

Astronomy Ranking Task: The Solar System

Exercise #1

Description: The table below shows some physical data for the eight planets in our solar system. The planets are assigned letters A through H.

Letter	Planet	Equatorial Diameter		Mass		Mean Density (kg/m ³)*	Surface Gravity (Earths)
		(km)	(Earths)	(kg)	(Earths)		
A	Mercury	4,879	0.383	3.302×10^{23}	0.055	5427	0.38
B	Venus	12,104	0.949	4.869×10^{24}	0.815	5243	0.91
C	Earth	12,756	1.000	5.974×10^{24}	1.000	5515	1.00
D	Mars	6,794	0.533	6.419×10^{23}	0.107	3933	0.38
E	Jupiter	142,984	11.209	1.899×10^{27}	317.83	1326	2.5
F	Saturn	120,536	9.449	5.658×10^{26}	95.16	687	1.1
G	Uranus	51,118	4.007	8.683×10^{25}	14.54	1270	0.91
H	Neptune	49,528	3.883	1.024×10^{26}	17.147	1638	1.1

*The density of water at standard temperature and pressure (68° F, 1 atm) is 998.23 kg/m³.

A. Ranking instructions: Rank the sizes of the planets.

Ranking Order: Largest 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8 ____ Smallest

Or, the planets are all the same size. ____ (indicate with a check mark)

Carefully explain your reasoning for ranking this way:

B. Ranking instructions: Rank the masses of the planets.

Ranking Order: Largest 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8 ____ Smallest

Or, the planets each contain the same amount of material. ____ (indicate with a check mark)

Carefully explain your reasoning for ranking this way:

C. Ranking instructions: Rank the densities of the planets.

Ranking Order: Highest 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8 ____ Lowest

Or, the planets all have the same average density. ____ (indicate with a check mark)

Carefully explain your reasoning for ranking this way:

D. Ranking instructions: Rank the surface gravities of the planets.

Ranking Order: Highest 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8 ____ Lowest

Or, you would weigh the same on each of the planets. ____ (indicate with a check mark)

Carefully explain your reasoning for ranking this way:

E. Saturn is less dense than water. If it were possible to place it in a tub of water, what would happen?