

## Hands on Astronomy Activity 2

**Topic:** Solar System

**Learning Objective:** Students will learn about the different planets in our solar system and their relative sizes and distances from the sun.

### Alignment with NGSS Grades K-2 and 3-5

Science and Engineering Practices

Developing and using Models K-2

- Distinguish between the model and the actual object, process and/or events the model represents.
- Compare models to identify common features and differences.
- Develop and/or use a model to represent amounts, relationships, relative scales, and or patterns in the natural or designed worlds.
- Develop a simple model based on evidence to represent a proposed object or tool.

### Crosscutting Concepts and Connections to Engineering, Technology, and Applications

Crosscutting Concepts Grades 3-5

Scale, Proportion, Quantity

- Observable phenomenon exist from very short to very long time periods.
- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

### Materials:

- Yard Ruler
- Sun - Ball, diameter 8.00 inches
- Mercury - Pinhead, diameter 0.03 inch
- Venus - Peppercorn, diameter 0.08 inch
- Earth - Second peppercorn
- Mars - Second pinhead
- Jupiter - Chestnut or a pecan, diameter 0.90 inch
- Saturn - Hazelnut or an acorn, diameter 0.70 inch
- Uranus - Peanut or coffee bean, diameter 0.30 inch
- Neptune - Second peanut or coffee bean

### Detailed Description

- Activity
  - Ask students about their conception of the Solar System

- How big is it? How far apart are the planets from one another? How long would it take to travel between them?
  - Procedure
    - Lay out materials on a table in the classroom, point out how much larger the Sun is than the Earth, tell them that a car driving at 65 MPH would take 13 days to circle the Earth, while the same car would take almost five years
    - Ask students how much space it will take us to make our model
    - Explain that one yard equals one pace, have a student pace out the distance between the Sun and the Earth (26 paces)
    - Tell students that we need to go outside to create this model, need a space that is  $\frac{1}{2}$  mile long, if possible
    - Assign planets to each student, give each Planet their object and a small flag
    - Make one student the “Pacecraft”
      - Have Pacecraft go out 10 paces. Mercury puts down the pinhead.
      - Another 9 paces. Venus puts down her peppercorn.
      - Another 7 paces. Earth
      - Another 14 paces. Mars
      - Another 95 paces. Jupiter
      - Another 112 paces. Saturn
      - Another 249 paces. Uranus
      - Another 281 paces. Neptune
    - Once all planets are laid out, have all students pace the entire length of the model, counting out their paces
    - Explain that Pluto is not the end of the Solar System, explain that it would take about 6,500 years to reach Pluto in a car going 65 MPH, but that it would take 16 million years to reach the edge of the Solar System, which is two light years from the Sun or about 12 trillion miles
    - Tell students that the closest star system, Alpha Centauri, is two times that distance away
    - Discuss the size of the largest stars and black holes with comparison to the model that we have created
- Questions
  - Encourage students to ask any questions that they may have about the size of the Solar System, the Sun, stars, and black holes