Business &
Computer Science

Brunswick School Department
Computer Programming with Python
Lists and Dictionaries

Essential Understandings	▪ Python makes using lists and dictionaries easier and versatile using pickle and shelf. ▪ Most computer software has the need to manipulate words and strings in useful ways; Python has a variety of special tools to make this easier. ▪ The same structures and algorithms that make simple computer games possible also have a wide array of uses in applied math, science, and education.
Essential Questions	▪ What is different (or better) about using lists to organize and retrieve information? ▪ Why can more complex information be represented because of this tool (lists or arrays, nested sequences)? ▪ What are the possible applications or practical uses the dictionary structure in Python makes available?
Essential Knowledge	▪ When combined with a good plan or blueprint (pseudocode), well named variables and comments, decision and branching structures, lists in Python can be used to create many useful and practical applications more easily. ▪ Store strings in text files with a .txt extension; pickle and shelve lists in a binary file with a .dat extension.
Vocabulary	▪ <u>Terms</u>: o list (or array), index, slice, append, sort
Essential Skills	▪ Create, index and slice a list (or array). ▪ Add and delete elements from a list. ▪ Append and sort a list. ▪ Use nested sequences to represent even more complex information. ▪ Use dictionaries to associate and work with data in pairs.

Related Maine Learning Results	Mathematics
	A. Number
	Real Number
	A1.Students will know how to represent and use real numbers.
	    a. Use the concept of nth root.
	    b. Estimate the value(s) of roots and use technology to approximate them.
	    c. Compute using laws of exponents.
	    d. Multiply and divide numbers expressed in scientific notation.
	    e. Understand that some quadratic equations do not have real solutions and that there exist other number systems to allow for solutions to these equations.
	D. Algebra
	Functions and Relations
	D4.Students understand and interpret the characteristics of functions using graphs, tables, and algebraic techniques.
	    a. Recognize the graphs and sketch graphs of the basic functions.
	    b. Apply functions from these families to problem situations.
	    c. Use concepts such as domain, range, zeros, intercepts, and maximum and minimum values.
	    d. Use the concepts of average rate of change (table of values) and increasing and decreasing over intervals, and use these characteristics to compare functions.

Sample Lessons And Activities	▪ *Hero's Inventory* program uses lists rather than Tuples to store the assortment of treasures and weapons carried by the Hero.
Sample Classroom Assessment Methods	▪ *High Scores program* ▪ *Hangman Game*
Sample Resources	▪ Publications: o Python Programming for the Absolute Beginner – Michael Dawson