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

Position of the Sun (with respect to the Earth)
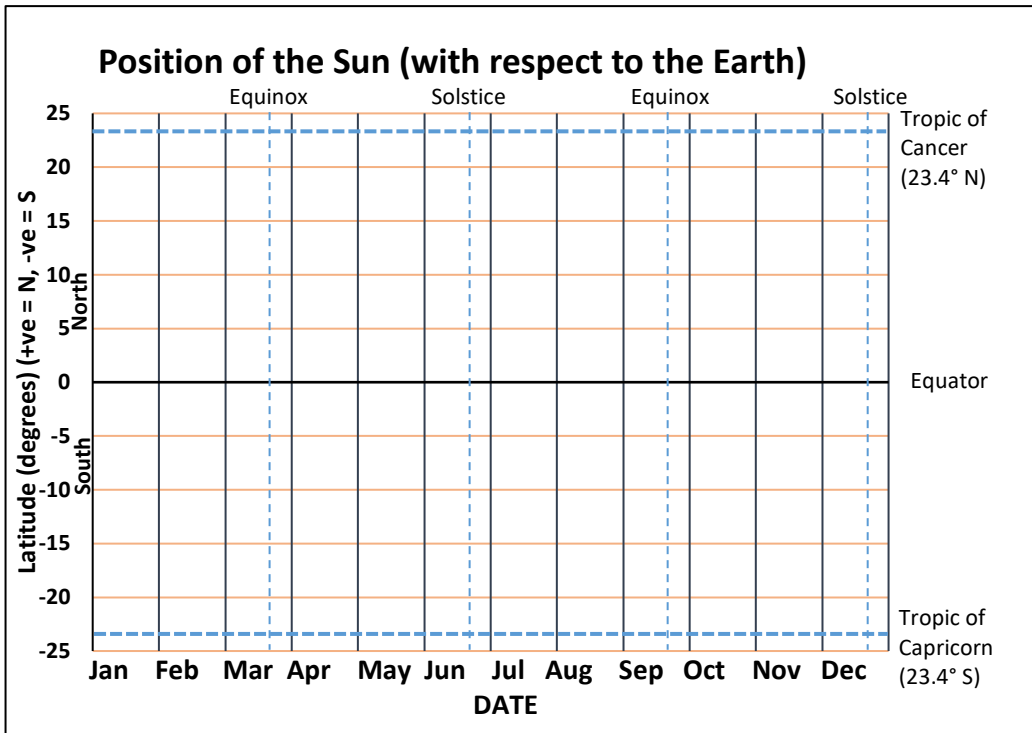
4. On the day of the September equinox and on the day of the March equinox, the sun is directly over the _____, which has a latitude of _____ degrees. Daytime and night time are about _____ hours each.

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 underlined equinox mean? _____
_____
_____

7. What does the word underlined 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.
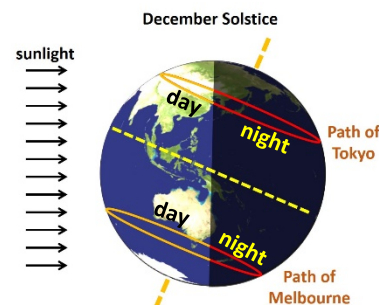_____
_____
_____
_____
_____
_____
_____

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

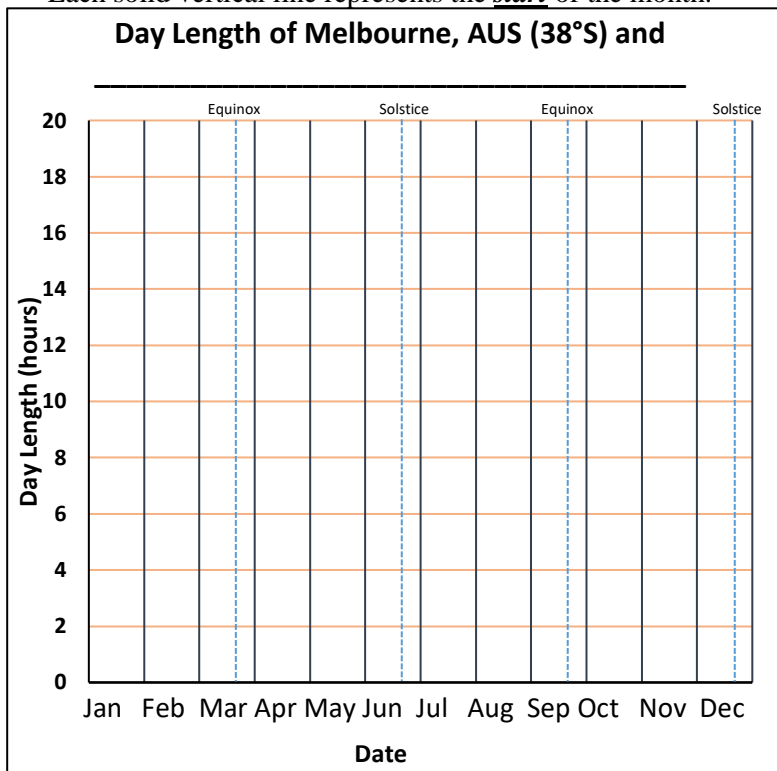‹ February | March | April ›   Month: March ⌄   Year: 2020 ⌄   Go

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.)

	Day Lengths at Different Times of the Year	
Date	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	
April 1	11:41	
May 1	10:33	
Jun 1	9:43	
June Solstice (typically June 21)	9:32	
Jul 1	9:35	
Aug 1	10:11	
Sep 1	11:16	
September Equinox (typically Sep 23)	12:08	
Oct 1	12:27	
Nov 1	13:40	
Dec 1	14:34	
December Solstice (typically Dec 21)	14:47	

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

Day Length of Melbourne, AUS (38°S) and
_____

Equinox   Solstice   Equinox   Solstice

Y-axis: Day Length (hours), 0 to 20
X-axis: Date — Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

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

11. Hover over the *Sun and Moon* drop-down menu again and click the "Day and Night Map" tab to see where the sun is right now. (This is not really a question.)

12. In the Southern Hemisphere, days get shorter and shorter until the _____ _____ after which they get longer and longer until the _____ _____.

13. How does a city's latitude affect the difference in day length throughout the year?

_____
_____
_____
_____

14. Briefly describe how Daylight Saving Time works.

_____
_____
_____

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

_____
_____
_____

Part D

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