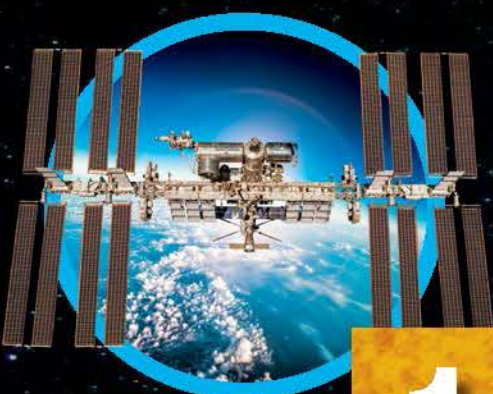


 NATIONAL  
GEOGRAPHIC  
KIDS



# 10000

FAKTEN ÜBER DEN

# WELTRAUM



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1

Our sun is a **star**, a ball of gas that creates its own light and heat in its **fiery core**.

2

All the planets, asteroids, and comets in our solar system **circle around the sun**.



3

The enormous sun holds **99.8 percent of the mass** of our solar system. The planets, moons, asteroids, and comets make up **0.2 percent**.

4

The sun formed from a giant cloud of gas and dust, called a **nebula**, about 4.6 billion years ago. It will exist for another five billion more.

5

The distance from the sun to Earth changes over the course of a year from 91 million miles to 94 million miles (146 million km to 151 million km). The average distance is about **93 million miles (150 million km)**.

6

The sun is **eight light-minutes away**. That means it takes light eight minutes to travel from the sun to Earth.

7

The sun is huge! Its **diameter** (width) is about 865,000 miles (1,392,000 km). You could fit **109 Earths, side to side**, across the width of the sun.

8

The sun is **much larger** than all the planets put together. In fact, you could fit **1,300,000 Earths** inside the sun and still have room for Pluto.

9

Although other bodies, including planets, can be a little squished, the sun is almost **perfectly round**. The sun is the most **spherical**, or ball-like, object in the solar system.

10

The sun is made up almost entirely of **hydrogen and helium** gases. It has other elements, too, but they make up **less than one percent** of its volume.

11

Different parts of the sun spin at different speeds. It takes about **25 days** for the sun's center to spin around once. At the poles, it takes about **36 days**.

12

The **hottest part** of the sun is the center, called the **core**. There, temperatures may reach **27,000,000°F (15,000,000°C)**.

13

The **outer layer** of the sun, the ball of light you see from Earth, is called the **photosphere**.

14

Our yellow-white sun is about **10,000°F (5538°C)** on its surface.

15

**Do not stare** at the sun with your naked eye or through a telescope. It is so bright that it could hurt your eyes or even **blind you**.



16

You can safely observe the sun only by using **proper solar filters**. Specially made eclipse shades have lenses dark enough to look at the sun without damaging your eyes.

17

**Dark sunspots** often pepper the surface of the sun. They are the sites of huge **eruptions of gas**.

18

Sunspots show up as darker spots because they are **slightly cooler** than the gas around them. While the surface of the sun is about 10,000°F (5538°C), sunspots can be as cool as 7200°F (3982°C). **That's still hot!**

19

Even a small sunspot is still thousands of miles wide. Many sunspots you see in pictures are **larger than Earth**.

20

Every 11 years the sun has a lot of sunspots during a time called **solar maximum**. Astronomers call the times of few sunspots **solar minimum**.

21

Astronomers **cannot predict** where sunspots will pop up or how long they will last. Some sunspots last a few hours, while others hang around for **a month**.

22

The sun is **explosive**. Violent eruptions called **prominences, flares, and coronal mass ejections** blast off the sun almost daily.

23

Solar prominences often **look like loops**. They happen when gases shoot off the surface of the sun, cool off, and then fall back to the sun again.

24

Solar flares are **violent explosions** of material that burst from the **sun's surface** in a matter of minutes.

25

Coronal mass ejections (CMEs) are the **most powerful solar explosions**. They shoot superhot gases off the sun and into space at around 1.2 million miles an hour (1.9 million km/h).



26

Even at more than a **million miles an hour**, it still takes CMEs **three days** to travel the 93 million miles (150 million km) to Earth.

27

When a CME runs into Earth, you are safe on the ground. **Its gases get trapped** high in the atmosphere.

28

Above the sun's photosphere is a layer called the **chromosphere**. Here, gases cool to around 7700°F (4260°C).

29

The only time you can see the chromosphere from Earth is during a **total solar eclipse**—when the moon blocks out most of the sun.

30

Above the chromosphere is the **corona**, the outer layer of the sun.

31

Even though the **corona** is farther from the sun's core than the photosphere or chromosphere, it is **way hotter** than those layers. In fact, the corona can be 2,000,000°F (1,100,000°C) or more!

32

Astronomers are **still trying** to understand why the corona is **so hot**.

33

We learn a lot about the sun from **unpiloted spacecraft**. For instance, the **Solar and Heliospheric Observatory (SOHO)** has circled the sun for more than 25 years, taking amazing images and videos of our star.



34

From Earth, we can see only **one side** of the sun at any time. NASA sent twin space probes, called **STEREO**, to the sun so astronomers could see two different parts at once.

35

The **Solar Dynamics Observatory** spacecraft watches the sun closely for changes in its surface. It has taken videos of **giant eruptions** shooting off into space.

36

NASA launched the spacecraft **Genesis** in 2001 to collect pieces of solar wind (particles shot out from the sun). When it returned to Earth, it accidentally crashed, but astronomers were still able to save some of the **solar material**.

37

The **Parker Solar Probe** orbits the sun to study its extremely hot corona. It swings close to the sun's surface, **facing more heat** than any other spacecraft.

38

The **Ulysses** spacecraft circled around the **north and south poles** of the sun to view parts of the solar surface not easily seen from Earth.

39

When the sun begins to **run out of fuel**, in about four to five billion years, it will get larger and larger and turn orange, then **red**.

40

In about five billion years, the sun will be a **red giant star**. It will swallow up Mercury and Venus and **may even engulf Earth**.

41

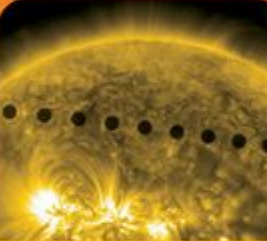
At the end of its existence, the sun will not be able to hold itself together. Its **outer layers** will fly off into space, creating a ring of gas called a **planetary nebula**.

42

After the sun becomes a planetary nebula, a **tiny white star** will be left behind. Our old sun will be changed into a new star called a **white dwarf**.

43

The **new sun**, now a white dwarf, could live on for **billions or even trillions** of years.



44

Only three large objects in space regularly come between Earth and the sun: **the moon** during a solar eclipse, and the planets **Venus** (here in a time-lapse photo) and **Mercury** in events called transits.

45

Earth is closest to the sun around every **January 4**. It is farthest from the sun around every **July 4**.



46

Earth's four seasons are caused by the **planet's tilt** as we travel around the sun—not by the distance to the sun.

47

The **summer solstice**, also known as the first day of summer, is the day when we have the most hours of daylight and the fewest hours of darkness.

48

The **winter solstice**, also known as the first day of winter, is the day when we have the fewest hours of daylight and the most hours of darkness.

49

On the **spring and fall equinoxes**, the entire Earth has 12 hours of daylight and 12 hours of darkness.

50

**Hawaii** is the only state in the United States where the sun can appear **straight overhead** in the sky.

# 50 SHINING Facts About THE SUN

Sunspots on the sun's surface