Graphing Sunspot Cycles

1. Set up a graph on your graph paper with years on the x-axis and number of sunspots on the y-axis. Number the graph so that it takes up as much room on the paper as possible.
2. Plot the sunspot number against time.

Sunspot number table, courtesy of the National Geophysical Data Center in Boulder, Colorado.

Year	Sunspot Number	Year	Sunspot Number	Year	Sunspot Number	Year	Sunspot Number	Year	Sunspot Number
1700	5								
1701	11	1761	85.9	1821	6.6	1881	54.3	1941	47.5
1702	16	1762	61.2	1822	4.0	1882	59.7	1942	30.6
1703	23	1763	45.1	1823	1.8	1883	63.7	1943	16.3
1704	36	1764	36.4	1824	8.5	1884	63.5	1944	9.6
1705	58	1765	20.9	1825	16.6	1885	52.2	1945	33.2
1706	29	1766	11.4	1826	36.3	1886	25.4	1946	92.6
1707	20	1767	37.8	1827	49.6	1887	13.1	1947	151.6
1708	10	1768	69.8	1828	64.2	1888	6.8	1948	136.3
1709	8	1769	106.1	1829	67.0	1889	6.3	1949	134.7
1710	3	1770	100.8	1830	70.9	1890	7.1	1950	83.9
1711	0	1771	81.6	1831	47.8	1891	35.6	1951	69.4
1712	0	1772	66.5	1832	27.5	1892	73.0	1952	31.5
1713	2	1773	34.8	1833	8.5	1893	85.1	1953	13.9
1714	11	1774	30.6	1834	13.2	1894	78.0	1954	4.4
1715	27	1775	7.0	1835	56.9	1895	64.0	1955	38.0
1716	47	1776	19.8	1836	121.5	1896	41.8	1956	141.7
1717	63	1777	92.5	1837	138.3	1897	26.2	1957	190.2
1718	60	1778	154.4	1838	103.2	1898	26.7	1958	184.8
1719	39	1779	125.9	1839	85.7	1899	12.1	1959	159.0
1720	28	1780	84.8	1840	64.6	1900	9.5	1960	112.3
1721	26	1781	68.1	1841	36.7	1901	2.7	1961	53.9
1722	22	1782	38.5	1842	24.2	1902	5.0	1962	37.6
1723	11	1783	22.8	1843	10.7	1903	24.4	1963	27.9
1724	21	1784	10.2	1844	15.0	1904	42.0	1964	10.2
1725	40	1785	24.1	1845	40.1	1905	63.5	1965	15.1
1726	78	1786	82.9	1846	61.5	1906	53.8	1966	47.0
1727	122	1787	132.0	1847	98.5	1907	62.0	1967	93.8
1728	103	1788	130.9	1848	124.7	1908	48.5	1968	105.9
1729	73	1789	118.1	1849	96.3	1909	43.9	1969	105.5
1730	47	1790	89.9	1850	66.6	1910	18.6	1970	104.5
1731	35	1791	66.6	1851	64.5	1911	5.7	1971	66.6
1732	11	1792	60.0	1852	54.1	1912	3.6	1972	68.9
1733	5	1793	46.9	1853	39.0	1913	1.4	1973	38.0
1734	16	1794	41.0	1854	20.6	1914	9.6	1974	34.5
1735	34	1795	21.3	1855	6.7	1915	47.4	1975	15.5
1736	70	1796	16.0	1856	4.3	1916	57.1	1976	12.6
1737	81	1797	6.4	1857	22.7	1917	103.9	1977	27.5
1738	111	1798	4.1	1858	54.8	1918	80.6	1978	92.5
1739	101	1799	6.8	1859	93.8	1919	63.6	1979	155.4
1740	73	1800	14.5	1860	95.8	1920	37.6	1980	154.6
1741	40	1801	34.0	1861	77.2	1921	26.1	1981	140.4
1742	20	1802	45.0	1862	59.1	1922	14.2	1982	115.9
1743	16	1803	43.1	1863	44.0	1923	5.8	1983	66.6
1744	5	1804	47.5	1864	47.0	1924	16.7	1984	45.9
1745	11	1805	42.2	1865	30.5	1925	44.3	1985	17.9
1746	22	1806	28.1	1866	16.3	1926	63.9	1986	13.4
1747	40	1807	10.1	1867	7.3	1927	69.0	1987	29.4

1748	60	1808	8.1	1868	37.6	1928	77.8	1988	100.2
1749	80.9	1809	2.5	1869	74.0	1929	64.9	1989	157.6
1750	83.4	1810	0.0	1870	139.0	1930	35.7	1990	142.2
1751	47.7	1811	1.4	1871	111.2	1931	21.2	1991	145.8
1752	47.8	1812	5.0	1872	101.6	1932	11.1	1992	94.5
1753	30.7	1813	12.2	1873	66.2	1933	5.7	1993	54.7
1754	12.2	1814	13.9	1874	44.7	1934	8.7	1994	29.9
1755	9.6	1815	35.4	1875	17.0	1935	36.1	1995	17.9
1756	10.2	1816	45.8	1876	11.3	1936	79.7	1996	8.6
1757	32.4	1817	41.1	1877	12.4	1937	114.4	1997	21.5
1758	47.6	1818	30.1	1878	3.4	1938	109.6	1998	64.3
1759	54.0	1819	23.9	1879	6.0	1939	88.8	1999	93.3
1760	62.9	1820	15.6	1880	32.3	1940	67.8	2000	119.0
								2001	110.9
								2002	104.0
								2003	63.7
								2004	40.4
								2005	29.8
								2006	15.2
								2007	7.5
								2008	2.9
								2009	3.1

Questions- answer on the back of your graph.

1. Connect the points you've plotted with a smooth curve. You'll notice that there are very clear peaks (maximums) and valleys (minimums). Which years are the maximums and which years are minimums? Label these years on your graph with a capital M and lower case m, respectively.

2. Is there is a regular pattern? To answer this question, take note of what scientists call the solar cycle, i.e., how many years are there between a solar maximum, a solar minimum and the next solar maximum?

   **For example, in 1705 there is a maximum, in 1711-1712 there is a minimum, in 1717 a maximum. So the first solar cycle you plotted lasted 12 years (subtract 1705 from 1717). Take note of the other solar cycles by making a table of maximums, minimums and the years between 2 maximums.*

   a) If you had to guess at the average solar cycle length, what would it be from 1700-present?

   b) Actually find the average solar cycle length. Show your work. (you can use a calculator if you need to.)

3. Make maximum or minimum (or moving toward one of those) predictions for the years 2012, 2018 and 2030.

4. How many sunspots were there during the year you were born? Predict whether it will be closer to a maximum or a minimum when you graduate from college and when you turn 30 years old.