AERO WEB

PYTHON COURSE
LESSON PLAN 2

TITTLE: Variables Introduction

DURATION: 60 Mins

CC STANDARDS: CCSS.ELA-LITERACY.RST.6-8.3, CCSS.ELA-LITERACY.RST.9-10.3, CCSS.ELA-LITERACY.RST.6-8, 9-10, 11-12. 4, CCSS.ELA-LITERACY.RST.9-10.5

MATERIALS: PowerPoint Presentation, Laptops (students can be grouped if not enough laptops are present), Internet, AeroWeb's Website

INTRODUCTION:

- Teacher reviews prior lesson that covered the introduction into Python by asking leading questions such as "What is a programming language? What does a programming language do? Can you name different programming languages?"
- Teacher introduces the topic and sets the learning goals which are:
    - Learn what are variables
    - Learn how to declare variables in Python
    - Learn the sentence structure of Python
    - Learn How to assign a value to a variable
- Teacher reminds the class of the opportunities, knowing how to use Python can bring the students and showcases a technology, product, program, or accomplishment that was done using Python. (AeroWeb recommends selecting a project from this list https://www.python.org/about/success/ that suits your class the best.)

LESSON PART 1:

- Teacher introduces the concept of a variable and asks the students what they think a variable is.
- Teachers shows that a variable is a reference to a memory location in the computer. In a way, how a hashtag or a tag would work.
- The students are asked what they think a variable can be, encouraging participation and deduction from what they have learned thus far.

- Students are taught that a variable can be many different things such as a name, number, sequence, lists, among others.
- Students are shown that a variable is an object of reference
- Teacher asks the students what they think an object of reference is once again encouraging deduction and analytical reasoning.

- After discussion, the teachers tell the students that an object of reference is basically data such as: numbers, strings, lists, dictionaries, etc.
- Teacher runs over an example of how objects of references are used with YouTube videos. “For example, when you search on YouTube, let’s say you want a Pewdiepie video and you write “Pewdiepie” on the search bar, this action will reference multiple existing objects of reference that were created before. It investigates the title, author, tags, description, among others that have an object of reference that matches what you searched, “Pewdiepie.”
- After the example, the teacher introduces the syntax commonly used in Python and how that is used to declare a variable.
- Then the teacher uses an example and walks the students on how that syntax is used by using:
  “X=10
  print(x)”
  Making sure the teacher explains that in this example, the variable was declared and given a value. After this was created, then Python can begin using commands or keywords such as “print” to refer back to the object of reference and use it.
- Teacher explains how the “=” operator is used in that syntax and how it is used for declaring a variable.
- Next, the teacher explains the two different cases that you can have when declaring a variable.
  1. The variable does not exist, and they are creating it for the first time.
  2. The variable was declared before, but you are giving it a new value.
- The teacher uses case #1 and #2 and ask the students what they think the result would be using what they learned previously about declaring values.

LESSON PART 2:

- The teacher opens the class to a group discussion as the students see how they can use variables and commands to move a turtle to create shapes.

- Teacher runs an example and shows how the pre-existing code that comes with Turtle has declared the variables.
- Teacher shows how they can change these variables and values by changing the turtle's name and purposefully not changing the rest of the code to refer back to the correct object of reference.
- Teacher asks the students what happened? If they have a hard time, the teacher asks a leading question such as "Could I have forgotten something?"
- Once the students point out the mistake, the teacher proceeds to correct it and move to an example by having the students help the teacher draw a square shape using turtle.
- During this example, the teacher asks the students what can be done next, making sure they understand that when giving the turtle any commands they must give it from the perspective of the turtle. For example, making sure they understand that if they want the turtle to turn completely to the left, they need to tell the program to turn the turtle by 90 degrees and how a square has equal sides, using some geometric basic knowledge.
- Once the teacher finishes the group-led example, the students proceed to work on their own computers drawing the next shape, a rectangle, by themselves.
- Teacher walks around the room monitoring students.

CONCLUSION:

- At the end of the lesson, the teacher reviews what has been learned and what they accomplished.
- Asks students if there is something they did not understand, or they would like for the teacher to cover in the next class.
- Teacher moves the rocket up the path and reminds them they are getting closer to the first milestone, controlling an RC car with Python.
- Teacher concludes by giving them a challenge. To go to www.aeroweb.info/python/turtle and attempt to draw a pentagon or hexagon.