

CYCLIC CHANGE SUNSPOT ANALYSIS

PURPOSE: The purpose of this laboratory exercise is to have you become familiar with changes which are cyclic and predictable. Also during this exercise you will be able to further enhance your graphing skills.

VOCABULARY: (10 points)

cyclic change _____

event _____

predictable _____

maxima _____

minima _____

OBJECTIVES: Upon completion of this laboratory exercise, you will be able to:

1. Define the terms: cyclic change, event, predictable, maxima, and minima.
2. Describe several natural events that are cyclic.
3. Characterize what a cyclic event will look like on a graph.
4. Graph a series of data from a data table and determine the maximas and minimas.

MATERIALS: pen/pencil

PROCEDURE: PART A (45 points)

In this part of the laboratory exercise, you will graph the data that is in the data table. On the graph paper provided at the end of the laboratory, correctly label the graph. Plot the years on the horizontal axis, and plot the Number of Sunspots on the vertical axis. Correctly label each of the axes with their appropriate units, and provide a title for the graph.

Sunspot Data

Year	Number of Sunspots	Year	Number of Sunspots	Year	Number of Sunspots	Year	Number of Sunspots	Year	Number of Sunspots
1908	49	1928	78	1948	136	1968	106	1988	100
1909	44	1929	65	1949	135	1969	105	1989	158
1910	19	1930	36	1950	84	1970	105	1990	143
1911	6	1931	21	1951	69	1971	67	1991	146
1912	4	1932	11	1952	32	1972	69	1992	94
1913	1	1933	6	1953	14	1973	38	1993	55
1914	10	1934	9	1954	4	1974	35	1994	30
1915	47	1935	36	1955	38	1975	16	1995	18
1916	57	1936	80	1956	142	1976	13	1996	9
1917	104	1937	114	1957	190	1977	28	1997	22
1918	81	1938	110	1958	185	1978	93	1998	64
1919	64	1939	89	1959	159	1979	155	1999	93
1920	38	1940	68	1960	112	1980	154	2000	120
1921	26	1941	48	1961	54	1981	140	2001	111
1922	14	1942	31	1962	38	1982	116	2002	104
1923	6	1943	16	1963	28	1983	67	2003	64
1924	17	1944	10	1964	10	1984	46	2004	40
1925	44	1945	33	1965	15	1985	18	2005	30
1926	64	1946	93	1966	47	1986	13	2006	15
1927	69	1947	152	1967	94	1987	29	2007	8

QUESTIONS: PART A (45 points)

1. Using the graph that you constructed, name the years in which the nine **maximas** occurred throughout the last 100 years.

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2. Using the graph that you constructed, name the years in which the ten **minimas** occurred throughout the last 100 years.

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3. Calculate the average number of years that occurred between each of the maximas and minimas.

Average number of years between maximas: _____

Average number of years between minimas: _____

Questions: Part A continued

4. Using the average number of years between maximas and minimas that you calculated in question 3, make an inference as to when you believe the next maxima and minima will occur.

The next maxima will occur in _____.

The next minima will occur in _____.

Explain how you arrived at the years that you have written above. Make your explanation simple enough so that an average person could understand how you calculated your answers.

5. Future changes in the environment can best be predicted from data that are
- (a) highly variable (changing) and collected over a short period of time
 - (b) highly variable (changing) and collected over a long period of time
 - (c) cyclic and collected over a short period of time
 - (d) cyclic and collected over a long period of time

6. List four natural events in Earth Science that would be considered cyclic.

- a. _____
- b. _____
- c. _____
- d. _____

7. Over several years, the apparent size of the Sun (how big it looks in the sky) as viewed by an observer on Earth will probably
- (a) vary in a cyclic manner
 - (b) decrease at a regular rate
 - (c) increase at a regular rate
 - (d) vary in an unpredictable manner

8. Circle the word which correctly completes this sentence:

An event which is cyclic must also be (predictable, unpredictable).

