Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: 1 2 3 4 5 6 7

**Weight, Mass and Gravity Practice**

Use the following formula to solve for weight:

Weight (W) = Mass (m) x gravity (g) W = mg

**Mass** is measured in **kilograms (kg)**

**Gravity on earth** is a constant: **9.8 m/s2**

**Weight** is measured in **Newton’s (1 N = 1 kg x m/s2)**

Answer the following questions – show ALL WORK and UNITS

1. Define Mass – **the amount of stuff (atoms) that makes up an object**

2. Define Weight – **the force of gravity on an object**

3. Describe what will happen (if anything) to mass and weight when you go to the moon.

 **The mass will remain the same. The weight will decrease because the moon is less massive than the Earth.**

a. Why would this happen?

**The force due to gravity on the moon is less because the moon is less massive than the earth and thus has a smaller gravitational force.**

4. Find the weight of a 60 kg astronaut on earth

 **w = mg**

 **w = ? N**

 **m = 60 kg**

 **g = 9.8 m/s2**

 **w = 60 kg x 9.8 m/s2**

 **w = 588 N**

5. Find the weight of the same object from #4 on a planet where the gravitational attraction has been reduced to 1/10 of the earth’s pull. Show all work.

 **First we need to find 1/10 of the acceleration due to gravity on the earth.**

 **9.8 m/s2 / 10 = 0.98 m/s2**

 **w = 60 kg x 0.98 m/s2**

 **w = 58.8 N**

 **OR**

 **You can take the value we got for number 4 and divide by 10 since the gravitational force is 1/10 of what it is on earth.**

6. A backpack weighs 8.2 Newtons and has a mass of 5 kg on the moon. What is the strength of gravity on the moon? (Be careful with units, remember 1N= 1 kg x m/s2)

 **w = mg**

 **g = ? m/s2**

 **m = 5 kg**

 **w = 8.2 N**

 **g = w/m**

 **g = 8.2 N/5 kg**

 **g = 1.64 m/s2**

6. A physical science text book has a mass of 2.2 kg

a. What is the weight on the Earth?

 **w = mg**

 **w = ? N**

 **m = 2.2 kg**

 **g = 9.8 m/s2**

 **w = 2.2 kg x 9.8 m/s2**

 **w = 21.56 N**

b. What is the weight on Mars (g = 3.7 m/s2 )

 **w = mg**

 **w = ? N**

 **m = 2.2 kg**

 **g = 3.7 m/s2**

 **w = 2.2 kg x 3.7 m/s2**

 **w = 8.14 N**

c. If the textbook weights 19.6 Newtons on Venus, What is the strength of gravity on Venus?

 **w = mg**

 **g =? m/s2**

 **m = 2.2 kg**

 **w = 19.6 N**

 **g = w/m**

 **g = 19.6 N/2.2 kg**

 **g = 8.9 m/s2**

7. Of all the planets in our solar system, Jupiter has the greatest gravitational strength.

a. If a 0.5 kg pair of running shoes would weigh 11.55 Newtons on Jupiter, what is the strength of gravity there?

 **w = mg**

 **g = ?**

 **w = 11.55 N**

 **m = 0.5 kg**

 **g = w/m**

 **g = 11.55 N/0.5 kg**

 **g = 23.1 m/s2**

b. If the same pair of shoes weighs 0.3 Newtons on Pluto, what is the strength of gravity on Pluto?

 **w = mg**

 **g = ? m/s2**

 **m = 0.5 kg**

 **w = 0.3 N**

 **g = w/m**

 **g = 0.3 N/0.5 kg**

 **g = 0.6 m/s2**

c. What does the pair of shoes weigh on earth?

 **w = mg**

 **w = ? N**

 **m = 0.5 kg**

 **g = 9.8 m/s2**

 **w = 0.5 kg x 9.8 m/s2**

**w = 4.9 N**