Scale Model of the Solar System

Estimated Time: 45 minutes to 1 hour

SUMMARY
"Space is big. You just won't believe how vastly, hugely, mind-bogglingly big it is." This quote from Douglas Adams really sums up the first important thing to learn about the solar system. In this activity, learners will see how vast our solar system is by constructing a scale model of the orbits in a long hallway or across their yard.

WHAT YOU'LL LEARN

- The enormous scale of the solar system and the order of the planets.
- The definition of a minor planet.

Materials Used	Resources Used
• Stickers or cotton swabs (see Step 4) • Clear tape • Index cards (11) and pen • Tape measure	• NASA website (nasa.gov)

WHAT TO DO

1. Make a list of all eight planets in the solar system. Write the name of each planet on one of the index cards (or a small piece of paper) and the distance from this planet to the Sun. You can find the distances (and a full list) in the table on the next page; younger learners might need help with these *really huge* numbers.

    a. Older learners might want to include some **minor planets** in this model. A minor planet (you might also see "dwarf planet") is a body that orbits the Sun and is mostly spherical (like a planet), but isn't big enough to push other big objects out of its orbit. Ceres and Vesta are two large asteroids in the Main Belt between Mars and Jupiter, and Pluto is an icy ball beyond the orbit of Neptune.

    b. Other minor planets can be found with some internet research. Use the semi-major axis as your distance.

2. Pick another index card to be the Sun and label it. You can also make a Sun out of construction paper if you like craft projects.

3. There are two sizes of models outlined in the table. The "small" model can be done in a long hallway or a pair of adjoining rooms; it needs a little more than 30 feet of room. The "large" model is more suitable for outside and requires more than 46 feet of room.

4. Tape the Sun at one end of the space you are using. Measure out the distance to Mercury according to the model you are using (3.6 inches or 7.3 inches). Mark the place of this planet with a sticker (for inside) or a cotton swab stuck in the ground (for outside). Put the "Mercury" index card nearby.

5. Do the same for all the other planets (and minor planets) until you reach the end of the solar system.

Planets	Average Distance to the Sun (miles)	Distance in the Model (small)	Distance in the Model (large)
Mercury	35,983,610	3.6 inches	7.2 inches
Venus	67,232,360	6.7 inches	1 foot, 1.4 inches
Earth	92,957,100	9.3 inches	1 foot, 6.6 inches
Mars	141,635,300	1 foot, 2.2 inches	2 feet, 4.4 inches
Jupiter	483,632,000	4 feet, 0.4 inches	8 feet, 0.8 inches
Saturn	888,188,000	8 feet, 6.8 inches	17 feet, 1.6 inches
Uranus	1,783,950,000	15 feet, 0 inches	30 feet, 0 inches
Neptune	2,798,842,000	23 feet, 4 inches	46 feet, 8 inches
Minor Planets			
Vesta	219,561,617	1 foot, 9.9 inches	3 feet, 7.8 inches
Ceres	257,409,851	2 feet, 1.7 inches	4 feet, 3.4 inches
Pluto	3,670,054,380	30 feet, 7 inches	61 feet, 2 inches

TIPS

- A game of imagination could be taking a “space trip” through the solar system, stopping at each of the planets in your model. Rocket sound effects are encouraged in this.

- Another imaginative game would be to use a toy ship, action figures, or some other stand-in for your ship. As you land at each planet, take a moment to “look around” by reading a book or from the NASA site about the planet you’ve arrived at.

- For older learners, produce a fact sheet instead of an index card to go next to the sticker/swab. This can list the name and distance, but also the surface conditions, a list of major moons, the presence of rings, and any other interesting facts about the planets. Did you know that Uranus is tipped over at a right angle? Crazy!

- For parents, you might be unclear about the definition of a minor planet. You’re not alone! Experts are actively discussing this and have been ever since Pluto was reclassified in 2006, some big drama that you might remember. What counts as a minor planet, what’s an asteroid and what isn’t, and if there’s a special definition of “dwarf planet” are all questions that are ongoing. Science is something that isn’t always clear, and that’s one of its most interesting qualities!