



## Home School Edition-

### Toilet Paper Solar System - A Scale Model

The distances between our planets are so vast they are almost incomprehensible. Visualize the expansiveness of our “cosmic neighborhood” with a roll of toilet paper!

#### Time

- 5 minutes prep time
- 30 minutes activity

#### Grade

- 2nd-8th

This activity is very adaptable. You can do it with multiple ages all together. Adults can join in, but most children 8 and up can do this with little help. The scale model is 42 feet long, so think about which space would work best.

**Important note: If you use the planet print outs, these are not on the same scale as your distance.** If they were, you wouldn't be able to see them at all!

#### Materials

- ◇ Toilet Paper Solar System Scale Model Table (next page).
- ◇ One role of toilet paper (or substitute string, yarn, or a measuring tape).
- ◇ Planet print outs, or objects to represent your planets. You can use coins or other small round objects.
- ◇ Marker
- ◇ Calculator if desired

#### Lesson overview

Our solar system is so immense that the distances in space can be difficult for anyone to comprehend. In this activity, students will unroll a roll of toilet paper to build a scale model of distances in the solar system. While understanding these distances, students will explore why the sun is so essential to life on earth by examining the temperatures of each planet relative to the distance away from the sun. Students will grasp that the location of the earth from the sun allows for life to be sustained due to the perfect amount of heat and energy produced by the sun. You can find a video introduction to this lesson on the **video tab above** or here:

<http://www.greatbasinobservatory.org/lesson-plans/z-homeschool-toilet-paper-solar-system>

#### Directions– Activity #1 Build your scale solar system model

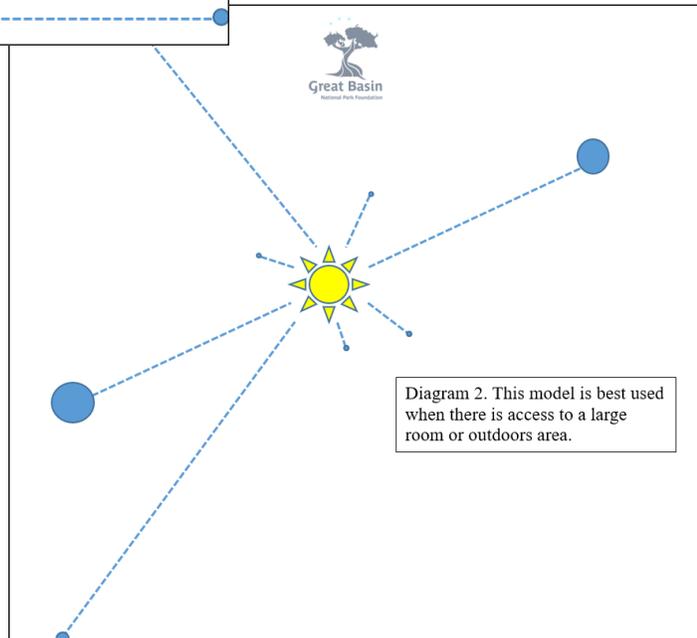
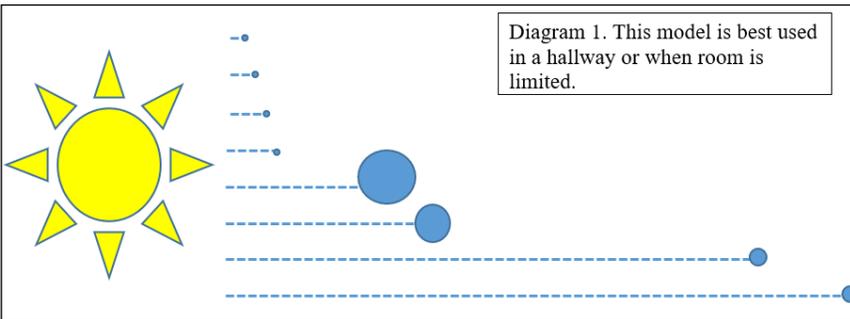
- Decide which space you will use to create your scale model.
- Gather your materials.
- You can use a pillow or dog bed to represent the sun.
- You will always be starting at the sun.
- Follow the Table on the next page to lay down your toilet paper squares (or string, yarn, or measuring tape) to place your planet in it's scaled orbit from the sun.
- Toilet paper squares are about 4 inches long. Therefore if you are using string or yarn, you will need to do some additional math, multiply the number of toilet paper squares by four. This is where a measuring tape will come in handy. You will now have the inches from the sun that each planet should be placed.
- **Remember:** Each time you need to start counting from the Sun. Do not start counting from the last planet.

# Table for Toilet Paper Solar System Scale Model

Remember to start counting from the **Sun** each time.

Planet	Squares of Toilet Paper from the Sun	If not using Toilet Paper multiply by 4	Inches you will go from the Sun to place your planet
Mercury	1.0	x 4 =	
Venus	1.8	x 4 =	
Earth	2.5	x 4 =	
Mars	3.8	x 4 =	
Jupiter	13.2	x 4 =	
Saturn	24.2	x 4 =	
Uranus	48.6	x 4 =	
Neptune	76.3	x 4 =	

In real life the planets are not laid out in a single line. How would you change your model to better represent the real solar system? Space may limit you from doing this. If you are using string, try starting each piece from the sun. After you lay them out, you can tack them to the sun and then spread the planets around in a more realistic pattern. See the examples below.



## Activity #2

- Now check out this Table of average temperatures on each planet. What do you notice?

<b>Planets</b>	<b>Average Temperature of Planets</b>
Mercury	811 °F
Venus	873 °F
Earth	61°F
Mars	-20 °F
Jupiter	-162 °F
Saturn	-217 °F
Uranus	-319 °F
Neptune	-332°F

- Write the temperature in marker on the toilet paper by each planet, or make a note on a piece of paper and place it by each planet.
- Take a tour of your solar system. What do you notice about the distances between planets?
- What do you notice about the temperatures of planets? What do you think, could there be life on other worlds in our solar system?

\*\*\*\*\*Optional Work Sheet\*\*\*\*\*

1. Earth is called the “Goldilocks Planet”. Do you remember the story of Goldilocks and the three bears? Why do you think Earth is called the “Goldilocks Planet”?

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2. Could any of Earth’s life forms live on another planet? Why or why not?

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3. The sun is essential for supporting almost all of life on Earth- Why?

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4. What would happen to all living things if the Earth was where Jupiter is?

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5. Imagine we discover life in outer-space- in a neighboring solar system. What is most likely to support that life? Hint- what does most life on Earth need to survive?

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## Up Next

We hope you had fun constructing your TP solar system!

Let us know how it went.

Send us a photo, video, or your worksheet to

[greatbasinobservatory@gmail.com](mailto:greatbasinobservatory@gmail.com)

We may ask permission to post your items on Facebook or our website– [www.greatbasinobservatory.org](http://www.greatbasinobservatory.org)

- Check out the videos on the video tab to learn how astronomers study extremophiles on Earth to anticipate what life we may find in outer space. Does all of life on Earth really depend on the energy from the Sun? Find out! Let us know what life you think lives on other planets and elsewhere in the universe.

*Thanks for visiting the Great Basin Observatory*

*Dark skies ..... Bright minds*