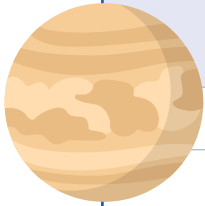


The Solar System to Scale

Compare and contrast properties of the planets by analyzing the data below.

1. This table shows the average distance from the sun and the average orbital speed of all the planets in our solar system.



Planet	Average Distance From the Sun (millions of km)	Average Orbital Speed (km/s)
Neptune	4,500	5
Saturn	1,430	10
Uranus	2,870	7
Mercury	58	47
Venus	108	35
Earth	150	30
Jupiter	778	13
Mars	228	24



- a. Rank the planets in order from closest to the sun to farthest from the sun and from fastest orbital speed to slowest orbital speed.

Closest to the Sun

↓

Farthest From the Sun

1. Mercury
2. Venus
3. Earth
4. Mars
5. Jupiter
6. Saturn
7. Uranus
8. Neptune

Fastest Orbital Speed

↓

Slowest Orbital Speed

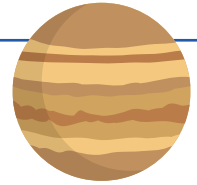
1. Mercury
2. Venus
3. Earth
4. Mars
5. Jupiter
6. Saturn
7. Uranus
8. Neptune

- b. What relationship do you notice between the average distance from the sun and the average orbital speed of the planets?

(Sample answer) The closer a planet is to the sun, the faster its orbital speed. The farther away a planet is from the sun, the slower its orbital speed.

The Solar System to Scale

Keep going! Answer the questions below.



2. The table below shows the average volume and the primary composition of all the planets in our solar system.

a. Rank the planets in order from smallest volume to largest volume.

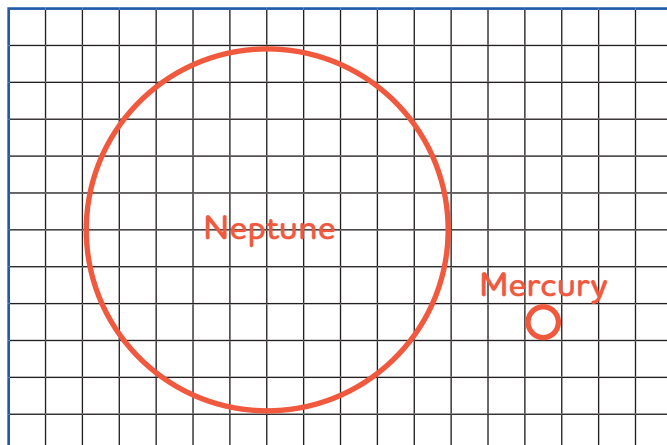
- Smallest Volume
- ↓
- Largest Volume
1. Mercury
 2. Mars
 3. Venus
 4. Earth
 5. Neptune
 6. Uranus
 7. Saturn
 8. Jupiter

Planet	Volume (billions of km ³)	Primary Composition
Mars	160	rock
Jupiter	1,431,280	gas
Neptune	62,530	ice
Earth	1,090	rock
Uranus	68,330	ice
Venus	930	rock
Mercury	60	rock
Saturn	827,130	gas

b. What relationship do you notice between the volume and the primary composition of the planets?
(Sample answer) Planets with the smallest volume are primarily composed of rock, and planets with the largest volume are primarily composed of gas.

3. The diameter of Mercury is roughly 5,000 kilometers, and the diameter of Neptune is roughly 50,000 kilometers. It's clear that Neptune is bigger than Mercury, but how much bigger? A **scale model** can help us visualize this difference in size.

a. Using the grid below, draw a scale model to compare the size of Mercury and Neptune. Every square of the grid represents 5,000 km.



b. Using the information from this question and the table from question 2, fill in the blanks and answer the question below.

Neptune's diameter is about 10 times as big as Mercury's. But Neptune's volume is about 1,000 times as big as Mercury's. Why do you think that is? (Sample answer) Diameter is the measure of how wide a spherical object is, while volume is how much space it occupies. Since Neptune is 10 times as big in each of its 3 dimensions, Neptune's volume is 10³ = 1,000 times as big as Mercury's.