Lab:

Models of Eclipses

Background Information

As the moon and the earth revolve around each other and the sun, they block some of the sun's light. When the sun or moon is blocked out by another object, an *eclipse* occurs. There are two types of eclipses — a lunar eclipse and a solar eclipse. During a lunar eclipse, the moon passes through the earth's shadow. A solar eclipse occurs when the moon is directly between the sun and the earth.

Shadows cast into space during an eclipse have two parts. The completely dark inner shadow is the *umbra*. The outer area where light is only partially blocked is called the *penumbra*.

In this investigation, you will draw a model of a solar eclipse and of a lunar eclipse and identify the parts of a shadow.

Problem

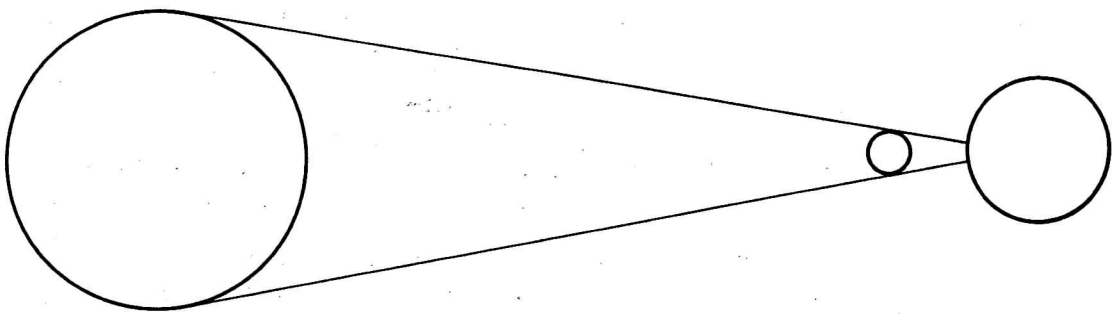
What happens during a solar and a lunar eclipse? What are the parts of the shadows they form?

Materials *(per student)*

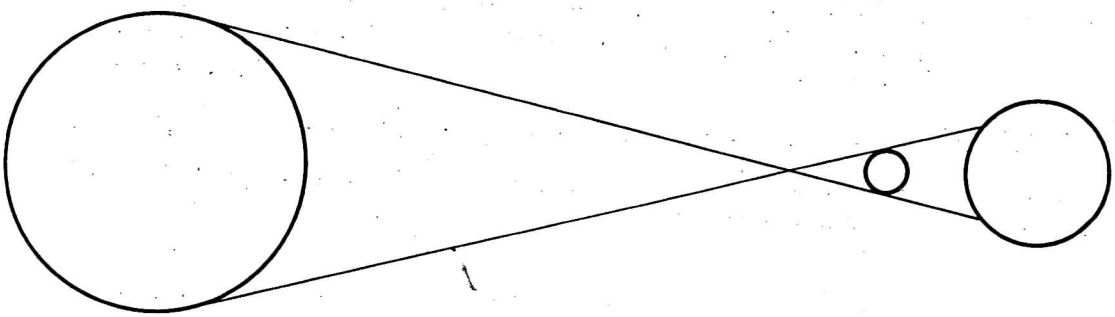
Ruler
Colored pencils

Procedure

1. Each step of the procedure should be done on the appropriate figure in Observations.
2. Color the sun orange, the moon blue, and the earth green in both Figures 1 and 2.
3. On Figure 1, use the ruler to draw a line from each side of the sun to the same side of the moon. Extend these lines until they intersect with the earth. Use the diagram below as a guide.

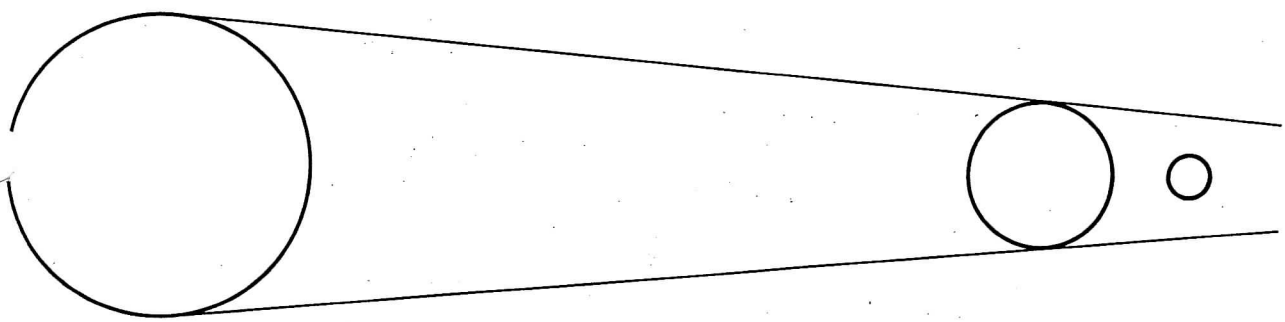


4. On the same figure, use the ruler to draw lines from the same points on the sides of the sun to the opposite sides of the moon. Extend these lines until they intersect with the earth. Use the diagram below as a guide.

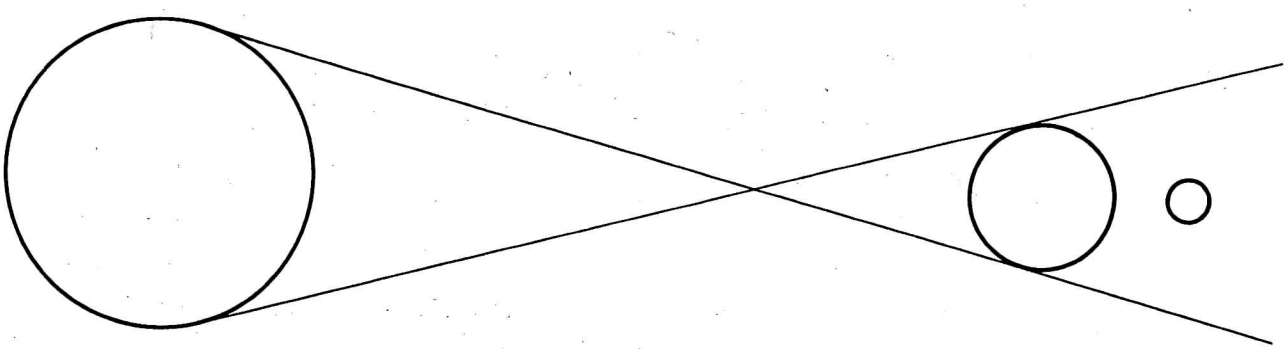


5. Color the umbra black and the penumbra purple.

6. On Figure 2, use the ruler to draw a line from each side of the sun to the same side of the earth. Extend these lines 4 cm beyond the earth. Use the diagram below as a guide.



7. On the same figure, use the ruler to draw lines from the sides of the sun to the opposite sides of the earth. Extend these lines 4 cm beyond the earth. Use the diagram below as a guide.



Observations

Lab: Eclipses Name _____

Period ____

Eclipses

Figure 1

Figure 2

Conclusions

1. What type of eclipse have you drawn in Figure 1?

   _____

   In Figure 2? _____

2. At what phase is the moon in Figure 1? _____

   In Figure 2? _____

3. Which type of eclipse occurs with the greatest frequency? Explain why.

   _____

4. Explain why a total solar eclipse or total lunar eclipse does not occur at least once a month. _____

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Critical Thinking and Application

1. **a.** If you were a lunar inhabitant, what kind(s) of eclipse(s) might you expect to see?

_____

b. Include a diagram to illustrate your answer.

2. Name the planets that could experience eclipses of the sun.

_____

_____

3. Why does our moon, which is much smaller than our sun, produce a total eclipse of the sun? _____

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