

1.

Planet	Input: Mass	Output: Radius	Actual Radius
Earth	1	1.007	1
Mars	.107	.523	.266
Mercury	.0553	.425	.1915

https://nssdc.gsfc.nasa.gov/planetary/factsheet/planet_table_ratio.html

2.

Planet	Input: Fe/Mg	Output: Radius	Actual Radius
Earth	.8	1.007	1
	1	.994	
	25	.825	
	.01	1.077	
	.001	1.078	
Mars	.8	.523	.266
	1	.517	
	25	.430	
	.01	.558	
	.001	.558	
Mercury	.8	.425	.1915
	1	.420	
	25	.350	
	.01	.453	
	.001	.453	

3.

Earth Mass	Input: FeO	Output: Radius	Core to Mantle Ratio (Core Mass Fraction/(1-Core Mass Fraction))	Mantle Composition
1	.01	1.007	.43	FeO=.55
				SiO2=52.26
				MgO=38.95
				CaO=3.79
				Al2O3=4.43
	.05	1.007	.40	FeO=2.71
				SiO2=51.12
				MgO=38.10
				CaO=3.71
				Al2O3=4.33
	.1	1.006	.37	FeO=5.29
				SiO2=49.77
				MgO=37.09
				CaO=3.61
				Al2O3=4.22
	.4	1.009	.21	FeO=18.26
				SiO2=42.95
				MgO=32.01
				CaO=3.11
				Al2O3=3.64

4.

Earth Mass	Input: Si in the core	Input: O in the core	Input: S in the core	Output: Radius	Core to Mantle Ratio (Core Mass Fraction/(1-Core Mass Fraction))	Mantle Composition
1	.01	.01	.01	1.011	.38	FeO=1.91
						SiO2=56.07
						MgO=34.69
						CaO=3.37
						Al2O3=3.94
	.05	.05	.05	1.018	.36	FeO=8.27
						SiO2=51.11
						MgO=33.52
						CaO=3.26
						Al2O3=3.81
	.1	.1	.1	1.024	.36	FeO=14.31
						SiO2=46.01
						MgO=32.75
						CaO=3.18
						Al2O3=3.72
	.4	.15	.15	1.031	.38	FeO=19.22
						SiO2=41.18
						MgO=32.68
						CaO=3.18
						Al2O3=3.72

5.

Earth Mass	Input: Si/Mg	Output: Amount of Perovskite
1	2	53.44
	1.8	59.05
	1.5	70.19
	1.1	93.67
	1	85.08

6.

What parameters are most useful in better reproducing the sizes of each of these planets? Is it realistic?

Mass was the critical parameter in determining the radius of a planet. As seen in table 1, depending on what mass is imputed the radius changes drastically. Unfortunately, compared to the real radii of planets, there was a big margin of error. The next factor to alter the radii was changing the amount of iron relative to Mg. As seen in table 2, as the ratio increases the radius decreases. Adding lighter elements into the core did change the radius also, but not as significantly as changing the mass or the ratio of Fe/Mg; increasing lighter elements lead to a bigger planet.