Unit A: Intro to Python Programming

Content Area: **CTE**
Course(s): **Prog. in Python with Alice**
Time Period: **September**
Length: **3**
Status: **Published**

Unit Overview:

- In this unit, Students will learn what Python is and how to do basic output using the Python IDE.
- Students will also learn the IDE environment and how to save programs.
- Students will learn how to declare and store information in variables.
- Students will learn how to use variables in basic output and calculations.

Enduring Understandings:

- Understanding that there are many different types of programming languages and that each was developed for specific reasons.
- A variable's scope indicates which procedure can use the variable
- all data stored in a computer is numerically.
- Commenting code is a necessary part of programming.
- Comments are internal documentation
- Creating a specific and accurate algorithms can save time when a programmer starts the coding of a program.
- Data is stored in memory locations called variables
- Learning how to print text on the screen is a basic and important aspect of programming
- Operators are symbols that perform specific operations.
- Python allows you to use mathematical equations.
- Python supports a set of data types.
- Python uses order of operations for mathematical operations.
- Understanding and learning the basics of the Python IDE.

Essential Questions:

- Describe the order of operations.
- Describe the purpose of operators and how calculations are performed in python?
- How are the different mathematical operators used in Python?
- How are variables declared and used?
- How do you use Python's IDE to write, edit, run and save your program?
- How to print text to the screen?
- What are comments and how do you use them in a program?
- What are some of the different ways that computer ethics can be broken?

- What are the data types supported and what type of data can each hold?
- What criteria should a programmer choose from one programming language over another?
- What is a data type?
- What is a variable?
- What is integer division and modulus? and how are they used in a program??
- What is the purpose of comments in programs?

Standards/Indicators/Student Learning Objectives (SLOs):

- SWBAT: Learni how to print text on the screen is a basic and important aspect of programming
- SWBAT: Understanding and learning the basics of the Python IDE.
- SWBAT: When to use the different operators to perform specific operations.

9.3.12.AC-DES.7	Employ appropriate representational media to communicate concepts and project design.
9.3.12.AC-DES.8	Apply standards, applications and restrictions pertaining to the selection and use of construction materials, components and assemblies in the project design.
ITEC.9-12.9.4.12.K.(4).9	Perform maintenance and customer support functions to maintain software applications.
ITEC.9-12.9.4.12.K.(4).10	Develop and maintain a database to store information.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.2.12.A	The Nature of Technology: Creativity and Innovation: Technology systems impact every aspect of the world in which we live.
TECH.8.2.12.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
TECH.8.2.12.C	Design: The design process is a systematic approach to solving problems.
TECH.8.2.12.D	Abilities for a Technological World: The designed world is the product of a design process that provides the means to convert resources into products and systems.
TECH.8.2.12.E	Computational Thinking: Programming: Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.

Lesson Titles:

- Lesson: Input and Output
- Lesson: Python IDE
- HW: Simple Algorithms

- Lesson: Algorithms and Psuedocodes
- Lesson: Computer Ethics
- Lesson: Computer Systems
- Lesson: History of Programming
- Lesson: Programming Languages
- Lesson: Variables & Data Types
- Lessons: Order of Operations
- Program: ASCII Art
- Program: Class Schedule
- Program: Hello World
- Program: Order of Operations

Career Readiness, Life Literacies, & Key Skills

12.9.3.IT-PRG.1	Analyze customer software needs and requirements.
12.9.3.IT-PRG.2	Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
12.9.3.IT-PRG.3	Analyze system and software requirements to ensure maximum operating efficiency.
12.9.3.IT-PRG.4	Demonstrate the effective use of software development tools to develop software applications.
12.9.3.IT-PRG.5	Apply an appropriate software development process to design a software application.
12.9.3.IT-PRG.6	Program a computer application using the appropriate programming language.
12.9.3.IT-PRG.7	Demonstrate software testing procedures to ensure quality products.
12.9.3.IT-PRG.8	Perform quality assurance tasks as part of the software development cycle.
12.9.3.IT-PRG.9	Perform software maintenance and customer support functions.
12.9.3.IT-PRG.10	Design, create and maintain a database.
TECH.9.4.12.CI	Creativity and Innovation
TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.CI.2	Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).
TECH.9.4.12.CI.3	Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
TECH.9.4.12.CT	Critical Thinking and Problem-solving
	Innovative ideas or innovation can lead to career opportunities.
	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
	With a growth mindset, failure is an important part of success.

Inter-Disciplinary Connections:

- Art
- English
- History
- Math
- Music
- Science

MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MA.A-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
LA.RST.11-12	Reading Science and Technical Subjects
LA.WHST.11-12	Writing History, Science and Technical Subjects
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
SOC.9-12.1.1	Chronological Thinking
SOC.9-12.1.3	Critical Thinking
VPA.1.3.12.D	Visual Art

Equity Considerations

Holocaust Mandate

Topic: How women are also influential in computer programming

Materials Used: https://www.computerscience.org/resources/most-influential-women-computer-science/

Addresses the Following Component of the Mandate:

- Bias
- Bigotry
- Bullying
- Holocaust Studies
- Prejudice

LGBTQ and Disabilities Mandate

Topic: How Coding analyzes LGBT families in America

Materials Used: http://pfch.nyc/python_and_the_queer/index.html

Addresses the Following Component of the Mandate:

- Economic
- Political
- Social

Climate Change

Topic: How Python Coding helps visualize Climate Change

Materials Used: https://towardsdatascience.com/visualizing-climate-change-data-with-python-74ea5bac8756

Addresses the Following Component of the Mandate:

- Economic
- Political
- Social

Asian American Pacific Islander Mandate

Topic: Bias against AAPI in computer careers

Materials Used: https://slate.com/technology/2014/01/programmer-privilege-as-an-asian-male-computer-science-major-everyone-gave-me-the-benefit-of-the-doubt.html

Addresses the Following Component of the Mandate:

- Economic

- Political
- Social

Amistad

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK:

- IS: Extra Time to complete Programs
- IS: NHS Assistance and Tutoring
- IS: One on One tutoring during Delsea One
- Lesson: Algorithms and Psuedocodes
- Lesson: History of Programming
- Lesson: Input and Output
- Lesson: Python IDE
- Lesson: Variables & Data Types
- Lessons: Order of Operations
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Modifications

ELL Modifications:

- Choice of test format (multiple-choice, essay, true-false)
- Continue practicing vocabulary
- Provide study guides prior to tests
- Read directions to the student
- Read test passages aloud (for comprehension assessment)
- Vary test formats

IEP & 504 Modifications:

- Allow for redos/retakes

- Assign fewer problems at one time (e.g., assign only odds or evens)
- Differentiated center-based small group instruction
- Extra time on assessments
- Highlight key directions
- If a manipulative is used during instruction, allow its use on a test
- Opportunities for cooperative partner work
- Provide reteach pages if necessary
- Provide several ways to solve a problem if possible
- Provide visual aids and anchor charts
- Test in alternative site
- Tiered lessons and assignments
- Use of a graphic organizer
- Use of concrete materials and objects (manipulatives)
- Use of word processor

G&T Modifications:

- Alternate assignments/enrichment assignments
- Enrichment projects
- Extension activities
- Higher-level cooperative learning activities
- Pairing direct instruction with coaching to promote self-directed learning
- Provide higher-order questioning and discussion opportunities
- Provide texts at a higher reading level
- Tiered assignments
- Tiered centers

- Jigsaw

At Risk Modifications

- Additional time for assignments
- Adjusted assignment timelines
- Agenda book and checklists
- Answers to be dictated
- Assistance in maintaining uncluttered space
- Books on tape
- Concrete examples
- Extra visual and verbal cues and prompts
- Follow a routine/schedule
- Graphic organizers

- Have students restate information
- No penalty for spelling errors or sloppy handwriting
- Peer or scribe note-taking
- Personalized examples
- Preferential seating
- Provision of notes or outlines
- Reduction of distractions
- Review of directions
- Review sessions
- Space for movement or breaks
- Support auditory presentations with visuals
- Teach time management skills
- Use of a study carrel
- Use of mnemonics
- Varied reinforcement procedures
- Work in progress check

Formative Assessment:

- Anticipatory Set
- Closure
- Warm-Up

Summative Assessment:

- Alternate Assessment
- Benchmark
- Group Programs
- Large Programs
- Marking Period Assessment
- Quiz: Algorithms
- Quiz: History of Computers
- Small Programs
- Test: Input, Output, Variables

Alternative Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Reflective pieces

Concept maps

Case-based scenarios

Portfolios

Benchmark Assessments

Skills-based assessment

Reading response

Writing prompt

Lab practical

Resources & Materials:

- Computer Lab
- Michael Dawson, Python Programming Third Edition, 2010, Course Technology: Cengage Learning
- Microsoft Visual Studios
- Powerpoint Presentation
- Python Idle
- Screen Sharing Software
- Various Websites

Technology:

- Adobe PhotoShop
- Google Classroom
- Microsoft Visual Studios

- Pygame Gaming Library
- Python Idle
- Screen Sharing Software
- Various Websites: classroom.google.com; classdojo.com; repl.it

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TECH.8.1.12.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.2.12	Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
TECH.8.2.12.B	Technology and Society: Knowledge and understanding of human, cultural and society values are fundamental when designing technology systems and products in the global society.
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