

## Details



**Completion Time:** About one period

**Permission:** Download, Share, and Remix

## Toolik, Daylight and Darkness

### Overview

Students will review charts of day length to determine when the sun will set at Toolik Lake.

### Objective

Students will learn the following:

- The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle.
- Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day.

### Preparation

Make copies of the attached document. Students/teachers need computer(s) with Internet access.

### Description

Handout document to students. Introduce concept of looking at pattern of daylight and darkness to predict when the sun will set for the first time after months of constant daylight at Toolik Lake, Alaska. After students predict, visit the website <http://www.gaisma.com> to find local charts. Teachers can use the website for students to compare the latitude and length of daylight/darkness at various locations.

### Resources

[www.Gaisma.com](http://www.Gaisma.com)

### Credits

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## Materials

- Computers
- Internet access
- Document (attached)

## Can you tell when it will get dark at Toolik?

Assume the latitude for the Gates of the Arctic and Toolik are close enough to not make a big difference. (Gates of the Arctic Lat = 67.75, Toolik Lat = 68.36.

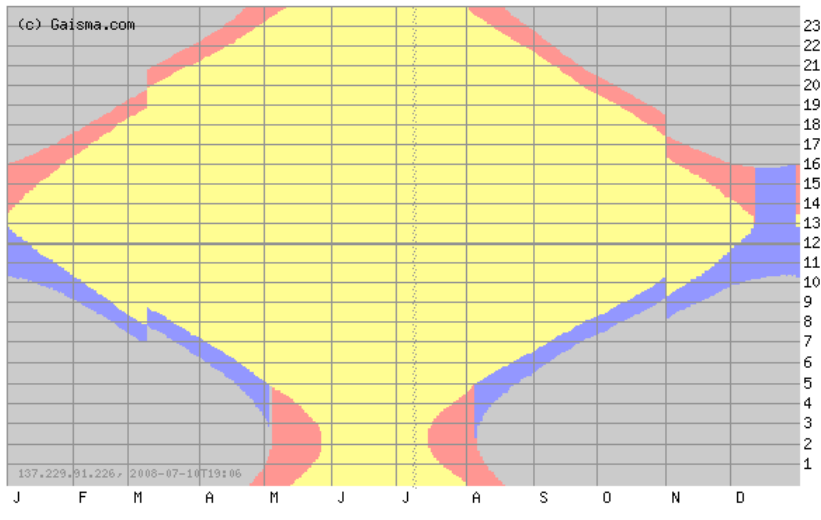
→ For more information on reading the graphs and checking on your own location, or any location around the world, visit: <http://www.Gaisma.com>

### Gates of the Arctic National Park and Preserve, [Alaska, United States](#) - Sunrise, sunset, dawn and dusk times, table

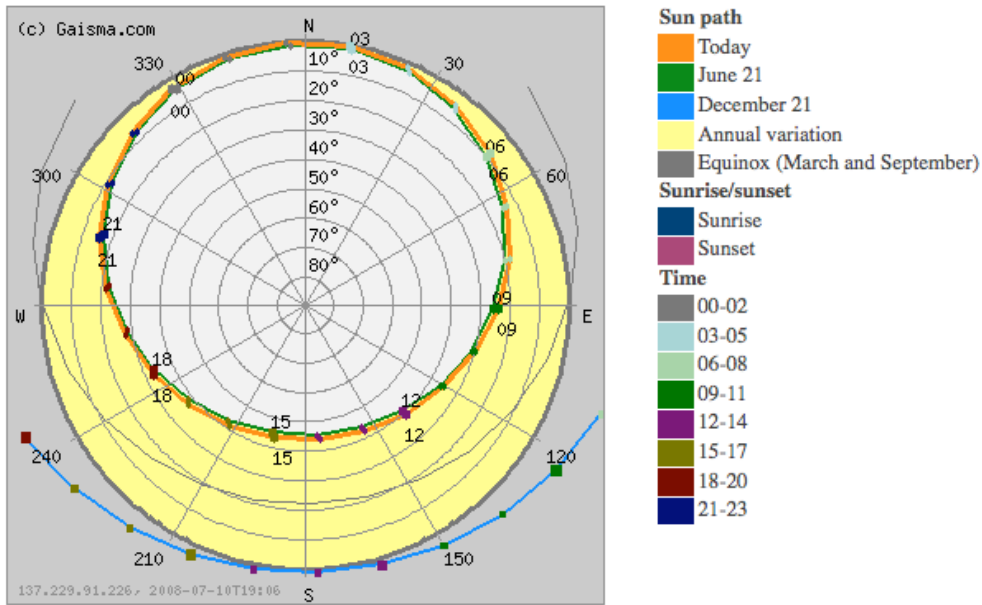
Date	Sunrise	Sunset	Length	Change	Dawn	Dusk	Length	Change
Today	---	---	24:00		---	---	24:00	
+1 day	---	---	24:00	00:00 equal length	---	---	24:00	00:00 equal length
+1 week	02:48	01:39*	22:51	01:09 shorter	---	---	24:00	00:00 equal length
+2 weeks	03:47	00:46*	20:59	03:01 shorter	---	---	24:00	00:00 equal length
+1 month	05:08	23:25	18:17	05:43 shorter	02:57	01:25*	22:28	01:32 shorter
+2 months	07:04	21:15	14:11	09:49 shorter	06:04	22:14	16:10	07:50 shorter
+3 months	08:49	19:10	10:21	13:39 shorter	07:54	20:05	12:11	11:49 shorter
+6 months	12:14	14:26	2:12	21:48 shorter	10:18	16:21	6:03	17:57 shorter

Notes: Daylight saving time, \* = Next day. Change [preferences](#).

### Gates of the Arctic National Park and Preserve, [Alaska, United States](#) - Sunrise, sunset, dawn and dusk times, graph



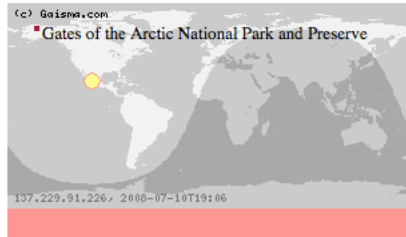
**Gates of the Arctic National Park and Preserve, [Alaska, United States](#) - Sun path diagram**



Notes: \* = Daylight saving time, \* = Next day. [How to read this graph?](#) Change [preferences](#).

**Gates of the Arctic National Park and Preserve, [Alaska, United States](#) - Basic information**

Latitude: +67.75056 (67°45'02.016"N)  
 Longitude: -153.25056 (153°15'02.016"W)  
 Time zone: UTC-9 hours  
 Local time: 11:09:11  
 Country: [Alaska, United States](#)  
 Continent: [Americas](#)  
 Sub-region: [Northern America](#)  
 Distance: 0 mi (from [home](#))  
 Altitude: ~980 m  
 Change [preferences](#).



**Gates of the Arctic National Park and Preserve, [Alaska, United States](#) - Solar energy and surface meteorology**

Variable	J	F	M	A	M	J	J	A	S	O	N	D
Insolation, kWh/m <sup>2</sup> /day	0.01	0.36	1.37	3.09	4.72	5.85	5.00	3.30	2.02	0.76	0.08	0.00
Clearness, 0 - 1	0.17	0.35	0.41	0.47	0.48	0.51	0.47	0.42	0.44	0.42	0.31	---
Temperature, °C	-26.45	-24.77	-21.64	-12.35	-1.99	9.52	11.65	6.55	-1.07	-13.36	-22.11	-24.54
Wind speed, m/s	6.54	6.16	5.27	4.68	4.39	4.25	4.67	4.89	5.07	5.62	6.38	6.58
Precipitation, mm	22	17	20	13	10	33	48	51	20	16	19	18
Wet days, d	7.4	7.7	8.5	7.1	6.8	10.5	13.2	14.6	12.5	11.6	10.1	9.9

These data were obtained from the NASA Langley Research Center Atmospheric Science Data Center; New et al. 2002  
 Notes: [Help](#). Change [preferences](#).