Toilet Paper Solar System

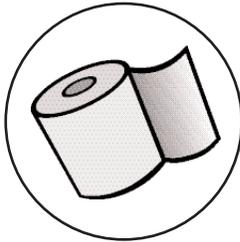**FAMILY ASTRO**

100-Sheet Model

What's This About?

Even in our own "cosmic neighborhood," distances in space are so vast that they are difficult to imagine. In this activity, we will build a scale model of the solar system using a roll of toilet paper.

Materials

- Planetary distances table
- Roll of toilet paper, with at least 100 sheets. Cheap 1000 sheet rolls work best. It will stretch out about 42 feet, so make sure you have space.
- Gel pen or felt tip pen to write on toilet paper
- Tape in case paper rips

What to Do

Take one sheet of toilet paper and test the pens. After learning the best way to write on toilet paper, throw away the test sheet.

Make a dot on the seam between the first two sheets of toilet paper. This is the Sun. Write the word Sun beside the dot.

Use the table of distances provided to mark off the distances to each of the planets. The number in the table is the number of sheets of toilet paper needed to reach the orbit of each planet from the sun, so keep a running count as you go along. Make a dot and write the appropriate planet name on toilet paper at each distance indicated. When you get to the asteroid belt, put one dot representing Ceres, the largest asteroid. In reality there are thousands of asteroids orbiting the sun at this distance. Place a folded index card with the name of the planet next to the location on the toilet paper strip so your eyes can see the locations of the planets.

Toss the toilet paper in recycling to clean up.

Our model is not accurate for the following reasons...

1] The planets will never all be in a straight line going out from Sun, as they are represented in this model. The planets are actually making circular orbits around the Sun. The closest planet, Mercury has the quickest orbit--only 88 days. The farthest planet, Neptune has the longest orbit--165 years! Earth's orbit (it's trip around the sun) takes 1 year. 2] If the planets were really these distances apart, they would be *extremely* tiny. The biggest planet, Jupiter, would be smaller than the size of a grain of sand. The dots you are putting on the toilet paper are actually TOO BIG!

PLANET	DISTANCE FROM SUN (KM)	SQUARES OF TOILET PAPER OUT TO PLANET'S ORBIT (short version)
Mercury	57,910,000 km	1.0
Venus	108,200,000 km	1.8
Earth	149,600,000 km	2.5
Mars	227,940,000 km	3.8
asteroid belt	414,436,363 km	7.0
Jupiter	778,330,000 km	13.2
Saturn	1,429,400,000 km	24.2
Uranus	2,870,990,000 km	48.6
Neptune	4,504,000,000 km	76.3
Pluto	5,913,520,000 km	100.0

Note:
Keep a running count as you work on this. Each distance is from your starting point, the Sun

The asteroid belt is a massive collection of space rocks that are in orbit between Mars and Jupiter. It was probably going to be the 5th planet out from the Sun. Some scientists think that Jupiter's massive gravity kept pulling it apart as it tried to form. Other scientists think that it got hit by a large object and smashed to pieces.

NOTE: Pluto is NOT a planet. It is the largest member of the Kuiper Belt, a zone of icy objects out past Neptune.
It does not have the same shape of orbit as the other planets, nor is it in the same plane in its orbit.
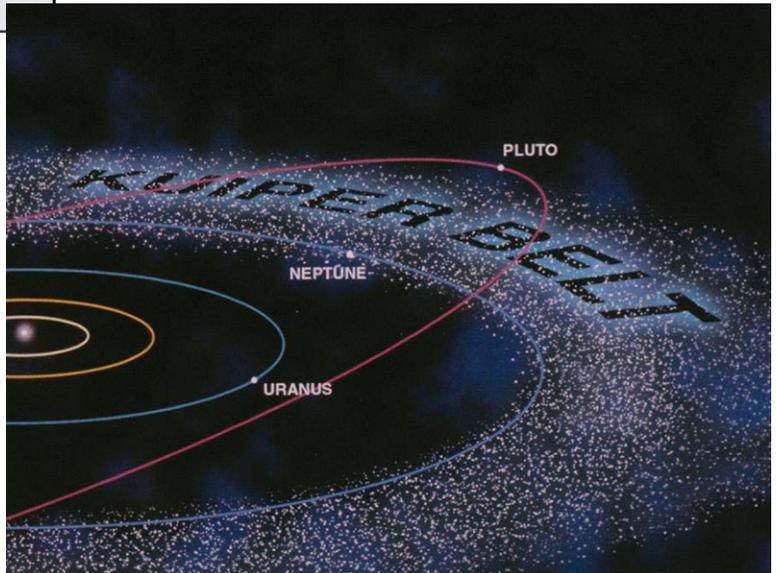
1] T or F? The planets are equally spaced apart.

2] T or F? The planets closer to the Sun are also closer to each other.

3] Where is there a greater distance, from Mercury to Venus or from Jupiter to Saturn?

4] T or F? The planets are always in a straight line away from the Sun.

5] In what 2 ways is this model NOT ACCURATE?
   1) _____ 2) _____

6] How do the planets move relative to the Sun?

7] What does orbit mean?

8] How long does it take for Earth to orbit the Sun?

9] T or F? Earth takes longer to orbit the Sun than Jupiter.

10] Since in this model Jupiter would only be the size of a grain of sand, Earth would be _____.

11] What is the asteroid belt?

12] What is the Kuiper belt?