

Name _____

Daylight Data: Days and Nights Around the World



Purpose: To investigate the number of hours of daylight received by countries at different latitudes.

Materials:

Daylight data sheet	Map pencils	Graph paper
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Procedure:

1. Graph the data you have been given.
2. Make a multiple line graph. **Why?**
3. Use a different color pencil for each different latitude.

Data Analysis:

Describe the pattern you see in the data.

If the data make a straight or almost straight line across the graph, what does that tell you about the length of day changes at that latitude?

What do lines that go up and down steeply tell you?

Questions:

The changes in day and night are caused by the rotation of the Earth. As the Earth rotates, only one half of our planet faces the Sun at any time. That half of the planet has day; the rest of the planet has night.

One complete rotation takes about 24 hours. In most places on Earth one change from day to night and back to day takes 24 hours.

The length of time spent in day and night depends on two things: 1) the time of year and 2) the distance from the equator.

If the Earth's axis were vertical all of the Earth would have 12 hours of day and 12 hours of night all year long. Since the axis is tilted, we have changes in the length of day and night.

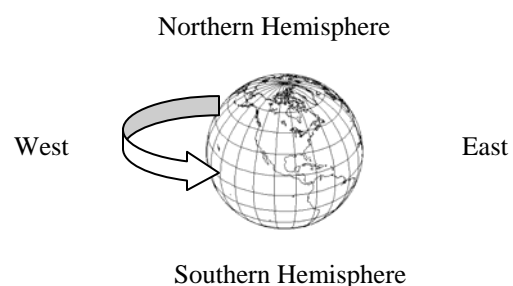
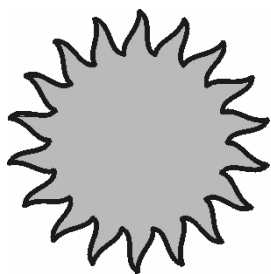
As the Earth revolves around the Sun, the tilt does not change; the position of the Earth changes compared to the Sun. During part of the revolution, the Earth is tilted so that the northern hemisphere is pointed toward the Sun. When this is true, the days are longer than the nights in the northern hemisphere.

When the Earth's revolution moves it to the other side of the Sun, the southern hemisphere is tilted toward the Sun and as a result has longer days than nights.

On June 21st, the northern hemisphere is most tilted toward the Sun. This is the day that the northern hemisphere has the most hours of daylight and fewest hours of night. It is the first official day of summer, and called the **summer solstice**. The southern hemisphere is most tilted away from the Sun, and has its least hours of daylight and the greatest hours of night. It is the first official day winter in the southern hemisphere and called the **winter solstice**. On December 21st, the reverse occurs.

The farther north or south of the equator a place is; the greater the difference between day and night.

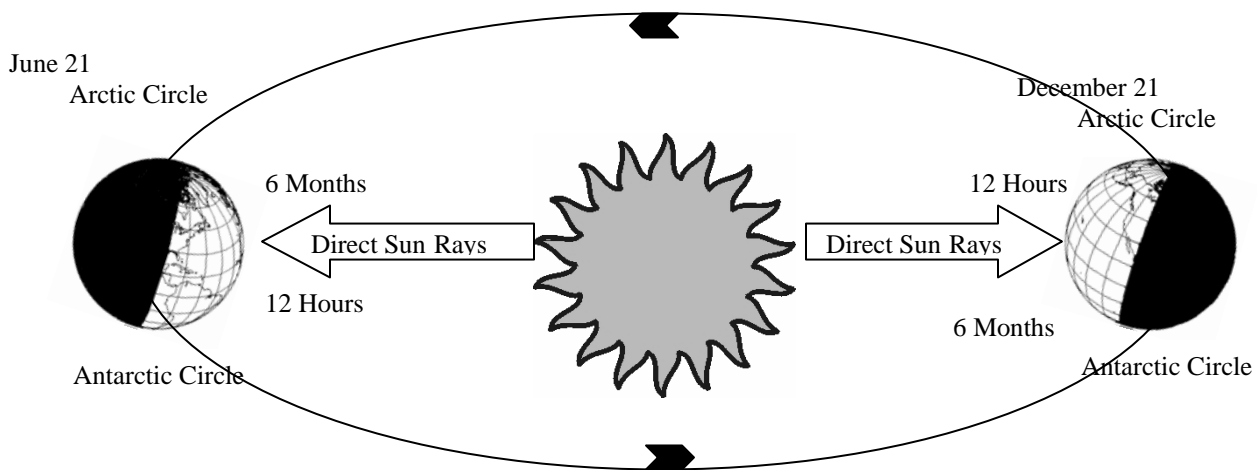
Use the diagram below to answer questions 1 - 6.



1. The Earth turns on its axis. Another way of saying this is the Earth _____ on its axis.
2. How many hours does one rotation of Earth take? _____
3. At any given time,

- a. How much of the Earth is facing the Sun? _____
- b. How much of the Earth is facing *away* from the Sun? _____
4. The part of the Earth facing the Sun has _____.
5. The part of the Earth facing away from the Sun has _____.
6. The Earth rotates from _____ to _____.

Use the diagram below to answer questions 7 - 6.



7. Look at the Earth's axis on June 21 and December 21. Has the angle of the tilt changed? _____
8. Has the direction of the tilt changed? _____
9. **ON JUNE 21:**
 - a. The _____ hemisphere tilts toward the Sun.
 - b. The _____ hemisphere tilts away from the Sun.
 - c. Which hemisphere has more sunlight? _____
 - d. Which hemisphere has less sunlight? _____
 - e. The days are longer in the _____ Hemisphere.

f. Which part of the Earth has 12 hour days and 12 hour nights?

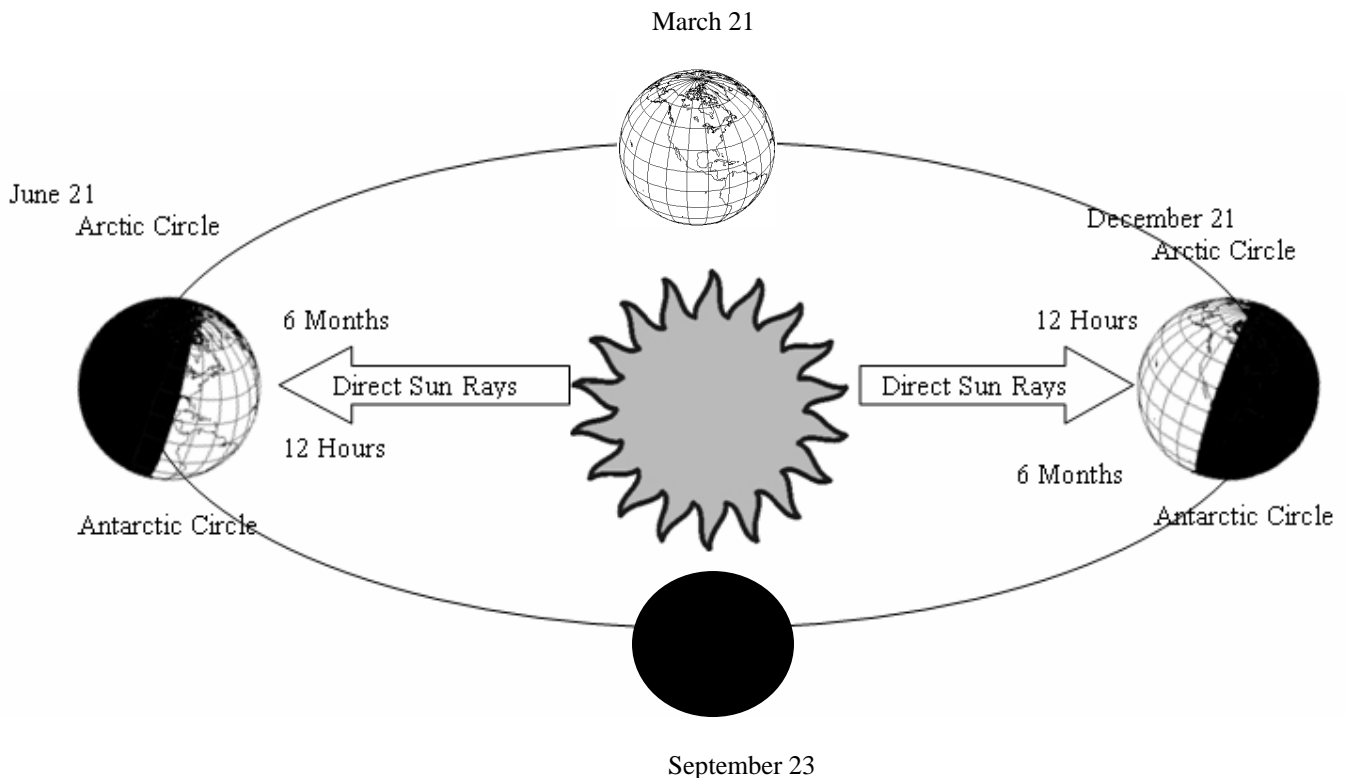
g. How long does a day last at the Arctic Circle? _____

h. When it is day at the Arctic Circle, it is _____ at the Antarctic Circle.

For most of the year, the number of hours of day and night is not the same in the northern and southern hemispheres.

However, on two days, every place on Earth has equal amounts of day and night.

On March 21 and September 23 (in most years) neither hemisphere leans toward the Sun. On these days all of the Earth has 12 hours of day and 12 hours of night. These days are called the **equinoxes** (equinox – equal night). March 21st is the spring or **vernal equinox** (the first official day of spring), and September 23rd is the fall or **autumnal equinox** (first official day of fall).



10. The Earth _____ on its axis.

11. The Earth _____ around the Sun.

12. One rotation makes one _____.
13. One revolution makes one _____.
14. The northern hemisphere tilts toward the Sun most on _____.
15. The northern hemisphere tilts away from the Sun the most on _____.
16. The Earth's axis does not tilt toward or away from the Sun on _____ and _____.
17. The longest day of the year in the northern hemisphere is _____.
18. The shortest day of the year in the northern hemisphere is _____.
19. In the northern hemisphere, between June 21 and September 23 days become _____. (longer / shorter)
20. In the northern hemisphere, between September 23 and December 21, days become _____. (longer / shorter)
21. In the northern hemisphere, between December 21 and March 21, days become _____. (longer / shorter)
22. In the northern hemisphere, between March 21 and June 21, days become _____. (longer / shorter)

Conclusions:

1. Does the Sun always set at the same time each day?

2. At what times of the year does the Sun stay up latest?

3. At what times of the year does the Sun rise the earliest?

4. Is the number of hours of daylight the same each day?

5. When are the shortest days?

6. Is the number of hours of daylight on a certain day the same all over the world?

7. What season is it in New Zealand in July?

8. What season is it in Scotland in July?

9. Are there any places where the Sun never comes during certain parts of the year? Where?

10. At what times of the year does this happen?

11. Where and when does the Sun stay up for 24 hours?

12. Are there any places on the graph where all the lines come together?

13. Use your textbook to define EQUINOX.

14. Where do you see evidence of an equinox on your graph?
