BUILD A SOLAR SYSTEM

Make a scale model of the Solar System and learn the REAL definition of "space."

This Page requires a JavaScript capable browser.

TO DO & NOTICE

- Fill in the diameter of the Sun you want your model to be scaled by. You can fill in either the red bordered inches box or the green bordered millimeters box. **Important:** Only fill in one box. If both are filled in you will get a dialog box asking you to clear one of the boxes. Use the **Clear** button to clear the entire form.
- Click on the "Calculate" button.
- Notice that the distances and sizes of the planets will automatically fill in. I've also provided some other interesting scale comparisons at the bottom of the chart.
- You can now build your scale model. You can do this with a long tape measure, or you can measure the size of your pace and walk it off counting the number of steps you take. To mark a planet's place you can use a piece of paper on a post that you stick into the ground, or you can use a flag, or even a person. Be prepared for a long walk!
- If you build your solar system on a roll of toilet paper, you can make the Sun about .4 inches (10 mm) across and still fit the entire solar system on the roll. A standard roll of toilet paper has about 450 sheets that are about 4.375 inches long, hence the roll is about 164 feet long. You should check your toilet paper for length. Some are longer.
- You can click on the names of the planets and satellites to go the the Nine Planets web site page about them. LOTS of info there!

Solar System Model

Body	Body Diam (km)	Body Diam (in)	Body Diam (mm)	Orbit radius (km)	Scaled orbit radius (ft & in)		Scaled orbit radius (meters)
Sun	**1391900**	0.3	10	Calculate	Clear		
Mercury	**4866**	0.0013	0	**57950000**	1 **ft**	4.39 **in**	0.416 **m**
Venus	**12106**	0.0034	0	**108110000**	2	6.57	0.776

					ft	in	m
Earth	12742	0.0036	0	149570000	3	6.3	1.074
					ft	in	m
Mars	6760	0.0019	0	227840000	5	4.44	1.636
					ft	in	m
Jupiter	142984	0.0404	1	778140000	18	4.09	5.59
					ft	in	m
Saturn	116438	0.0329	0.8	1427000000	33	7.62	10.252
					ft	in	m
Uranus	46940	0.0132	0.3	2870300000	67	7.86	20.621
					ft	in	m
Neptune	45432	0.0128	0.3	4499900000	106	0.8	32.329
					ft	in	m
Pluto	2274	0	0	5913000000	139	4.5	42.481
					ft	in	m

Other interesting distances and speeds

Quantity	Real Quantity	Scaled Quantity (English)		Scaled Quantity (Metric)	
Speed of light	299792 km/sec	0.084	in/sec	2.1	mm/sec
Light year	9.46051E+12 km	42.2	mi	67.9	km

Distances to Stars and Galaxies

To Alpha Centauri	4.03964E+13 km	180.3	mi	290.2	km
To Sirius	8.17388E+13 km	364.8	mi	587.2	km
To Deneb	1.32636E+16 km	59211.2	mi	95291.3	km
To Galactic center	2.62151E+17 km	1170292.9	mi	1883403.9	km

Sizes of Stars

Hottest star (Type 05)	12527100 km	0.29	ft	0.09	m
Coolest star (Type M5)	222704 km	0.06	in	0.16	cm
Red giant (Betelgeuse)	521962500 km	12.3	ft	3.7	m
White dwarf (Sirius B)	13919 km	0.0039	in	0.099	mm
Neutron star	20 km	0.000005	in	0.00014	mm

I've only given you the sizes and distances to the planets. If you'd like to see the satellites of the planets as well, click here for a much more extensive page (and a longer download time too!)

WHAT IS GOING ON?

One of the most exciting excercises I ever did as a kid was to make a scale model of the Solar System. Most of the pictures in my books made the distance between planets seem small and easy to travel. Museums were no help either. The models they displayed usually had the sizes of the planets to scale, but the distances between them were a completly different scale, giving the impression of a rather close-knit family.

I made my first scale model on a roll of teletype paper tape (anyone remember that stuff?) On this 1-inch tape, my Sun was the size of the tape - 1 inch in diameter. It all started out well. Mercury was only about 3-1/2 feet from the sun and Earth was almost 9 feet from the Sun. What I didn't bargain for was that Pluto was 354 feet down the tape! I used up almost the entire roll.

I also calculated the sizes that I should make the dots that represented the planets. I found that even the largest planet, Jupiter, should have a spot size smaller than 1/8 inch. The other planets, especially the small rocky inner planets, would be virtually invisible dust spots.

Needless to say, this was an eye-opening experience. This one excercise taught me the real meaning of the word "space." It sure made me feel insignificant looking at the scale of the Solar System - never mind the rest of the universe!

Now we have great tools like spreadsheets to do the numerical computations for us. Below you can download OpenOffice (or Libre Office), Apple Numbers or Excel format files. In these spreadsheets, you set the scale of the model by entering a radius for the Sun. The sheets should then calculate everything else based on this number.

Download Apple Numbers-format spreadsheet

Download Excel-format spreadsheet

Download OpenOffice-format spreadsheet

Links to other Solar System resources

- **Your Age On Other Worlds**
- **Your Weight On Other Worlds**
- The Exploratorium's "Observatory"
- The Nine Planets
- A Solar System Scale Model Meta Page.
- A new geocaching model in California. Get out that GPS to find the planets!
- Filmmakers Show the Scale of the Solar System in Amazing Video
- If the Moon Were Only 1 Pixel
- THE THOUSAND-YARD MODEL or, The Earth as a Peppercorn
- Colorado Scale Model Solar System

- The Eugene Oregon 1:1,000,000,000 Scale Model Solar System
- Scale Model Solar System lesson plan from meteorite.unm.edu
- Solar System Exploration from NASA-JPL
- NSSDC Photo Gallery
- JPL's Welcome to the Planets
- A diagram of the solarsystem NOW! (In stereo if you want!)
- Astronomy Picture of the Day

Thanks to Bill Arnett for his fantastic Nine Planets web site.