

Mass vs. Weight Assignment

Name: _____ Date: _____

1. Describe the difference between mass and weight. Be clear and explain.

DONE!

2. Describe the difference between volume and mass. Be clear and explain. (you might want to include a definition of density)

DONE!

3. A person has a mass of 89 kg. Calculate their weight on Earth at the equator where the acceleration of gravity is 9.78 m/s/s.

$$\begin{aligned}
 F_g &= mg \\
 &= (89)(9.78) \\
 &= \boxed{870\text{ N}} \text{ @ the equator}
 \end{aligned}$$

4. A person has a mass of 89 kg on the moon (acceleration of gravity is 1.6 m/s/s). Calculate their weight on Mars where the acceleration of gravity is 3.8 m/s/s.

Mass is the same!

$$\text{So, on Mars: } F_g = mg = (89)(3.8) = \boxed{338\text{ N}} \checkmark$$

5. An object has a weight of 1230 N on Earth (9.8 m/s/s). Calculate the object's mass.

$$F_g = Mg$$

$$m = \frac{F_g}{g} = \frac{1230}{9.8} = \boxed{125.5 \text{ Kg}}$$

6. A person has a weight of 700 N on Earth and then travels to another far away planet, Planet X. The weight of the person on that planet is 900 N. Calculate the acceleration of gravity on the Planet X.

on Earth

$$F_g = Mg$$

$$m = \frac{F_g}{g}$$

$$= \frac{700}{9.8}$$

$$m = 71.4 \text{ Kg}$$

on Planet X

$$F_g = Mg$$

$$g = \frac{F_g}{m}$$

$$= \frac{900}{71.4}$$

$$\boxed{g = 12.6 \text{ m/s/s}}$$

7. An astronaut travels to Pluto and lands on the surface. He does an experiment to determine the acceleration of gravity on the planet. He applies two forces in opposite directions to each other on an object. One force is 18 N and the other is 6 N. The object accelerates at 1.5 m/s/s. He also weighs the object and records that it weighs 4.96 N. Calculate the acceleration of gravity on Pluto.

$$\Sigma F = ma$$

$$18 - 6 = m(1.5)$$

$$m = \frac{12}{1.5}$$

$$m = 8 \text{ Kg}$$

on Pluto

$$F_g = Mg$$

$$g = \frac{F_g}{m}$$

$$= \frac{4.96}{8}$$

$$\boxed{g = 0.62 \text{ m/s/s}}$$

