ST. LAWRENCE UNIVERSITY

Clocks and Racing Planets
Fall 2026

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Why do we change the clocks??

- ☆ Earth's tilt changes day length constantly
  - At 44.6° N (Canton) this means
    - Shortest day (~ 12/21) is 8h 49m long
    - Longest day (~6/21) 15h 37m long
    - Difference = 6h 48m
  - On the equator, all days are 12h long
  - At 60 ° N (& S), day length changes by 13 hr.
    - 18h 52m June, 5h 52m December
  - On & north of the Arctic Circle (66.5° N) day length goes from 24 hours of dark to 24 hours of light (same on & S. of Antarctic Circle)

Photo by Marc Staves 2011

Why do we change the clocks??

- ☆ We must cope with changing daylight
  - Standard time
    - ☽ Clock noon is solar noon
    - ☽ Sunset & sunrise (almost) symmetric about clock noon
  - Daylight time
    - ☽ 1 pm is solar noon
    - ☽ Sunrise & sunset shifted an hour later
      - ♈ More light in the evening, more dark in the morning
  - Daydark time
    - ☽ 11 am is solar noon
    - ☽ Sunrise & sunset shifted an hour earlier

Yeah ... nobody does this, but it's an option!!

Yeah ... nobody does this, but it's an option!!

Photo by Marc Staves 2011

Why do we change the clocks??

- ☆ What would it be like to have
  - Year-Round Standard time
    - ☽ Clock noon is solar noon
  - Year-Round Daylight time
    - ☽ 1 pm is solar noon
    - ☽ Sunrise & sunset shifted an hour later
      - ♈ More light in the evening, more dark in the morning
    - ☽ Started in January 1974 … Repealed in October
      - ♈ Everyone hated it!!
    - ☽ Proposed in "Sunshine Protection Act"
      - ♈ Passed in the House on 7/14/26, stalled in the Senate
        - ♍ Some senators remember 1974!!

Photo by Marc Staves 2011

Current Practice

- ☆ Daylight Saving Time (EDT)
  - 🌎 Begins on 2nd Sunday in March
    - ☽ Spring Equinox ~ 3rd week of March (~3/21)
    - ☽ Change clocks ~ 1 week before equinox
  - 🌎 Ends on 1st Sunday in November
    - ☽ Halloween in EDT for trick-or-treaters on 10/31
- ☆ Standard Time (EST)
  - 🌎 Begins on 1st Sunday in November
    - ☽ Autumnal Equinox ~ 3rd week of September (~9/21)
    - ☽ Change clocks ~ 6 weeks after equinox
      - ♈ Like starting EDT on 2nd Sunday of February!
      - ♈ Lack of symmetry due to Halloween accommodation!

Photo by Marc Staves 2011

Year-Round Standard Time

- ☆ Humans prefer to rise around Sun rise
  - 🌎 Year-round standard time
    - ☽ Summer Sun rise at 4:13 am

Summer EST Sunrise at 4:13 am.

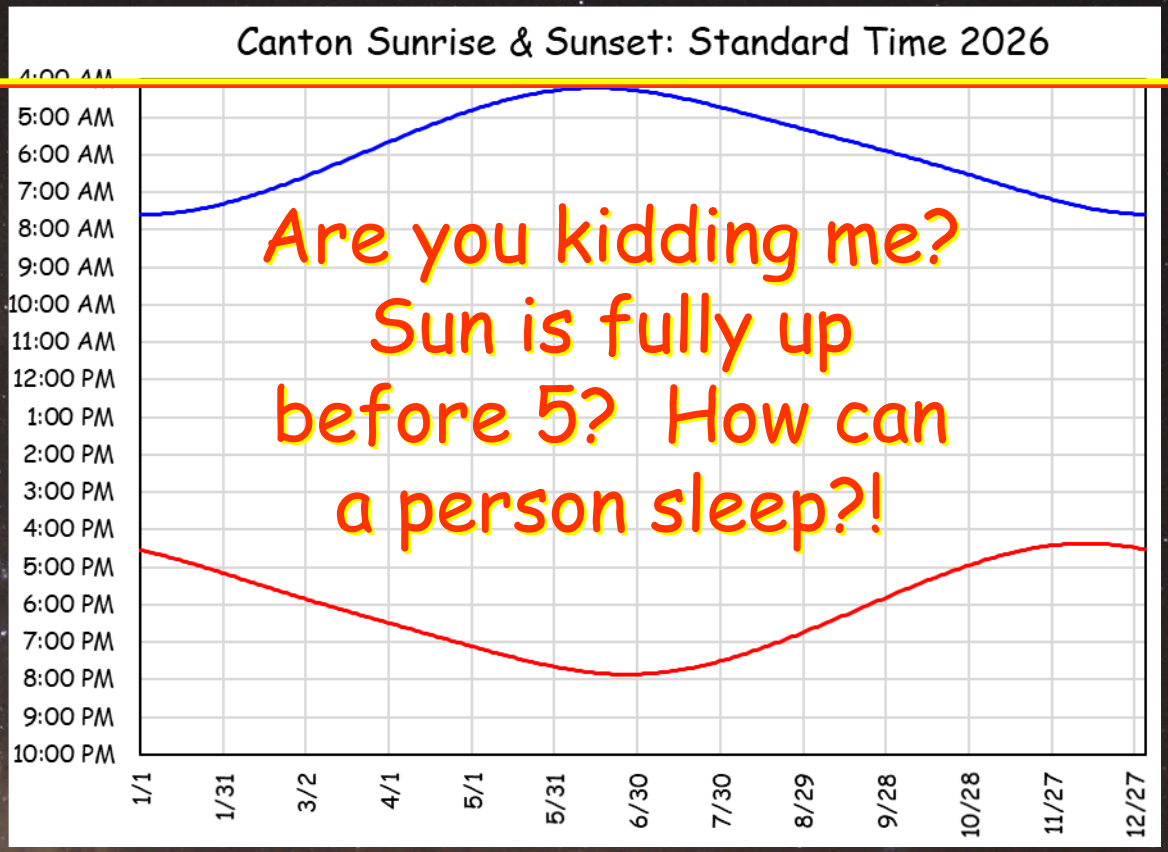


Photo by Marc Staves 2011

Year-Round Daylight Saving Time

- ☆ Humans prefer to rise around Sun rise
  - 🌎 Stay in daylight time
    - ☽ Winter Sun rise at 8:36 am

Winter
EDT Sunrise at
8:36 am.

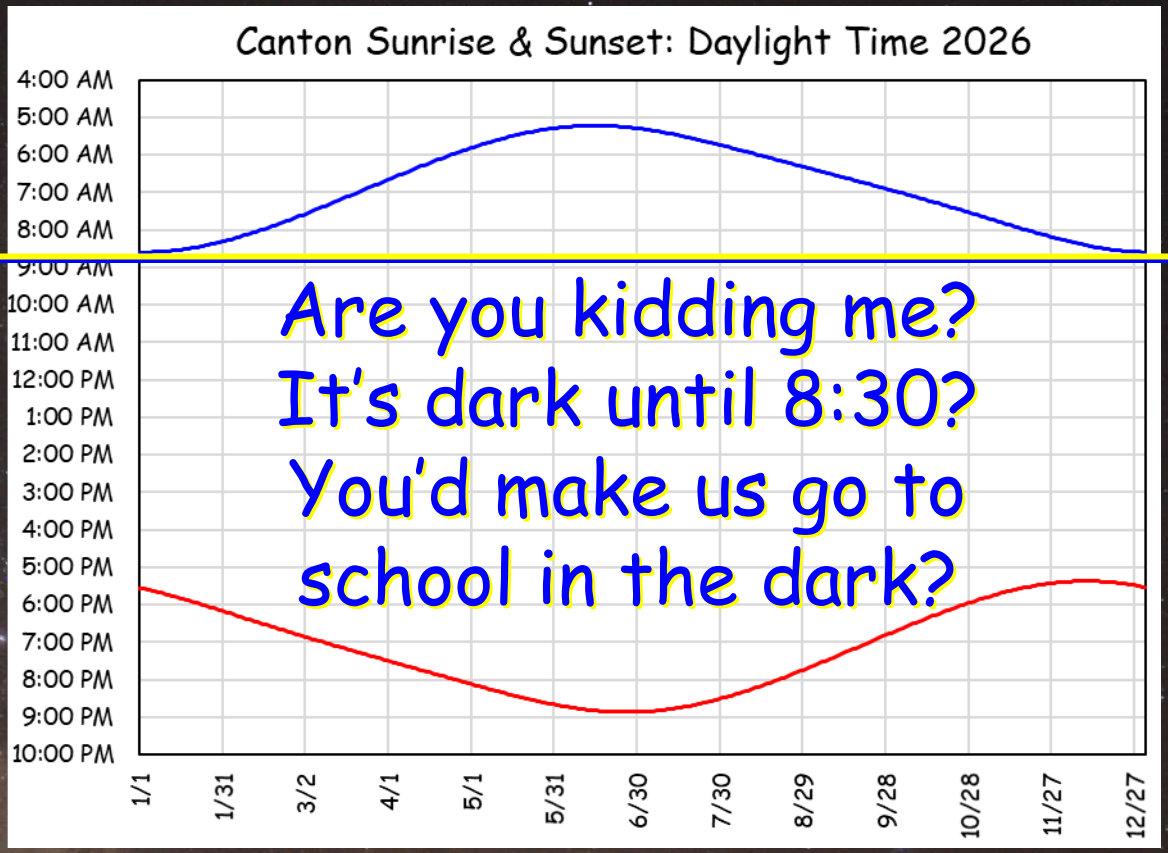


Photo by Marc Staves 2011

Changing Clocks in 2026

- ☆ Humans prefer to rise around Sun rise
  - 🌎 Changing clocks is the best compromise
    - ☽ Summer Sun rise 5:13 am, Winter Sun rise 7:36 am

Summer EDT Sunrise at 5:13 am.

Winter EST Sunrise at 7:36 am.

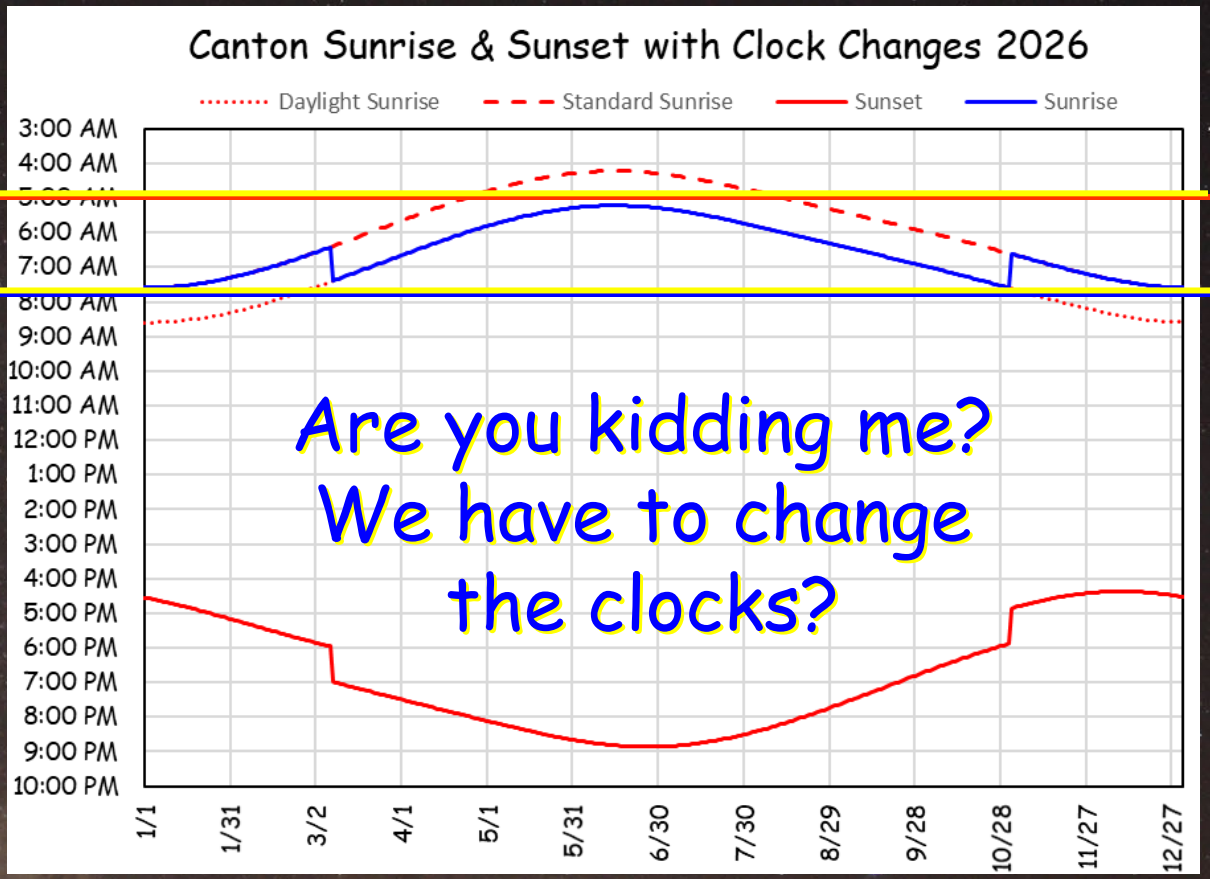


Photo by Marc Staves 2011

The compromise of changing the clocks seems to work best.

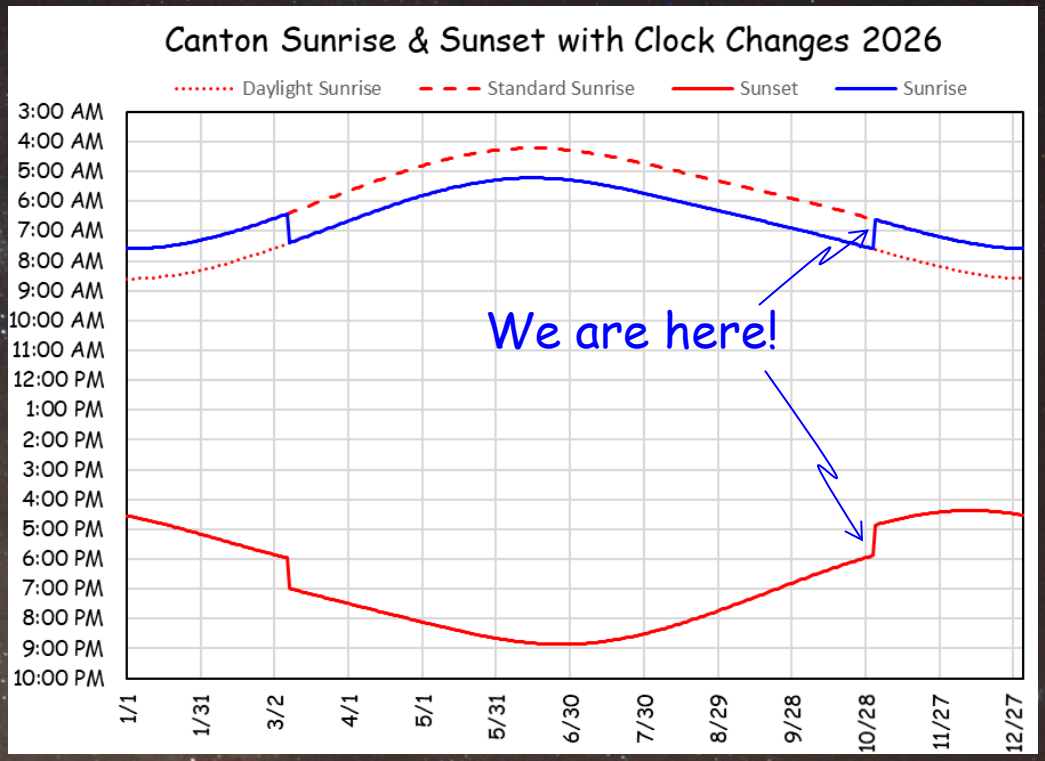


Photo by Marc Staves 2011

Clocks in 2026

- ☆ Daylight Saving Time (EDT)
  - 🌎 Started 3/8/2026, will start 3/14/2027
- ☆ Standard Time (EST) in the winter

Standard Time

Begins on November 1, 2026

"Fall Back"

Photo by Marc Staves 2011

Racing Morning Planets

- ☆ Jupiter in Leo
  - 🌎 Orbit 5 times larger than Earth's
    - ☽ Yearly path longer than Mars ($10\pi R_{\text{Earth orbit}}$)
    - ☽ Weaker solar gravity makes it slower in orbit
      - ♈ Jupiter at about 30,000 mph
- ☆ Mars in Cancer, moving toward Leo
  - 🌎 Orbit 1.5 times larger than Earth's
    - ☽ Yearly path shorter than Jupiter's ($3\pi R_{\text{Earth orbit}}$)
    - ☽ Stronger solar gravity makes it faster than Jupiter
      - ♈ Mars at 54,000 mph
      - ♈ Earth at about 67,000 mph

Photo by Marc Staves 2011

Racing Morning Planets

- ☆ Jupiter & Mars high in sky at 6 am
  - Jupiter 50° above SE horizon
    - ☽ Brightest object in morning sky (other than moon)
    - ☽ Above Leo's front paw (Sphinx looking west)
  - Mars 7° west (right, higher) and reddish
- ☆ Mars will pass Jupiter on 11/16
  - Moon passes both on November 2
    - ☽ Waning Crescent … Light on left, ~47% illuminated
  - Mars will be 1° N (above) Jupiter
    - ☽ Conjunction = objects close in sky
- ☆ Illustrated on following slides

Photo by Marc Staves 2011

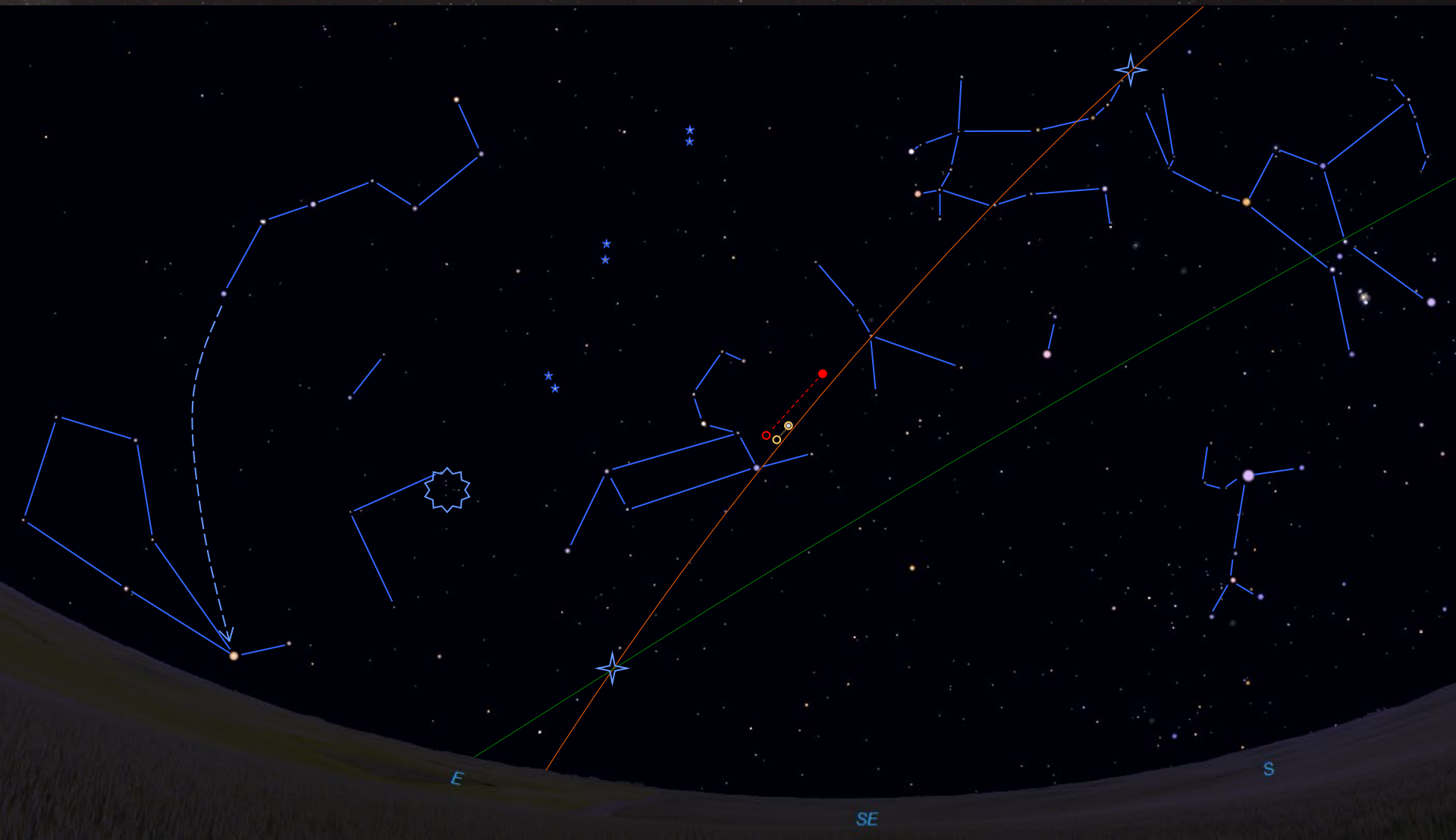
Racing Morning Planets

☆ Mars overtakes Jupiter on 11/16/26



Racing Morning Planets

- ☆ Mars overtakes Jupiter on 11/17/26



Racing Morning Planets

☆ Mars overtakes Jupiter on 11/17/26



In the Wilderness Above,

The adventure continues ...

