

**In this activity, we will create charts by using the data provided by U.S. Department of Energy, Energy Information Administration related to world carbon dioxide emissions from the consumption and flaring of fossil fuels (Million Metric Tons of Carbon Dioxide), between 1980 and 2006. We will use these charts to explore and compare the carbon dioxide emission for different regions/countries of the world.**

 **Learning Outcomes:**

Upon the completion of this activity, the students will

1. distinguish between categorical and quantitative variables
2. create
* bar graphs
* pie Charts
* histograms
1. Choose appropriate graph to display the available data

## Context for Use

**This activity can be used in any course where the students need to give graphical summary of the information which is presented as data.**

Description and Teaching Materials

**This activity is used in a classroom lab environment where each student has an access to a computer. It can also be used as a group project if the number of computers available is limited. If students have been exposed to use the graphical features of Excel, it can be given as homework.**

Teaching Notes and Tips

**I strongly encourage students to collect all of their work in one file (main activity word document) and submit one file to be graded. I do remind them to “copy” and use “paste special” option to paste their Excel work to the word document as a “Microsoft Office Excel Worksheet Object.” When grading their work, I just double click on the pasted object and see students’ work/formulas as an Excel worksheet.**

**Assessment**

Pre and posttests aligned with learning outcomes

References and Resources

<http://www.eia.doe.gov/iea/carbon.html>

**MAIN ACTIVITY:**

To start this activity, open the file titled “International Energy Annual.xlsx.” Please do not forget to use “copy” and “paste special” to paste your work from Excel to this file as “Microsoft Office Excel Worksheet Object.”

Part A:

1. Create an Excel table and calculate the **percentage** of total carbon dioxide emissions for each year from 1980 to 2006 for North America and Europe.
2. Use Excel’s Analysis ToolPak to create a histogram for the totalcarbon dioxide emissions from 1980 to 2006 for North America and describe what the graph shows.
3. Use Excel’s Analysis ToolPak to create a histogram for the totalcarbon dioxide emissions from 1980 to 2006 for Europe and describe what the graph shows.
4. Compare the histograms you created for Europe and North America. What is the main difference between two regions in terms of the total carbon dioxide emissions?
5. Create a graph (you decide what kind of graph you need to use) comparing the total carbon dioxide emissions by North America to the world’s total from 1980 to 2006. Briefly discuss what can be learned from this graph.
6. Create two charts/graphs (you decide what kind of chart/graph you need to use) comparing the total carbon dioxide emissions by each region (North America, South & Central America,…) to the world’s total
	* In the year 1980
* In the year 2000

Briefly discuss what can be learned from each one of these graphs.

Part B:

Choose any aspect of the data presented in the file *International Energy Annual.xlsx* that can be summarized and displayed by a HISTOGRAM.

1. Display data you used as the input for your histogram. Please include the necessary labels with your data.
2. Create and display your histogram. Please make sure that all axes are labeled and your histogram has a title.
3. Briefly discuss what this graph shows.

PART C:

Choose any aspect of the data presented in the file *International Energy Annual CO2.xls* (in Quiz 1 folder) that can be summarized and displayed by a BAR GRAPH.

1. Display the data which will be used as the input for your Bar Graph. Please include the necessary labels with your data.

2. Create and display your Bar Graph. Please do make sure that all the axes are labeled and your Bar Graph has a title. Recall that your graphs should always be self-explanatory.

3. Describe what the Bar Graph shows.

PART D:

Choose any aspect of the data presented in the file *International Energy Annual CO2.xls* (in Quiz 1 folder) that can be summarized and displayed by a PIE Chart.

1. Display the data which will be used as the input for your Pie Chart. Please include the necessary labels with your data.

2. Create and display your Pie Chart. Please do make sure that all the axes are labeled and your Pie Chart has a title. Recall your graphs should always be self-explanatory.

3. Describe what your Pie Chart shows.