**Earth Science/Astronomy/Ms. Cohn**

**Lab \_\_\_\_: Solar System Scale Model**

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lab Partners: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Introduction:**

Take a look at the image to the right. Do you think that image represents the real scaled distances each planet is from other another and the sun? Absolutely not! Most Images of our solar system are not depicted to scale, for reasons that you will learn in to today’s lab activity. Today you will create an accurate scaled model of the **DISTANCES** each planet is from one another to see the true scale of our Solar System on a piece of register tape.

**Part I:**

The 8 planets and dwarf planet, Pluto, are listed as follows in order. Predict which planet you believe falls in the actual middle of the solar system if we could draw a straight line from the Sun all the way out to Pluto (dwarf planet):

Order of planets: Mercury🡪Venus🡪Earth🡪Mars🡪Jupiter🡪Saturn🡪Uranus🡪Neptune🡪Pluto

Which planet will fall in the middle of your straight line from the sun out to Pluto?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain your prediction:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part II:**

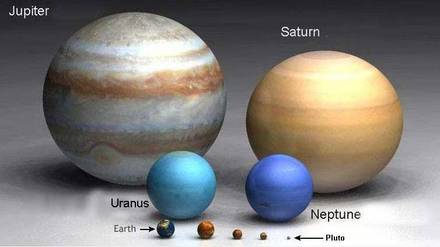
1. Fill in the chart below to convert the real mean distances of planets from the sun into scaled distances you will use in your model. We will be using register tape that is 1.2 (m) long, therefore your **scaled distance** is equal to:

**1cm on register tape= 50 million kilometers in real life**

|  |  |  |
| --- | --- | --- |
| **Celestial Object** | **Actual Distance From the Sun**  **In millions of km** | **Calculated distance in scale model**  **Actual Distance (km)**  **Scaled distance (50 km)**  **(Round to nearest 10th )** |
| **Mercury** | **57.9** |  |
| **Venus** | **108.2** |  |
| **Earth** | **149.6** |  |
| **Mars** | **227.9** |  |
| **Asteroid Belt** | **456.6** |  |
| **Jupiter** | **778.4** |  |
| **Saturn** | **1,426.7** |  |
| **Uranus** | **2,871.0** |  |
| **Neptune** | **4,498.3** |  |
| **Pluto** | **5,906.4** |  |

**Part III:**

1. Write your name and your lab partners name on the register tape. Tape down each side of the register tape so that it lays flat across your desk. **The end furthest to the left will represent the edge of the sun (looking sideways).** *This is your reference point from where you will measure every object from*



1. Begin marking the locations of the celestial objects from your chart (planets and asteroid belt) on the register tape by **starting from the sun** **EACH TIME** you measure to an object with a meter stick.
2. Use the below picture to draw **approximate sizes** of each planet compared to one another. (This will NOT be true to scale- if it were ,you would not even be able to draw mercury or pluto on this paper!) Make sure that the center of your planet or asteroid is the distance that you measured to.
3. Label each planet drawn by name.
4. If time permits, lightly color in each planet you have drawn.

**PART IV Discussion Questions**

1. a. Which planet, now that you have made your scale model, falls midway between the outer edges of our solar system and the sun?

b. Was your original hypothesis about which planet was in the middle of our solar system correct? Why did this not work out to be your prediction? Use **data on distance** to justify your answer (and perhaps some math)

1. What do you notice about the placement of the Jovian Planets (outer planets) compared to the Rocky Terrestrial planets (inner planets)? –how do the distances **between** the planets of each of these groups differ?
2. How does the force of gravity between the sun and each planet changes as you move outward in our solar system? How is this supported by your observations in your scale model?
3. The asteroid belt is located between which two planets?

Explain one theory which explains why the debris within the asteroid belt were never able to form a planet. Use the position and any additional information to justify your answer.