

# Sunspot Graphing

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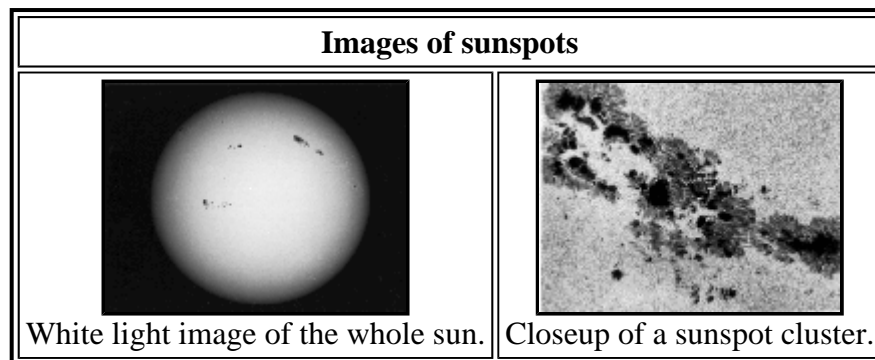
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## Purpose:

1. To illustrate the need to accumulate data over time and graph that data to discern patterns.
2. To learn about sunspots, Galileo, instruments for data collection.

## Materials:

1. Graph paper
2. Sunspot frequency data (see below)
3. Scissors
4. Tape



## Directions:

1. Obtain sunspot information from the yearly [sunspot data set](#). This is the web site for the [Royal Observatory of Belgium](#) and is extensive. See the list at the end of this activity for an outline of the site.
2. Cut the chronological sunspot data into 15 year segments.
3. Give each student a 15 year segment.
4. Hold the graph paper with the long direction vertical.
5. So that there is uniformity, determine the intervals for 15 years along the horizontal axis and the frequency interval for the vertical axis.
6. Have the students plot their data.
7. Have the students describe the pattern in their segment.
8. Cut off the left side of each graph paper (except the graph for the 15 years of data).
9. Overlap the left edge of each graph to form a continuous graph.
10. Ask the students to describe the pattern formed.
11. Discuss why the pattern from their individual sheet did not and could not match the class graph.
12. Discuss why is it so difficult to definitively answer the question, "Is there global warming?", and similar questions that require long records.

## Conclusion:

This is a valuable activity to illustrate the need to accumulate data without any specific application. There are times when the public does not understand or support expenditures for the accumulation or analysis of the data. This activity also describes the "grunt" work that is the basis for science.

### **Additional information:**

General information can be found at the [Royal Observatory of Belgium](#) and is extensive. Departments are:

- Geodynamics and Earth Rotation
- Seismology
- Earth Tides
- Earth Rotation, Precession / Nutation
- GPS
- Gravimetry
- Time
- Time Service
- Astrometry
- Astrophysics
- MIDAS (Dep III www server)
- Solar Physics and Radioastronomy
- International Centers
- Earth Tide Commission
- EUREF Permanent Network Information System
- International Center for Earth Tides (ICET)
- Sunspot Index Data Center

### **Other sun web sites:**

- [How to safely look at sunspots.](#)
- [Lots of sun information](#), and sun images from radio to X-ray wavelengths.
- [What causes sunspots?](#)
- [NASA Sunspots, Aurora, and Magnetic Disturbances.](#)



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