

Scientists from around the world are gathered this week at NASA's Ames Research Center in Moffett Field, Calif., for the second Kepler Science Conference, where they will discuss the latest findings resulting from the analysis of Kepler Space Telescope data.

New Kepler data analysis and research also show that most stars in our galaxy have at least one planet. This suggests that the majority of stars in the night sky may be home to planetary systems, perhaps some like our solar system.

**Problem 1** - Based on a total of 3538 candidate planets, Kepler announced in November 2013 that it had detected 674 objects smaller than 1.25 Re, 1076 objects between 1.25 and 2.0 Re, 1457 objects between 2.0 and 6.0 Re, 229 objects between 6.0 and 15 Re, and 102 objects larger than 15 Re. What are the percentages of each size of planet candidate, and create a histogram plot to show this data.

**Problem 2** - The survey included 42,000 stars and detected 10 candidate planets that were about the same size as Earth, and located at a distance from their stars where liquid water could occur (Goldilocks Zone). Because of the way that Kepler detected these planets, they were only able to see about 1.3% of all planets orbiting the surveyed stars. If the Milky Way contains about 500 billion stars similar to the ones surveyed by Kepler, about how many Earth-like planets might you expect to find in the entire Milky Way galaxy?

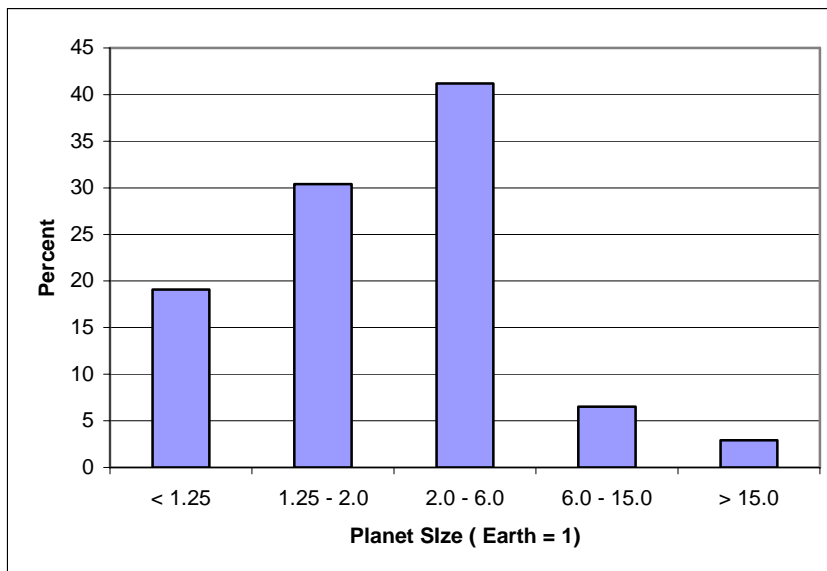
**NASA Kepler Results Usher in a New Era of Astronomy**  
**November 4, 2013**

<http://www.nasa.gov/content/nasa-kepler-results-usher-in-a-new-era-of-astronomy/index.html>

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**Answer:**

1.25	=	674 / 3538	=	<b>19.1 %</b>
1.25 to 2.0	=	1076 / 3538	=	<b>30.4 %</b>
2.0 to 6.0	=	1457 / 3538	=	<b>41.2 %</b>
6.0 to 15.0	=	229 / 3538	=	<b>6.5 %</b>
> 15.0	=	102 / 3538	=	<b>2.9 %</b>



**Problem 2** - The survey included 42,000 stars and detected 10 candidate planets that were about the same size as Earth, and located at a distance from their stars where liquid water could occur (Goldilocks Zone). Because of the way that Kepler detected these planets, they were only able to see about 1.3% of all planets orbiting the surveyed stars. If the Milky Way contains about 500 billion stars similar to the ones surveyed by Kepler, about how many Earth-like planets might you expect to find in the entire Milky Way galaxy?

**Answer:** 500 billion x (10 detections / 42,000 surveyed stars) x (100 stars / 1.3 detection) = 9.1 billion planets. To the nearest billion this becomes **9 billion earth-like planets**.