

Name _____ Period _____ Date _____

Gravitational Attraction Worksheet

1. Sally pets the family dog, a black lab named Caesar, outside on her porch. The distance between Sally and the dog is about 1.00 m. Find the gravitational force between them if Sally weighs 500.0 N and the dog has a mass of 30 kg.

2. Determine the force of gravitational attraction between the earth ($m = 5.98 \times 10^{24}$ kg) and a 70-kg physics student if the student is standing at sea level, a distance of 6.37×10^6 m from earth's center.

3. Determine the force of gravitational attraction between the earth ($m = 5.98 \times 10^{24}$ kg) and a 70-kg physics student if the student is in an airplane at 40000 feet above earth's surface. This would place the student a distance of 6.38×10^6 m from earth's center.

4. Suppose that you have a mass of 70 kg (equivalent to a 154-pound person). How much mass would another object have to have in order for your body and the object to attract each other with a force of 1-Newton when separated by 10 meters?

Planet	Radius (m)	Mass (kg)	g (m/s^2)
Mercury	2.43×10^6	3.2×10^{23}	3.61
Venus	6.073×10^6	4.88×10^{24}	8.83
Mars	3.38×10^6	6.42×10^{23}	3.75
Jupiter	6.98×10^7	1.901×10^{27}	26.0
Saturn	5.82×10^7	5.68×10^{26}	11.2
Uranus	2.35×10^7	8.68×10^{25}	10.5
Neptune	2.27×10^7	1.03×10^{26}	13.3
Pluto	1.15×10^6	1.2×10^{22}	0.61