**MAKING A SCALE MODEL OF THE SOLAR SYSTEM**

INTRODUCTION:

The planets range in size from our smallest terrestrial planet Mercury to the gigantic gaseous planet Jupiter. The volume of Jupiter is about 200,000 times that of Mercury the smallest inner planet. If one is to appreciate the sizes of the inner planet versus the outer planet, it is necessary to make scale models of the planets. Scale is the ratio between the dimensions of a representation and those of the object.

OBJECTIVE:

Using the planetary data and scale conversion you will construct diagrams that show the relative sizes of the planets.

PROCEDURE A:

1. Draw Data Table 1 below into your notebook,
2. Using the scale 1 cm = 7000 km, determine the scale size of each planet. Be sure to round to the nearest tenths place.
3. Using the scale diameters in Data Table 1, construct circles representing the planets on a piece of paper using a compass.
4. Label each circle with the name of the planet, the actual size, and the scale size. Color each planet the appropriate color. Use the computers if needed to look up the colors of the planets.

Data Table 1:

|  |  |  |
| --- | --- | --- |
| Planet | Equatorial Diameter (km) | Scale Diameter (cm) |
| Mercury | 4,880 |  |
| Venus | 12,104 |  |
| Earth | 12,756 |  |
| Mars | 6,787 |  |
| Jupiter | 142,800 |  |
| Saturn | 120,000 |  |
| Uranus | 51,800 |  |
| Neptune | 49,500 |  |
| Pluto  | 2,390 |  |

PROCEDURE B:

1. Draw Data Table 2 below.
2. Using the scale 1 cm = 10,000,000 km, find and record the scale distances from the Sun. Be sure to round to the

nearest tenths place.

1. Obtain 5 meters of cash register tape and spread it out along the desks or floor.
2. Measure 10 cm from the end of the cash register tape and label it “Sun”. This will represent
3. the Sun’s surface and will be your starting point for all your measurements.
4. Using a meter stick, measure all the distances of the planets from the line labeled “Sun”, make a line representing each planet. Label the space between measurements with the actual distance and the scale distance.
5. Label each line with the name of the planet.

Data Table 2:

|  |  |  |
| --- | --- | --- |
| Planet | Scale Distance from Sun (km) | Scale Distance from Sun (cm) |
| Mercury | 57, 900,000 |  |
| Venus | 108,200,000 |  |
| Earth | 149,600,000 |  |
| Mars | 227,900,000 |  |
| Jupiter | 778,300,000 |  |
| Saturn | 1,427,000,000 |  |
| Uranus | 2,869,000,000 |  |
| Neptune | 4,496,000,000 |  |

Analyzing questions: Write out the following questions, discuss the answers with your group and record your answers in complete sentences.

1. Which are the two largest planets and how do you know?

2. Which planet is closest to the size of the Earth and how do you know?

3. How do the sizes of the inner planets (terrestrial) compare to the sizes of the outer planets (jovian)?

4. The Sun has a diameter of 1,394,000 km. Using the scale from Procedure A 1 cm = 7000 km) what would be the scale diameter for the circle representing the Sun?

5. How do the distances between the inner planets differ from that of the outer planets?

6. Which two planets are closest to Earth and how do you know?

7. Pluto is at an average distance from the Sun of 5,906,376,272 km. Using the scale from Procedure B 1 = 10,000,000

CONCLUSION: Compare the sizes of the planets and the distances between them. Predict why the planets are found in this order and at these distances from the Sun.