What is the Difference Between Mass and Weight?

Worksheet

Mass (kg) is the amount of matter in an object and stays constant. Weight (N) is the gravitational force on that mass, given by W = mg, so it changes with the local gravitational field g.

$$W = m \cdot g$$

Questions

1. A 50 kg object on Earth (g = 9.8 m/s) weighs...

A) 50N
B) 490N
C) 5.1N
D) 98N

2. Which quantity stays the same on the Moon and on Earth?

A) Weight
B) Mass
C) Gravitational force
D) Newtons

3. What is the unit of weight?

A) Kilogram
B) Newton
C) Joule
D) Gram

4. An object's mass is 20 kg. What is its weight on Mars (g = 3.71 m/s)?

A) 74.2N
B) 20N
C) 3.71N
D) 197N

5. A person has a mass of 60 kg on Earth (g = 9.8 m/s). Find their weight.

6. An astronaut has a mass of 80 kg. What is their weight on the Moon (g = 1.62 m/s)?

7. A 10 kg object - find its weight on Earth and on Mars (g_Mars = 3.71 m/s).

8. Define: What is mass?

9. Define: What is weight?

10. Define: What is the mass-weight formula?

Answer Key

1. B) 490N - W = mg = 50 9.8 = 490N.
2. B) Mass - Mass is constant everywhere; weight depends on gravity.
3. B) Newton - Weight is a force, measured in newtons (N).
4. A) 74.2N - W = mg = 20 3.71 = 74.2N.
5. W = mg = 60 9.8 = 588 N
6. W = mg = 80 1.62 = 129.6 N
7. Earth: W = 10 9.8 = 98 N Mars: W = 10 3.71 = 37.1 N
8. The amount of matter in an object, measured in kilograms (kg); it doesn't change with location.
9. The gravitational force on an object's mass, measured in newtons (N); it changes with gravity.
10. W = mg, where g is the local gravitational acceleration.