

## Space weather facts

1. Solar flares and coronal mass ejections can cause a disturbance in the Earth's magnetic field (magnetosphere), called a geomagnetic storm.
2. Solar flares can sometimes heat the solar atmosphere to temperatures of 50 million C - far hotter than the sun's core!
3. The fastest coronal mass ejection was recorded on 4<sup>th</sup> August 1972 and travelled from the sun to earth in 14.6 hours - a speed of nearly 10 million kilometers per hour!
4. On 8<sup>th</sup> April 1947, the largest sunspot in modern history reached its maximum size of over 330 times Earth's area.
5. The first solar flare recorded occurred on 2<sup>nd</sup> September 1859 and was sighted by two astronomers who happened to be looking at the sun at exactly the right time!
6. Between 10-12<sup>th</sup> May 1999, the solar wind nearly vanished, causing Earth's magnetosphere to expand in volume by over 100 times!
7. A typical CME can be millions of kilometers in size, but have the mass of only a small mountain!
8. The most powerful aurora can generate over 1 trillion watts of power.
9. On 13<sup>th</sup> March 1989 a geomagnetic storm caused a blackout in Quebec, Canada. It resulted in a £4 billion loss to the Canadian economy.
10. During intense solar flares, astronauts see bright flashing streaks of light as a result of high-energy particles zipping through their eyeballs.

11. The largest, single, challenge for astronauts travelling to Mars will be to overcome exposure to solar storms and radiation.

12. Around £1 billion in satellite technology was damaged or destroyed during the last sunspot cycle.

13. The 4<sup>th</sup> August 1972 flare (in between Apollo missions 16 and 17) solar was so powerful that, by some estimates, a space-suited astronaut would have received a lethal dose of radiation.

14. Earth's climate was seriously chilled during the Maunder Minimum (1645-1715) when no sunspots were observed. People ice-skated on the Thames in summer!

15. During a single second, the sun converts 4 million tons of matter into pure energy.

16. The core of the sun is nearly as dense as lead, and has a temperature of 15 million C.

17. During a severe solar storm, Earth loses about 100 tons of its atmosphere into space.

18. Toy 'rare-earth' magnets can be 5 times stronger than a sunspot magnetic field.