Lesson 1: Records and Dictionaries

In this lesson, students will learn about the record data structure and how to use dictionaries to represent records in Python. The lesson will begin with a discussion on the purpose of data structures and the importance of organizing data. Students will then be introduced to the concept of records and how they can store multiple pieces of related information together. They will also learn about dictionaries in Python and how they can be used to represent records. The lesson will include demonstrations on creating dictionaries, accessing and modifying their values, and nesting dictionaries within a list to create a simple database. Students will have the opportunity to practice creating and manipulating dictionaries and databases through guided exercises. Finally, students will be given an independent task to create their own database using dictionaries within a list, allowing them to apply their knowledge and skills. The lesson will conclude with an exit ticket to assess students' understanding of the material covered.

## **Objectives:**

- Students will be able to describe the record data structure.

- Students will be able to use a dictionary to represent a record in a program.

- Students will be able to use a dictionary with a list to represent records in a database.

## **Materials:**

- Computer with Python IDE installed

- Projector or whiteboard

- Handouts with code examples and exercises

## **Bell-Ringer Activity (5 minutes):**

- Display the following question on the board: "What is a data structure?"

- Give students a few minutes to write down their answers individually.

- Afterward, ask a few students to share their answers with the class.

## **Introduction (10 minutes):**

- Explain to students that in this lesson, they will be learning about two new data structures: records and dictionaries.

- Emphasize that records are used to store and organize data in a structured way.

- Explain that while Python does not have a built-in record data structure, dictionaries can be used to represent records.

- Inform students that they will be using dictionaries to create a "database" in Python.

## **Direct Instruction (20 minutes):**

- Define the record data structure as a way to store multiple pieces of related information together.

- Explain that a record can have different fields, each representing a specific piece of information.

- Show examples of records in real-life scenarios, such as a student record with fields like name, age, and grade.

- Introduce the concept of dictionaries in Python and explain that dictionaries can be used to represent records.

- Demonstrate how to create a dictionary and assign values to its fields.

- Show examples of accessing and modifying the values of dictionary fields.

- Explain that dictionaries can be nested within a list to represent multiple records in a database.

- Demonstrate how to create a list of dictionaries to form a simple database.

- Show examples of accessing and modifying the values of fields in the database.

## **Guided Practice (25 minutes):**

- Provide handouts with code examples and exercises for students to practice creating and manipulating dictionaries and databases.

- Walk around the classroom to assist students and answer any questions they may have.

- Encourage students to work in pairs or small groups to collaborate and solve the exercises together.

## **Independent Practice (20 minutes):**

- Assign a task for students to create their own database using dictionaries within a list.

- Provide a set of requirements for the database, such as fields for student names, ages, and grades.

- Instruct students to write code that allows them to add, remove, and modify records in the database.

- Encourage students to test their code with different scenarios and data.

## **Exit Ticket (5 minutes):**

- Distribute exit tickets to students.

- Ask students to write down one thing they learned about records and dictionaries in Python.

- Collect the exit tickets before the end of the class.

## **Closure (5 minutes):**

- Recap the main points of the lesson, emphasizing the use of dictionaries to represent records and databases in Python.

- Ask students if they have any questions or if there is anything they would like to review in the next class.

- Thank the students for their participation and effort in the lesson.

## **Common Core Standards:**

- CCSS.ELA-LITERACY.RST.9-10.3

- CCSS.ELA-LITERACY.RST.9-10.4

- CCSS.ELA-LITERACY.RST.9-10.5

- CCSS.ELA-LITERACY.RST.9-10.10