Shedding Light on the Sun and Earth Episode 2: Long Hot Summer Days Name: _____

Part A

1. How does the length of summer days compare to the length of winter days?

   _____

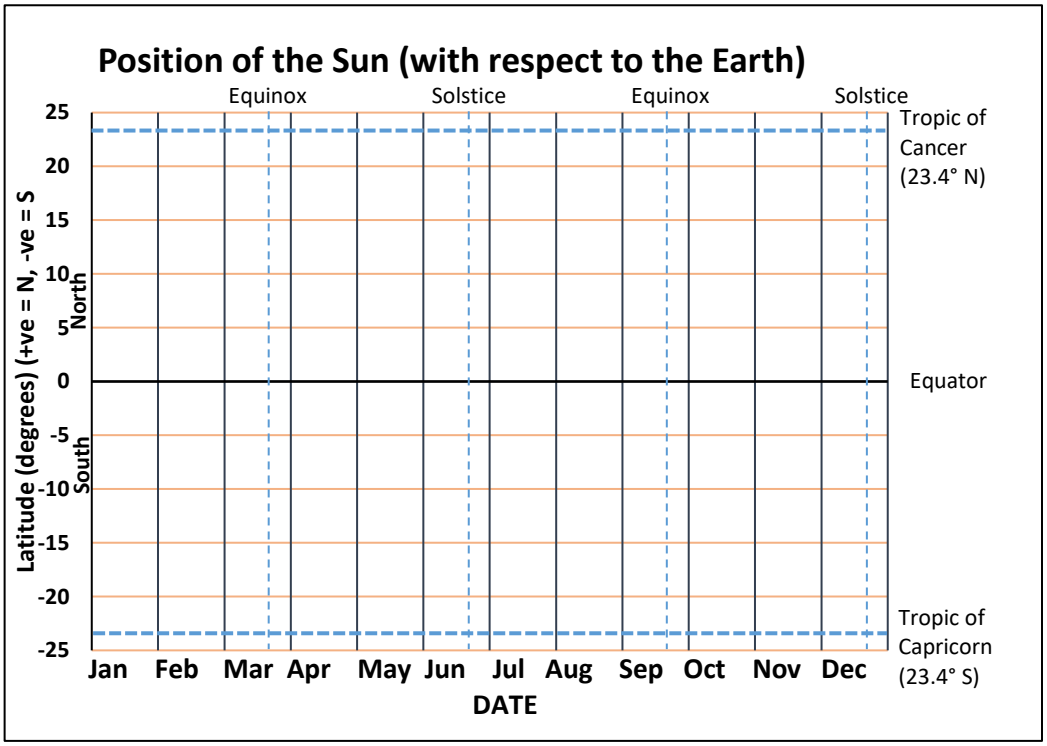
   _____

2. Melbourne's daytime lasts _____ on December 21st, and its night time goes for _____. On June 21st, the daytime lasts for _____ and the night lasts for _____. (These times are similar for all cities with similar latitudes to Melbourne.)

Part B

3. Use the table of the sun's position at different times of the year to draw a line graph. Each solid vertical line is the ***start*** of the month. Connect the dots with a smooth line. (Technical note: The number of days in each month varies slightly, but the graph shows all the months equally spaced. This is not ideal but is probably okay for our purposes.)

Position of the Sun over the Earth Throughout the Year	
Date	Latitude
January 1	23° S
February 1	17° S
March 1	7.5° S
March 21 (equinox)	0°
April 1	4.5° N
May 1	15° N
June 1	22° N
June 21 (solstice)	23.4° N
July 1	23° N
August 1	18° N
September 1	8° N
Sep 23 (equinox)	0°
October 1	3.5° S
November 1	14.5° S
December 1	22° S
Dec 21 (solstice)	23.4° S



4. On the day of the September equinox and on the day of the March equinox, the sun is directly over the _____, which has a latitude of _____ degrees. Daytime and night time are about _____ hours each.
5. On the day of the December solstice, the sun is directly above the _____, which has a latitude of _____°S. It is usually the _____ (longest or shortest) day of the year in the southern hemisphere and the _____ day of the year in the northern hemisphere. On the day of the June solstice, the sun is directly above the _____, which has a latitude of _____°N.
6. What does the word equinox mean? _____

   _____

   _____
7. What does the word solstice mean? _____

   _____

   _____

Part C

8. Explain why southern hemisphere cities get long days and short nights in December, while the reverse is true for northern hemisphere cities.

   _____

   _____

   _____

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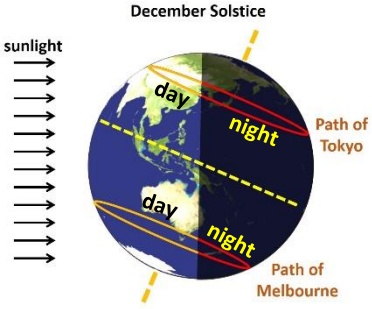


9. Go to the Time and Date website (www.timeanddate.com), hover over the *Sun and Moon* drop-down menu item and then click *Sun Calculator*. Search for your city or town.
Scroll down and you will see a graphic and a table (an example is shown below). Use the information in the day length column of your city to fill in the rest of the table (below Q10). Each month has its own tab.

March 2020 — Sun in Melbourne

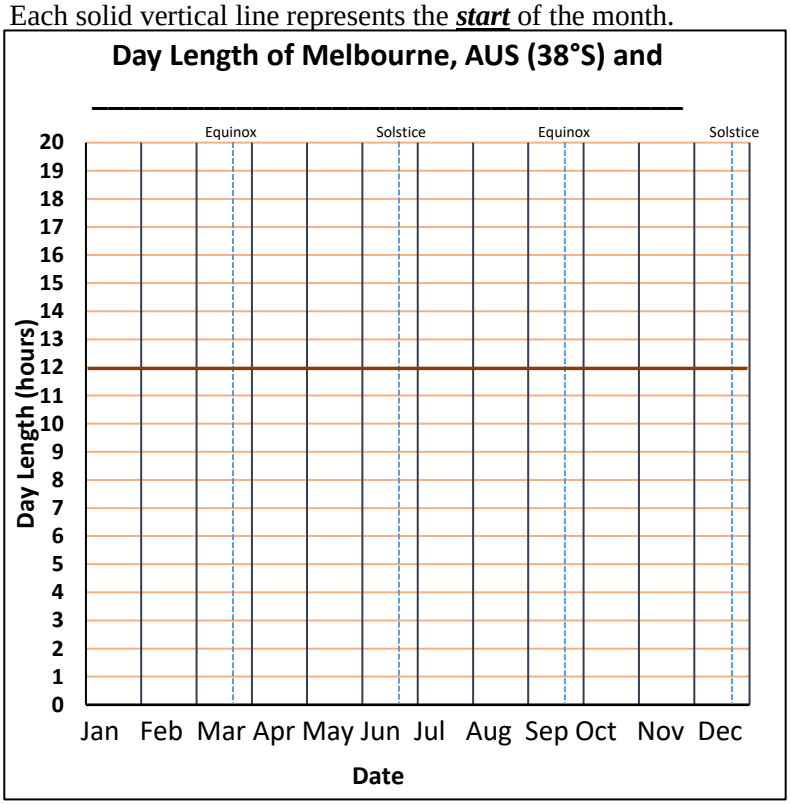
‹ February | March | April › Month: March Year: 2020 Go

2020	Sunrise/Sunset		Daylength		Astronomical Twilight		Nautical Twilight		Civil Twilight		Solar Noon	
Mar	Sunrise	Sunset	Length	Difference	Start	End	Start	End	Start	End	Time	Mil. km
1	7:04 am →(100°)	7:59 pm ←(260°)	12:55:03	−2:25	5:33 am	9:30 pm	6:06 am	8:58 pm	6:37 am	8:26 pm	1:32 pm (59.6°)	148.231
2	7:05 am →(100°)	7:58 pm ←(261°)	12:52:37	−2:26	5:34 am	9:29 pm	6:07 am	8:56 pm	6:38 am	8:24 pm	1:32 pm (59.3°)	148.267

10. Draw up line graphs for the day length of Melbourne and for the city of your choice. (There will be two lines on the graph.)

Date	Day Lengths at Different Times of the Year	
	Melbourne, AUSTRALIA hh:mm	_____ _____ hh:mm
Jan 1	14:44	
Feb 1	14:01	
Mar 1	12:55	
March Equinox (typically Mar 21)	12:08 (dotted line on graph)	(dotted line)
April 1	11:41	
May 1	10:33	
Jun 1	9:43	
June Solstice (typically June 21)	9:32 (dotted line on graph)	(dotted line)
Jul 1	9:35	
Aug 1	10:11	
Sep 1	11:16	
September Equinox (typically Sep 23)	12:08 (dotted line on graph)	(dotted line)
Oct 1	12:27	
Nov 1	13:40	
Dec 1	14:34	
December Solstice (typically Dec 21)	14:47 (dotted line on graph)	(dotted line)

Each solid vertical line represents the ***start*** of the month.



Latitude of Melbourne: 38°S
Latitude of _____: _____

11. In the Southern Hemisphere, days get shorter and shorter until the _____ _____ after which they get longer and longer until the _____ _____.
12. How does a city's latitude affect the difference in day length throughout the year?

_____
_____
_____
_____

Part D

13. Briefly describe how Daylight Saving Time works.

_____
_____
_____
_____

14. Countries near the equator rarely use Daylight Saving Time. Why not?

_____
_____
_____