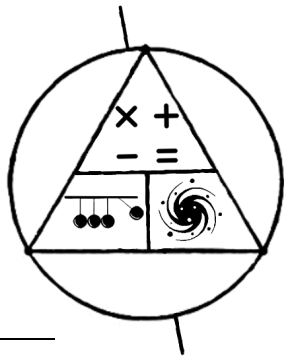
Python Coding

Lesson: Intro. to Python and Central Tendency
Time: 1-3 hours depending on st. level

Course: Grade 8
Teacher: Roger Wilkinson



Before class prep:

- ☐ Students should already be familiar with the concepts of central tendency: mean, median, mode, and range
- ☐ Ensure the code runs properly
- ☐ Share the link with students on Google classroom
- ☐ double check link works properly

Materials Needed:

- ☐ Students need electronic devices or book computer/lab time
- ☐ SMART board or white board
- ☐ projector

Learning Outcomes:

Students can;

- define variables including numbers, lists, equations, and strings
- write and execute basic code including FOR loops and conditional statements
- calculate mean, median, and range of a data set step by step or by using a function
- calculate the mode of a given data set using a function
- use information from their code to determine various properties of the data set concerning central tendency
- make informed judgements about the data using the mean, median, mode, and range including whether or not the data has outliers.

Specific Curriculum Expectations:

- C3.1 - solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves the analysis of data in order to inform and communicate decisions
- C3.2 - read and alter existing code involving the analysis of data in order to inform and communicate decisions, and describe how changes to the code affect the outcomes and the efficiency of the code

Activity	Time	Description
Getting Started	10 min	**Pre-teaching Vocabulary:** • Review the following terms on the white board: – Variable: number, equation, list, string – List: element, index ∗ You can explain the term 'index' using reference to the index in a textbook, which tells you where things are in the book – Function: input, output, pre-written piece of code, calling a function
Working On It	120 - 180 min	**Class Coding:** • Project the Colab file so that the class can see it while simultaneously having it open on their own computers. – Click HERE to go to the Colab Student Activity • Walk the student through the Introduction to Python section making reference back to the pre-taught terms and having students guess how to code certain steps. (Some students will show an intuitive grasp of which symbols to use for certain things like division.) • Much of how Python works is clear from how the activity is setup; however, you may still want to explicitly explain things like how Python reads the code line by line and how the # blocks out chunks of code. • The lesson is structured so that students can start to intuitively build off of the previous sections, but you should have a whiteboard handy to draw out what happens with FOR loops and conditional statements if needed. • In the mean section, the coding focus is FOR loops. • In the median and range sections, the coding focus is indexing. • In the mode section, the coding focus is importing functions from code packages. • Before beginning the final section to remove outliers, have a class discussion about whether or not they would work for the company based on the mean, median, mode, and range that they calculated. • The class should conclude that there are outliers in the data. You can then have students move on to the final section and try to remove the outliers using everything they have covered thus far.

Consolidating & Connecting	10 min	**<u>Consolidation:</u>** • Have class discussion about the Python coding environment. – What did students like? – What did they find difficult? easy? intuitive? – What else could they use Python for? • What other types of data could they analyze using Python?

Assessment Tools

- Live coding activities during lesson (formative)
- Observation (diagnostic)
- In class coding assignment (summative)
  - Click HERE to go to assignment on Colab

Homework

- Students will continue to have access to their code via Google Classroom, so they can review and alter their code at home.
- Teachers may also want to assign other various tasks to students building off of the code covered in this lesson.