?	order to utilize the information it returns. If the information isn't needed it should be void. • Even though the method may be returning information, the actions that are coded in the method still run.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to combine their Boolean methods with && and statements. - Be able to write methods with Boolean return types. - Be able to determine which methods require Boolean return types vs. void. - Utilize all the previously available tools at maximum effectiveness	Introduce the notes with return types. Students should practice these skills by having a few small tasks to complete in class and compare with a partner. Instructional Strategies: • Individual work with help from peers • In-class programming time with assistance from teacher
Differentiation	
Extension offered for 10% of overall grade.* Technology Integration: Greenfoot Program Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	Assessments Formative Assessment: Teacher will walk around the room and touch base with each student at least once during the course of the project. Summative Assessment: Project 4 – Methods – Students will write their own Boolean methods to help a Wombat “carpet” the world with leaves.

Unit 4: Parameters

Standard
Big Ideas: <i>Course Objectives / Content Statement(s)</i> • Students will be able to create and utilize number and Boolean parameters. • Students will learn the difference between variables and parameters. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language. 9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications. 8.1.2.AP.2: Model the way programs store and manipulate data by using numbers or other symbols to

represent information.

8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.

Career-Ready Practices

CRP1: Act as a responsible and contributing citizen and employee.

CRP2: Apply appropriate academic and technical skills.

CRP3: Attend to personal health and financial well-being.

CRP4: Communicate clearly and effectively and with reason.

CRP5: Consider the environmental, social and economic impacts of decisions.

CRP6: Demonstrate creativity and innovation.

CRP7: Employ valid and reliable research strategies.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9: Model integrity, ethical leadership and effective management.

CRP10: Plan education and career paths aligned to personal goals.

CRP11: Use technology to enhance productivity.

CRP12: Work productively in teams while using cultural global competence.

Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i>	Enduring Understandings <i>What will students understand about the big ideas?</i>
• What is the core feature difference between variables and parameters and what purpose do each of them serve. • How can a parameter be useful and how do I ensure that the parameter made is actually being used throughout the code?	Students will understand that... • Parameters require a value provided for them to function while Variables will have their value provided directly by the coder. • There are other types of parameters that can be used, and that will come up later on.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Apply previous units' topics to this project to maximize efficiency and simplify code. - Create various types of parameters and draw conclusions about the differences and uses between parameters and variables.	Introduce the notes. Students should practice these skills by having a few small tasks to complete in class and compare with a partner. Instructional Strategies: • Individual work with help from peers • In-class programming time with assistance from teacher
Differentiation	
Extension offered for 10% of overall grade.* Technology Integration: Greenfoot Program Global Perspectives: We will discuss how programming languages are the new global	
	Assessments
	Formative Assessment: Teacher will walk around the room and touch base with

language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	each student at least once during the course of the project. Summative Assessment: Project 5 – Parameters – Students will code several individual Wombat methods utilizing variables and parameters. Each problem must be made as efficient as possible. Quiz #1 – This will be a quiz on all of the topics covered in Quarter 3. This quiz should have both a paper and a programming section.
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Unit 5: For Loops

Standard	
Big Ideas: <i>Course Objectives / Content Statement(s)</i> - Students will learn how to create and use for loops and how to nest them. - Students will practice reading and writing code on paper. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language. 9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications. 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms. 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice. Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. CRP10: Plan education and career paths aligned to personal goals. CRP11: Use technology to enhance productivity. CRP12: Work productively in teams while using cultural global competence.	
Essential Questions	Enduring Understandings
<i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i> - When would a for loop be better suited than a while loop? - How can a while loop act as a for	<i>What will students understand about the big ideas?</i> Students will understand that... - For loops are usually used to execute a certain number of repeated code. - Discovering the pattern of rows vs. columns is

loop? Is there really a difference? • How can I test that my code works on paper without running it on the computer? • How can I nest statements to create the pattern I am looking for?	important for deciding where to put the appropriate conditions.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to identify inefficient code and simplify it. - Be able to identify which code requires the use of a for loop and which does not.	Introduce the notes. Students should practice these skills individually. However, the project could benefit from being a partner project. Instructional Strategies: • Individual work with help from peers • In-class programming time with assistance from teacher
Differentiation	Assessments
Extension offered for 10% of overall grade.* Technology Integration: BlueJ or repl.it Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	
	Formative Assessment: Teacher will walk around the room and touch base with each student at least once during the course of the project. Summative Assessment: Project 6 – Nested For Loop – Students will create various designs and patterns by working through the patterns of a for loop and creating complex conditions or nested structures.

Unit 6: Introduction to Arrays

Standard
Big Ideas: <i>Course Objectives / Content Statement(s)</i> • Students will learn how to use for loops to iterate through an array. • Students will learn how to create and manipulate arrays and their various attributes. • Students will work with number and character arrays, but will also be introduced to String arrays. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language. 9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications. 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and

existing algorithms.

8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.

Career-Ready Practices

CRP1: Act as a responsible and contributing citizen and employee.

CRP2: Apply appropriate academic and technical skills.

CRP3: Attend to personal health and financial well-being.

CRP4: Communicate clearly and effectively and with reason.

CRP5: Consider the environmental, social and economic impacts of decisions.

CRP6: Demonstrate creativity and innovation.

CRP7: Employ valid and reliable research strategies.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9: Model integrity, ethical leadership and effective management.

CRP10: Plan education and career paths aligned to personal goals.

CRP11: Use technology to enhance productivity.

CRP12: Work productively in teams while using cultural global competence.

Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i>	Enduring Understandings <i>What will students understand about the big ideas?</i>
• How does an array simplify our previously written code? • How are arrays and for loops linked? How are they not? • How can I initialize an array in multiple ways?	Students will understand that... • Array's lengths are static. While the elements in the array may be changed, the number of elements may not. • A for loop assists in coding with arrays, but is not required. • Arrays of different types may require different syntax (i.e. char and String arrays). • Arrays can also be the return type of a method or the parameter.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to identify inefficient code and simplify it. - Be able to identify how a for loop can help iterate through an array. - Access only one element of the array. - Create, access, and change elements at any index in the array.	Introduce the notes. Students should practice these skills by having a few small tasks to complete in class and compare with a partner. Instructional Strategies: • Individual work with help from peers • In-class programming time with assistance from teacher
Differentiation	Assessments
Extension offered for 10% of overall grade.*	Formative Assessment: Teacher will walk around the room and touch base with

Technology Integration: BlueJ or repl.it Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	each student at least once during the course of the project. Summative Assessment: Project 7 – ArrayWork – Students will solve a series of small methods providing them the opportunity to work with arrays (manipulating, creating, and changing arrays). Each method should take in an array parameter to ensure that their code works for all arrays.
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Unit 7: Introduction to Strings

Standard	
Big Ideas: <i>Course Objectives / Content Statement(s)</i> - Students will be able to solve problems utilizing Strings (substring, equals, length methods). - Students will learn the relationship between arrays and Strings. - Students will learn that String are immutable. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language. 9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications. 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms. 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice. Career-Ready Practices CRP1: Act as a responsible and contributing citizen and employee. CRP2: Apply appropriate academic and technical skills. CRP3: Attend to personal health and financial well-being. CRP4: Communicate clearly and effectively and with reason. CRP5: Consider the environmental, social and economic impacts of decisions. CRP6: Demonstrate creativity and innovation. CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them. CRP9: Model integrity, ethical leadership and effective management. CRP10: Plan education and career paths aligned to personal goals. CRP11: Use technology to enhance productivity. CRP12: Work productively in teams while using cultural global competence.	
Essential Questions	Enduring Understandings
<i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i> How are String stored in the computer's memories? Why are	<i>What will students understand about the big ideas?</i> Students will understand that... Strings cannot be changed, but they may be

String not “built-in” to Java? - How are String and Arrays similar? - How are they different?	redefined. - All classes have an equals method to utilize, instead of a == that we would use for other primitive data types. - There are a number of inherited methods that need to be used with strings. - A string can be thought of as an array of characters.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to draw strong connections between their array solutions and their string solutions. - Solve problems that integrate both strings and arrays without direct instruction.	Introduce the notes. Students should practice these skills by having a few small tasks to complete in class and compare with a partner. Instructional Strategies: - Individual work with help from peers - In-class programming time with assistance from teacher
Differentiation	Assessment
Extension offered for 10% of overall grade.* Technology Integration: BlueJ or repl.it Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems.	Formative Assessment: Teacher will walk around the room and touch base with each student at least once during the course of the project. Summative Assessment: Project 8 – StringWork – Students will solve a variety of small, increasingly difficult String methods. Each method should take in a String parameter to ensure that their code works for all strings. Quiz #2 – This will be a quiz on all of the topics covered in Quarter 3 and up to this point in Quarter 4. This quiz should have both a paper and a programming section.

Unit 8: Class Creation and Interaction

Standard
Big Ideas: <i>Course Objectives / Content Statement(s)</i> - Students will learn how to write a java class from scratch, including constructor, instance variables, methods (including mutator and accessor methods). - Students will be able to create multiple interacting classes from scratch all following good programming standards. Standards: 9.3.IT-PRG.6 Program a computer application using the appropriate programming language.

9.3.IT-PRG.4 Demonstrate the effective use of software development tools to develop software applications.

8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.

8.1.2.AP.2: Model the way programs store and manipulate data by using numbers or other symbols to represent information.

Career-Ready Practices

CRP1: Act as a responsible and contributing citizen and employee.

CRP2: Apply appropriate academic and technical skills.

CRP3: Attend to personal health and financial well-being.

CRP4: Communicate clearly and effectively and with reason.

CRP5: Consider the environmental, social and economic impacts of decisions.

CRP6: Demonstrate creativity and innovation.

CRP7: Employ valid and reliable research strategies.

CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9: Model integrity, ethical leadership and effective management.

CRP10: Plan education and career paths aligned to personal goals.

CRP11: Use technology to enhance productivity.

CRP12: Work productively in teams while using cultural global competence.

Essential Questions <i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i>	Enduring Understandings <i>What will students understand about the big ideas?</i>
- What are the core components of a class and what does each component accomplish? - How can I organize my work so that I do not become confused? - Which tasks should I tackle first? How can I tell the ideal order?	Students will understand that... - It is the responsibility of the programmer to devise and utilize their available tools to create a program that does what is intended. - Mutator and accessor methods are used to get and set the instance variables. - Classes may contain other classes as “variables”. - Code should utilize their object’s methods to create efficient code.
Areas of Focus: Proficiencies (Cumulative Progress Indicators)	Lessons
Students will: - Be able to forward integrate all the tools they learned coding with Wombats into traditional coding. - Start a program from scratch. - Build on a program that they have previously completed by adding in more classes.	Introduce the notes about classes and objects. Students should practice these skills by individually. Instructional Strategies: - Individual work with help from peers - In-class programming time with assistance from teacher
Differentiation	Assessment
Extension offered for 10% of overall grade.* Technology Integration: BlueJ or repl.it	Formative Assessment: Teacher will walk around the room and touch base with each student at least once during the course of the project.

Global Perspectives: We will discuss how programming languages are the new global language. Computer languages are internationally recognized and used and learning them makes the user part of an international community. During the semester students will learn how to collaborate with others in the classroom as well as utilizing the internet as a resource for solving problems. Students will examine, and fix, the code of students of a similar ability level to themselves. They will bring this code up to standards.	Summative Assessment: Project 9 – LunchAccount– Create specifically written methods that allow for practice and use of various instance variables and methods to create a class from scratch. Project 10 – Cafeteria – After fixing project 9, they will integrate this project into a new class that has 4 lunch accounts as it's instance variables.
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Supports for English Language Learners		
Sensory Supports	Graphic Supports	Interactive Supports
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In pairs or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	Interventions	Modifications
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations

Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading