Lesson Plan

Teacher's Name: **Lesson Title: Data Types and Mathematical Operations**

CSTA (Computer Science Teacher Association) Standards:
2-AP-13, 2-AP-17

What is the learning target:
Students will learn to differentiate between different types of data, and how to use each in their programs. They will understand how to perform mathematical operations in their code and how to display the results. Students will be introduced to string concatenation and multiplication.

What will the students be working on:
Students will work through a series of exercises in which they must display different types of data to the console using the Python print() function.

Common Errors And Their Solutions

- **Unexpected end of file (EOF) error or invalid syntax error:** Check that the value and any surrounding quotes are nested entirely within the parentheses of the print() function
- **Console displays numbers within equation instead of equation result:** Remove any quotation marks surrounding number values or equations, as this will cause them to be evaluated as strings. Quotes are not necessitated by use of a print statement; they are necessitated by use of a string.
- **TypeError:** You are most likely trying to combine two different data types or trying to use operands such as '-' and '/' with a string. Python cannot support these functionalities.

Probing Questions for Differentiation

Assessing Questions	**Advancing questions**
● Which of the four data types would best describe your name/age/height in meters/if you are wearing a gray shirt? ● What does the term 'data' refer to in the context of computer science? ● What would you expect the following code to do? print("3*2")	● What is an example of data that may need to update throughout the run of a program? ● Can you think of a program that uses the same value for multiple purposes or multiple times?

Planning Tasks	**What will the teacher be doing?**	**How will students be engaged?**
How will you communicate the lesson's standards/ objectives to	The teacher will begin class with an introduction to data. They will ask students where they have seen this	Students will reflect on where they have encountered the term 'data' and what it may mean. They will identify examples of

students and provide relevance?	word, what it means, and where data is encountered in both the real world and in familiar technology.	data from their lives and in the technology they use.
How will the lesson be iterative and incremental?	The teacher will begin by demonstrating how to display one value at a time from the different data types. They will then build on this fundamental concept by showing how to display mutltiple values, either by combining strings or creating equations.	Students will first practice displaying one value at a time. Once they have practiced working with the different data types they will learn to use print statements that combine multiple values.
What activities will you utilize to teach computational thinking and/or problem solving in this lesson?	Teacher can lead a round of 'guess the data type'. They will show various values and have students identify each one.	Students will examine different values and categorize them as strings, booleans, floats, or integers.
How will you provide differentiated materials, methods & student choice?	Teacher will encourage individual experimentation with the print statement. These explorations may include concatenation, the combination of different data types, and complex equations.	Students will conduct their own experiments in regard to printing various data types and their combinations.
How will you elicit student questions and reflection? How will your assessment be used to inform future instruction?	Teacher will ask students to make predictions about the output of various print statements. Teacher will instruct students to test their hypotheses by running the code.	Students will make predictions about the output of various print statements. After forming and discussing predictions, students will test their hypothesis by running the code.
How will the students see the big picture, and break it down into smaller tasks?	Teachers will lead up to showing complex print statements that combine multiple types of data, by first having students practice using one piece of data at a time.	Students will begin the lesson with exercises that allow them to understand how one piece of data is used. Once they have mastered each data type, they will move into combining them.