# Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# ***Activity 2: Dictionaries (Containers)***

Containers are objects that store other objects. For example, list stores a sequence of objects, and dict stores a mapping of objects to objects. Containers can also hold other containers, which makes it possible to represent any type (or shape) of data.

### **Content Learning Objectives**

*After completing this activity, students should be able to:*

* Demonstrate how to create a dictionary and get/set its items.
* Explain how rows and columns of data can be stored in lists.
* Write nested for loops to iterate data and compute functions.

### **Process Learning Objectives**

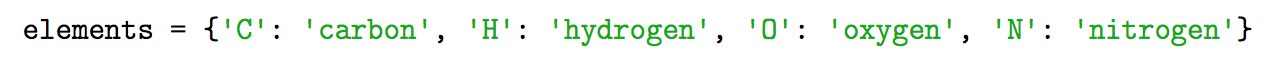
*After completing this activity, students should make progress toward:*

* Developing algorithms that loop through lists to compute a result. (Problem Solving)

## 

## ***Model 1 Dictionaries***

In Python, a **dictionary** stores ''key: value'' pairs. The pairs are separated by commas and sandwiched between curly braces. For example:

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|  |  |
| --- | --- |
| **Key** | **Value** |
| 'C' | 'carbon' |
| 'H' | 'hydrogen' |
| 'O' | 'oxygen' |
| 'N' | 'nitrogen' |

In contrast to sequence types, a dictionary is a **mapping** type. Values are referenced by **keys**, rather than by indexes.

|  |  |
| --- | --- |
| **Python code** | **Shell Output** |
| type(elements) | <class ‘dict’> |
| elements.keys() | dict\_keys( [‘C’, ‘H’, ‘O’ ‘N’] |
| elements.values() | dict\_values(['carbon', 'hydrogen', 'oxygen', 'nitrogen']) |
| elements['C'] | ‘carbon’ |
| atom = 'N' |  |
| elements[atom] | ‘nitrogen’ |
| elements[N] | Error N is not defined |
| elements['nitrogen'] | Key error |
| elements[1] | Key error 1 |
| len(elements) | 4 |
| elements['B'] = 'Boron' |  |
| elements.items() | dict\_items([('C', 'carbon'), ('H', 'hydrogen'), ('O', 'oxygen'), ('N', 'nitrogen'), ('B', 'Boron')]) |

|  |  |
| --- | --- |
| ***Questions (15 min)*** | start  time: |

1. List all the keys stored in the elements dictionary (after completing the table).

C, H, O, N, B

1. What is the data type of the keys in the elements dictionary?

Str

1. What is the name of the method that returns a list of values in a dictionary?

.values

1. Ignoring the ''dict\_items()'' part, describe both the contents and type of data returned by the items() method.

First is the (‘key’,’item’), (‘key2, item2), etc

1. Explain the reason for the error after entering each of the following lines:
   1. elements[N] the key Is a str value not N but ‘N’
   2. elements["nitrogen"] this isnt the key it’s the item

* 1. elements[1] one isnt a key for an item

1. Write a Python expression that creates a dictionary for the seven days of the week, i.e., Sun=1, Mon=2, Tue=3, etc. Assign the dictionary to the variable *dow*.

dow = {'Sun': '1', 'Mon': '2', 'tue': '3', 'wed': '4', 'thu': '5', 'fri': '6', 'sat': '7'}

1. Enter your code from #6 into a Python Shell, and then print your dow variable. Do the items display in the original order? What does this result tell you about dictionaries?

They do print in order they’re always as written

1. If you assign two different values to the same key (i.e., two assignment statements with one value each), which value is stored in the dictionary? Give an example, and explain your result.

dow = {'Sun': '1', 'Mon': '2', 'tue': '3', 'wed': '4', 'thu': '5', 'fri': '6', 'sat': '7', 'Sun': '8'}

when I enter dow[‘Sun’] it prints the most recent assignment. Which is 8 as it was added last.