Lesson 12

ORBITS

OBJECTIVES:

* To understand elliptical orbits.

GRADES: 6 and up.

SCHEDULING:

This lesson will take one class period.

MATERIALS:

* String, marking pens of various colors
* A bulletin board
* A large piece of paper
* Pins

DISCUSSION:

Tell the students that people used to think that the Sun, the Moon, the planets, and the stars all went around the Earth in circles.

* To what extent were they right? (The Moon orbits around the Earth)
* How were they wrong? (The planets, including Earth, orbit around the Sun)
* What is a comet? What is an asteroid? (Have students give reports on their research.)

ACTIVITY:

Place the large piece of paper on the bulletin board. Draw a Sun near the center, and place a pin at the Sun's center. Make a loop of string, and draw a circle centered at the Sun as

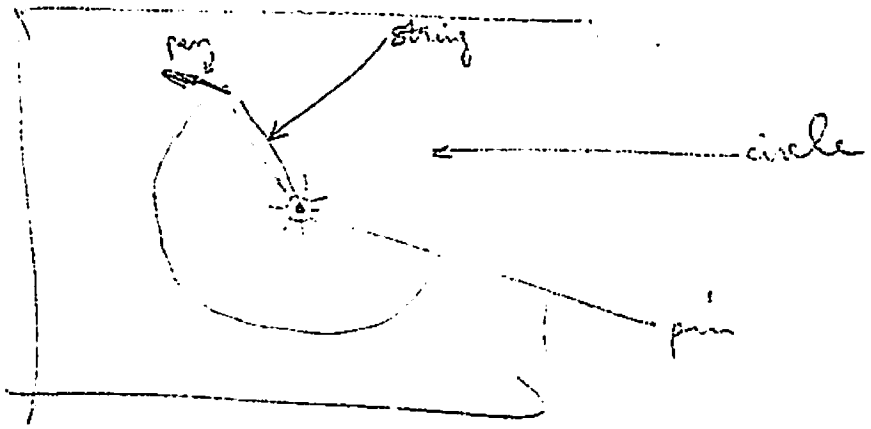
shown in Figure 12-1.

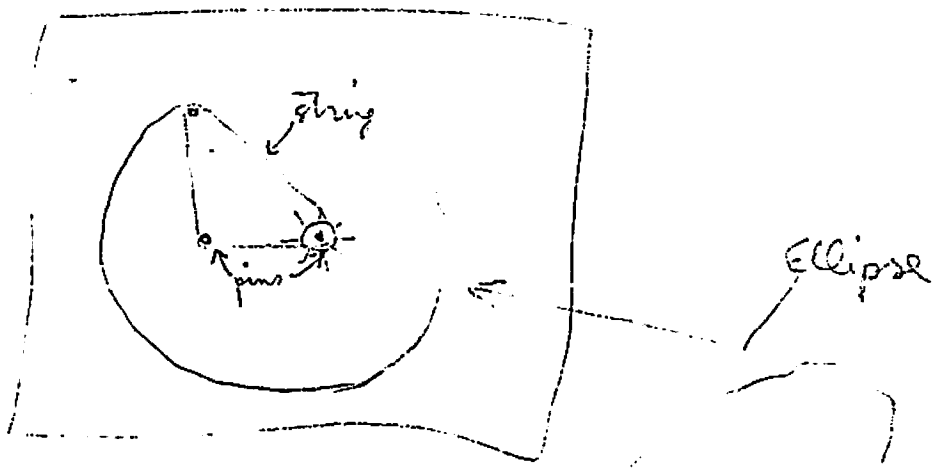
Then, draw an ellipse by putting the loop around two pins (one at the Sun, and the other elsewhere). Show the class that if the two pins are close, the ellipse resembles a circle. Otherwise, it is very elongated. Explain that most planets travel around the Sun in fairly circular orbits, but that comets travel in excentric orbits, which is why they are only visible to us for a short time, and then disappear for long periods.

Tell the students that the point of the orbit where the planet is nearest the Sun is called "aphelion". The point where it is furthest from the Sun is called "perihelion". Discuss how to find these points on the ellipses on the bulletin board. (They are at the points where the orbit meets the straight line that passes through the pins.)

COMMENTS:

* The students can draw their own ellipses if you provide them with cardboard to put under their papers, so that the pins do not damage their desks.





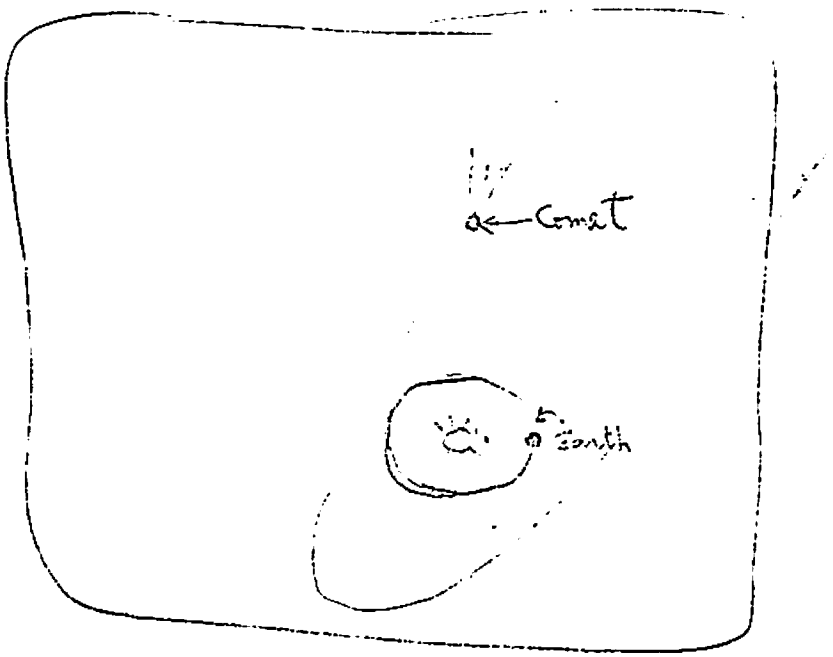


Fig 12-1