

## Are We There Yet? Walking the Solar System

Grade 5

1. Standards and Safety and Materials:
  - A. NGSS Standards: ESS1.B: Earth and the Solar System
  - B. Safety Concerns: minimal safety concerns with regular class activity
  - C. Materials: Pencil, Measuring tape
2. Objectives:
  - A. Students will **construct** a scale graphical display of the solar system.
  - B. Students will **measure** distances accurately.
  - C. Students will **demonstrate** understanding of scale.
3. Connections, Misconceptions, and Crosscutting Concepts:
  - A. Real world connections: Engineer, Architect, City Planner
  - B. Student connections: Locations across town, state, and country
  - C. Misconceptions: Scale of solar system
  - D. Crosscutting Concepts: Scale, Proportion, Quantity
4. Catch/Engagement
  - A. Visual: Photos of planets and Sun
  - B. Auditory: *The Planets* by Gustav Holst
  - C. Taste: Cheese puffs
5. Pre-Test: See below
6. Activity/Exploration
  - Part 1: Lecture
    - X – See photos below showing position and order of planets.
    - Y – 1. Photo of Solar System
    2. Discuss terrestrial vs. gas planets
    3. Discuss dwarf planets
    4. Distances within town of Evanston
    5. Discuss purpose of constructing scale model
  - Part 2: Lab
    - M – See instruction handout below
    - N – Lab Procedure
      1. Introduce scaled distance table
      2. Discuss how measurements were converted
      3. Name beginning and endpoint in hallway
      4. Discuss procedure for measuring and create small student groups
      5. Describe jobs within group, ensure that each student has a task:
        - a. Tasks: Read table, Measure, Mark, Inspector, Data Resource
  - Part 3: Reading: See below
  - Part 4: Discussion: Students will **know** order of planets and relative distances between them.
7. Review/Essential Questions/Explanation
  - A. Low Level – What is the order of the planets in the Solar System?
  - B. Middle Level – What is important for accurate measurement?
  - C. High Level – How does a model help us understand scale?

8. Assessments

- A. Formative: Teacher will assist groups during class to check for understanding.
- B. Post-test: Same as Pre-test
- C. Summative: Students will construct a model of solar system distances in the hallway.
- D. Material will be reviewed at the beginning of the next lesson as it builds directly on this information.

9. Timeline: 35 minutes total

- A. Catch: 2 min
- B. Pre-test: 3 min
- C. Activity: 22 min
- D. Review and Post-test: 8 min

10. Enrichment/Elaboration: Extra Activity

- A. Write on a sticky-note which planets are gas and terrestrial planets and place them in the hallway in the correct position.

11. IEP Accommodations/ Differentiation/Diversity: Students will work in small groups, chosen by the teacher to include a mixture of ability levels.

## Pre/Post Test

1. How many planets are in our solar system?
2. List the three closest planets to the Sun:
  - a.
  - b.
  - c.
3. What are the next three planets in order?
  - a.
  - b.
  - c.
4. Name the last three planets including the one dwarf planet:
  - a.
  - b.
  - c.
5. Which planets are terrestrial planets?
  - a.
  - b.
  - c.
  - d.
6. Which four planets are gaseous planets?
  - a.
  - b.
  - c.
  - d.

**Instructions:**

The sun is the starting point for the scaled model outside the classroom.  
Measure beginning from the wall where the sun is posted.  
Pluto will already be posted.

**Group 1:** The first planet is Mercury. Measure 4 feet from the sun and place the planet label on the wall. Next, measure to Venus.

**Group 2:** Locate Earth at 10 feet from the Sun. Next, locate Mars.

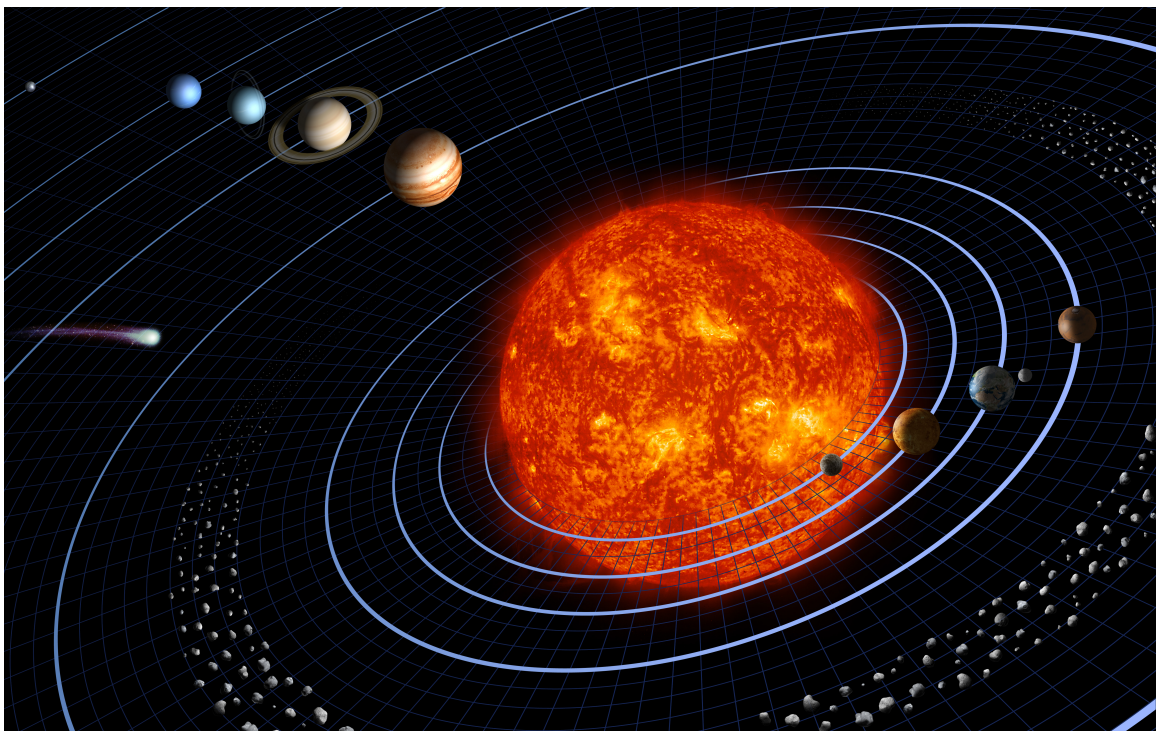
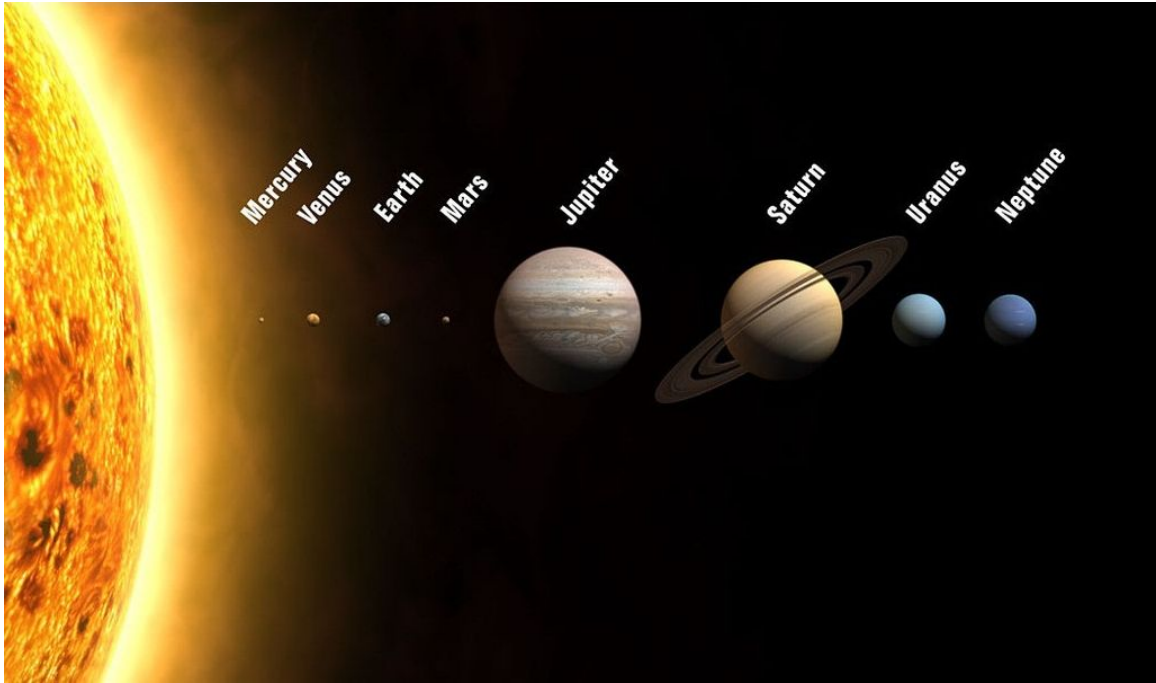
**Group 3:** Position Jupiter 53 feet from the Sun. Next, label Saturn.

**Group 4:** Label Uranus 194 feet from the Sun.

**Group 5:** Locate Neptune 304 feet from the Sun.

Object	Distance from Sun (millions of km)	Scaled Distance (feet)
Mercury	58	4
Venus	108	7
Earth	150	10
Mars	228	15
Jupiter	778	53
Saturn	1427	97
Uranus	2871	194
Neptune	4497	304
Pluto	5913	400

# Introduction Photos



## Reading

Our Solar System is a small part of a spiral galaxy, the Milky Way. The Solar System consists of the Sun and eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. The largest object of our Solar System is the Sun. Pluto is a dwarf planet, the farthest from the Sun. Four planets are terrestrial planets, consisting of rock and metal: Mercury, Venus, Earth, and Mars. The last four planets are gaseous planets: Jupiter, Saturn, Uranus, and Neptune.

To get an idea of the very large scale of our Solar System, a model can be created. The model is like a map that shows large distances in a small area. Today, we will be working together to create this map of the Sun and the planets.