

Contents

SECTION 1: THE METRIC SYSTEM

1. History of the Metric System	3
2. Advantages of the Metric System	5
3. Metric System Prefixes	8
4. Quiz 1	10

SECTION 2: USING THE METRIC SYSTEM

5. Length	11
6. Area and Volume.	13
7. Mass and Weight	17
8. Temperature	20
9. Quiz 2	23

SECTION 3: GRAPHS

10. Uses of Graphs	25
11. Bar Graphs	28
12. Pictographs	32
13. Line Graphs	35
14. Circle Graphs	39
15. Self Check.	42
16. LightUnit Test.	45

Vocabulary Words

weight: the force exerted on an object by gravity

△ **Pronounce this word to someone.**

Units of Mass

A gram is a very small amount—it takes about 28 grams to make one ounce. This unit is so small that it is unhandy to use when weighing heavy things. Because of this, scientists decided to make the kilogram (kg) the base metric unit of mass. A kilogram weighs about 2.2 pounds.

Mass

What is the difference between mass and **weight**? First, let's talk about mass. An object's mass is the amount of matter that object contains. For example, consider a man that has a mass of 75 kg. The man will have the same mass whether he is on the earth or on the moon. Mass is determined by balancing an object on a beam balance scale. On one side of the balance is placed the object whose mass is to be determined; on the other side are placed gram or kilogram units until the object is balanced. The mass of the object is then the number of grams or kilograms required to balance it. This mass would be the same whether the balance was on

earth, on the moon, or on another planet. The mass of an object remains the same regardless of where it is.

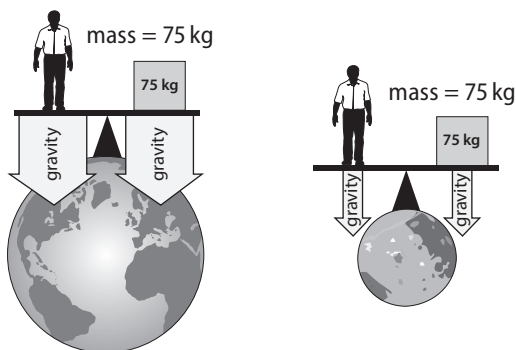
Weight

Now let's consider weight. Weight is the measure of the pull of gravity on an object's mass. Scientists do not use the kilogram to measure weight since weight measures the pull of gravity, not the mass of an object. Instead, scientists use a unit called the newton (N).

Because it measures the pull of gravity on an object, weight changes when the strength of gravity changes. On earth the pull of gravity is quite strong; on the moon the pull of gravity is only about $\frac{1}{6}$ as strong as on earth. So on earth, our 75 kg man would weigh 735 N (165 lb), but on the moon he would weigh only about 123 N (28 lb).

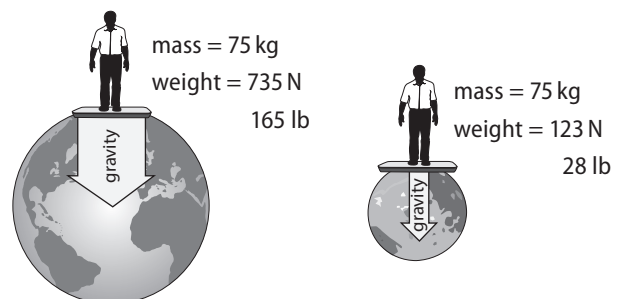
Another important difference between weight and mass is that weight can be measured using a spring scale, but mass is *always* measured using a balance beam scale.

Mass



Mass never changes and is not affected by the strength of gravity.


Weight




Weight is affected by the strength of gravity. The weight of an object changes depending on where the object is.

Lesson 7

Study Exercises

 Write *true* if the statement is *true* and *false* if it is *false*. Correct the italicized part of any false statements.

- _____ About 28 *grams* make one ounce.
- _____ The base metric unit of mass is a *liter*.
- _____ A kilogram is about 2.2 *pounds*.
-  _____ Since the moon's gravity is $\frac{1}{6}$ earth's gravity, a 60 pound child would weigh 20 pounds on the moon.

 Place a check mark under the term each characteristic is describing.

	mass	weight
5. measured with a spring scale	<input type="checkbox"/>	<input type="checkbox"/>
6. stays the same no matter where it is	<input type="checkbox"/>	<input type="checkbox"/>
7. measures the pull of gravity on an object	<input type="checkbox"/>	<input type="checkbox"/>
8. changes depending on strength of gravity	<input type="checkbox"/>	<input type="checkbox"/>
9. measures the amount of matter in an object	<input type="checkbox"/>	<input type="checkbox"/>
10. always measured with balance beam scale	<input type="checkbox"/>	<input type="checkbox"/>
11. not affected by the strength of gravity	<input type="checkbox"/>	<input type="checkbox"/>

Looking Back

 Calculate the areas and volumes. Remember to use the correct units in your answer.

- A patio is 10.8 meters by 5.2 meters. What is the area of the patio? _____
- A roll of fabric is 44 inches wide by 600 inches long. What is the area of the roll of fabric?

- What is the volume of a rectangular watering tank that is 100 cm by 50 cm by 40 cm?

- What is the volume of a box that has the dimensions $W = 12.0$ cm $L = 25.0$ cm $H = 10.5$ cm?

**Answer the questions.**

16. Which metric unit is slightly larger than a quart? _____
17. What is the definition of volume? _____
18. What does all matter take up? _____

**Circle the best unit for measuring each object.**

- | | | | |
|------------------------------|-----------------------|-----------------------|----------------------|
| 19. volume of lake | mL | kL | L |
| 20. mass of elephant | mg | g | kg |
| 21. area of large meadow | mm² | cm² | m² |
| 22. volume of drinking glass | mL | L | kL |
| 23. mass of apple | mg | g | kg |

**Complete the activity.**

24. Record the daily temperature on page 38.