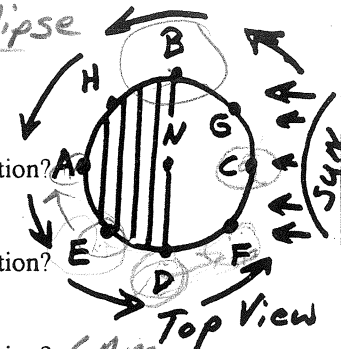
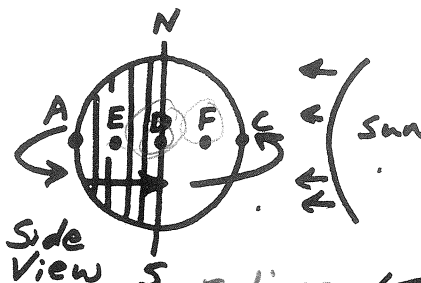
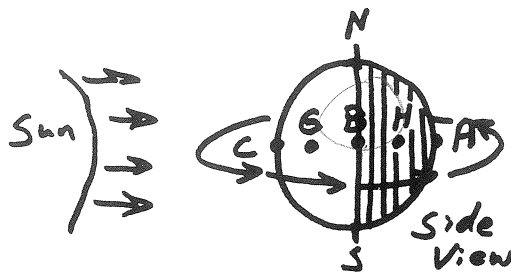


Unit: System of The Earth, Moon, and Sun

Earth Science Notes (Stapleton) Time Zones and The International Dateline (Earth's Rotation)

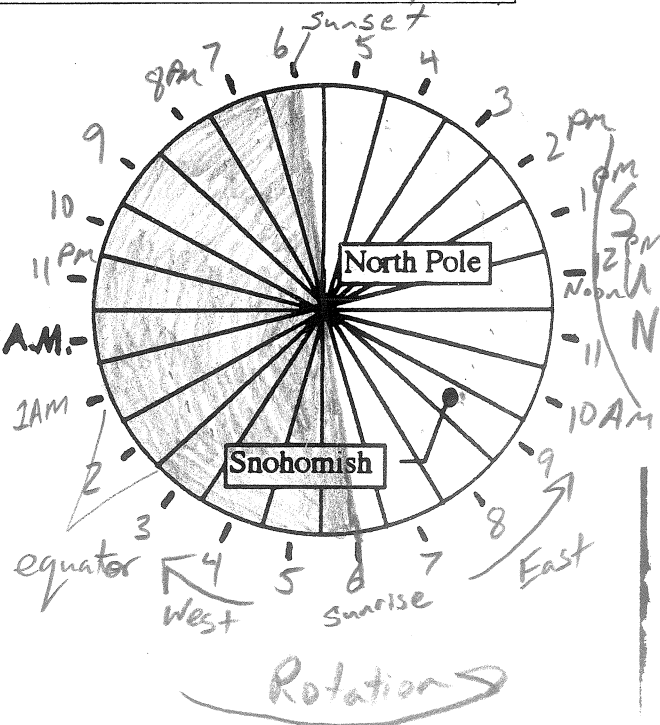
Name: Answers



- How much of the Earth is always dark? $\frac{1}{2}$
 - Is there ever an exception to this? If so, explain. Solar Eclipse
- Which side is dark? (the side facing the sun, or the side opposite the sun)
- In the pictures above, which point is entering darkness? B
 - What's that time of day called? Sunset
 - Approximately what hour would it be according to a clock at this location? 6 PM
- In the pictures above, at which point is the sun directly overhead? C
 - What's that time of day called? Noon
 - Approximately what hour would it be according to a clock at this location? 12 PM
- In the pictures above, which point is entering daylight? D
 - What's that time of day called? Sunrise
 - Approximately what hour would it be according to a clock at this location? 6 AM
- In the pictures above, which point is located opposite the sun, in complete darkness? A
 - What's that time of day called? Midnight
 - Approximately what hour would it be according to a clock at this location? 12 AM
- Estimate the time of day at each of the following points:
E = 3 AM F = 9 AM G = 3 PM H = 9 PM
- If a person moves instantly from point D to point F, does the time of day get later or earlier?
- If a person moves instantly from point E to point A, does the time of day get later or earlier?
- When you travel east into a new time zone, should you add or subtract an hour? add
- When you travel west into a new time zone, should you add or subtract an hour? subtract
- Imagine that you take a one minute trip around the world, and you keep re-setting your watch every time you cross into a new time zone. Your watch says 8:00 AM as you leave. What time should it say when you return? 8:01 AM In order for this to happen, how many different time zones must there be? 24

12. The diagram on the right shows the Earth as you would see it if you were looking down from above the North Pole.

- Part of the Earth should be dark. On the Diagram lightly shade the correct part of the Earth.
 - Draw the sun where it should be located.
 - Use arrows to show which direction the Earth is rotating.
 - On the diagram, label a place where the sun is "rising."
 - Label places which are experiencing sunset, midnight, and noon.
- Label the equator.
 - Draw an arrow along the equator pointing East, and label it "East"
 - Draw an arrow along the equator pointing West, and label it "West"



13. The time in one of the time zones is labelled. Correctly label the times in the other 23 time zones.

- Using the diagram on the first page, take a mental trip around the world. Start on the diagram in Snohomish. Imagine your starting date is April 20th. Keep heading east, and watch how the time changes. Also watch how the day changes. Remember that a new day begins at 12:00 A.M. (Midnight). What time is it when you arrive back in Snohomish? What is the date?
9 AM April 21st
- Repeat your mental trip going West instead of east. According to the diagram, do you return a day earlier or a day later?
9 AM April 19th
- If someone could leave an airport at noon and fly around the world in 30 minutes, they should return on the same day that they left. Your previous answers should have shown that the day would change. In order to fix things so that you get the correct date:
 - should you add a day or subtract a day when you travel around the world heading east? *subtract*
 - should you add a day or subtract a day when you travel west? *add a day*

Notes:

- There are 24 time zones on the Earth.
- When you cross into a new time zone heading east, you: +1 hour
- When you cross into a new time zone heading west, you: -1 hour
- The international dateline is at 180° longitude, in the middle of the pacific ocean.
- When you cross the international dateline heading west, you add 1 day. When you cross the international dateline heading east, you subtract 1 day.

Questions:

- If it is 1:00 P.M. in Snohomish, what time is it in the next time zone to our east?
- It is 5:30 P.M. in Seattle. What time is it in New York?
- What time is it in Seattle when it is 4:20 A.M. in St. Louis?
- If you fly west across the international dateline, and it was Monday when you left, what day will it be after you cross the dateline?

Challenging:

- Why do you think the edges of the time zones are not always straight lines?
- You are on the west side of the international dateline. Your time is 5:00 P.M., on Thursday. What is the time and day when you step to the east and cross the international dateline?
- You fly from Denver to Miami. The flight lasts 3 hours. You left Denver at 7:15 A.M. Mountain Time. What time do the clocks in Miami show when you arrive in the Miami airport?
- Why do we need an international dateline?

Most difficult

- Judging by the diagram on the first page, how is it possible to travel around the world, through every time zone, in under 5 seconds -- without using any machinery?
- If every location on the Earth has the same day and date, what time is it at the International Date Line?

