



Activity 3: Answers The Capacity of The Planets

1. Change each number in the chart to scientific notation.

Planet	Approximate Diameter in miles	Approximate Distance from Sun in miles
Mercury	3.03×10^3	3.63×10^7
Venus	7.52×10^3	6.72×10^7
Earth	7.93×10^3	9.30×10^7
Mars	4.22×10^3	1.42×10^8
Jupiter	8.89×10^4	4.84×10^8
Saturn	7.49×10^4	8.88×10^8
Uranus	3.18×10^4	1.78×10^9
Neptune	3.08×10^4	2.80×10^9
Pluto	1.45×10^3	3.67×10^9

2. Use the answers from #1 to compute the distance from Pluto to the Earth from. Show all of your work.

Use the Distance from the Sun column.

$$3.67 \times 10^9 - 9.30 \times 10^7 = 3.577 \times 10^9$$

Therefore, Earth is 3,577,000,000 miles from Pluto.

3. How much farther is Neptune from Mercury than Uranus?

Use the Distance from the Sun.

Distance from Neptune to Mercury and the Distance from Uranus to Mercury is done similarly as #1.

$$\text{Distance from Neptune to Mercury} = 2.80 \times 10^9 - 3.63 \times 10^7 = 2.7637 \times 10^9 \text{ miles}$$

$$\text{Distance from Uranus to Mercury} = 1.78 \times 10^9 - 3.63 \times 10^7 = 1.7437 \times 10^9 \text{ miles}$$

The difference between the two is the solution.

$$2.7637 \times 10^9 \text{ miles} - 1.7437 \times 10^9 \text{ miles} = 1.02 \times 10^9 \text{ miles}$$

4. How many Earths can fit into Jupiter? Show all of your work.

Use the volume of a sphere: $V = \frac{4}{3} * \pi * \text{radius cubed}$

$$V = \frac{4}{3} * 3.14 * (r^3)$$

First find the radius of each planet by dividing the diameter by 2.

You'll get:

$$\text{radius (Earth)} = 4.445 \times 10^4$$

$$\text{radius (Jupiter)} = 3.965 \times 10^3$$

When comparing the two volumes, the $\frac{4}{3}$ and π cancels out so that you only have to compare the radii which will give you about 11.

Therefore, you can fit (pour, for capacity) 11 Earths into a Jupiter.

5. If $\frac{3}{4}$ of the Earth's surface is water, about how much of Pluto's surface can be covered with Earth's water?

Area of a sphere: $A = 4 * \pi * \text{radius squared}$

$$A = 4 * 3.14 * (r^2)$$

First find the radius of each planet by dividing the diameter by 2.

You'll get:

$$\text{radius (Earth)} = 4.445 \times 10^4$$

$$\text{radius (Pluto)} = 7.25 \times 10^2$$

$$A(\text{Earth}) = 4 * 3.14 * 4.445 \times 10^4 \text{ square miles} = 5.58292 \times 10^5 \text{ square miles}$$

$$\frac{3}{4} \text{ of this is the amount of water on the Earth's surface} = 4.18719 \times 10^5 \text{ square miles}$$

$$A(\text{Pluto}) = 4 * 3.14 * 7.25 \times 10^2 \text{ square miles} = 9.106 \times 10^3 \text{ square miles}$$

Therefore, the water from Earth's surface would cover Pluto about 45 times.

6. Create a problem using the chart.

Answers will vary.