

ROBBINSVILLE PUBLIC SCHOOLS

OFFICE OF CURRICULUM AND INSTRUCTION

Technology Department

**Computer Science I (Semester)
Grades 9-12**

Board of Education

Ms. Jane Luciano, President

Mr. Scott Veisz, Vice President

Ms. Shaina Ciaccio

Mrs. Sharon DeVito

Mr. Vito Galluccio

Mr. Craig Heilman

Mr. Richard Young

Dr. Kathie Foster, Superintendent

Dr. Kimberly Tew, Assistant Superintendent

**Curriculum Writing Committee
Radhika Vaidyanathan**

**Supervisors
Tiffany Brennan**

BOARD OF EDUCATION INITIAL ADOPTION DATE:

Course Philosophy

Python is a widely used high-level, general-purpose, interpreted, dynamic programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than possible in other popular programming languages. This course will give students a sense of understanding of a programming language. This will also prepare them to learn higher level of programming in the next course. The skills they learn in this course is easily transferred to any other programming language.

Course Description

The Computer Science - I introduces students to foundation of Computer Science along with introduction to programming using Python with an emphasis on helping students develop logical thinking and problem-solving skills. This course is designed for complete beginners with no previous background in Computer Science. We will move quickly through topics in computer science with a focus on embedded systems and computer programming. Students will have hands-on experience in writing Python codes along with understanding the basics behind a programming language. By the end of this course, students will be able to break down a big problem into smaller tasks and write an efficient program in Python to solve the problem.

Core and Supplemental Instructional Materials

Core Materials	Supplemental Materials
<ul style="list-style-type: none"> ● Think Python 2: How to Think Like a Computer Scientist by Allen Downey (Green Tea Press) ● Intro to Computer Science in Python from www.codehs.com 	<ul style="list-style-type: none"> ● Online references: http://greenteapress.com/thinkpython/html/index.html ● Classroom Textbook references

Integration of 21st Century Themes and Skills

Educational Technology
Standards: (8.1.12.A.3, 8.1.12.B.2)
<ul style="list-style-type: none"> ● <u>Technology Operations and Concepts:</u> Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue. <u>Example:</u> Students can use codehs.com website in learning the content and solving a problem using the coding language, Python.
<ul style="list-style-type: none"> ● <u>Creativity and Innovation:</u> Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology. <u>Example:</u> Students will be creating an online game using the previously learned content in Python Language.

Career Ready Practices

Standards: (List number: CRP2, CRP9)

CRP2: Apply appropriate academic and technical skills. Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation

Example: Students will be using the problem-solving skills they learned in Math in order to solve a problem in hand. Students will be asked to break down a bigger problem into smaller tasks in order to tackle the problem.

CRP9: Model integrity, ethical leadership and effective management. Career-ready individuals consistently act in ways that align personal and community-held ideals and principles while employing strategies to positively influence others in the workplace. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the directions and actions of a team or organization, and they apply insights into human behavior to change others' action, attitudes and/or beliefs. They recognize the near-term and long-term effects that management's actions and attitudes can have on productivity, morals and organizational culture.

Example: Students will understand the integrity of writing codes on their own and not rely on online resources in finding a solution to a problem. Students will understand copying code from an online resource is called plagiarism.

Robbinsville Ready 21st Century Skill Integration

The following skills will be embedded throughout the curriculum and instruction of this course.

Collaborative Team Member: Robbinsville students will learn more by working together than in isolation. As educational theorist Lev Vygotsky advocated, learning is a social process. Many workplaces today encourage employees to work in teams to solicit diverse perspectives, brainstorm new ideas and/or products, and solve problems. Further, collaboration fosters interpersonal relationships, self-management skills, cooperation, and a sense of collective responsibility. Collaborative team members are able to work with diverse groups of people who hold a variety of perspectives.

Effective Communicator: Robbinsville students must be able to clearly articulate their ideas orally, in writing, and across various media in order to successfully connect to the world around them. As the world becomes increasingly globalized, communication is more than just sharing one's ideas. Effective communicators are able to communicate their convictions, actively listen and analyze others' work to identify perspective and/or potential bias.

Emotionally Intelligent Learner: Robbinsville students who are emotionally intelligent learn to be empathetic, demonstrate integrity and ethical behavior, are kind, are self-aware, willing to change, and practice self-care. They are better able to cope with the demands of the 21st century digital society and workplace because they are reliable, responsible, form stable and healthy relationships, and seek to grow personally and professionally. Emotionally intelligent people are able to manage their emotions, work effectively on teams and are leaders who can grow and help to develop others.

Informed and Involved Citizen: Robbinsville students need to be digital citizens who are civically and globally aware. The concept of what it means to be "literate" has evolved along with 21st century technological and cultural shifts. Our progressive vision of literacy entails having our students explore real world problems in the classroom. Informed and involved citizens are able to safely and accurately communicate with people all around the world and are financially, environmentally and informationally literate.

Innovative Thinker: Robbinsville students must encompass innovative thinking skills in order to be successful lifelong learners in the 21st century world. As stated by Karl Fisch and Scott McLeod in the short film Shift Happens, "We are currently preparing students for jobs that don't yet exist . . . using technologies that haven't been invented . . . in order to solve problems we don't even know are problems yet." Innovative thinkers are able to think analytically, solve problems critically, creatively engage in curiosity and tinkering, and demonstrate originality.

Resilient and Self-Directed Learner: Robbinsville students need to take risks and ultimately make independent and informed decisions in an ever-

changing world. Author of *Life, the Truth, and Being Free*, Steve Maraboli stated, “Life doesn’t get easier or more forgiving, we get stronger and more resilient.” Self-directed scholars of the 21st century are able to set goals, initiate resolutions by seeking creative approaches, and adjust their thinking in light of difficult situations. Resilient students are able to take risks without fear of failure and overcome setbacks by utilizing experiences to confront new challenges. Resilient and self directed scholars will consistently embrace opportunities to initiate solutions and overcome obstacles.

**Robbinsville Public Schools
Scope, Sequence, Pacing and Assessment**

Computer Science – I

Unit Title	Unit Understandings and Goals	Recommended Duration/ Pacing	Assessments			
			Formative	Summative	Common Benchmark Assessments (mid-course and end of course <u>only</u>)	Alternative Assessments (projects, etc. <u>when appropriate</u>)
Unit 1: Intro to Computers and Programming	<ul style="list-style-type: none"> ● What are computers and where are they used? ● Digital Citizenship. ● What is programming? Introduction to Python programming <ul style="list-style-type: none"> ○ Learning commands to move Tracy the turtle in the canvas 	3-4 Weeks	To understand students' understanding, students will write program and execute them as they learn a new command	End of Unit test from codehs.com	Hangman Project	Writing a program to draw checkerboard across the canvas
Unit 2: Basic Python and Console Interaction	<ul style="list-style-type: none"> ● Printing ● Variables ● Types ● User Input ● Arithmetic Expressions ● String Operations ● Comments 	2-3 weeks	To understand students' understanding, students will write program and execute them as they learn a new command	End of Unit test from codehs.com	Hangman Project	Writing a program to get a recipe for the number of servings entered

Unit 3: Conditionals	<ul style="list-style-type: none"> ● If Statements ● Boolean Values ● Logical Operators ● Comparison Operators ● Floating Point Numbers and “Equality” 	1-2 weeks	To understand students’ understanding, students will write program and execute them as they learn a new command	End of Unit test from codehs.com	Hangman Project	Writing a program to get a recipe for the number of servings entered
Unit 4: Looping	<ul style="list-style-type: none"> ● While loops ● For loops ● Break and Continue ● Nested Control Structures 	1-2 weeks	To understand students’ understanding, students will write program and execute them as they learn a new command	End of Unit test from codehs.com	Hangman Project	Writing a program to print the combination of numbers you may get when rolling dice
Unit 5: Functions and Exceptions	<ul style="list-style-type: none"> ● Functions ● Namespaces ● Parameters ● Return Values ● Exceptions 	2-3 weeks	To understand students’ understanding, students will write program and execute them as they learn a new command	End of Unit test from codehs.com	Hangman Project	Write a program to convert Fahrenheit to Celsius and vice versa. Extn: Add exception handling.
Unit 6: Strings	<ul style="list-style-type: none"> ● Indexing and Slicing ● Math Operators on Strings ● For Loops over a String ● String Methods 	2-3 weeks	To understand students’ understanding, students will write program and execute them as they learn a new command	End of Unit test from codehs.com	Hangman Project	Write a program that takes a string and returns that string in all upper case.

Unit 7: Tuples and Lists	<ul style="list-style-type: none"> ● Tuples ● Lists ● For loops and Lists ● List Methods 	1-2 Weeks	To understand students' understanding, students will write program and execute them as they learn a new command	End of Unit test from codehs.com	Hangman Project	Writing a program to print the same string from user but replacing every lowercase "i" with !
--------------------------------	------------------------------------------------------------------------------------------------------------------------------------	-----------	-----------------------------------------------------------------------------------------------------------------	----------------------------------	-----------------	-----------------------------------------------------------------------------------------------

Final Project: Project Hangman: The final program, students will create in this project, will pick a random word from a list of words. It will allow the user to guess letters in the word, one at a time. When the user guesses a letter, the program will reveal where that letter appears in the word. If the user guesses all the letters in the word, they win! However, if they make ten incorrect guesses before this happens, they lose.

Robbinsville Public Schools
Unit #1: Introduction to Computers and Programming

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● What are computers and where are they used? ● Digital Citizenship. ● What is programming? Introduction to Python programming ● Learning commands to move Tracy the turtle in the canvas 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● What are computers and what is programming? ● How is programming an essential part of the digital age? ● What is Python programming? ● How do you write Python to move Tracy the turtle?
<p>Interdisciplinary Connection</p> <p>ELA: NJSLSA.W8: Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism</p> <p>Example: When students are asked to do a research project, the online content that they use should be checked for copyrights. Just like this, when students are asked to write a program to solve a problem, they should think about using their knowledge of content in solving, but not copying code from an online resource.</p> <p>High School Geometry – Students will be asked to work on a 400X400 canvas. This canvas will act as a coordinate plane and students will be working on drawing shapes and images according to the given description and placement.</p>	

	Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
	9.3.IT.5 What are computers?	Explain the implications of IT on business development.	Introduce students to computers as a technology in any fields, just not as a gaming/social media tool.	www.codehs.com	Share their ideas of computers in front of class.
	8.1.12.D.1 8.1.12.D.4 Digital Citizenship	Demonstrate appropriate application of copyright, fair use and/or Creative Commons to an original work.	Introduce digital citizenship to students through modeling right practices and ethics.	www.codehs.com	Create a presentation understanding the digital citizenship

9.3.IT- PRG.1, 8.2.12.E	What is Programming? Python programming	Programs are used for _____ What is Python language? How Tracy the Turtle is being moved through the canvas using the commands written.	Introduce students to Python and start writing program to control Tracy the Turtle.	www.codehs.com	End of unit Quiz from www.codehs.com
-------------------------------	--------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------	----------------	--------------------------------------------

Robbinsville Public Schools
Unit #2: Basic Python and Console Interaction

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● Printing ● Comments ● Variables and Types ● User Input ● Arithmetic Expressions ● String Operations 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● How to use Python Console? ● What are the various commands in Python? ● How are they used in writing a program? ● How does a computer run/compile these python programs?
<p>Interdisciplinary Connection</p> <p>Math: A-SSE: Write expressions in equivalent forms to solve problems. Example: Students will write a program to solve arithmetic expressions using the arithmetic operators available in Python.</p>	

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
9.3.IT-PRG.1, 8.2.12.E	How to use Python Console?	Using Python console to write, store and compile a program	Practicing writing mini programs to understand the console of Python	Python 2.x console lab	Take turns in modeling how to use console in front of the class
9.3.IT-PRG.1, 8.2.12.E	How to use Print statement and add comments to a Python program?	Learning how to print statements to the console and how to add comments so that the reader can understand what is going on in the program.	Showing them the example of using comments in Word documents to understand why adding comments in every program is very important.	www.codehs.com	Exercises to use print and comment in a program.

9.3.IT-PRG.1, 8.2.12.E	What are Variables in Python and how many types of variables are available in Python?	Using variables in a programming language and learning how many types are there.	Students will be shown why we have to use variables in a program. Analogy of comparing “pronouns” to replace a noun.	www.codehs.com	Write a program to store their names and other details in a variable.
9.3.IT-PRG.1, 8.2.12.E	How to get the user input in Python and how to store them in a variable?	Getting input from the user and knowing how to use the input that the user provides	Activity to show why user input is important in many cases	www.codehs.com	Write a program to compute Area and perimeter of a rectangle / square
9.3.IT-PRG.1, 8.2.12.E	How to calculate arithmetic expression in Python? Does order of operation matter?	Learning different operators in Python to compute an arithmetic expression		www.codehs.com	Write a “Calculator” program in getting user input and computing what user asked to compute
9.3.IT-PRG.1, 8.2.12.E	Strings are texts, but can we perform arithmetic operations on them. If not, what kind of operators are be used?	Learning to use different tools in Python to manipulate Strings	Students will be demonstrated on how to use different Python commands to use with Strings.	www.codehs.com	Write a program that asks the user for three ingredients, three amounts, and a number of servings, and calculates how much of each ingredient is needed to serve the specified number of servings.

Robbinsville Public Schools
Unit #: 3 Conditionals

Enduring Understandings: <ul style="list-style-type: none"> ● If Statements ● Boolean Values ● Logical Operators ● Comparison Operators ● Floating Point Numbers and “Equality” 	Essential Questions <ul style="list-style-type: none"> ● How to get Python not to execute a line in its set of commands? ● What kind of logical operators are there and how can we use them in a conditional statement? ● Can Python compare a String and an integer type? If so, how does that work?
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Interdisciplinary Connection

Math: S-CP: Conditional Probability and the Rules of Probability

Examples: Students will be using Venn diagram to understand AND / OR/ NOT operators which will be used in writing conditional statements.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
9.3.IT-PRG.1, 8.2.12.E	How can Python skip a few lines when compiling a program?	Introducing to conditional statements. If <condition>, then <statements>	When do you use conditions in real life? What kind of life choices do you have to make? Brainstorming ideas and making connection in writing a program	www.codehs.com	Is it raining? Using Conditional statements, write a program for user to know what to do.
9.3.IT-PRG.1, 8.2.12.E	How do you translate yes/no answers in to a Python language code?	Introducing Boolean values (TRUE, FALSE) and how we use them in conditional statements	Demonstrate the uses of Boolean Value in a conditional statement.	www.codehs.com	Write a program to print if a user can vote? (Getting input from user)

9.3.IT-PRG.1, 8.2.12.E	How and why do you combine conditional statements?	Logical operators (AND, OR, NOT) Comparison Operators (<, >, =, not = etc..)	True/False table to show how conditions work. Modeling to show how to use this Python programming	www.codehs.com	Write a program to get user input and updates / prints balance according to the condition (deposit / withdrawal)
9.3.IT-PRG.1, 8.2.12.E	Is it possible to store decimals? How do arithmetic operators work on decimals?	Floating decimal point numbers	Give examples of how just integers are just not enough to work with expressions. Students will be making lists of examples where they may be using decimals instead of integers	www.codehs.com	Find errors in program where integers may have been used instead of a decimal.

Robbinsville Public Schools
Unit #: 4 Looping

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● While loops ● For loops ● Break and Continue ● Nested Control Structures 	<p>Essential Questions</p> <ul style="list-style-type: none"> ● How to avoid repeat of the same sentences in the program? ● When to use For loop and when to use While loop? ● Differences between For and While loop? ● How to break out of the loop? ● Loop within loop? Is it possible?
<p>Interdisciplinary Connection</p> <p>Music: 1.3.2.B.5 Reading notations with repeat symbol on it.</p> <p>Examples: Students are writing a program with the same concept of using repeat while reading music and playing their instrument. While loop is the example when the students are asked to repeat a certain piece until the conductor says to break and continue after the repeat.</p>	

	Guiding / Topical Questions with Specific Standards	Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
9.3.IT-PRG.1, 8.2.12.E	How to avoid repeats of sentences?	Executing the same lines until the condition is satisfied.	Role play in showing how to use while loop.	www.codehs.com	Write a program using loop to ask for the user input to divide 2 numbers.
9.3.IT-PRG.1, 8.2.12.E	Why to use For loop instead of While loop?	For loop: The set of statements will be executed until the loop condition is satisfied.	Iterating through the steps to figure out how to write for loop with a condition.	www.codehs.com	Write a program to compute average test score. Using for loop in getting average score for 3 tests and compute average of the 3 scores.

9.3.IT-PRG.1, 8.2.12.E	How to break out of a loop?	Break: Using this keyword, the program is able to break out of the loop and go to the next set of sentences right after the loop. Continue: Without breaking, continue through the loop until the condition is satisfied	Showing errors in code that may run into an infinite loop. Brainstorm ways to avoid an infinite loop. Break and Continue are one such ways to avoid it if used right.	www.codehs.com	Write a program to ask the user to guess a number between 1 and 100, notify the user if the guess was too high or low. Break out of the loop when the user guesses the word right.
9.3.IT-PRG.1, 8.2.12.E	Can we use a loop with in a loop?	Learning how to create nested control structures.	Brainstorming in finding out under what instances you would use a nested loop. Model for students how to use the nested loops.	www.codehs.com	Write a program to print out all combinations that can be made when 2 dice are rolled.

Robbinsville Public Schools
Unit #: 5 Functions and Exceptions

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● Functions ● Namespaces ● Parameters ● Return Values ● Exceptions 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● What are functions and how to use them in Python? ● Can the variables declared and used in a function be used in another function? ● Can we pass a value of a variable to a function? ● Can we return a value back to the program from a function? ● Types of errors and how it can be handled in Python?
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Interdisciplinary Connection

Math: F-IF/F-BF: Functions

Example: Students will be writing functions in the program which has the similar connection to the Functions in Math. Parameters are the values of x and return value from the function is value of y.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
9.3.IT-PRG.1, 8.2.12.E	When and how do we use functions in Python? How are variables affected inside and outside of a function?	Functions: Understanding how to write a function (defining a function) and how to call a function Namespaces: Understanding the visibility of variables used inside and outside the function	Modeling the ways to write, define and call a function inside a Python program.	www.codehs.com	Write a program to get 2 numbers along with if they would like to add, sub or mul and call the function according to the input from user.
9.3.IT-PRG.1, 8.2.12.E	When calling a function how can we pass a parameter in to a function? (Parameters) How to pass a value from a function to the program? (Return a value)	Understanding how to pass a value (parameters) to a function from the program. Introducing to the concept of how to return a value back to the program from a function.	Showing students how the parameters are passed in to the function from the program. After that how can they return a value to the program from the function.	www.codehs.com	How can the above program be different if the parameters are passed in to the function and value can be returned in to function?

9.3.IT- PRG.1, 8.2.12.E	How can the errors be handled inside the program without it crashing?	Handling errors are the effective way to write a program.	Figuring out how many errors may be thrown by the program.	www.codehs.com	Write a program to divide 2 numbers. Also, handle errors that may occur (divide by zero error)
-------------------------------	-----------------------------------------------------------------------	-----------------------------------------------------------	------------------------------------------------------------	----------------------------------------------------	------------------------------------------------------------------------------------------------

Robbinsville Public Schools
Unit #: 6 Strings

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● Indexing and Slicing ● Math Operators on Strings ● For Loops over a String ● String Methods 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● How could Strings be handled differently? ● Does Math operators work on Strings? ● Can For-loop be used in Strings? ● What pre-defined String methods are available to use in the program?
<p>Interdisciplinary Connection</p> <p>HPE: 2.5.12.C.1. Analyze the role, responsibilities, and preparation of players, officials, trainers, and other participants and recommend strategies to improve their performance and behavior.</p> <p>Example: Students will be working in groups to achieve certain goals set by the teacher. They would have to take turns in working show good sportsmanship when another team finishes before them and work really well as a team together.</p>	

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
9.3.IT-PRG.1, 8.2.12.E	Can we use information from a String and alter them in many ways?	Slicing and Indexing of a String Variable.	Making posters in a group to figure out where slicing can be used in a String variable. Introducing the techniques of slicing and indexing	www.codehs.com	Write a program to slice the given word and concatenate the sliced words in to a new word.
9.3.IT-PRG.1, 8.2.12.E	Can we replace particular character of the given String? What is Immutability?	Understanding some restrictions in using the String variable. (Immutability)	Fixing a program with errors showing String's Immutability in the program.	www.codehs.com	Write a program to show different ways to change the value of a String with understanding Immutability

9.3.IT-PRG.1, 8.2.12.E	How can we navigate through a String? How will FOR loop be used in doing that?	Replacing a single character in a String with another character. Removing a particular character or word in a sentence.	Writing pseudo code to walk through a String using For loop. Students will iterate through the program to figure out how the loop helps in doing that.	www.codehs.com	Write a program to find a vowel in a sentence provided by the user.
9.3.IT-PRG.1, 8.2.12.E	What are String Methods? How do they benefit the user in writing a program?	Upper / lower / swapcase/ strip/ find	Figuring out the practical uses of String and finding out if there is a Method that exists to be used with a String	www.codehs.com	Write a program to remove all the characters that appear in the given String

Robbinsville Public Schools
Unit #: 7 Tuples and Lists

<p>Enduring Understandings:</p> <ul style="list-style-type: none"> ● Tuples ● Lists ● For loops and Lists ● List Methods 	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● How can we use single variable to store more values? ● What are the ways to access lists / Tuples? ● What are the differences between Lists and Tuples?
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Interdisciplinary Connection

N -VM - Vector and Matrix Quantities.

Example: Students will be using the knowledge of matrix in creating lists and tuples. Students will be extending their knowledge in using lists with String and other types of variables.

Guiding / Topical Questions with Specific Standards		Content, Themes, Concepts, and Skills	Teaching Strategies	Instructional Resources and Materials	Assessment Strategies
9.3.IT-PRG.1, 8.2.12.E	How are Tuples same as String? Are they immutable like Strings?	Knowing how to create Tuples and storing values in them. Accessing the values stored in Tuples.	Demonstrating Tuples using pill organizer. Students will use hands on in understanding indices in using Tuples.	www.codehs.com	Write a program to find the distance between 2 points.
9.3.IT-PRG.1, 8.2.12.E	If tuples are immutable, how lists are used instead of tuples?	Creating / accessing / printing from lists	Demonstrating Lists using pill organizer. Modeling in writing program using lists	www.codehs.com	Write a program to convert String to Lists.

9.3.IT-PRG.1, 8.2.12.E	What is the efficient way to access every single value in a list?	Using FOR loop in accessing lists	Iterating through FOR loop in understanding how the program will work in accessing values of list.	www.codehs.com	Write a program to get user input in changing one character of the string until -1 is entered.
9.3.IT-PRG.1, 8.2.12.E	Just like String methods, which methods are available for lists?	Methods: append, index, sort, reverse, extend, count, remove	Brainstorming through ideas that students may be able to use with lists.	www.codehs.com	Write a program to print the lists of last names from all the names user entered.

Final Project: Project Hangman: The final program, students will create in this project, will pick a random word from a list of words. It will allow the user to guess letters in the word, one at a time. When the user guesses a letter, the program will reveal where that letter appears in the word. If the user guesses all the letters in the word, they win! However, if they make ten incorrect guesses before this happens, they lose.

General Differentiated Instruction Strategies

<ul style="list-style-type: none"> ● Leveled texts ● Chunking texts ● Choice board ● Socratic Seminar ● Tiered Instruction ● Small group instruction ● Guided Reading ● Sentence starters/frames ● Writing scaffolds ● Tangible items/pictures ● Adjust length of assignment 	<ul style="list-style-type: none"> ● Repeat, reword directions ● Brain breaks and movement breaks ● Brief and concrete directions ● Checklists for tasks ● Graphic organizers ● Assistive technology (spell check, voice to type) ● Study guides ● Tiered learning stations ● Tiered questioning ● Data-driven student partnerships ● Extra time
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Possible Additional Strategies for Special Education Students, 504 Students, At-Risk Students, and English Language Learners (ELLs)

Time/General	Processing	Comprehension	Recall
<ul style="list-style-type: none"> ● Extra time for assigned tasks ● Adjust length of assignment 	<ul style="list-style-type: none"> ● Extra Response time ● Have students verbalize steps ● Repeat, clarify or reword 	<ul style="list-style-type: none"> ● Precise step-by-step directions ● Short manageable tasks ● Brief and concrete 	<ul style="list-style-type: none"> ● Teacher-made checklist ● Use visual graphic organizers ● Reference resources to

<ul style="list-style-type: none"> ● Timeline with due dates for reports and projects ● Communication system between home and school ● Provide lecture notes/outline 	<p>directions</p> <ul style="list-style-type: none"> ● Mini-breaks between tasks ● Provide a warning for transitions ● Reading partners 	<p>directions</p> <ul style="list-style-type: none"> ● Provide immediate feedback ● Small group instruction ● Emphasize multi-sensory learning 	<p>promote independence</p> <ul style="list-style-type: none"> ● Visual and verbal reminders ● Graphic organizers
Assistive Technology	Assessments and Grading	Behavior/Attention	Organization
<ul style="list-style-type: none"> ● Computer/whiteboard ● Tape recorder ● Spell-checker ● Audio-taped books 	<ul style="list-style-type: none"> ● Extended time ● Study guides ● Shortened tests ● Read directions aloud 	<ul style="list-style-type: none"> ● Consistent daily structured routine ● Simple and clear classroom rules ● Frequent feedback 	<ul style="list-style-type: none"> ● Individual daily planner ● Display a written agenda ● Note-taking assistance ● Color code materials

Enrichment

The goal of Enrichment is to provide learners with the opportunity to participate in extension activities that are differentiated and enhance the curriculum. All enrichment decisions will be based upon individual student needs.

- Show a high degree of intellectual, creative and/or artistic ability and demonstrate this ability in multiple ways.
- Pose questions and exhibit sincere curiosity about principles and how things work.
- The ability to grasp concepts and make real world and cross-curricular connections.
- Generate theories and hypotheses and pursue methods of inquiry.
- Produce products that express insight, creativity, and excellence.
- Possess exceptional leadership skills.
- Evaluate vocabulary
- Elevate Text Complexity
- Inquiry based assignments and projects
- Independent student options
- Tiered/Multi-level activities
- Purposeful Learning Center
- Open-ended activities and projects

- Form and build on learning communities
- Providing pupils with experiences outside the 'regular' curriculum
- Altering the pace the student uses to cover regular curriculum in order to explore topics of interest in greater depth/breadth within their own grade level
- A higher quality of work than the norm for the given age group.
- The promotion of a higher level of thinking and making connections.
- The inclusion of additional subject areas and/or activities (cross-curricular).
- Using supplementary materials in addition to the normal range of resources.

English Language Learner (ELL) Resources

- Learning style quiz for students- <http://www.educationplanner.org/students/self-assessments/learning-styles-quiz.shtml>
- "Word clouds" from text that you provide-<http://www.wordle.net/>
- Bilingual website for students, parents and educators: <http://www.colorincolorado.org/>
- Learn a language for FREE-www.Duolingo.com
- Time on task for students-<http://www.online-stopwatch.com/>
- Differentiation activities for students based on their Lexile-www.Mobymax.com
- WIDA-<http://www.wida.us/>
- Everything ESL - <http://www.everythingESL.net>
- ELL Tool Box Suggestion Site<http://www.wallwisher.com/wall/elltoolbox>
- Hope4Education - <http://www.hope4education.com>
- Learning the Language <http://blogs.edweek.org/edweek/learning-the-language/>
- FLENJ (Foreign Language Educators of NJ) 'E-Verse' wiki: <http://www.flenj.org/Publications/?page=135>
- OELA - <http://www.ed.gov/offices/OBEMLA>
- New Jersey Department of Education- Bilingual Education information <http://www.state.nj.us/education/bilingual/>

Special Education Resources

- Animoto -Animoto provides tools for making videos by using animation to pull together a series of images and combining with audio. Animoto videos or presentations are easy to publish and share. <https://animoto.com>
- Bookbuilder -Use this site to create, share, publish, and read digital books that engage and support diverse learners according to their

individual needs, interests, and skills. <http://bookbuilder.cast.org/>

- CAST -CAST is a non-profit research and development organization dedicated to Universal Design for Learning (UDL). UDL research demonstrates that the challenge of diversity can and must be met by making curriculum flexible and responsive to learner differences. <http://www.cast.org>
- CoSketch -CoSketch is a multi-user online whiteboard designed to give you the ability to quickly visualize and share your ideas as images. <http://www.cosketch.com/>
- Crayon -The Crayon.net site offers an electronic template for students to create their own newspapers. The site allows you to bring multiple sources together, thus creating an individualized and customized newspaper. <http://crayon.net/> Education Oasis -Education Oasis offers a collection of graphic organizers to help students organize and retain knowledge – cause and effect, character and story, compare and contrast, and more! <http://www.educationoasis.com/printables/graphic-organizers/>
- Edutopia -A comprehensive website and online community that increases knowledge, sharing, and adoption of what works in K-12 education. We emphasize core strategies: project-based learning, comprehensive assessment, integrated studies, social and emotional learning, educational leadership and teacher development, and technology integration. <http://www.edutopia.org/>
- Glogster -Glogster allows you to create "interactive posters" to communicate ideas. Students can embedded media links, sound, and video, and then share their posters with friends. <http://edu.glogster.com/?ref=personal>
- Interactives – Elements of a Story -This interactive breaks down the important elements of a story. Students go through the series of steps for constructing a story including: Setting, Characters, Sequence, Exposition, Conflict, Climax, and Resolution. <http://www.learner.org/interactives/story/index.html>
- National Writing Project (NWP) -Unique in breadth and scale, the NWP is a network of sites anchored at colleges and universities and serving teachers across disciplines and at all levels, early childhood through university. We provide professional development, develop resources, generate research, and act on knowledge to improve the teaching of writing and learning in schools and communities. <http://www.nwp.org>
- Pacecar -Vocab Ahead offers videos that give an active demonstration of vocabulary with audio repeating the pronunciation, definition, various uses, and synonyms. Students can also go through flash cards which give a written definition and visual representation of the word. <http://pacecar.missingmethod.com/>