Solar flares

Solar flares are powerful explosions of energy and matter from the Sun's surface. One explosion, lasting only a few minutes, could power the entire United States for a full year. Astronauts have to be protected from solar flares because the most powerful ones can kill an astronaut if they were working outside their spacecraft.

In this exercise, you will learn how scientists classify flares, and how to decode them.

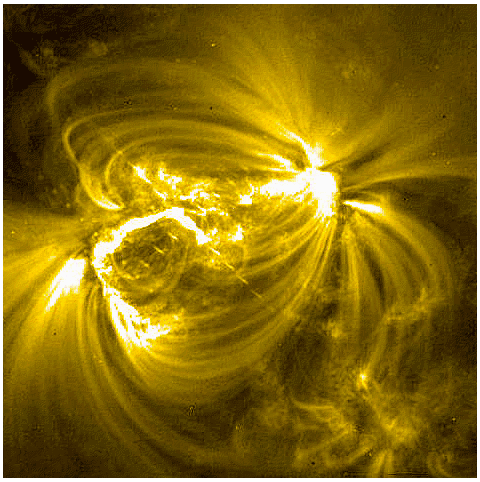

Image of Sun showing flare-like eruption.

Scientists create alphabetic and numerical scales to classify phenomena, and to assign names to specific events.

- Simple equations can serve as codes.

Here's how to do it!

A solar flare scale uses three multipliers defined by the letter codes C = 1.0, M=10.0, X=1000.0.

- A solar flare might be classified as M5.8 which means a brightness of (10.0) x (5.8) = 58.0.
- A second solar flare might be classified as X15.6 which means (1000.0) x (15.6) = 15,600.0

The X15.6 flare is (15,600/58) = 269 times brighter than the M5.8 flare.

Now you try!

The GEOS satellite has an X-ray monitor that records daily solar flare activity. The table below shows the flares detected between January 11 and March 3, 2000.

Flare Codes for Major Events

Date	Code	Date	Code
1-11	M1.5	2-12	M1.7
1-12	M2.8	2-17	M2.5
1-18	M3.9	2-18	C2.7
1-22	M1.0	2-20	M2.4
1-24	C5.3	2-21	M1.8
1-25	C6.8	2-22	M1.2
2-3	C8.4	2-23	C6.8
2-4	M3.0	2-24	M1.1
2-5	X1.2	2-26	M1.0
2-6	C2.4	3-1	C6.9
2-8	M1.3	3-2	X1.1

1) What was the brightest flare detected during this time?

2) What was the faintest flare detected during this time?

3) How much brighter was the brightest flare than the faintest flare?

4) What percentage of the flares were brighter than M1.0?

More about sunspot cycles: http://image.gsfc.nasa.gov/poetry/educator/Sun79.html