DO NOW:***WRITE DOWN YOUR ANSWERS***

1) Out of the following pairs, choose the color with a higher energy/frequency:

orange or red

blue or orange

yellow or violet

red or green

2) How do you think eclipses occur?

3) Why don't we have an eclipse every month?

Today's Objectives:

- Review the properties of the Sun
- Be able to explain how an eclipse occurs
- Describe parallax and how it is used to determine the distance of stars

HW:

Read the bottom of page 350 titled "Measuring Distance by Triangulation and Parallax" through page 354.

Answer question #2 under *Though Questions* on page 384

Sun Video

3, 2, 1 . . .

3 things you already knew about

2 new things you did not know

1 question you have still

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Eclipse Exploration

1) How/why do eclipses occur?

2) How often do they occur?

3) Why don't we have eclipses every month?

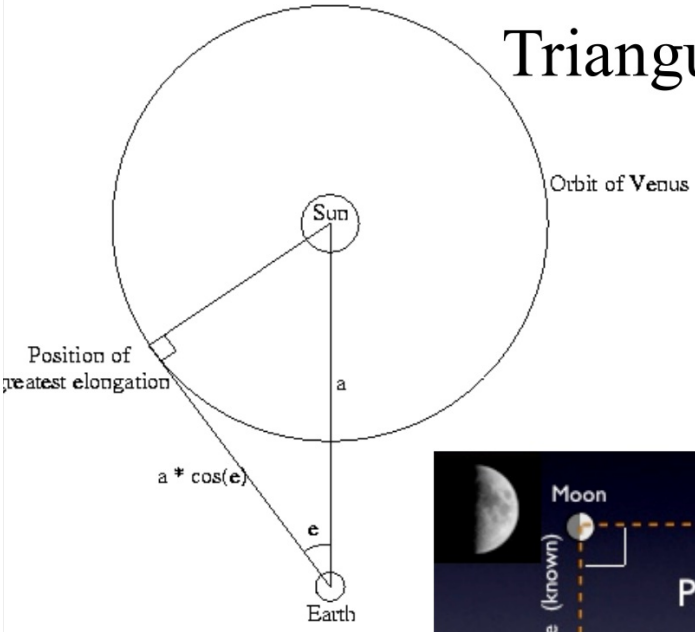
Solar Distances to Know

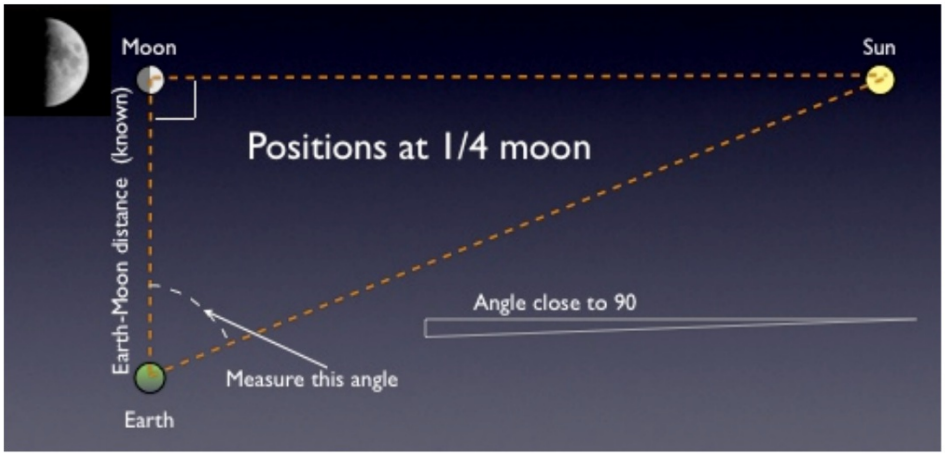
1 AU (distance from earth to sun) = 1.5×10^{11} meters

1 light-year = 9.5×10^{15} meters

1 Parsec (parallax and arc second) = 3.26 light-years

Triangulation

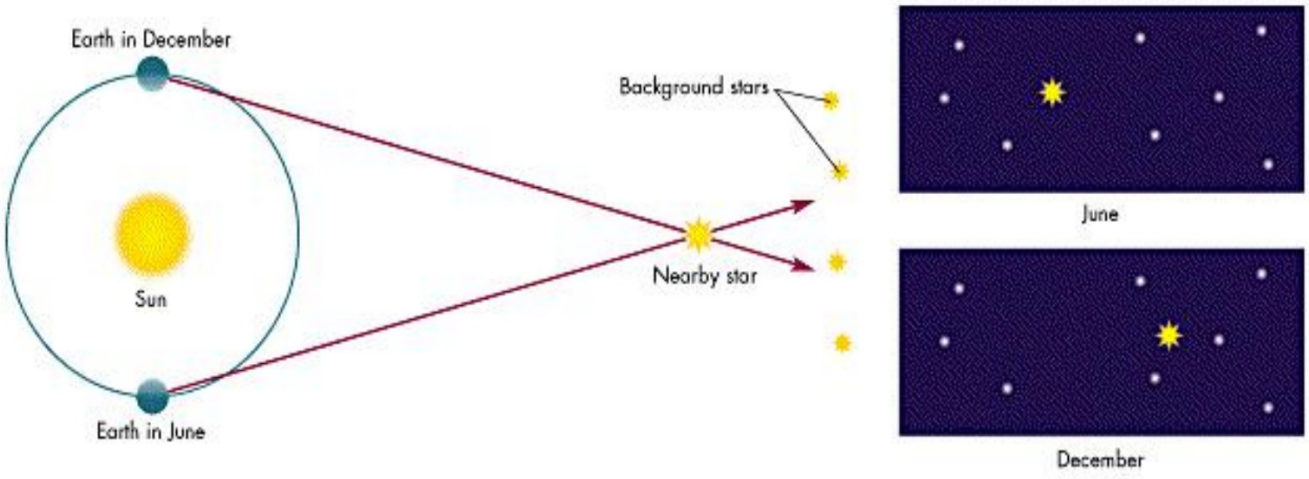




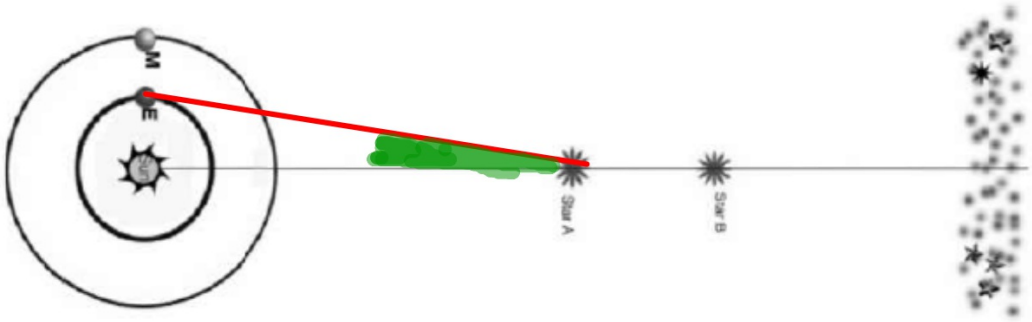
Parallax

Parallax is a difference in the *apparent position*
of an object viewed along two different lines of sight.

Astronomers used the principles of parallax and math to calculate distance of celestial objects (like our sun, & other stars).



Parallax activity



Parallax activity

Part II: What happens when your finger is a star?

7. The point labeled E in Figure 2 represents the Earth in its orbit in January. Use a ruler and draw a line from the Earth to the background stars going through Star A. Mark the Earth–Star A–Sun angle. This is called the *parallax*.
8. Describe what you think will happen to that angle if we were to do what we just did but for Star B.
9. Test your prediction by using Figure 2. Comment on your results. Were you correct?
10. Now, find where the Earth will be in six months.
    The imaginary line that runs from the Earth's position in January through the Sun to the Earth's position in July, is our baseline. In general, this is the separation between the positions from which two measurements are made, and it is perpendicular to the direction to the object whose distance we are measuring.
    Repeat question 7 using star A at this new position in its orbit. Draw on Figure 3 below where Star A will appear to be in January and then six months later.
11. Extend our observations over a number of years. How will Star A appear to move against the background stars?
12. How about star B over the same number of years compared to the motion of Star A?
13. The apparent motion of stars as seen from Earth relative to a background of more distant, fixed stars, is known as *stellar parallax*. Now think back to your experiment in part I. What is it about the Earth that corresponds to blinking your eyes?

FIG. 2.— View of Earth, Sun, two nearby stars, and a bunch of distant stars.

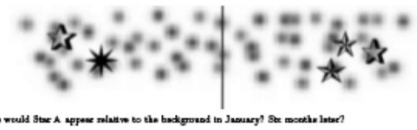


FIG. 3.— Where would Star A appear relative to the background in January? Six months later?