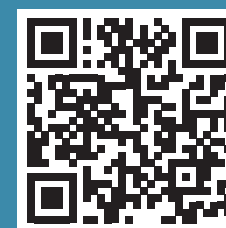


# Measuring Mass and Weight



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## What is mass?

Mass is the amount of matter that something has. The base unit of measurement is the gram (g). The SI unit is the kilogram (kg). It is measured using a balance.

### Types of Balances



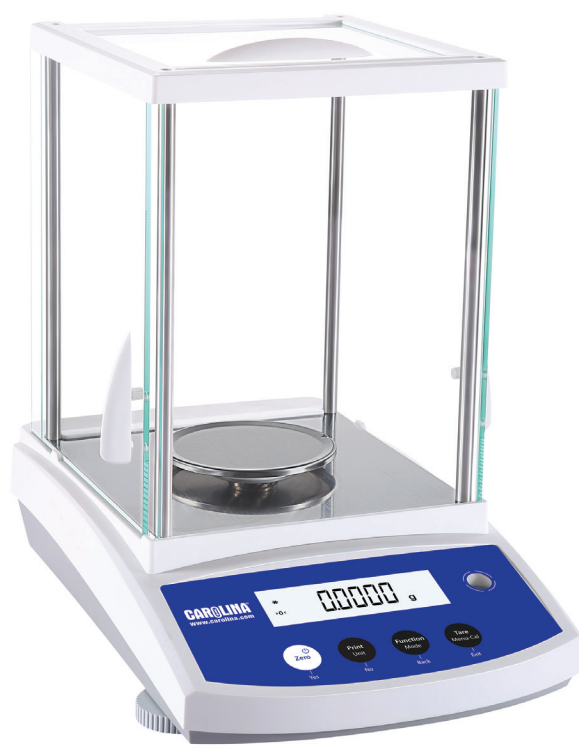
Triple Beam Balance



Digital Balance



Hanging Pan Triple Beam Balance



Analytical Balance

### How to Use a Triple Beam Balance

1. Ensure that your balance or scale is calibrated and reads 0.
2. Place your object on the pan.
3. Move the largest weight until the pointer goes below 0, then move it back one. Repeat with all the weights going from largest to smallest.
4. Add the weight displayed on each of the beams to get the total mass.

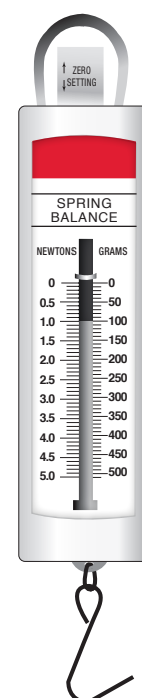
#### Taring a Balance or Scale

The “tare” or “0” button sets the balance display to 0, known as “taring the balance.” To use, place a vessel such as a beaker on the balance, then press the tare/0 button. After the display reads 0, add material to the beaker. The mass shown is that of the material only.

## What is weight?

Weight is the force gravity exerts on the mass of an object. The base unit of force is a newton (N)\*. Weight is measured with a scale.

### Types of Scales



Spring Scale



Dial Spring Scale



Dial Scale



Digital Scale



Dial Scale



Digital Scale

### How to Use an Electronic Balance or Scale

1. Turn on the balance or scale.
2. Ensure that your balance or scale is calibrated and reads 0. You may need to press the tare/0 button to get it to read 0.
3. Ensure that your units are set. Often digital scales and balances have a button that you can press to get to the unit of choice.
4. Center your object on the massing or weighing surface.
5. Read the displayed value.

\*Gravity is fairly constant on Earth, so weight and mass are often used interchangeably. This is why scales display weight in grams or pounds (the imperial or customary unit for mass).

## Real World Connections



### Truck Driver

Truck drivers must know the weight of their trucks and cargo to ensure the safety of themselves and other motorists. Federal law prohibits the weight of a truck and its cargo from exceeding 80,000 pounds. Mandatory stops at weigh stations help keep drivers in compliance.



### Veterinarian

Veterinarians must know the weight of their patients. By tracking weight, vets monitor patient health and know how much medication to administer or prescribe if needed.



### Baker

Bakers weigh their ingredients or portions because measuring by weight on a scale is more accurate than a measuring by volume. The result is a more consistent product every time.



### Rocket Scientist

Rocket scientists use the mass of a rocket, its components, and its payload to determine how much force and fuel are required to launch the rocket into space.