

Lesson 14

ECLIPSES

OBJECTIVES:

- * To get a sense of the relative size and distance between the Moon and the Earth.
- * To simulate solar and lunar eclipses.

GRADES: 6 and up.

SCHEDULING:

This lesson requires one class period on a sunny day.

MATERIALS:

For each group of two:

- * One 3" diameter styrofoam ball
- * One 3/4" diameter white bead
- * One 7 1/2' length of string
- * Two 1/16" diameter, 9" long dowels

STUDENT SHEET:

- * Eclipses

DISCUSSION:

Hold up the styrofoam ball. Ask the class:

- * If the Earth was this size what size would the Moon be?

After hearing some answers, hold up the bead, and tell the class that the Moon would be this size. Now ask:

- * How far apart would they be?

Again, after hearing some answers, tell the class the answer is 7 1/2 feet.

- * How large and how far would the Sun be? (The Sun would be

more than 27 feet in diameter, at a distance of more than half a mile.)

ACTIVITY:

Tell the students that the dowels will be used to hold the spheres. Have them follow the instructions on the student sheet. Help them answer the questions.

CONCLUSIONS:

During a Solar Eclipse:

- * The Moon is New.
- * The Moon's shadow covers only a small area of the Earth. Since most people are not in that area, very few people experience total eclipses of the Sun.

During a Lunar Eclipse:

- * The Moon is Full.
- * It is eclipsed as long as it is in the Earth's shadow.
- * You do not have to be any particular place to see a Lunar eclipse -- just look up at the Moon.

ECLIPSES

In this activity, the Earth and the Moon will be represented by spheres of the appropriate sizes, held on thin dowels by two people. Tie the dowels to each other with an appropriate length of string. (See Figures 1 and 2. For the Sun, use the real Sun.)

SOLAR ECLIPSE:

During a solar eclipse, the Moon's shadow falls onto the Earth. Use your model to show this, and try to answer the questions.

* What phase is the Moon in during a solar eclipse?

* Notice the size of the Moon's shadow. For people who are standing in the shadow, the Sun is completely hidden by the Moon. This is called a total eclipse of the Sun. The area on Earth over which the Moon's shadow passes is called the "path of totality". Explain why most people do not see a total eclipse.

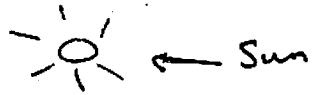
LUNAR ECLIPSE:

During a lunar eclipse, the Earth's shadow falls onto the Moon. Use your model to show this, and try to answer the questions.

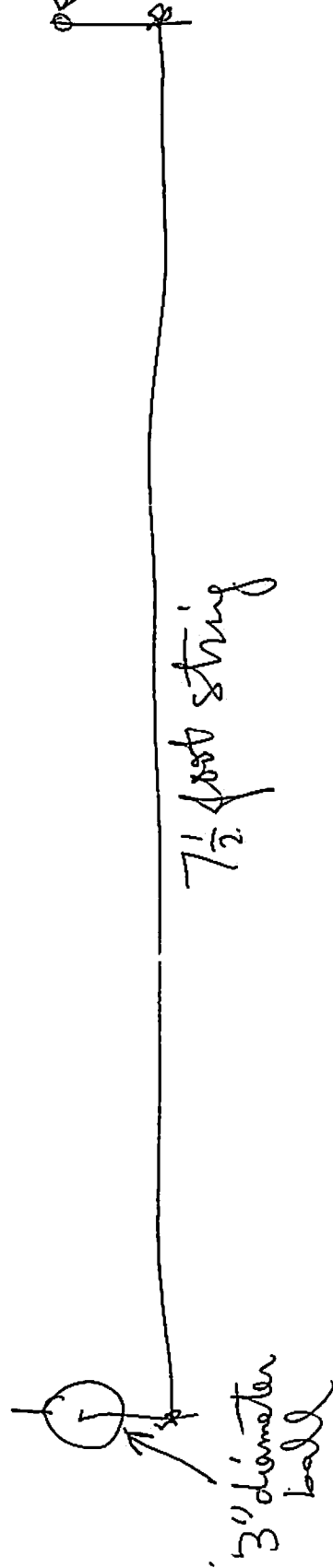
* What phase is the Moon during a lunar eclipse?

* Notice the size of the Earth's shadow. It covers an area greater than that of the Moon. Explain why a lunar eclipse lasts longer than a solar eclipse.

* Explain why everybody who can see the Moon can see a lunar eclipse.



$\frac{3}{4}$ " diameter ball



7 1/2 foot string

3" diameter ball

Fig 1

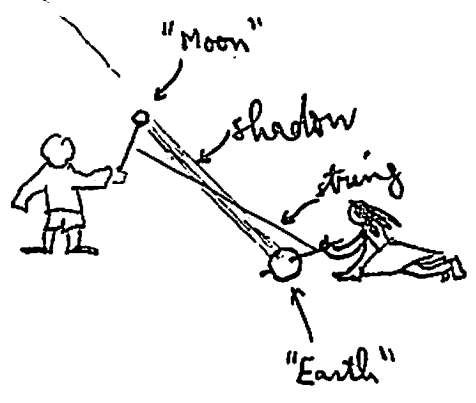


Fig 2.