

Mysteries of the Sun and its Influence

Astronomy · Answer Key · 21 Questions

1. What is the heliosphere?

- A) The inner core of the Sun.
- B) The outer atmosphere of the Sun and the edge of its magnetic influence.**
- C) A layer within Earth's atmosphere.
- D) The region between stars.

2. Which NASA mission is designed to map the heliosphere at the outer reaches of our solar system?

- A) Voyager 1 & 2
- B) Solar Dynamics Observatory (SDO)
- C) Interstellar Boundary Explorer (IBEX)**
- D) Magnetospheric Multiscale Mission (MMS)

3. The Sun is composed mostly of which two elements?

- A) Oxygen and Nitrogen
- B) Carbon and Oxygen
- C) Hydrogen and Helium**
- D) Iron and Nickel

4. How long does it take for energy to radiate through the Sun's radiative zone?

- A) About 170 years
- B) About 17,000 years
- C) About 170,000 years**
- D) About 1.7 million years

5. What is the visible layer of the Sun called?

- A) Corona
- B) Photosphere**
- C) Chromosphere
- D) Radiative Zone

6. Sunspots appear darker because they are:

- A) Holes in the Sun's surface
- B) Areas of lower temperature radiating less energy**
- C) Regions of intense magnetic field that emit more light
- D) Composed of different elements than the photosphere

7. The Sun's equatorial regions rotate faster than its polar regions. This non-uniform rotation is known as:

- A) Uniform rotation
- B) Differential rotation**
- C) Polar rotation
- D) Equatorial rotation

8. What is the approximate period of the Solar Cycle?

- A) 5 years
- B) 11 years**
- C) 22 years
- D) 50 years

9. What is the term for the period of time when the number of sunspots is lowest?

- A) Solar maximum
- B) Solar minimum**
- C) Solar peak
- D) Solar eclipse

10. The 'butterfly diagram' illustrates the migration of sunspots from higher latitudes towards the equator during a solar cycle. Who was first to identify this pattern?

- A) Nicolaus Copernicus
- B) Galileo Galilei
- C) Edward Maunder**
- D) Anaxagoras

11. A coronagraph is a telescope that produces an artificial solar eclipse by using a disk to block the Sun's bright surface to reveal:

- A) The Sun's core
- B) The Sun's radiative zone
- C) The faint solar corona, stars, and planets**
- D) The Earth's magnetosphere

12. Solar flares and coronal mass ejections originate from:

- A) The Sun's core
- B) The Sun's magnetic field**
- C) The Sun's radiative zone
- D) The Sun's convection zone

13. What are solar flares?

- A) A continuous stream of charged particles.
- B) Explosive bright spots on the Sun's surface caused by the release of magnetic energy.**
- C) Large, bright features extending outward from the Sun's surface.
- D) Regions of cooler temperature on the Sun's surface.

14. A solar prominence is also known as a:

- A) Sunspot
- B) Coronal loop
- C) Filament**
- D) Solar flare

15. What occurs when magnetic forces overcome pressure and gravity in the solar corona, lifting a huge mass of solar plasma?

- A) Solar flare
- B) Solar prominence
- C) Coronal mass ejection (CME)**
- D) Sunspot

16. Earth's magnetosphere is a magnetic shield that protects the planet from:

- A) Incoming asteroids
- B) Solar wind carrying energetic, charged particles**
- C) Earthquakes
- D) Volcanic eruptions

17. The magnetosphere is formed by the Earth's rapidly spinning:

- A) Solid metal core
- B) Liquid metal core**
- C) Rocky mantle
- D) Atmosphere

18. What is the magnetopause?

- A) The region where the solar wind slows down.
- B) The outer boundary of the magnetosphere.**
- C) The core of the magnetotail.
- D) A type of solar storm.

19. Magnetic reconnection is an explosive process that can catapult charged particles into the magnetosphere and is associated with:

A) Auroras and space-weather events

B) Increased solar irradiance

C) The formation of sunspots

D) The solar dynamo

20. Which NASA mission comprises four spacecraft to make three-dimensional measurements of the magnetosphere to study magnetic reconnection?

A) STEREO

B) ACE

C) MMS

D) IBEX

21. The Van Allen Radiation Belts consist of:

A) Low-energy particles

B) Medium-energy particles

C) High-energy particles trapped in two regions

D) Neutral atoms