Grade 8 – Unit 2 – Introduction to Python Programming

Madison Public Schools

Unit Focus

Python is one of the most popular computer programming languages in the world. It was first released in the 1990's and is now used to build millions of apps, games, and websites. Python is a great language for getting started with text-based computer programming. Many schools and universities use it to teach coding. Here are some of the reasons that Python's so useful.

- Easy to read and write
- Works everywhere
- Comes with everything needed to start coding right away
- Packed with lots of useful tools and pre-programmed code (Standard Library)

Problem solving is a necessary skill when working in any computer programming language. Students will be expected to expand their troubleshooting capabilities throughout this unit. All activities are designed to further encourage problem solving skills.

Students will see similarities between Python and previously taught concepts in Scratch. A culminating PBA will have the students create a computer program that relies on variable user input to draw a customized graphic.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer
Connecticut Goals and Standards *Computer Information Systems: 8* • Apply design principles to programming tasks. *CIS.6.1.I.2* • Test, debug, and document code. *CIS.6.1.I.3*	**T1** Develop a product/solution that adheres to key parameters (e.g., cost, timeline, restrictions, available resources and audience). **T2** Explore and hone techniques, skills, methods, and processes to create and innovate.

CSTA: Computer Science Standards (2017-)
CSTA: 6-8
- Create clearly named variables that represent different data types and perform operations on their values. *2-AP-11*
- Create procedures with parameters to organize code and make it easier to reuse. *2-AP-14*
- Incorporate existing code, media, and libraries into original programs, and give attribution. *2-AP-16*
- Document programs in order to make them easier

Meaning

Understanding(s)	Essential Question(s)
U1 Programming languages, such as Python, are very user-friendly and useful in allowing programmers and end-users to complete tasks, yet they are confining and leave no margin for error. **U2** Programmers debug and revise their programs to improve the stability of the program and end user experience. **U3** Textual code allows programmers to design more sophisticated programs and customize them without limits.	**Q1** How does one use computer programming (coding) to complete a task? **Q2** How do I troubleshoot why my code is not working as intended? **Q3** What kind of applications calls for programming with textual code instead of block code?

Stage 1: Desired Results - Key Understandings

to follow, test, and debug. *2-AP-19* **ITEEA - Standards for Technological Literacy** *Technological Literacy: K-12* • Students will develop the abilities to use and maintain technological products and systems. *12* • Students will develop an understanding of and be able to select and use information and communication technologies. *17* **Student Growth and Development 21st Century Capacities Matrix** *Critical Thinking* • Synthesizing: Students will be able to thoughtfully combine information/data/evidence, concepts, texts, and disciplines to draw conclusions, create solutions, and/or verify generalizations for a given purpose. *MM.1.3* *Collaboration/Communication* • Product Creation: Students will be able to effectively use a medium to communicate important information (findings, ideas, feelings, issues, etc.) for a given purpose. *MM.3.2* *Self-Direction* • Reflection: Students will be able to analyze their performance to evaluate progress toward learning goals in order to determine next step(s). *MM.4.1*	**U4** Programming uses logic to turn programming constructs into a language a computer can interpret and apply.	

Acquisition of Knowledge and Skill

Knowledge	Skill(s)
K1 The difference between textual coding vs. block coding. **K2** The differences between the two main windows (Shell and Editor). **K3** Vocabulary: Print command, function, modules, syntax, input variables, string, loops, logic, comment, if statements, operator, conditional statements **K4** Branching is a conditional statement that controls the flow of execution depending on some condition using keywords such as if, elif, and else. **K5** The sequential flow process of a Python program. **K6** Python comments are a method for programmers to annotate their code	**S1** Open the Python software, save a Python file with a .py extension, and run a Python module. **S2** Demonstrate troubleshooting techniques within the process of finding and removing syntax errors within Python code **S3** Identify and correctly use the print command **S4** Utilize various types of variables within a program's code - predefined & input. **S5** Write functional lines of code following the syntax of the software. **S6** Follow a program's logic by closely reading and analyzing the program.