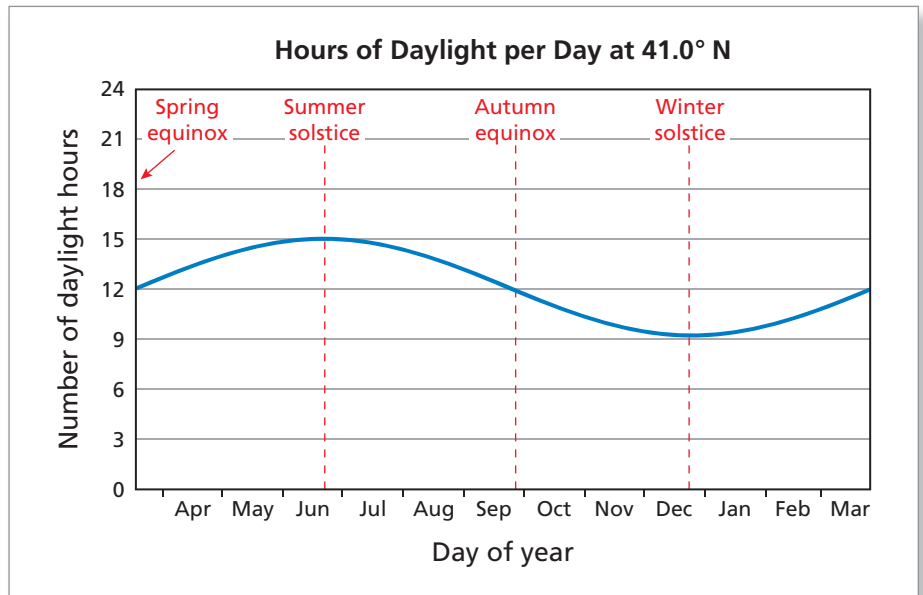




In the United States, the 41st parallel forms the border between Wyoming and Utah, Wyoming and Colorado, and Colorado and Nebraska.

EXAMPLE 6 Analyzing Hours of Daylight

The graph shows how the hours of daylight vary at any location on the 41st parallel in the northern hemisphere. Describe this pattern.

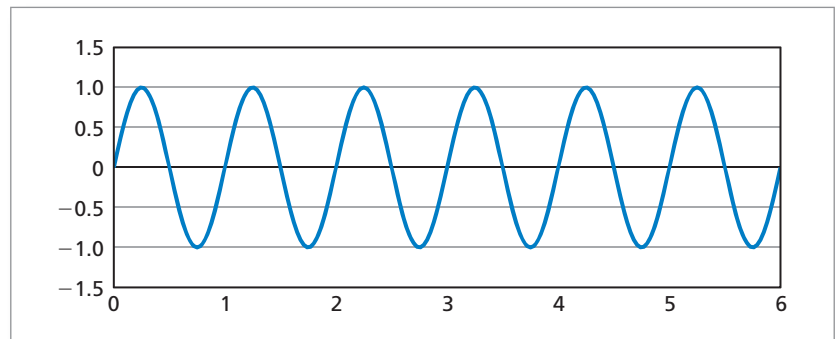


SOLUTION

There are four critical points on the graph.

- **Summer solstice:** This day corresponds to the greatest number of hours of daylight at any location in the northern hemisphere.
- **Winter solstice:** This day corresponds to the least number of hours of daylight at any location in the northern hemisphere.
- **Spring & autumn equinox:** On these 2 days, every location in the northern hemisphere receives equal amounts of daylight and darkness—12 hours of daylight and 12 hours of darkness.

This pattern is called a *sine wave* or a *sinusoid*. It continuously oscillates above and below a mean value.



✓ Checkpoint

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Describe other occurrences in nature that can be modeled by a sine wave. Explain your reasoning.