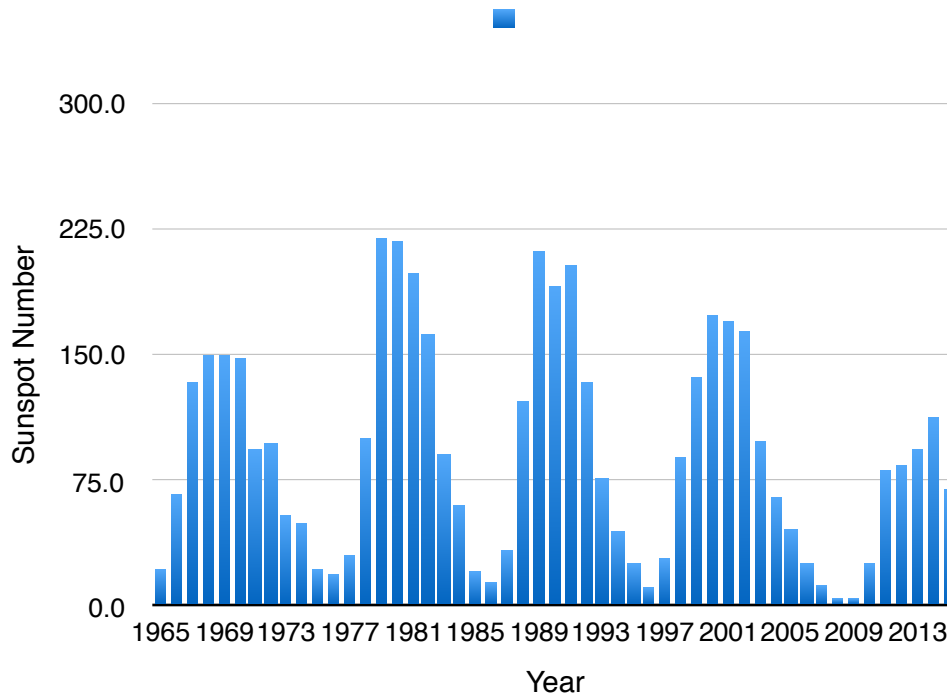


1. Connect the points you've plotted with a smooth curve. You'll notice that there are very clear peaks (maximums) and valleys (minimums). Which years are the maximums and which years are minimums?

Years that are maximums 1968, 1979, 1989, 2000, 2014

Years that are minimums 1965, 1976, 1986, 1996, 2008



2. Is there is a regular pattern for sunspot numbers? 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 1968 there is a solar maximum, followed by a solar minimum in 1976, followed by another maximum in 1979. So the solar cycle would be 11 years for that first set of data (1979 minus 1968).

Find the next solar cycle starting in 1979.

Solar maximum=1979

Next solar minimum= (1986)

Next solar maximum= (1989)

Solar cycle (time between a solar maximum, solar minimum, and next solar maximum)= (10 years)

Find the next solar cycle starting with 1989.

Solar maximum=1989

Next solar minimum= (1996)

Next solar maximum= (2000)

Solar cycle (time between a solar maximum, solar minimum, and next solar maximum)= (11 years)

Find the next solar cycle starting with 2000.

Solar maximum=2000

Next solar minimum= (2008)

Next solar maximum= (2014)

Solar cycle (time between a solar maximum, solar minimum, and next solar maximum)= (14 years)

You should have four solar cycles calculated (one was done for you).

a) If you had to guess at the average solar cycle length, what would it be from 1968-2014? Students might guess from 10-14 years.

b) Now find the average solar cycle length from 1968-2014 with a calculator: 11.5 years

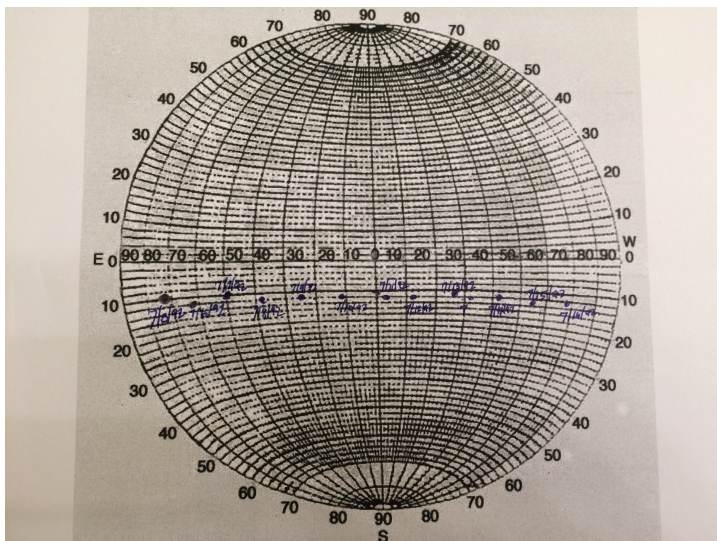
3. If you had to make a prediction for the years 2019 and 2025, would the years be maximums or minimums? 2019 would likely be a minimum and 2025 should be close to a solar maximum.

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 high school and for when you turn 30 years old.

Answers will depend on student.

## Skill #2 Tracking How an Active Region Moves Across the Sun

1. What pattern do you notice about the movement of AR7220? The students' graphs should show something similar to this student's:



2. Do you see much motion in the north-south range? On average, how many degrees west does the active region move in one day?

No on motion in the north-south range. About 13 degrees west on average.

3. Scientists are tracking another active region on the Sun. The first day that AR7216 was seen, its location was N13E75. After 12 days where would you expect AR7216 to be?

The Sun rotates on its axis. This rotation is faster at the equator than at the poles. The Sun will make a complete rotation in about 28 days at the equator and 37 days at the poles. Therefore, sunspots at the equator rotate across the face of the Sun in about 14 days. AR7220 moves westward 10-14 degrees each day. The average it moves turns out to be very close to 13 degrees each day. So after 12 days, AR7216 should be at approximately 81 degrees west.