Ages:
3th gr and up

Duration:
30 minutes

Materials:
- Safety vests with signs or pictures of the planets
- Measuring tape

~ LPI Education/Public Outreach Science Activities ~

Human Model of the Solar System

Overview —

Build your Solar System to scale, to fit your sidewalk, football field, or parking lot, then have your students model the position of the planets relative to the Sun.

Objective —

The students will be able to:

- Describe the relative distances of the planets to each other
- Compare the sizes and distances of various planets to the Sun
- Contrast the size of the planets to the amount of space between the planets

Before You Start: *The students should be with the concept of a scale model.*

Activity —

Decide where you would like to have your students line up to represent the distances of the planets from the Sun, and estimate its length. Then use the website http://www.exploratorium.edu/ronh/solar_system/ to automatically calculate the scaled sizes of the planets and distances from the Sun, relative to the size of the Sun you provide.

Pick students to act as various planets. Each student should have a form of identification; safety vests with pictures or the names of the planets are recommended if you are using a parking lot or sidewalk outside. The students may also want to have an object to represent the size of the planet, such as the head of a pin or a marble.

Explain to the students that they are modeling the distances of the planets from the Sun, and not the motion or actual position of the planets around the Sun.

Bring your class to the place where they will spread out to model the Solar System. Ask the students to move to where they think they should be with respect to the Sun and the other planets. (They will likely be much too close together.) Then measure out the distances and have the students move to the correct position.

Follow up with discussion:

- *Were they surprised by the actual distances?*
- *What effect does the distance have on their thoughts of interplanetary travel?*
- *Can they imagine how long it takes each planet to orbit the Sun?*

Body	Body Diam (km)	Body Diam (in)	Body Diam (mm)	Orbit radius (km)	Scaled orbit radius (ft & in)			Scaled orbit radius (meters)
Sun	1391900	1	25.4		Clear			
Mercury	4866	0.0034	0	57950000	3 ft	5.63 in		1.057 m
Venus	12106	0.0086	0.2	108110000	6 ft	5.67 in		1.972 m
Earth	12742	0.0091	0.2	149570000	8 ft	11.45 in		2.729 m
Mars	6760	0.0048	0.1	227840000	13 ft	7.68 in		4.157 m
Jupiter	139516	0.1002	2.5	778140000	46 ft	7.04 in		14.199 m
Saturn	116438	0.0836	2.1	1427000000	85 ft	5.21 in		26.04 m
Uranus	46940	0.0337	0.8	2870300000	171 ft	10.14 in		52.378 m
Neptune	45432	0.0326	0.8	4499900000	269 ft	4.91 in		82.116 m
Pluto	2274	0.001	0	5913000000	354 ft	0.15 in		107.903 m

TIES TO STANDARDS —

Connections to National Science Standard(s)
Scientific Processes — The student is expected to analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information; represent the natural world using models and identify their limitations.

Standard D: Earth and Space Science
Grades 5-8

- Earth in the Solar System: The earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.

Principles & Standards for School Mathematics
Number and Operation Standard for Grades 6—8: All students should develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.

Problem Solving: Instructional programs from PK through grade 12 should enable all students to solve problems that arise in mathematics and in other contexts.