Toilet Paper Solar System

Interplanetary travel is extremely difficult due to the almost unimaginable distances between the planets in our solar system. Voyager II, traveling at nearly 50,000 mph took 12 years to reach the planet Neptune! This gives you an idea of just how far our planets are from each other. However, we can make a *scale model* of the distances between the planets using almost anything as our reference. In doing so, we may be able to determine a variety of ways to classify the planets of our solar system and get an idea of just how much *space* there is in *space*. Still, even with all of the technological advances that have been made in the last several years, it is almost impossible to make a scale model of the solar system that is correct in both planetary diameter and distance.

Measures of the Planets from the Sun

Planet	Distance to the Sun (in miles)
Mercury	35,983,610
Venus	67,232,360
Earth	92,957,100
Mars	141,635,300
Jupiter	483,632,000
Saturn	888,188,000
Uranus	1,783,950,000
Neptune	2,798,842,000

In order to figure out the distance of each planet from the sun, you will have to use a *scale model.* Making a scale model requires you to do *conversions.* Because the distances we're dealing with are so large, we have to convert them into smaller units. For this project, we are going to *convert the distances of the planets to the Sun to sheets of toilet paper.*

How to Convert:
1. One sheet of toilet paper = 10,000,000 miles
2. Take the distance of each planet and divide it by 10,000,000 or…
3. Move the decimal of each distance seven places to the left and round to the nearest tenths place.

Example:

Mercury = 35,983,610 ÷ 10,000,000 = 3.59; Round to 3.6

Scale Model

Celestial Object	Number of Sheets from Sun
Sun	0.0
Mercury	
Venus	
Earth	
Mars	
Jupiter	
Saturn	
Uranus	
Neptune	

Directions:

1. Using the directions on **How to Convert**, fill out the scale model above and figure out the **number of sheets from the sun** for each planet (grey column).

2. After your group has finished your conversions, check your work with your teacher. You will then count the number of sheets each planet is from the Sun and put the name of the planet on that sheet of toilet paper.

3. Your team needs to make a Sun. It will need to be really big! On this scale, make your Sun with a diameter of 77 inches. You may need to tape together a few big sheets of orange construction paper for the Sun.

4. Once you have all your calculations, and your Sun, see your teacher to get your planet folder. In the planet folder, are the scaled images of the planets on popsicle sticks.

5. Once ALL teams are ready, we will head outside and stretch out our "Solar System" so we can see just how large the Solar System looks, even on this scale.
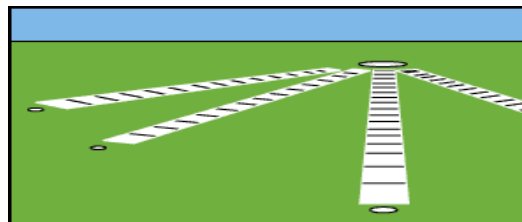
You will stretch out your toilet paper and place you planet stick in the ground.

Questions:

1. What did you observe about Mercury, Venus, Earth, and Mars?

2. What do you notice about Jupiter, Saturn, Uranus, and Neptune?

3. Alpha Centauri is the closest visible star to our Sun. It is located 25,000,000,000,000 miles away. How many sheets away is it?

4. Why do we use a scale to model the solar system?

5. What does this lab make you realize about our solar system?

6. **Reflection**:
   *What could we have added to our "Solar System" to make this more realistic?

   *What did you like/dislike about this activity? Do you have any suggestions for the teacher that would make this a better experience for students in the future?