Cosmic Chemistry: Planetary Diversity

The Missing Planet

STUDENT ACTIVITY

INSTRUCTIONS

The known planets are spaced fairly regularly around the sun, but there is an obvious gap between Mars and Jupiter. All the mathematical formulae for modeling the distances of the planets from the sun suggest that there should be a planet somewhere between 2.8 AU and 3.5 AU.

If these asteroids had condensed to form a planet at a distance of 3.2 AU from the sun, at the same time and in the same way as the other nine known planets, what might its characteristics be? Describe your predictions for the missing planet by answering the following questions, *complete with the reasons for your answers.*

1) Would the missing planet be a terrestrial planet or a gaseous planet?

2) What would you estimate the mass, the diameter, and the average density of the missing planet to be?

3) What would be the average temperature of the missing planet?

4) What do you predict that the missing planet's period of rotation would be?

5) What chemical constituents would be found on the missing planet?

6) Would the missing planet have an atmosphere? If so, what would its chemical constituents be?

7) Would the missing planet have a magnetosphere? If so, what would the plasma sources be?

8) Would the missing planet show evidences of cratering? Why or why not?