

LESSON 1: SOLAR SYSTEM WALK

OBJECTIVE

Our Solar System is vast and wondrous. We are so tiny in comparison, and can see only a few planets as points of light in our sky. We need a way to appreciate our System's immense size and Earth's place in it. While the film visually demonstrates the huge distances between planets, creating a physical sense requires a scale model Solar System Walk. Scale models allow us to explore and examine things that are too large to otherwise comprehend.

Starting with a balloon as the Sun, students will walk to each planet using a "pace" (2 normal steps, about one meter) as a measure, and place a marker for each planet as you go. The final walk will be about 600 meters (less than half a mile).

LESSON LENGTH

30 minutes preparation

50 minutes walk

MATERIALS

- Round balloon that can be blown up to 14 cm in diameter
- Sign-making materials (cardboard, pens or crayons) for planet signs
- Sticks or stiff wires to hold the planet signs
- Tape
- Metric ruler or meter stick

Scale Model Planet Diameter

Planet (1/10 billion scale)	Scale Model (mm)	Actual (km)
Mercury	0.5	4,880
Venus	1.0	12,100
Earth	1.0	12,800
Mars	0.5	6,790
Jupiter	14	142,980
Saturn	12	120,540
Uranus	5.0	51,120
Neptune	5.0	49,530

Solar System Scale Model Distances

Planets (1/10 billion scale)	Paces between Objects (meters)	Total Paces from Sun to Each Planet	Average Distance from Sun (meters)
Sun to Mercury	6	6	60,000,000,000
Mercury to Venus	5	11	110,000,000,000
Venus to Earth	4	15	150,000,000,000
Earth to Mars	8	23	230,000,000,000
Mars to Jupiter	55	78	780,000,000,000
Jupiter to Saturn	65	143	1,430,000,000,000
Saturn to Uranus	144	287	2,870,000,000,000
Uranus to Neptune	163	450	4,500,000,000,000

PREPARATION

- 1 **Choose the walk area.** The 600-meter area does not have to be in a strictly straight line, and it doesn't need to be all open space or outside—it can start in a soccer field and continue through parking lots, sidewalks and even hallways.
- 2 **Practice walking along a meter stick on the floor,** to make sure that your steps are even. Ensure your "pace" is two normal steps per meter. **Teachers:** Identify good "pacers" for the walk.
- 3 **Make planet signs,** attaching them to sticks or stiff wires for placing in the ground. **Teachers:** Assign each student or small group responsibility for a planet. If you have time, students can research their planets so they will be able to give facts about them during the walk.
- 4 **Make the Sun:** Blow up a round balloon to 14 cm diameter to represent the Sun, or if your walk can start at a building, use a light instead of a balloon to represent the sun. Cut a pie tin reflector to the appropriate 14 cm size. **Optional:** Make planets at the same scale. For example, use a mustard seed for Earth and a small marble for Jupiter. The Scale Model Planet Diameter table to the left of this activity will help you.
- 5 Take the Sun balloon, tape, planet signs, and Solar System Scale Model Distances chart (left) outside to the activity area.
- 6 Tape the "Sun" to a fixed object, such as a doorway or post.

START

Beginning at the Sun, "pace" to each planet, and place the sign for it as you go. For the number of paces, use the Solar System Scale Model Distances chart to the left. When you get to Earth, estimate where Saturn will be in the model. Also, between Mars and Jupiter, remember that you are walking through the Asteroid Belt!

If you cannot leave the classroom, take a virtual walk!

joshworth.com/dev/pixelspace/pixelspace_solarsystem.html

DISCUSSION

- What surprised you most about the scale model?
- How fast do you think a spacecraft would travel in this model? **Answer:** 0.6 cm/hr
- How does this model help you understand the challenges of space travel?
- Would you like to walk to the next closest star (Proxima Centauri) from the Sun? Pack your bag! It would be almost 5000 km away in this model. That's the distance from Boston, MA to Seattle, WA!