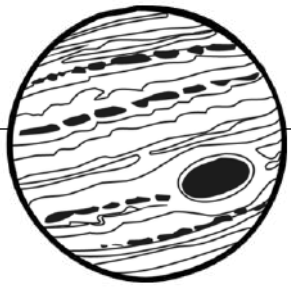
Plotting Density versus Diameter for Solar System Objects



Introduction

As the sun formed from the collection of gases, ices, and dust that made up the solar nebula a lot of left over material formed a disk of debris around it, Out of this debris other objects formed. These objects formed the rest of our solar system. They come in many different sizes, and are made of a great variety of material so vary in density and other properties. You will be working with 13 of these objects to learn more about the different types of objects found in our solar system.

Materials

- Solar System Object Cards
- Density versus Diameter grid paper

Procedure

- Use the information for diameter and density provided on the cards to create a scatter-plot. As you plot the position of the objects on the grid provided, be sure to label each point with the object number.
- Make an attempt to sort the objects into 4 groups, based on their positions on the grid. Circle each set of objects that you consider part of the same group.

Questions

1. Which objects do you feel are the terrestrial planets? Why?
   Objects 1, 2, 3, 4, & 5. These are in the terrestrial group because they have the highest densities, and are smaller in diameter than the giants.

2. Which objects do you feel are the gas giants? Why?
   The gas giants are those objects with the largest diameters and the lowest densities. (6 & 7)

3. Which objects do you feel are the ice giants? Why?
   The ice giants have a higher density than the gas giants and lower densities than the dwarf and terrestrial planets. They are also between the terrestrial and gas giant planets in terms of their diameters.

4. Which objects do you feel are the dwarf planets? Why?
   The dwarf planets (objects 10, 11, 12, & 13) have the smallest diameters and have densities between the terrestrial and ice giant planets.

Questions for further discussion

1. Why do you think that objects #4 and #5 are so far to the left of the others in the terrestrial planet group?

   These are the Moon, and Mars. Students can research current thinking about the composition of these objects to help them explain the difference.

2. Why are the ice giants so different from the gas giants?

These objects lack the amount of low-density gases (hydrogen and helium) that are found in the gas giants.