

Name _____

NATS 102 – Prather
February 9, 2004

Exam #1

Test Form A

*Answer all of the following questions on the bubble sheet provided using a #2 pencil. Make sure that your **Name, Student ID Number** and **test form letter** are on the answer sheet and that all answers are recorded in the correct position. **ALWAYS SELECT THE BEST ANSWER.** Each question is worth 1 point. This is a closed-book, closed-note exam and you have approximately one hour to complete it. If you have questions, please raise your hand.*

**Be sure to write and bubble in your ID number and test form letter.
IF YOUR STUDENT ID BEGINS WITH AN “S,” WRITE IT IN AND BUBBLE A “0.”**

DO NOT START THE EXAM UNTIL YOU ARE TOLD TO DO SO!

Exam #1 Form A – February 9, 2004

Answer all of the following questions on the bubble sheet provided using a #2 pencil. Make sure that your **Name, Student ID Number and test form letter** are on the answer sheet and that all answers are recorded in the correct position. If your student ID begins with an “S,” write it in and bubble a “0.” **ALWAYS SELECT THE BEST ANSWER.** Each question is worth 1 point. This is a closed-book, closed-note exam and you have approximately one hour to complete it. If you have questions, please raise your hand.

1. How many constellations do astronomers officially recognize today?
 - a. 50
 - b. 88
 - c. 134
 - d. 180

2. Which of the following statements is true about the location of the Sun at sunrise during the middle of winter?
 - a. The Sun will rise north of East.
 - b. The Sun will rise directly in the East.
 - c. The Sun will rise south of East.
 - d. None of the above.

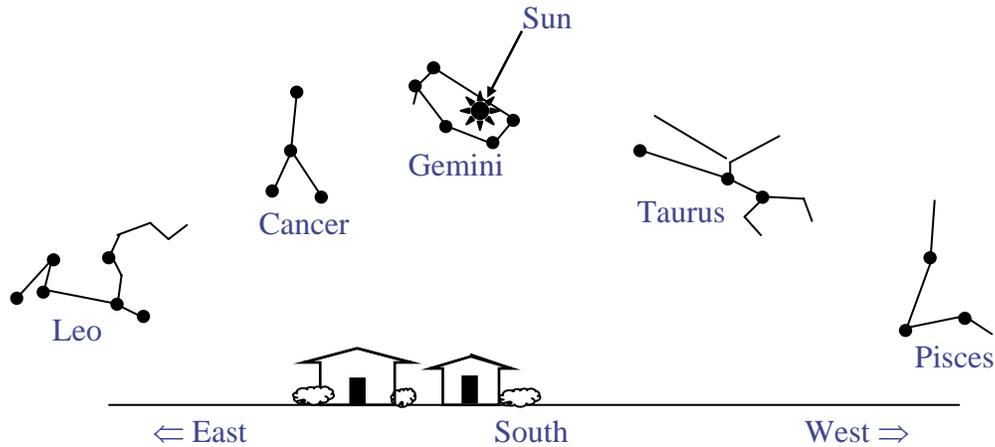
3. What two conditions must be met in order for a solar eclipse to occur?
 - a. The Moon must be full and cross the Earth-Sun orbital plane.
 - b. The Moon must be full and not cross the Earth-Sun orbital plane.
 - c. The Moon must be new and not cross the Earth-Sun orbital plane.
 - d. The Moon must be new and cross the Earth-Sun orbital plane.

4. The Moon orbits around Earth. In which direction does it orbit if observed while looking downward from a point directly above Earth's North Pole?
 - a. clockwise
 - b. counterclockwise
 - c. either direction

5. If the Moon is in the waxing gibbous phase tonight, approximately how long will it be until the Moon is in the waning crescent phase?
 - a. one day
 - b. one week
 - c. two weeks
 - d. three weeks
 - e. a month

6. Stars located near _____ appear to move in circles when viewed from Earth.
 - a. the Sun
 - b. Polaris
 - c. Orion
 - d. the Moon

Use the drawing below to answer the next two question.



7. If you could see stars during the day, the drawing above shows what the sky would look like at noon on a given day. The Sun is near the stars of the constellation Gemini. Near which constellation would you expect the Sun to be located at *sunrise*?
 - a. Leo
 - b. Cancer
 - c. Gemini
 - d. Taurus
 - e. Pisces

8. Which constellation will be highest in the sky 6 hours after the time shown in the drawing above?
 - a. Leo
 - b. Cancer
 - c. Gemini
 - d. Taurus
 - e. Pisces

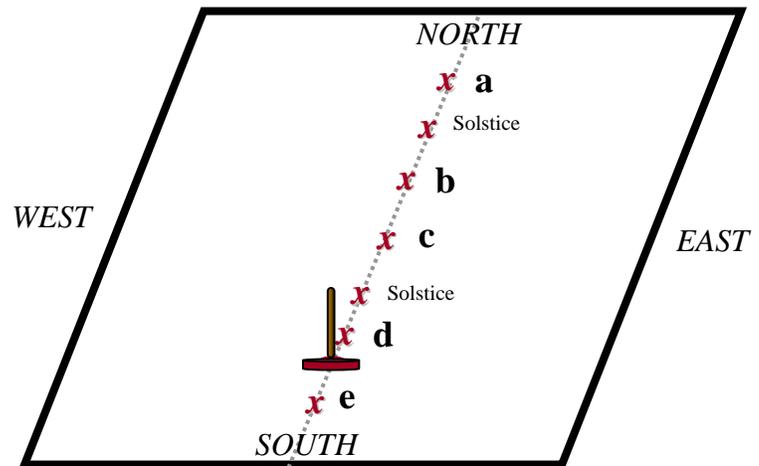
9. What do we call the day(s) of the year when the Sun rises directly in the East and sets directly in the West? Choose all answers that apply.
 - a. the winter solstice
 - b. vernal equinox.
 - c. the summer solstice
 - d. autumnal equinox.

10. Well-known, “connect-the-dot” star patterns are called
 - a. asterisms.
 - b. constellations.
 - c. star maps.
 - d. the Milky Way.

11. Which phase of the Moon rises in the east as the Sun sets in the west?
 - a. waxing crescent
 - b. waning gibbous
 - c. full
 - d. third quarter
 - e. new

12. If the moon is highest in the sky this morning at 6:00 am, what phase will the Moon be in one week from now?
- full
 - waxing crescent
 - waning crescent
 - waning gibbous
 - new

13. For an observer in the continental U.S., which of the x's (a – e) in the figure at right correctly shows the position of the top of the stick's shadow at noon for different times of the year? *Bubble in all the choices that could be correct.* Note that the positions of the Sun's shadow at noon on the solstices are shown.

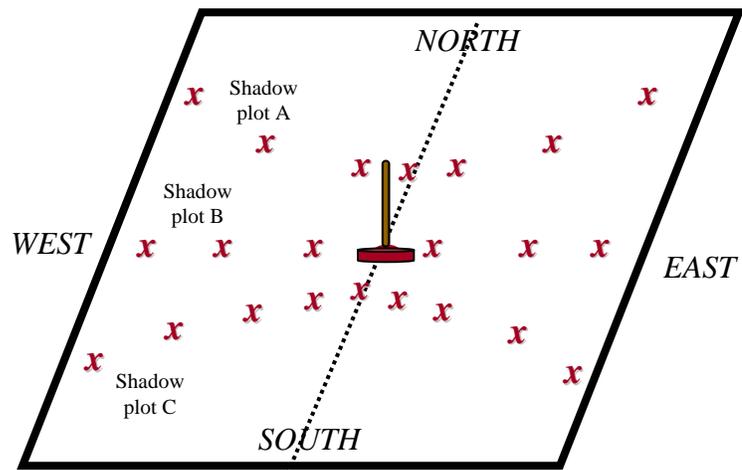


14. If the seasons on Earth were the same in both the northern and southern hemispheres at the same time, what thing(s) would have to change about the current state of the Earth-Moon-Sun system?
- The Sun would need to give off the same amount of energy all the time.
 - The Earth would have to stay the same distance from the Sun all the time.
 - The amount of direct sunlight and hours of daylight would have to stay the same all year long.
 - The Earth would have to orbit the Sun at the same speed all the time.
 - All of the above.
15. Which of the following consecutive sequences of moon phases is possible within one cycle of phases:
- waxing gibbous, waxing crescent, new, waning crescent
 - full, waning gibbous, first quarter, new
 - third quarter, waxing gibbous, full, waning gibbous
 - new, waxing crescent, first quarter, waxing gibbous
 - waning crescent, first quarter, full, waning gibbous
16. A lunar eclipse can only occur at which phase of the Moon?
- new
 - full
 - crescent
 - quarter

17. During the new moon phase, how much of the Moon's total surface is being illuminated by sunlight?
- none
 - less than half
 - half
 - more than half

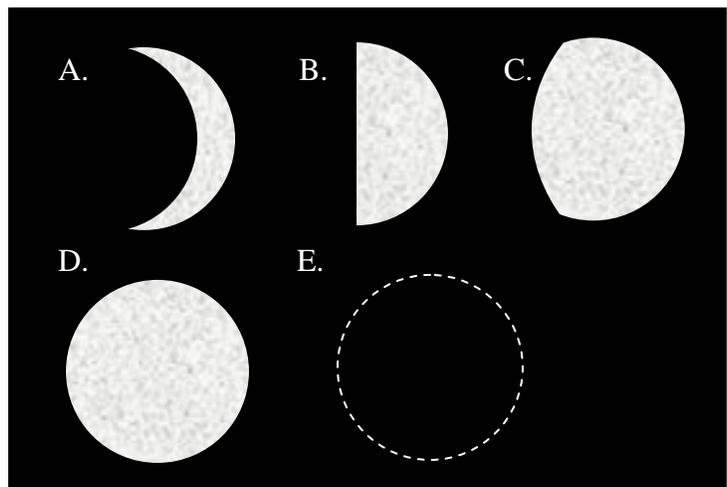
18. For an observer in the continental U.S., which of the three shadow plots, shown at right, correctly depicts the Sun's motion for one day?

- Shadow plot A
- Shadow plot B
- Shadow plot C
- More than one of the plots is possible, on different days of the year.
- None of the plots are possible.



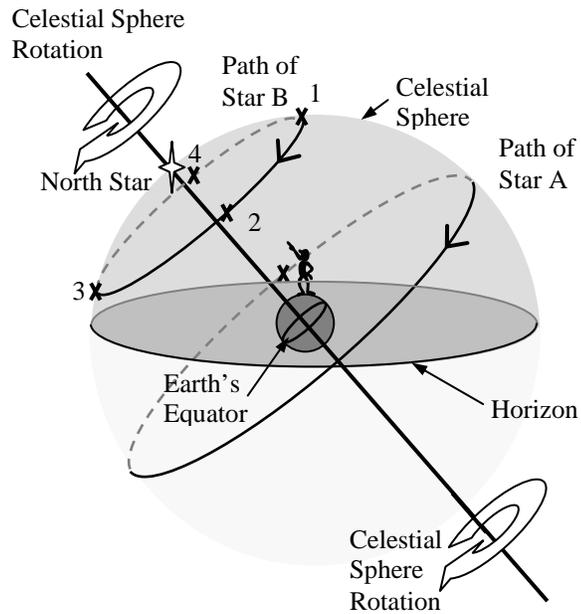
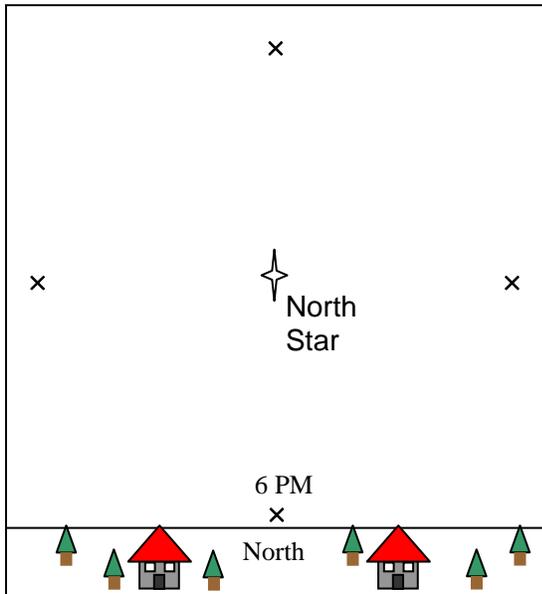
19. Imagine that Earth's orbit were changed to be a perfect circle about the Sun so that the distance to the Sun never changed. How would this affect the seasons?
- We would no longer experience a difference between the seasons.
 - We would still experience seasons, but the difference would be *much less* noticeable.
 - We would still experience seasons, but the difference would be *much more* noticeable.
 - We would continue to experience seasons in the same way we do now.

20. You look to the eastern horizon as the Moon first rises and discover that it is in the new moon phase. Later when the moon reaches its highest position in the sky, which of the moon phases shown at right will the Moon look like?



For the questions 21 - 24, use the two figures provided below, which show the motion of stars A and B in the sky.

Note that Star A reaches its maximum height above the horizon at 6:00 pm.



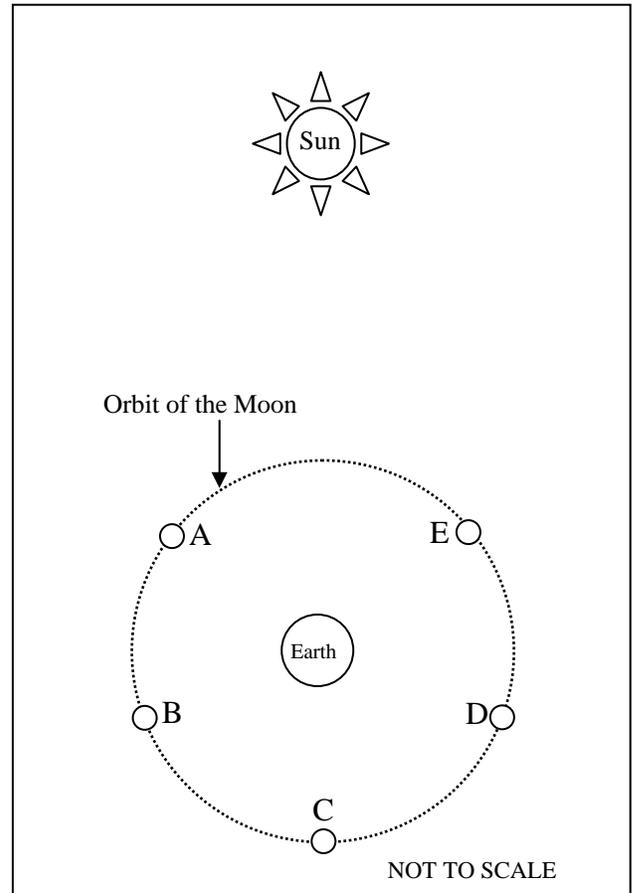
21. At what time will Star B be located high in the Northwestern sky?
 - a. 4:00 am
 - b. 11:00 am
 - c. 2:00 pm
 - d. 7:00 pm
 - e. 1:00 am

22. In what direction is Star B moving at Noon?
 - a. west (to the left)
 - b. east (to the right)
 - c. south(out of the page)
 - d. away from the horizon (up)
 - e. toward the horizon (down)

23. At what time would you see Star A in the southern part of the sky?
 - a. 6:00 am
 - b. Noon
 - c. 6:00 pm
 - d. Midnight

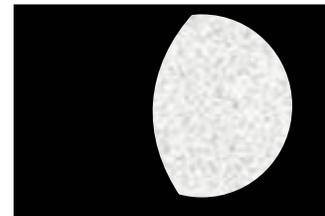
24. At what time would you see Star A in the west?
 - a. 6:00 am
 - b. Noon
 - c. 6:00 pm
 - d. Midnight

25. Which Moon position (A-E), shown in the diagram at right, best corresponds with the moon phase shown below?



26. In general, individuals get their horoscope birth signs from
- the constellation that is overhead at midnight when they are born.
 - the constellation that is hidden by the Sun when they are born.
 - the constellation that is most like their personalities.
 - tracking the changing positions of the planets.

27. What time is it when the moon phase shown at right first begins to rise above the horizon?
- in the late morning
 - at noon
 - in the mid-afternoon
 - at midnight



The star map provided below shows the sky at midnight on July 1 as seen from Tucson. Use it for the next two questions.

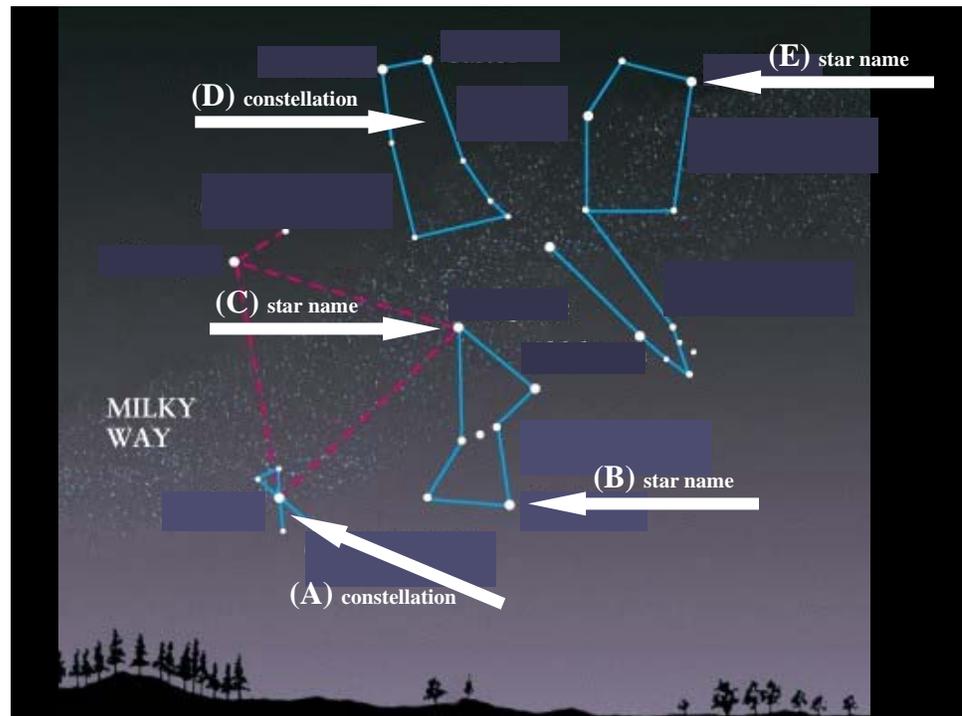
34. What is the name of the star group that will appear high in the southern part of the sky at midnight?
- Auriga
 - Ursa Major
 - Draco
 - Corona Borealis
 - Scorpius
35. What is the name of the star group that will appear on the horizon when looking to the east at midnight?
- Auriga
 - Scorpius
 - Draco
 - Equuleus
 - Crater



36. Which of the following best describes the cause for the seasons here on Earth?
- The distance between Earth and the Sun changes during the year.
 - More sunlight reaches Earth during some times of the year than others.
 - Earth's rotational axis is tilted with respect to the plane of Earth's orbit around the Sun.
 - The Sun gives off different amounts of sunlight during different times of the year.
 - Some times of the year Earth orbits the Sun more slowly than other times of the year.
37. Which of the following best describes why the Moon goes through phases?
- Earth's shadow falls on different parts of the Moon at different times.
 - The Moon is somewhat flattened and disk-like, and appears more or less round depending on the precise angle from which we see it.
 - We see only part of the lit-up face of the Moon depending on its position relative to Earth and the Sun.
 - The sunlight reflected from Earth lights up the Moon but is less effective when the Moon is lower in the sky than when it is higher in the sky.

Which letter on the map at right shows:

- Betelgeuse?
- Canis Major?
- a blue supergiant star in Orion?
- Gemini?



42. Imagine you see Mars rising in the east at 6:30 pm. Six hours later what direction would you face (look) to see Mars when it is highest in the sky?
- toward the north
 - toward the south
 - toward the east
 - toward the west
 - directly overhead

Use the figure below for questions 43 - 47. In this Earth-Sun system drawing we have indicated the direction of both the daily rotation of the Earth about its own axis and its annual orbit about the Sun. Imagine you are the observer shown on the Earth in the northern hemisphere.

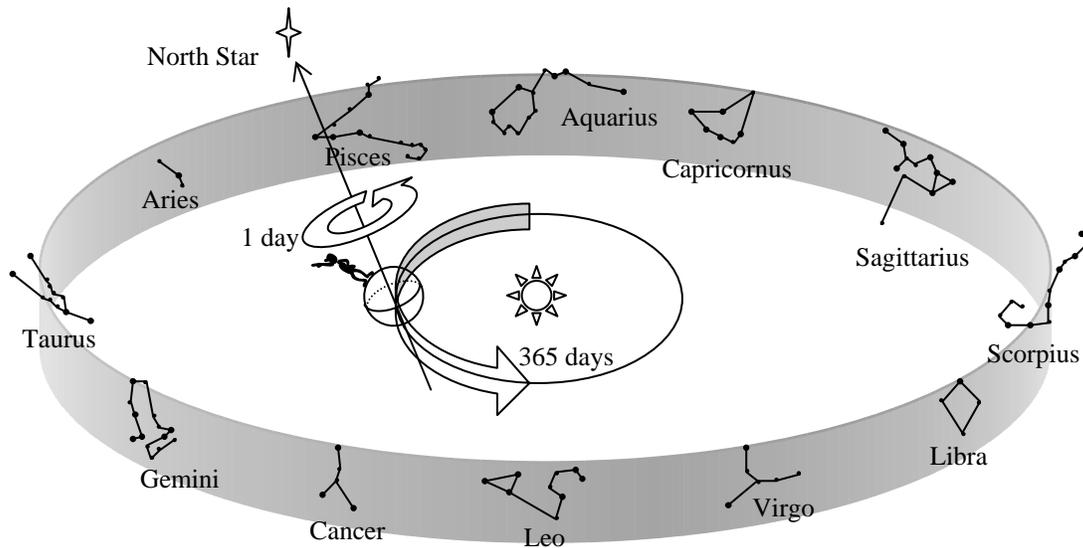


Figure 1

43. What direction is the observer facing?
 - a. east
 - b. west
 - c. north
 - d. south
 - e. overhead

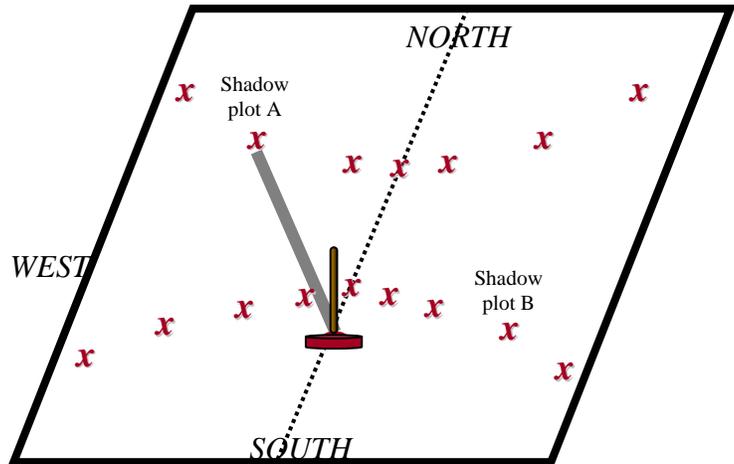
44. For the time shown, what constellation would the observer see high in the sky?
 - a. Aquarius
 - b. Pisces
 - c. Leo
 - d. Taurus
 - e. Scorpius

45. For the time shown, what constellation is setting on the western horizon?
 - a. Pisces
 - b. Leo
 - c. Cancer
 - d. Taurus
 - e. Scorpius

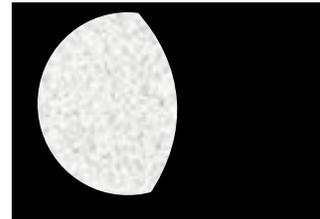
46. What constellation will be highest in the sky at noon?
 - a. Aquarius
 - b. Pisces
 - c. Leo
 - d. Taurus
 - e. Scorpius

47. How long until Leo is the constellation highest in the sky at midnight?
- 6 hours
 - 3 days
 - 4 weeks
 - 3 months
 - none of the above

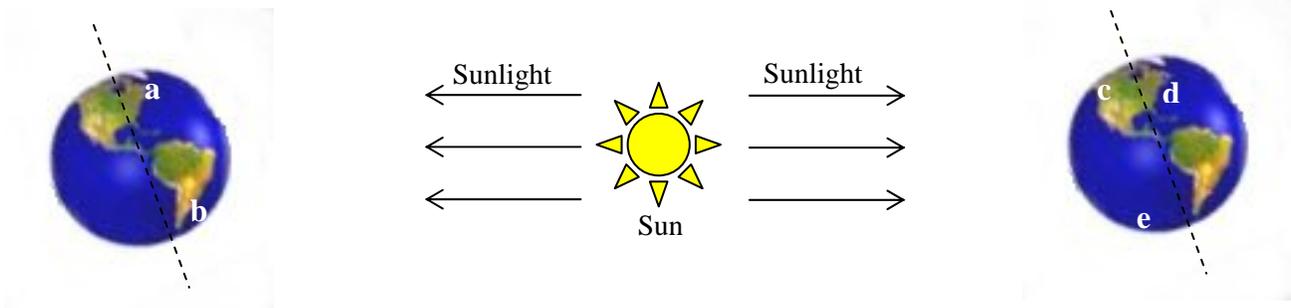
48. Which shadow plot (A or B) most closely corresponds to the Sun's path through the sky during the summer?
- Shadow plot A
 - Shadow plot B



49. Which phase of the Moon is represented in the figure at the right?
- waxing gibbous
 - third quarter
 - waning crescent
 - full moon
 - waning gibbous



50. Looking at the images below, which letter (a-e) best represents winter in the United States?



Note: this drawing is not to scale. In fact you could fit more than 11,000 Earths between the Sun and the Earth.