

Planetary Mass and Gravity Worksheet Answer Key

Table 1. Ratios of mass, density, and gravity on other planets in the Solar System compared to Earth

Planet name	Mass	Density	Gravity
Mercury	0.0553	0.984	0.378
Venus	0.815	0.951	0.907
Earth	1	1	1
Mars	0.107	0.713	0.377
Jupiter	317.8	0.24	2.36
Saturn	95.2	0.125	0.916
Uranus	14.5	0.23	0.889
Neptune	17.1	0.297	1.12
Pluto	0.0022	0.332	0.059

Adapted from Planetary Fact Sheet – Ratio to Earth Values- The NSSDC! – NASA
http://nssdc.gsfc.nasa.gov/planetary/factsheet/planet_table_ratio.html

Instructions: Answer the following questions based on Table 1.

1. Which planet has the largest mass?

Answer: Jupiter

2. Which planet has the highest density?

Answer: Earth

3. Which planet has the strongest gravity?

Answer: Jupiter

4. Look only at the mass and gravity columns of the table. Describe the effect that a planet's mass has on the gravity experienced on that planet: *[Hint: compare the gravity experienced on planets with larger masses to planets with smaller masses]*

Answers should reflect the fact that planets with higher masses have stronger gravitational pulls than planets with lower masses

5. Density is the amount of matter in a given volume, or space. Imagine a balloon filled with air about the size of a bowling ball. Now imagine that the balloon is sitting next to an actual bowling ball. Which of the two is heavier? The ball has a much higher density than the balloon... it has more "stuff" inside of the same volume as the balloon. If two planets were the same size but one was much denser than the other, which would have a stronger gravitational pull and why?

Answer: if two planets were the same size but one was denser, it would contain more mass, and would therefore have a stronger gravitational pull than the less-dense planet.