Lesson 15

SCALE MODELS

OBJECTIVES:

* To give students a sense of the relative sizes of the various components of the Solar System.

* To give students a sense of the relative distances between them.

GRADES: 6 and up.

SCHEDULING:

This lesson requires one or two class periods.

MATERIALS:

* As many spheres of various sizes as possible. (The ones provided in this kit are sufficient, but if you have more spheres, use them. Or, you could ask your students to bring spheres of various sizes to school.)

* String

* A measuring tape

* A transparent ruler, or (if available) a caliper

STUDENT SHEETS:
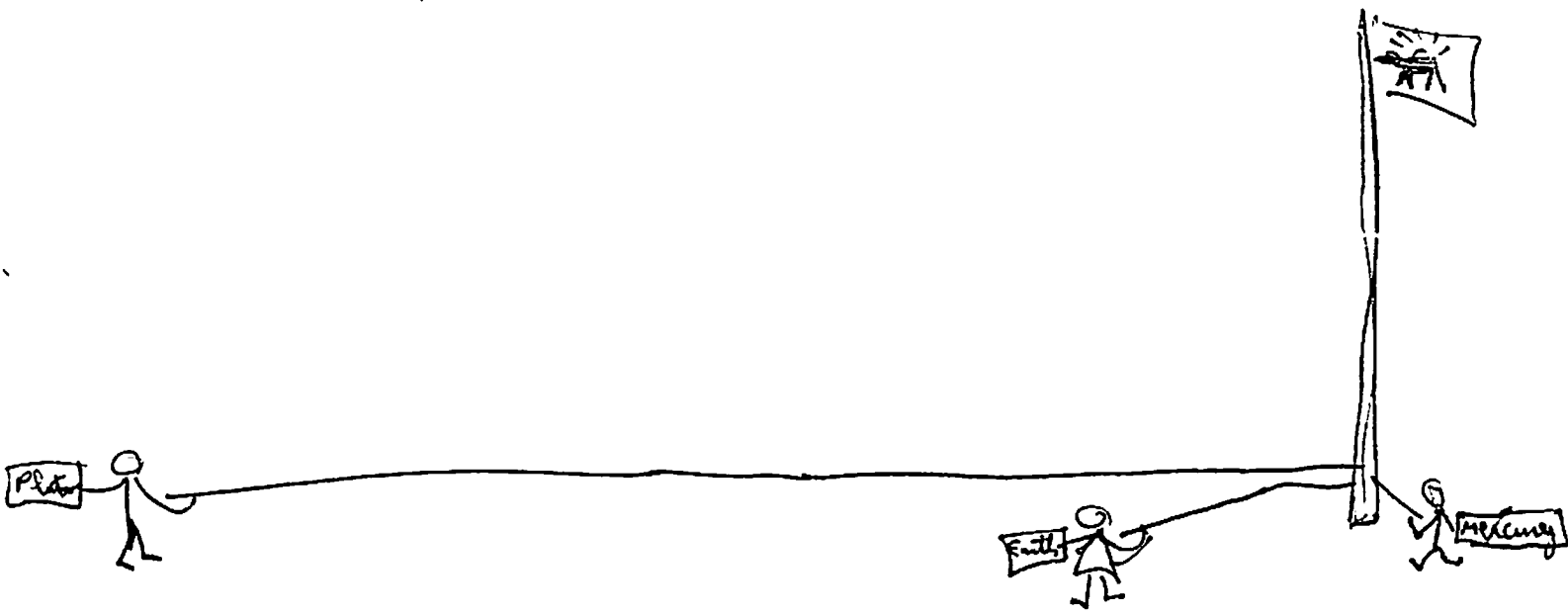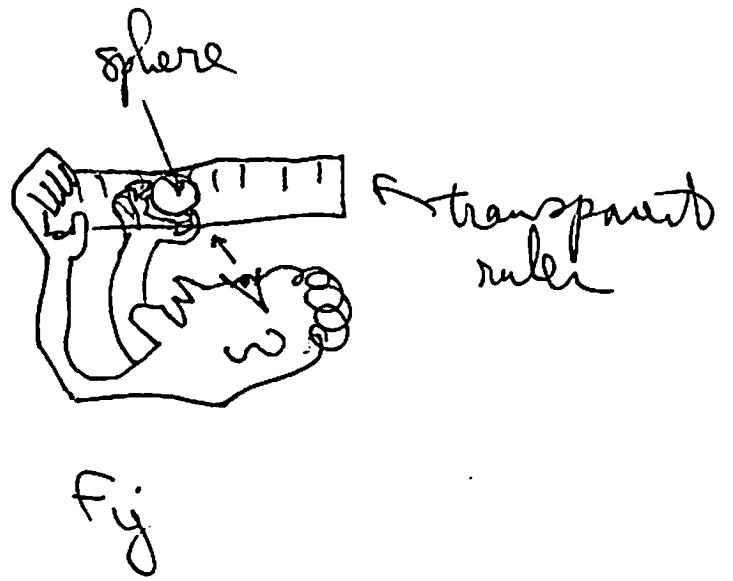
* Scale Models

ACTIVITY:

Hand out the Scale Model student sheets, and discuss how to make each of the two models. Your students should be able to figure out that while the planets for the first model can be represented by some of the spheres included in this kit, the Sun would be difficult to show, and the distances required

would spread the model all over a medium-sized town. On the other hand, the second model can fit in the playground, but the planets would be so small as to be invisible.

For the first model, show the students how to measure the diameters of spheres by looking though a transparent ruler. Of course, if you have a caliper, encourage them to use it.

For the second model, use the measuring tape to measure lengths of string for each distance. Assign a student to each planet and have them hold one end of the string. Then, on the playground, tie the other end to a flagpole. You may want the children to wear signs bearing the planet's names. (See Figure.)

You can combine the two models into one, using the scale from the first model for the sizes, and the scale from the second model for the distances. However, the result would not convey clearly the immensity of the empty space between planets.

sphere

transparent
ruler

Fig

Pluto

Earth

mercury

Solar System Model
Harri's class, 1979.

Scale : one billionth (1/1,000,000,000)

Planet	Diameter (mm)	Distance (When furthest from Sun) Aphelion (m)	Distance (When closest to Sun) Perihelion (m)
Sun	1,392	—	—
Mercury	4.88	69.7	45.9
Venus	12.1	109	107.4
Earth	12.76	152.1	147.1
Mars	6.79	249.1	206.7
Jupiter	142.8	815.7	740.9
Saturn	120	1,507	1,347
Uranus	51.8	3,004	2,735
Neptune	49.5	4,537	4,456
Pluto	6	7,375	4,425

Solar System Model

Scale: One hundred billionth (1/100,000,000,000)

Planet	Diameter (mm)	Aphelion (m)	Perihelion (m)
Sun	.1392	—	—
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Mercury	0.05	.697	.459
Venus	.1	1.090	1.074
Earth	.1	1.521	1.471
Mars	.07	2.491	2.067
Jupiter	1.4	8.157	7.409
Saturn	1.2	15.07	13.47
Uranus	.5	30.04	27.35
Neptune	.5	45.37	44.56
Pluto	.06	73.75	44.25