

**Introduction:** You have been assigned a position in a research institute dealing with global climate issues. A research scientist has just given you some "raw" data regarding greenhouse gases in Earth's atmosphere. Within a week there will be a major international conference on global change. The data needs to be presented and organized in a meaningful and useful way.

Graphs on the concentrations of various greenhouse gases in Earth's atmosphere in recent history will be created using the Excel program. Look for trends in the data as you make your graphs. In the case of data taken over a period of time, graphs also make it easier to see what might occur in the future.

**Procedures:**

1. Each group will create 2-different graphs on Excel, using 2-different charts of raw data: Carbon dioxide (CO<sub>2</sub>), chlorofluorocarbon (CFC), Methane (CH<sub>4</sub>) and Nitrous oxide N<sub>2</sub>O or world temperatures.
2. Now analyze the graphs and look for trends. Predict what the graph will look like in 50-years.
3. Post all the graphs in the room (like an art gallery). Look at the graphs and answer the analysis questions.
4. Each group needs to select a spokesperson to talk about one of their graphs and their predictions for the future.
5. On the back of this page sketch the 2-graphs your group did NOT create.

**Analysis Questions:**

1. Do all the graphs look the same? Why?
2. What general trends do the graphs show?
3. Looking at the CFC graph, what trend can you predict for the future?
4. What graph to climate scientists compare all the others to? Why?

<b>Year</b>	<b>Methane Gas</b> Concentration in parts per million by volume <i>[Gaps in the record between 1958-1975]</i>
1850	0.90
1879	0.93
1880	0.90
1892	0.88
1908	1.00
1917	1.00
1918	1.02
1927	1.03
1929	1.13
1940	1.12
1949	1.18
1950	1.20
1955	1.26
1956	1.30
1957	1.34
1958	1.35
1975	1.45
1976	1.47
1977	1.50
1978	1.52
1979	1.55
1980	1.56
1981	1.58
1982	1.60
1983	1.60
1984	1.61
1985	1.62
1986	1.63
1987	1.65
1988	1.67

<b>Year</b>	<b>Carbon Dioxide</b> in parts per million by volume
1958	314.8
1959	316.1
1960	317.0
1961	317.7
1962	318.6
1963	319.1
1964	319.4
1965	320.4
1966	321.1
1967	322.0
1968	322.8
1969	324.2
1970	325.5
1971	326.5
1972	327.6
1973	329.8
1974	330.4
1975	331.0
1976	332.1
1977	333.6
1978	335.2
1979	336.5
1980	338.4
1981	339.5
1982	340.8
1983	342.8
1984	344.3
1985	345.7
1986	346.9
1987	348.6
1988	351.2

Year	CFC (chlorofluorocarbon)
	<ul style="list-style-type: none"> <li>CFCs include the manufactured gas combinations of chlorine, fluorine, and carbon. These gases were not present in Earth's atmosphere until the 1930's.</li> </ul>
1955	100
1957	120
1959	140
1961	150
1963	150
1965	200
1967	225
1969	290
1971	320
1973	375
1975	350
1977	360
1979	330
1981	325
1983	320
1985	340
1987	300
1989	305
1991	310

Year	Nitrous Oxide in parts per billion by volume (ppbv)
1750	283.0
1760	283.5
1770	284.0
1780	284.5
1790	285.5
1800	285.0
1810	286.0
1820	286.5
1830	287.0
1840	287.5
1850	288.0
1860	288.5
1870	289.0
1880	289.5
1890	290.0
1900	291.0
1910	292.0
1920	292.5
1930	293.0
1940	294.0
1950	295.0
1960	297.0
1970	299.0
1980	305.0
1990	310.0

### Average Global Temperature, 1880-2007

Year              Temperature (C)

1880	13.88
1890	14.05
1900	13.75
1910	13.69
1920	13.92
1930	13.77
1940	13.98
1950	13.91
1960	14.05
1970	14.00
1980	14.14
1990	14.26
2000	14.46
2007	14.66