(http://csmatters.org/pd-new)   P - 01

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Introduction to Python

Unit Programming

Revision Date: Nov 07, 2017
Duration: 120 50-minute sessions

Lesson Summary

Summary: Teachers consider and discuss the importance of learning programming, how to teach it, and how to learn it. Then, they pair program to both learn the value of this technique and to complete introductory Python programs.

Outcomes:

Teachers will:

- learn the significance of computer programming in today's world.
- discuss different ways for teaching and learning programming.
- discuss the usage of the Python language over other programming languages.
- set up computers for programming Python in either an IDE or the command line.
- create a basic program in Python using the turtle library.

Overview:

Estimated Time: 135 minutes with a 15 minute break halfway through

1. Why Teach Programming? (60 minutes)
2. Break (15 minutes)
3. Setting up Python and Beginning Programming (60 minutes)

Learning Objectives

CSP Objectives

Big Idea - Professional development includes learning experiences and resources to ensure that teachers understand how the subject(s) they teach addresses the Maryland content standards and the relationships between the subjects they teach and other subjects in the curriculum.

- - ○ LO 1a - Professional development includes learning experiences and resources to ensure that teachers understand how the subject(s) they teach addresses the Maryland content standards and the relationships between the subjects they teach and other subjects in the curriculum.

Big Idea - Professional development provides ongoing opportunities for teachers to examine a variety of classroom assessments, practice using them in their classrooms, and analyze the results to (1) understand and report on student mastery of Maryland content standards.

- - ○ LO 1c - Professional development provides ongoing opportunities for teachers to examine a variety of classroom assessments, practice using them in their classrooms, and analyze the results to (1) understand and report on student mastery of Maryland content standards.

Big Idea - Professional development includes ongoing opportunities for teachers to read and reflect on current research on topics of interest to them and consistent with state and local school improvement priorities.

- - ○ LO 2a - Professional development includes ongoing opportunities for teachers to read and reflect on current research on topics of interest to them and consistent with state and local school improvement priorities.

Big Idea - Professional development provides ongoing opportunities for teachers to practice working with colleagues, including other teachers, principals, counselors, social workers, and others, and emphasizes that collaboration is a means and not an end in addressing issues related to school improvement and improved student learning.

- - ○ LO 3a - Professional development provides ongoing opportunities for teachers to practice working with colleagues, including other teachers, principals, counselors, social workers, and others, and emphasizes that collaboration is a means and not an end in addressing issues related to school improvement and improved student learning.

Big Idea - Professional development focuses on developing teachers' understanding of and disposition to acknowledge the diversity of student learning styles and needs.

- - ○ LO 4a - Professional development focuses on developing teachers' understanding of and disposition to acknowledge the diversity of student learning styles and needs.

Big Idea - Professional development fosters a safe, inclusive, equitable learning community where teachers, administrators and students participate in maintaining a climate of caring and respect.

- - ○ LO 5a - Professional development fosters a safe, inclusive, equitable learning community where teachers, administrators and students participate in maintaining a climate of caring and respect.

Key Concepts

Teachers should understand:

- Some impacts of computer programming on the world.
- Some teaching strategies and learning strategies for programming.
- The importance of pair programming.
- The basic syntax of Python.

Teacher Resources

Student computer usage for this lesson is: **required**

PROG01_Introduction to Python Folder (https://drive.google.com/open?id=0B5vAY-fhOT-iam5yQ21kdXhVU3M)

Required materials:

- A whiteboard or piece of chart paper taped to the wall with the title "Success" written on it.
- Sticky notes for the Success list
- Journals (for each teacher)

Pycharm related issues (where could we include this resource?):

https://docs.google.com/document/d/14SiuWfLKEVjvmfEu309nvKUM5NHcaHPPOl8G8iK-fJ4/edit (https://docs.google.com/document/d/14SiuWfLKEVjvmfEu309nvKUM5NHcaHPPOl8G8iK-fJ4/edit)

Lesson Plan

Note: For this lesson teachers will all need laptops/computers. They should be in pairs or small groups.

Part 1: Why teach programming? (60 minutes)

Materials: The PowerPoint "Intro to Python"

Start the lesson by BRIEFLY going over the highlights of the previous session. Namely:

- The importance of journaling/taking notes
- How to use the parking lot
- The roles of teacher vs. student (teachers will need to be able to pretend to be students for parts of the workshop)
- What is Runestone and how teachers should be using it to prepare for the course

For this lesson, teachers will need to bring up the powerpoint on their computers to make use of the resources provided. The instructor will introduce a new question/topic each slide, and the teachers will:

- Investigate resources and report back to each other.
- Record any important information/advice/questions/tips in their journal.
- Place any off-topic questions in the parking lot

Break (15 min)

Part 2: Setting up Python and begin programming (60 minutes)

Materials: The same PowerPoint

Teachers should spend some time setting up their computers for Python, if they have not already. It is recommended that they download PyCharm (free online from JetBrains). If they do not have Python 3 on their computer (most do) they can download it from Anaconda (https://www.continuum.io/downloads).

After some additional discussion of programming, teachers will create a simple python program. Teachers should record:

- Any possible points of confusion for students
- Tips for teaching programming
- Resources they plan to look into

Possible discussion points:

- The internet as a resource for coding: Good or Bad? The problem of plagiarism.
- Making intentional coding mistakes on the board for students to pick up on (or unintentional)

Journal: At the end of the lesson, teachers should answer in their journals: How could paired programing contribute/detract to the learning process?

Evidence of Learning

Formative Assessment

Teachers will discuss various teaching tips and techniques, in addition to different programming languages and their advantages or disadvantages.

Summative Assessment

Teachers will create a simple program demonstrating basic Python understanding. It should be noted and explained that there are two versions of Python available today: 3.6 (as of July, 2017) and 2.7, which each have slightly different syntax. For consistency, make sure that all teachers are running the newer version of Python.

 (http://www.umbc.edu/) (http://www.umd.edu/)

(http://www.nsf.gov/)

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