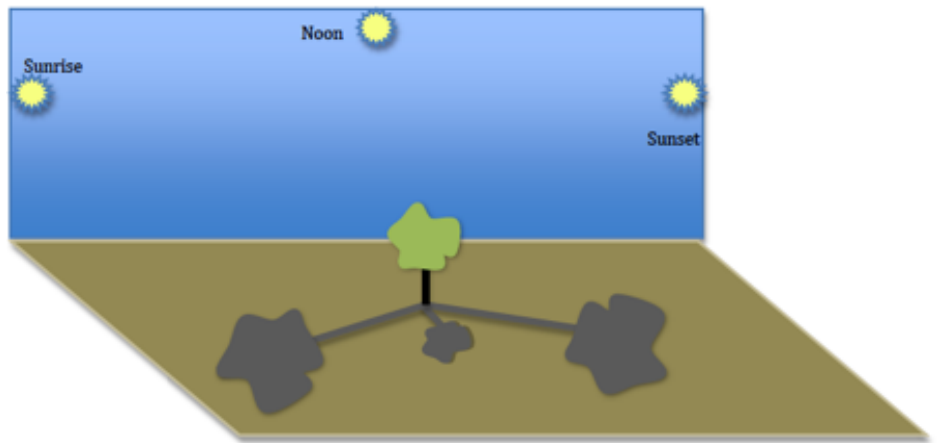


LIGHTLAB EXTRA 4: LOCAL NOON

PURPOSE: Measure a stick's shadow to determine your local noon.

INTRODUCTION: Local noon or solar noon occurs when the sun reaches its highest point in the sky. It will occur halfway between sunrise and sunset.



The shadows of objects on the ground will be shortest at noon than any other time of the day. On the other hand, the longest shadows will be at sunrise and

sunset, because the sun is at an angle. As shown in the diagram, the shadows of a tree will vary in size at different times of the day.

Solar noon doesn't always occur at the same time as your clock reads 12:00 noon. The shortest shadow of the tree is likely to occur at a time that is different from your clock, by just a few minutes or over an hour. This will depend on your location, and whether you are in Day Light Savings Time or Standard time.

There are various resources that help find your local noon when the sun is truly at its highest point and the shadows are shortest. Checkout <https://www.timeanddate.com> and find its Sunrise and Sunset calculator which provides critical times of the day.

For example, if you want to find local noon in Philadelphia PA on November 1 2022, enter that information in the **Sunrise and Sunset** Calculator, and you will obtain a table of data on times of the day. The first row will look like the display below where the Solar noon is 12:44pm.

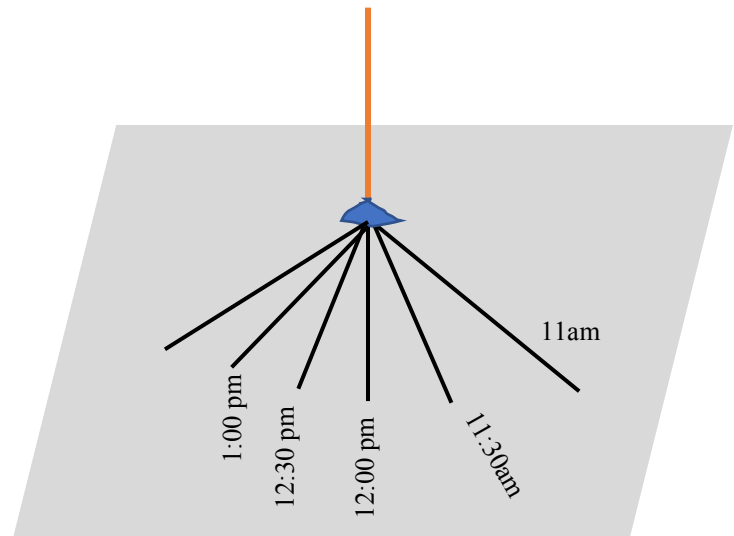
2022	Sunrise/Sunset		Daylength		Astronomical Twilight		Nautical Twilight		Civil Twilight		Solar Noon	
	Sunrise	Sunset	Length	Diff.	Start	End	Start	End	Start	End	Time	Min/mi
1	7:29 am →	5:58 pm ←	10:28:32	-2:18	5:58 am	7:29 pm	6:29 am	6:58 pm	7:01 am	6:26 pm	12:44 pm	92.260

EXPERIMENT TO FIND LOCAL NOON:

MATERIALS: A wooden stick, playdough, a ruler, a pencil, clear sky

PROCEDURE:

1. Pick a sunny day and choose a flat location outside that is away from traffic.
2. Hold the pencil stick straight such as playdough or glue.
3. Place the mounted stick at the same location throughout the complete measurement.
4. Measure the length of the shadow every 30 minutes from 11am to 2pm.
5. Record your results in Table 1 below.



RESULTS AND DISCUSSION:

TABLE 1 Shadow Measurements

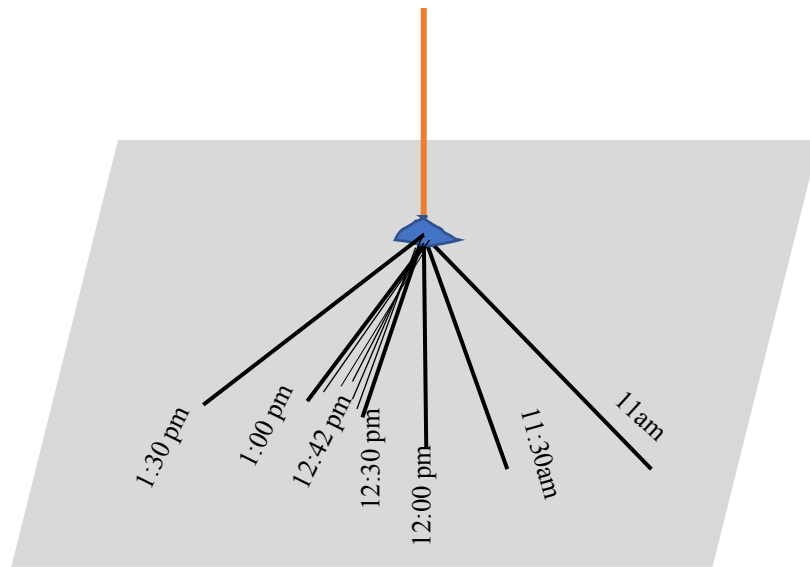
Time	<u>11am</u>	<u>11:30 am</u>	<u>12:00</u>	<u>12:30pm</u>	<u>1:00pm</u>	<u>1:30pm</u>	<u>2:00pm</u>
Length of shadow							

- Describe your observations about the shadow over time: _____

- Enter the 2 times when the shadow was shortest. T₁ _____ and T₂ _____.
- Find out local noon at your current location and date using the website <https://www.timeanddate.com>
Date of the Experiment: _____ Location: _____ Local noon: _____
- Which time is closest to the local solar noon? T₁ or T₂ _____.

FURTHER INVESTIGATION:

You might want to repeat the experiment and take more frequent measurements around the local noon, to find out if the shadow of the stick is indeed shortest then. Let us say, you find out from <https://www.timeanddate.com> that your local noon is 12:42 pm. You will begin taking measurements every 30min from 11:am until 12:30pm. The shadow should be getting _____er. At 12:30pm, you will begin measuring the shadow every 4 minutes for 20 minutes!



Go ahead design your own experiment on another sunny day, and use Table 2 which has plenty of cells to enter your measurements. Repeat steps 1-4

Date of Experiment: _____ **Location:** _____ **Local noon:** _____

- Enter the times in Table2 ahead of time, to allow more time for measuring.

TABLE 2 Record length of shadow of stick at the determined times

Time									
Length of shadow									
Time									
Length of shadow									

- Record the 2 times of the shortest shadows. T₃ _____ T₄ _____.
- Which one is closest to the local noon? _____
- Is this time closer to local noon than you obtained for T₁ and T₂ in Table 1?

by Suzanne Shera, M.S. Author of Lightlab

- **CONCLUSION**: Write what you did and what you learned. What do you propose to do differently the next time you repeat this?

Feel free to contact us (<https://www.lightlabetc.com>) so that:

- a. we evaluate your results and answer your questions
- b. you comment about this activity
- c. you send questions on physics and the nature of light in particular.

For more postings on science and faith, follow us @lightlabetc on Instagram, Facebook, Youtube and Pinterest

God's Light:

Our earth orbits an ideal Star: The sun is a single star, has the right mass, releases a stable energy and brightness, the perfect age not too young (excessive Magnetic activity) or too old and expanded. The sun is also at a perfect distance from the earth to keep it warm enough.

Why not stop and praise our God for His creation!

Psalm 19

19 The heavens declare the glory of God,
and the sky above^[a] proclaims his handiwork.

² Day to day pours out speech,
and night to night reveals knowledge.

³ There is no speech, nor are there words,
whose voice is not heard.

⁴ Their voice^[b] goes out through all the earth,
and their words to the end of the world.

In them he has set a tent for the sun,

⁵ which comes out like a bridegroom leaving his chamber,
and, like a strong man, runs its course with joy.

⁶ Its rising is from the end of the heavens,
and its circuit to the end of them,
and there is nothing hidden from its heat.

Psalm 113:3

³ From the rising of the sun to its setting, the name of the Lord is to be praised!

Ecclesiastes 1:5

The **sun** rises, and the **sun** goes down, and hastens to the place where it rises.

Also check out more related verses: Psalm 50:1, Psalm 72:5, Psalm 72:17, [Psalm 74:16](#), Psalm 84:11, Psalm 89:36, Psalm 104:19, Psalm 113:3, [Psalm 136:8](#), [Psalm 148:3](#)