Family edition

# Sun and Seasons Lab: Your Town's Sun Through the Year

Ages 11-14 · about 45 minutes, in one sitting

Your child maps your own town's year in Sun and Seasons Lab: the longest and shortest days, the equinoxes, how high the Sun climbs at noon, and when that happens on the clock. The point is that the Sun's path changes through the year, and sun noon is rarely 12:00.

## What you need

- A computer or Chromebook with a current browser.
- The lesson link: mytekdev.com/try/sunseasonslab?lesson=your-towns-sun-through-the-year&ref=fam-sunseasonslab-2. No account, no email and nothing to install.
- The name of your town, or the nearest town of 15,000 people or more.

## Before you start: try it once yourself

Open mytekdev.com/try/sunseasonslab?lesson=your-towns-sun-through-the-year&ref=fam-sunseasonslab-2. Denver on June 21 at 10 in the morning, with every control showing and no guide inside the app; the lesson's guide runs along the bottom of the page.

1. **Sun noon.** Press `Sun noon`. A note gives the time: 1:02 pm. The readout on the ground says the Sun is 74 degrees up and the shadow 0.29 m.
2. **December.** Press `December solstice`. The day is 9 hours 21 minutes; at sun noon, 11:58 am, the Sun is 27 degrees up and the shadow 1.97 m.
3. **The equinoxes.** Press `March equinox`: 12 hours 9 minutes, sun noon at 1:07 pm, 50 degrees. Then `September equinox`: 12 hours 9 minutes again, sun noon at 12:53 pm.
4. **My town.** Press `Find my town`, type a name, and pick it from the list. Or tap the world map; a spot on the map is kept to a whole degree, with no name.

> The numbers are for 2026 and match the US Naval Observatory to the minute. Sunrise and sunset are for flat ground, so real times can differ by a minute or so with hills and the air.

## The ideas, in plain words

Earth's tilted axis keeps pointing the same way as Earth goes round the Sun. From March to September the north end leans toward the Sun, so in the northern half of Earth the Sun climbs higher and stays up longer. The June solstice is the peak, the December solstice the bottom, and on the equinoxes the Sun is over the equator.

Equinox days are not exactly 12 hours. Sunrise counts from the moment the top edge of the Sun appears, and the air bends its light up over the horizon, so most places get 12 hours and 7 to 15 minutes. Denver gets 12 hours 9

minutes.

Sun noon is when the Sun is highest. Clocks are set for a whole time zone and daylight saving moves them an hour, so sun noon wanders around the clock. In Denver, which sits almost on its time zone's middle line, it runs from 11:43 am in early November to 1:11 pm in early March. Miami sits west of its zone's middle line, so on March 20 its sun noon is at 1:28 pm. A third, smaller reason, Earth's speed and tilt changing through the year, is at the high school level.

## Do it together

1. Open mytekdev.com/try/sunseasonslab?lesson=your-towns-sun-through-the-year&ref=fam-sunseasonslab-2 together and press `Sun noon`.

   > **You'll know it worked when:** In Denver on June 21 the Sun is highest at 1:02 pm, not 12:00.

2. Press `December solstice`, then `March equinox`, then `September equinox`, and read the card each time.

   > **You'll know it worked when:** December is 9 hours 21 minutes of daylight; the equinoxes are a little over 12 hours.

3. Press `Find my town`, type your town's name and pick it.

   > **If you get stuck:** Only places of 15,000 people or more are listed. Pick the nearest bigger town, or tap the map.
   >
   > **You'll know it worked when:** The town list now says My town.

4. Go through the same four days in your town and write down the day length, the noon height and the time of sun noon.

   > **You'll know it worked when:** Your child can say how your town's year differs from Denver's, and why sun noon is not 12:00.

## Talk about it

Ask these while you work together. A child who has understood it can answer them without help:

- Which day of the year is longest in your town? How long is it?
- Where on the year graph are the equinoxes, and how long are those days?
- Why is the noon shadow long in December?
- Your town's sun noon is not 12:00. Give one reason.
- Is your town's summer day longer or shorter than Denver's? What could cause that?

> The last question is the real test: a child who links a longer summer day to being farther north is reading latitude off the model.

## For younger and older kids

**Younger:** For a younger child, go outside at lunch on a sunny day and look at your shadows. Then compare the June and December noon shadows in the app.

**Older:** For a teenager, solve the puzzle When is noon?, then switch the level to High school and check one day with the noon height formula.

## Keep going

- Solve the puzzle When is noon? and explain why Anchorage's sun noon on June 21 is at 2:02 pm.
- Pick Tromso, Norway on the year graph and find the days the Sun never sets and never rises.
- Switch the level to High school and use the noon height formula, 90 minus the latitude plus the Sun's declination, to check one day.

## Bring it into other subjects

- Math: graph your town's day length on the first of every month and find the steepest part of the curve.
- Geography: find the middle line of your time zone on a map. Is your town east or west of it, and does that fit your sun noon?
- History: read how towns kept their own sun time before railroads brought time zones in 1883.
- Art: sketch the Sun's path over your school on the four days, using the dotted arcs in the app as a guide.

## For your records

Ready to copy into an hour log, a portfolio or a transcript.

| | |
|---|---|
| **LESSON** | Sun and Seasons Lab: Your Town's Sun Through the Year |
| **SUBJECTS** | Earth and space science |
| **TIME** | 45 minutes |
| **WHAT WE DID** | Read a model of the Sun's path through the year for Denver and our own town: the solstices, the equinoxes, day length, the noon Sun's height, and why sun noon is not 12:00 on the clock. |
| **SKILLS PRACTICED** | Solstices and equinoxes; Reading a graph; Using a model |

# Activity sheet (optional)

Name: _____ Date: _____

Open the app: scan the QR code, or go to mytekdev.com/try/sunseasonslab?lesson=your-towns-sun-through-the-year

Essential question: How does the Sun's path over your town change through the year?

Warm-up: When is the Sun highest in the sky? At 12:00? Why? _____

1. **Vocabulary.** Solstice, equinox, day length, sun noon, latitude: write each in your own words.

2. **Denver.** For March 20, June 21, September 22 and December 21, write the day length, the noon Sun's height and the clock time of sun noon.

3. **My town: _____.** The same four days: day length, noon height, sun noon.

1. Which is the longest day in your town, and which is the shortest? How do the noon heights compare?

2. Why is sun noon not at 12:00 on the clock in your town?

## Quick check

Name: _____

1. In the northern half of Earth, the longest day of the year is near (A) March 20 (B) June 21 (C) December 21

2. In Denver on June 21, the Sun is highest at about (A) 12:00 pm (B) 1:02 pm (C) 3:00 pm

3. Why is a stick's noon shadow longer in December than in June?

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## Answers

| QUESTION | ANSWER | WHY |
|---|---|---|
| 1 | B | The June solstice: in Denver, 14 hours 59 minutes of daylight. |
| 2 | B | Daylight saving moves the clock an hour ahead, and Denver is almost on its time zone's middle line, so sun noon is about 1:00 pm. |
| 3 | The Sun is lower | The December noon Sun is low (27 degrees in Denver against 74 in June), so the shadow stretches farther: 1.97 m against 0.29 m for a 1 m stick. |

If your state or umbrella school asks, this lesson covers NGSS MS-ESS1-1, Texas TEKS 112.26(b)(9)(A).

## Terms of use

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The app this lesson uses is free and runs in the browser, with nothing to install and no account needed. It is at mytekdev.com.

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