

## Lesson 4 - Dictionaries

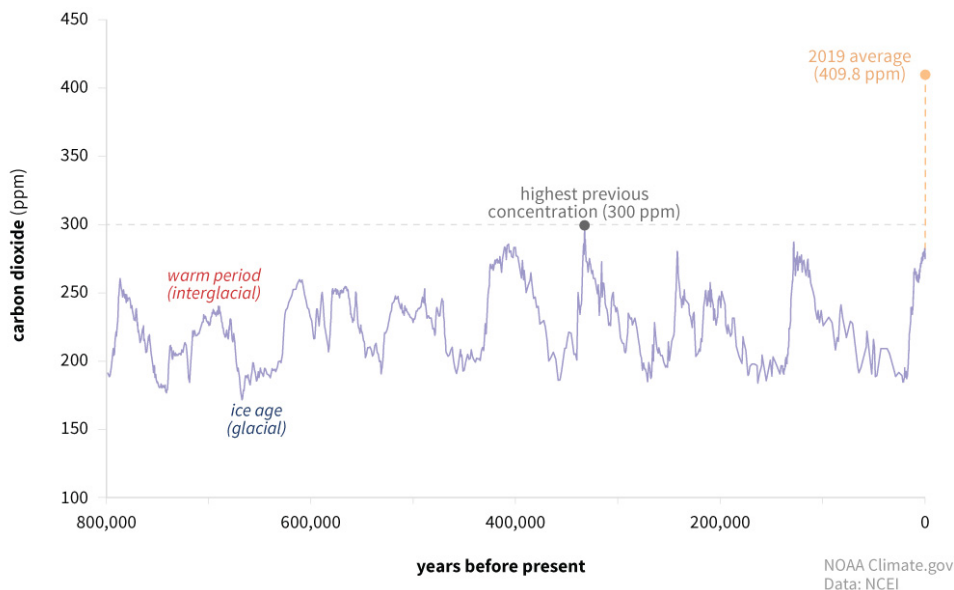
Function: Stores data in key-value pairs for easy retrieval

### The Anthropogenic Greenhouse Gas Effect

Though there is a need for natural [greenhouse gases](#) to warm the atmosphere (otherwise the average global temperature would drop from  $14^{\circ}\text{C}/57^{\circ}\text{F}$  to approximately  $-18^{\circ}\text{C}/-0.4^{\circ}\text{F}$ , **anthropogenic greenhouse gases** (greenhouse gases caused by human activity), mostly consisting of carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ), nitrous oxide ( $\text{N}_2\text{O}$ ), and ozone ( $\text{O}_3$ ), trap the sun's radiation that is being reflected off the surface of the earth, further amplifying the warming effect.

The burning of [fossil fuels](#) such as coal, oil, and natural gas, which are [non-renewable resources](#), is especially problematic as it releases the carbon stored in these fossil fuels that took millions of years to form, back into the atmosphere. Global atmospheric carbon dioxide concentrations (measured in parts per million, ppm) have thus increased dramatically, reaching a record high of 409.8 ppm in 2019. To put that into context, as per the graph below, even in the interglacial periods when carbon dioxide concentrations were at the highest, it never surpassed 300 ppm.

### CARBON DIOXIDE OVER 800,000 YEARS



Source:

Climate Change: Atmospheric Carbon Dioxide: NOAA Climate.gov. (2020, August 14). Retrieved December 03, 2020, from <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>

## Part 1: Create a dictionary

1. Name the dictionary `my_dict` (could have any name)
2. Use `{}` to create a dictionary with a sequence of items
3. Use single quotation marks `"` and a colon `:` to identify the `'key' : 'value'`
4. Separate the sequence of items with a comma `,`

Example: creating a dictionary with two keys and two values

```
main.py
1  my_dict = {'key':'value', 'key2':'value2'}
```

✓ **Task 1: Create a dictionary that includes the following data and print the entire dictionary:**

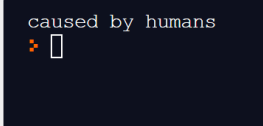
- Anthropogenic GHGs are caused by humans
- Coal is a fossil fuel
- CO2 concentrations in 2019 were 409.8 (ppm)

## Part 2: Access dictionary items

1. To print the desired value, the key (including the single quotation marks) must be placed inside square brackets `[]`

Example: to access the value `'caused by humans'`, the key `'anthropogenic GHG'` must be indexed:

```
main.py
1  my_dict = {'anthropogenic GHG':'caused by humans', 'coal':'fossil fuel',
             'CO2 in 2019': 409.8,}
2  print(my_dict['anthropogenic GHG'])
```



✓ **Task 2: Access the value for the key `'CO2 in 2019'`, print it, and identify the type of data.**