

# Understanding the seasons

Here's something to chew on that you may not have ever given a lot of thought to.

Thanks to Bing AI now being available online, I thought I'd run these questions by it to see if Bing AI could come up with some logical answers on said topic; how are the seasons established.

**Question #1:** On which calendar day is the North Pole tilted directly towards the sun?

**Answer #1:** The North Pole is tilted directly towards the Sun around **June 20th**. This is known as the summer solstice in the Northern Hemisphere and it marks the longest day of the year in this region. After this point, the days start to get shorter [*in the Northern Hemisphere*] as the Earth continues its orbit around the Sun.

**Question #2:** On which calendar day is the South Pole tilted directly towards the sun?

**Answer #2:** The South Pole is tilted directly towards the Sun around **December 20th**. This is known as the summer solstice in the Southern Hemisphere and it marks the longest day of the year in this region. After this point, the days start to get shorter [*in the Southern Hemisphere*] as the Earth continues its orbit around the Sun.

**Question #3:** What are the first and last calendar days of the **meteorological definition** of the seasons summer, fall, winter and spring in the Northern and Southern Hemispheres?

**Answer #3:**

In the **Northern Hemisphere:**

- Spring starts on **March 1** and ends on **May 31**.
- Summer starts on **June 1** and ends on **August 31**.
- Fall (Autumn) starts on **September 1** and ends on **November 30**.
- Winter starts on **December 1** and ends on **February 28** (or **February 29** in a leap year).

In the **Southern Hemisphere:**

- Spring starts on **September 1** and ends on **November 30**.
- Summer starts on **December 1** and ends on **February 28** (or **February 29** in a leap year).
- Fall (Autumn) starts on **March 1** and ends on **May 31**.
- Winter starts on **June 1** and ends on **August 31**.

**Question #4:** Based on the **meteorological definition** of the seasons, why are there fewer days (apx 20 days) in summer before the summer solstice in the Northern Hemisphere than after the summer solstice (apx 41 days) in the Northern Hemisphere?

#### Answer #4:

The meteorological definition of seasons is based on the annual temperature cycle and the calendar. It divides the year into four seasons of approximately equal length: spring, summer, fall (autumn), and winter. Each season starts on the first day of a particular month: March, June, September, and December respectively.



The reason there are fewer days in summer before the summer solstice than after, according to the meteorological definition, is because this definition doesn't take into account the Earth's tilt and its elliptical orbit around the Sun. The summer solstice, which usually occurs around June 20 or 21, is the day when the North Pole is most directly tilted towards the Sun. However, the meteorological definition of summer starts on June 1, which is about 20 days before the solstice.

After the summer solstice, the days begin to get shorter in the Northern Hemisphere. However, due to a phenomenon known as **seasonal lag**, the warmest temperatures don't occur until a bit later. This is because Earth's water, which covers about 70% of the planet's surface, soaks up a lot of the heat and takes longer to heat up the land. Therefore, even though the days are getting shorter after the solstice, they are also getting hotter, which is why we still consider it to be summer.

So, in summary, the meteorological definition of summer includes the time leading up to the summer solstice as well as the period of warmest temperatures that occur due to seasonal lag.

**Question #5:** What are the first and last calendar days of the **astronomical** seasons summer, fall, winter and spring in the Northern and Southern Hemispheres in the years 2023 to 2024?

#### Answer #5:

In the **Northern Hemisphere** for the years 2023 to 2024 (times stated as EDT time zone):

- Spring starts on **March 20, 2023** at 5:24 P.M. EDT and ends on **June 20, 2023** at 10:58 A.M.
- Summer starts on **June 21, 2023** at 10:58 A.M. EDT and ends on **September 22, 2023** at 2:50 A.M.
- Fall (Autumn) starts on **September 23, 2023** at 2:50 A.M. EDT and ends on **December 21, 2023** at 10:27 P.M.
- Winter starts on **December 21, 2023** at 10:27 P.M. EST and ends on **March 19, 2024** at 11:06 P.M.

In the **Southern Hemisphere** for the years 2023 to 2024:

- Spring starts on **September 23, 2023** at 2:50 A.M. EDT and ends on **December 21, 2023** at 10:27 P.M.
- Summer starts on **December 21, 2023** at 10:27 P.M. EST and ends on **March 19, 2024** at 11:06 P.M.
- Fall (Autumn) starts on **March 20, 2024** at 11:06 P.M. EDT and ends on **June 20, 2024** at 4:51 P.M.
- Winter starts on **June 20, 2024** at 4:51 P.M. EDT and ends on **September 22, 2024** at 8:44 A.M.