Posted by **Tempest** • **April, 2024**

TEMPEST NEWS | APRIL 2024

OPTIMIZING YOUR ECLIPSE EXPERIENCE: LEVERAGING YOUR PERSONAL WEATHER STATION FOR MAXIMUM INSIGHT

On April 8th, 2024, a total solar eclipse will sweep across North America, offering skygazers a rare and captivating celestial event. As enthusiasts prepare to witness this phenomenon, personal weather station owners in the path of totality have a unique opportunity to monitor the event more closely and collect their own data during the eclipse.

TYPES OF ECLIPSES

LUNAR ECLIPSE

Between four and seven different times throughout the year, the Earth, Moon, and Sun align precisely to produce the captivating phenomenon of an eclipse. There are two main types of eclipses: lunar and solar. During a lunar eclipse, the Earth's shadow obscures the Moon, while during a solar eclipse, the Moon obstructs the view of the Sun. Lunar eclipses manifest in three distinct forms:

- **Total Lunar Eclipse:** occurs when the Moon enters the inner part of Earth's shadow, called the umbra, resulting in a dimly lit Moon due to sunlight filtering through Earth's atmosphere, often appearing orangish or reddish due to scattering.
- **Partial Lunar Eclipse:** happens when the Moon passes through only a portion of Earth's umbra, causing the shadow to grow and recede without fully covering the Moon.
- **Penumbral Eclipse:** occurs when the Moon traverses through the faint outer part of Earth's shadow, the penumbra, causing a subtle dimming effect that can be easily missed if one is not attentive.

The next total lunar eclipse will occur on March 14, 2025, and it will be visible in the Americas, Western Europe, Western Africa, and the Pacific.

SOLAR ECLIPSE

Solar eclipses occur during specific alignments of the Sun, Moon, and Earth, known as eclipse seasons, which happen approximately twice a year. These seasons occur roughly every six months when the orbital planes of the Earth and the Moon intersect in such a way that the Moon can cast its shadow on Earth. However, not every alignment results in an eclipse because of differences in the Earth and Moon's orbital pathways around the Sun. Types of solar eclipses include:

- **Total Solar Eclipse:**
  - Occurs when the Moon completely blocks the Sun's face, leading to complete darkness for observers in the path of the Moon's shadow.
  - Viewers may see the Sun's corona, the outer atmosphere, typically hidden by the Sun's brightness.
- **Annular Solar Eclipse:**
  - Happens when the Moon is at or near its farthest point from Earth, appearing smaller than the Sun.
  - The Sun forms a ring-like appearance around the dark disk of the Moon.
- **Partial Solar Eclipse:**
  - Occurs when only a portion of the Sun is covered by the Moon due to imperfect alignment.
  - Creates a crescent shape on the Sun's surface.
- **Hybrid Solar Eclipse:**
  - A rare phenomenon where an eclipse shifts between total and annular forms as the Moon's shadow moves across Earth's curved surface.

Solar eclipses provide remarkable opportunities for scientific research and public fascination, often drawing large crowds to observe this celestial event. During a total solar eclipse, the sudden darkness and the appearance of the Sun's corona offer unique insights into solar physics and atmospheric phenomena. Additionally, solar eclipses have cultural and historical significance, inspiring myths, legends, and folklore across different civilizations throughout history. It's crucial to use proper eye protection when viewing any phase of a solar eclipse to prevent eye damage.

ENHANCE YOUR ECLIPSE EXPERIENCE WITH INSIGHTS FROM YOUR PERSONAL WEATHER STATION

If you live in the path of totality and have access to a personal weather station, you're in a unique position to enhance your eclipse experience and contribute valuable data to scientific research. Among the various measurements to monitor during the eclipse, Solar Radiation and UV levels will stand out as the most drastically affected. Here's how your weather station can provide insights into atmospheric dynamics during the eclipse:

- Solar Radiation: Watch a dramatic drop in light intensity during the eclipse, providing valuable data on the duration and magnitude of darkness.
- Temperature Changes: Monitor temperature readings before, during, and after the eclipse to observe any fluctuations caused by the temporary reduction in solar radiation.
- Wind Speed and Direction: Note any changes in wind speed and direction that may occur due to atmospheric dynamics during the eclipse.
- Humidity Levels: Keep track of humidity levels to observe any variations, as the decrease in solar radiation during the eclipse could affect atmospheric moisture content.
- Barometric Pressure: Record barometric pressure readings to detect any changes associated with atmospheric disturbances during the eclipse.

By carefully monitoring these factors during a total eclipse, personal weather station owners can contribute valuable data to scientific research and enhance our understanding of atmospheric dynamics during this unique celestial event.

For personal weather station owners in the path of totality, the event presents a unique opportunity to monitor and collect data during the eclipse closely. With insights into various eclipse types, including lunar and solar, and the chance to enhance their experience through weather observations, individuals can contribute valuable information to scientific research. By understanding the significance of solar eclipses and the role of personal weather stations, enthusiasts can prepare to make the most of this extraordinary event on April 8th.

- OTHER WEATHER NEWS -

WHY THE 2024 SOLAR ECLIPSE IS SO SPECIAL

The 2024 eclipse will occur during a peak in the sun's activity cycle, offering a chance to compare the corona's appearance with that of the previous eclipse. Solar scientists anticipate more structure and activity in the corona due to the current heightened solar activity. This event provides a unique opportunity for scientific study, offering insights into the sun's corona and magnetic field interactions that are crucial for understanding space weather and its potential impacts on Earth.

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COLLEGE MAKES APP TO REPORT BIRD BEHAVIOR DURING ECLIPSE

At Indiana University Bloomington, researchers are launching the SolarBird smartphone app, in collaboration with the IU Luddy School of Informatics, to enlist the help of citizen scientists nationwide in observing bird behavior during the eclipse. By leveraging community participation, the project aims to gather valuable data on how birds respond to sudden darkness, shedding light on the impact of such events on animal behavior. The app, designed by a team of students and faculty, will streamline the data collection process, allowing people to contribute observations easily while experiencing this rare celestial event.

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FIVE NASA EXPERIMENTS HAPPENING DURING THE ECLIPSE

NASA has allocated funding for five interdisciplinary science projects aimed at leveraging this unique opportunity. Led by researchers from various academic institutions, these projects will utilize a range of instruments, including cameras aboard high-altitude research planes, to explore the Sun's influence on our planet. Additionally, two of the projects welcome participation from citizen scientists, expanding the scope of research. Such endeavors exemplify the longstanding tradition of utilizing solar eclipses as a platform for scientific breakthroughs, from the discovery of helium to advancements in our understanding of the Sun's impact on Earth's upper atmosphere.

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WHAT ARE PLANTS DOING DURING A SOLAR ECLIPSE?

During a solar eclipse, plants may experience reduced photosynthesis and physical changes like drooping leaves. Observations during the 2017 eclipse showed a disruption in photosynthetic pathways, leading to a significant decrease in photosynthesis rates for some plants. Wildlife, including birds and crickets, may also be affected by the sudden darkness, altering their behavior. Temperature drops of up to 11 degrees Fahrenheit have been reported during past eclipses, further influencing plant and wildlife activity. These observations provide intriguing insights into the effects of solar eclipses on the natural world.

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