

NAME _____ Period _____



Physical Science
Mass and Weight

Use the following formula to solve for weight:

$$\text{Weight (W)} = \text{Mass (m)} \times \text{gravity (g)}$$

$$W = mg$$

Mass is measured in kilograms (kg)

Gravity on earth is a constant: 9.8 m/s^2

Weight is measured in Newton's ($1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$)

Answer the following questions – show **ALL WORK** and **UNITS**

1. Define Mass –

2. Define Weight –

3. Describe what will happen (if anything) to mass and weight when you go to the moon.
 - a. Why would this happen?

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

$$\begin{aligned} W &= \quad \times \\ &= \quad \text{kg} \times \quad \text{m/s}^2 \\ &= \quad \text{N} \end{aligned}$$

- a. Find the weight of the same object on a planet where the gravitational attraction has been reduced to $1/10$ of the earth's pull. Show all work.

$$\begin{aligned} W &= \quad \times \\ &= \quad \text{kg} \times \quad \text{m/s}^2 \\ &= \quad \text{N} \end{aligned}$$

5. 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 $1\text{N} = 1\text{ kg} \cdot \text{m/s}^2$)

m/s²

6. A physical science test book has a mass of 2.2 kg
a. What is the weight on the Earth?

N

- b. What is the weight on Mars ($g = 3.7\text{ m/s}^2$)

N

- c. If the textbook weighs 19.6 newtons on Venus, What is the strength of gravity on Venus?

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?

m/s²

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

m/s²

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

N