

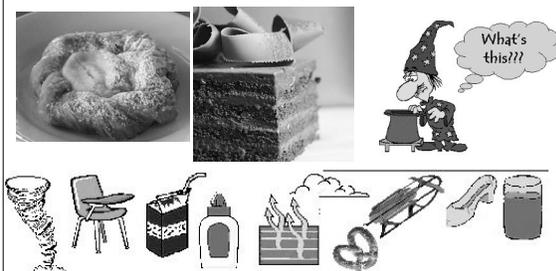
# The Properties of Matter

## Chapter 2

What do the following objects have in common?



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What do the following objects have in common?

- ∨ Give up?
- ∨ They are all made up of atoms and molecules, which means, they are all types of **matter**.
- ∨ So basically, everything in the universe is matter.
- ∨ Cupcakes are matter, baby elephants are matter, 8th graders are matter.
- ∨ Matter is everything around you.

## More Matter

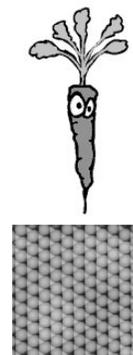
- ∨ Matter is anything made of atoms and molecules.
- ∨ As of 1995, scientists have identified **five** states of matter - we will talk about these later.
- ∨ Matter is also anything that has **volume** and **mass**.



THE EARTH IS ONE LARGE MIXTURE OF MOLECULES IN GASES, LIQUIDS AND SOLIDS.

Let's take this carrot:

- ∨ Let's get closer and closer to the smaller parts of the carrot-carrot atoms!
- ∨ These small parts of the carrot are called **atoms**.
- ∨ Anything you see and can feel is made of atoms.



- ∨ All atoms are too small to be seen with the naked eye or even a microscope,
- ∨ although there are some new types of microscopes that are now able to see larger atoms such as gold.



## Matter is made up of atoms!

- ∨ All matter is the same because all matter is made up of atoms.
- ∨ Matter is also different because objects can be made up of different kinds of atoms.
- ∨ Gold is made of one kind of atom-gold atoms.
- ∨ Salt is made up of two different kinds of atoms-sodium atoms and chloride atoms.

## Objects have mass. (WRITE THIS)



- ∨ Mass is how much there is of an object.
- ∨ Mass is related to how much something weighs.
- ∨ Mass and weight are two different things.
- ∨ The unit for mass is a gram.
- ∨ A nickel has the mass of about one gram.

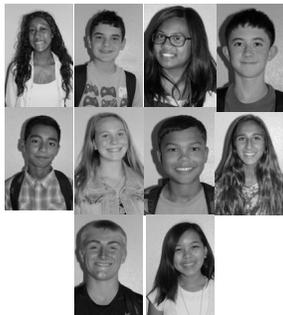
## Objects have mass.



- ∨ Objects that take up space and have mass are called matter.
- ∨ Everything around you is made up of matter.
- ∨ Chocolate cake is made up of matter.
- ∨ You are made of matter.

## Objects have mass.

- ∨ If you are having trouble understanding matter, look all around you.
- ∨ You can see matter makes up the walls of your house and your classroom.
- ∨ Matter is large and matter is small.



## M is for Mass

- ∨ Mass is the amount of matter in an object.
- ∨ Mass is also affected by gravity.
- ∨ Gravity is a force of attraction between two objects.
- ∨ This force causes all objects to "pull" towards each other.
- ∨ The more mass two objects have; the stronger the pull.
- ∨ The closer the objects are to each other; the stronger the pull.

## How are mass & weight different?

Mass is . . .

- a measure of the amount of matter in an object.
- always constant for an object no matter where the object is in the universe.
- measured with a balance (shown below).
- expressed in kilograms (kg), grams (g), and milligrams (mg).



- ✓ **Mass -**
- ✓ **A measurement of the amount of matter in an object (grams). (The stuff that makes it up!)**

## How are mass & weight different?

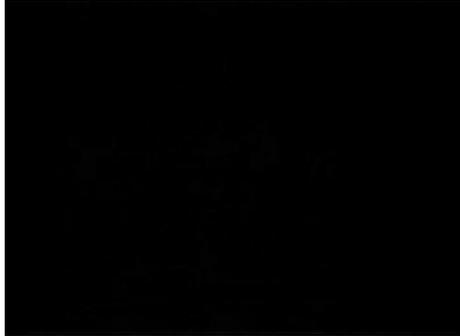


Weight is . . .

- a measure of the gravitational force on an object.
- varied depending on where the object is in relation to the Earth (or any other large body in the universe).
- measured with a spring scale (shown above).
- expressed in newtons (N).

- ✓ **Weight -**
- ✓ **A measurement of the gravitational force of attraction of the earth acting on an object.**
- ✓ (When you get on a bathroom scale, this measures gravity pushing down on you)

## 1. Weight vs Mass! Take notes on the back page



## What about weight?

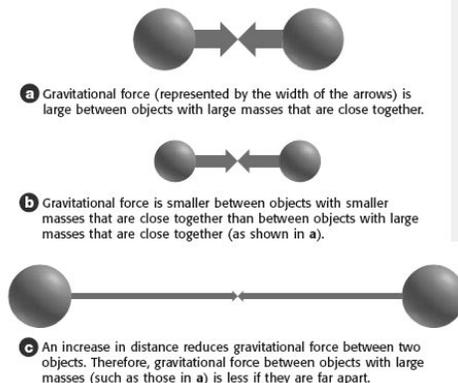
- ✓ Weight is the measure of **gravitational pull** on an object. Compare a brick to a sponge.
- ✓ The brick has mass. Earth has mass. Therefore, the brick and Earth are attracted to one another.
- ✓ The weight of the brick is a measure of this attraction by Earth.
- ✓ Now look at the sponge. It is the same **size** as the brick, but its **mass** is less.
- ✓ Therefore, the sponge's attraction to Earth is less. It's weight is also less than the brick.



## Massive Confusion

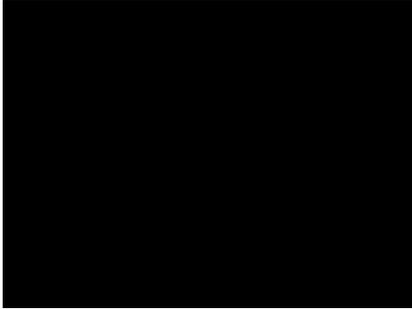
- ✓ On Earth, gravity is the same everywhere.
- ✓ Sooo.... On Earth, mass and weight are the same thing.
- ✓ BUT, if you were to go to the moon, they would be different.
- ✓ The moon has less gravitational pull, so the attraction between you and the moon would be less.
- ✓ On the moon, your weight is less.
- ✓ Your mass remains the same though.

Figure 6 How Mass and Distance Affect Gravity Between Objects



## 2. Let's look at "Microgravity"

Take notes on the back page



## 3. More Microgravity...

Take notes on the back page

