Business & Computer Science

Brunswick School Department
Computer Programming with Python
Branching While Loops

Essential Understandings	▪ Computers can be made to simulate the decision making processes of humans using special looping and branching structures. ▪ Since computers only appear to think, the programmer must fully understand the possible choices and the outcomes of each choice. ▪ Games that play against humans are well thought out and involve a series of decision and conditional structures programmers have designed and tested. ▪ Thousands of hours of planning and testing have gone into successful software and computer games one takes for granted.
Essential Questions	▪ Can pseudo code become a blueprint for thoughtful and elegant program design? ▪ How do computers use branching and conditional structures to simulate human decision making?
Essential Knowledge	▪ Python uses *if* statements to execute code based on a condition. ▪ Python uses an *else* clause to make an alternate choice. ▪ Python uses *elif* clauses to make a choice among several possible conditions. ▪ Python uses *while* loops to repeat portions of programs. ▪ One can plan a program by using pseudocode as a blueprint.
Vocabulary	▪ <u>Terms</u>: o if, else, elif, while, randint(), randrange
Essential Skills	▪ Write an *if* statement that only executes if a condition is met. ▪ Write an *if…then….else* statement that can choose among two conditions. ▪ Write multiple if….elif…else statements that choose among multiple conditions.

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
	   D5.Students express relationships recursively and use iterative methods to solve problems.
	      a. Express the (n+1)st term in terms of the nth term and describe relationships in terms of starting point and rule followed to transform one terms to the next.
	      b. Use technology to perform repeated calculations to develop solutions to real life problems involving linear, exponential, and other patterns of change.

Sample Lessons And Activities	▪ *Craps Roller game* simulates rolling dice and random number generation used in many card games and games of chance. ▪ *Guess My Number game* correctly guesses a number between 1 and 100 in a given number of guesses to win.
Sample Classroom Assessment Methods	▪ 80 Point quiz on Guess_My_Number program ▪ Quiz on Fortune_Cookie program
Sample Resources	▪ Publications: o Python Programming for the Absolute Beginner – Michael Dawson