What is Matter?

Everything is made of matter

(water, food, computers, rocks etc)

Hey that's almost like
"Everything MATTERS"

Matter

Matter - is anything that has mass and takes up space (everything around you, including you). It has 3 forms Solid, Liquid or Gas.

Particle Theory of Matter

- All matter is made up of very tiny particles.
- All particles in a pure substance are the same but different from another substance.
- There are spaces between the particles.
- The particles are always moving. They move faster if they gain energy(Heat).
- There are attractions between particles. Some are weak and some are strong.

Matter has 3 states

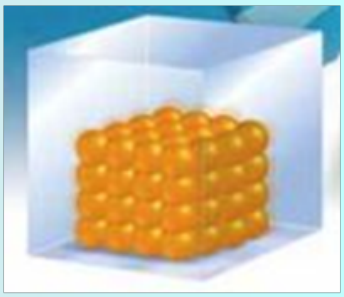
Look at this picture of 7Up in a glass with ice.

What are the 3 states of matter in this picture?

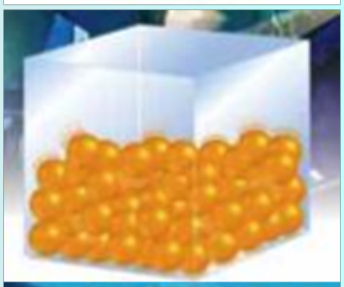
Properties of Matter

- Matter is made of small particles. There are empty spaces between all of these particles that allow the particles to move.

> **Solid particles** are packed together and cannot move freely. They only vibrate.



> **Liquid particles** are farther apart and can slide past each other.

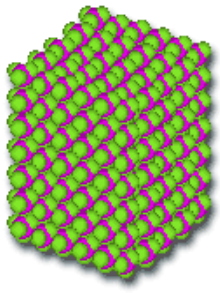


> **Gas particles** are far apart and move around quickly.

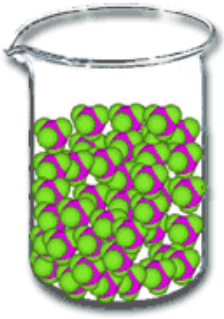
3 States of Matter

Copy the chart

State	Shape	Volume	Particle arrangement	Particle movement
1. Solid	Definite	Definite	Close	Vibrate
2. Liquid	Indefinite	Definite	Close	Free flowing
3. Gas	Indefinite	indefinite	Far Apart	Random



Solid



Liquid

Gas

particles tightly packed, like bees in a hive. Greatly effected by gravity, that is why solids fall to the ground. Vibrate since cannot move around freely.

Particles in liquid have enough energy to pull away from each other, while at the same time vibrating close together in small clusters. Relate this to a group of people talking at a party. They can move around as a group, or flow in between other groups.

Still effected by gravity. falls downward

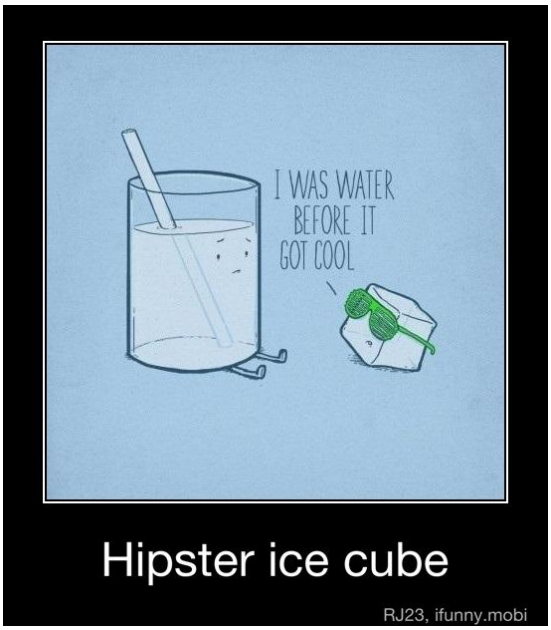
Diffusion of food coloring in water

Particles are so far apart and they have lots of energy.

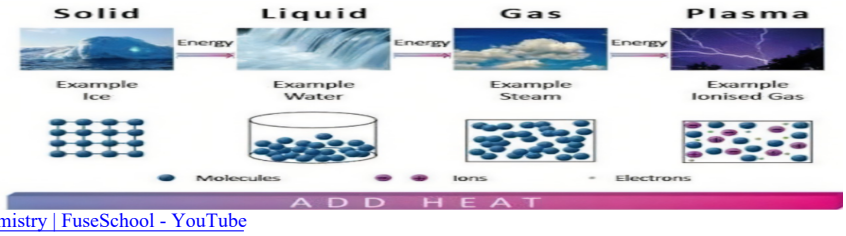
Sometimes goes against gravity.

Takes shape of any container or room it is in.

Remember diffusion of perfume


I WAS WATER
BEFORE IT
GOT COOL
Hipster ice cube
RJ23, ifunny.mobi

Plasma



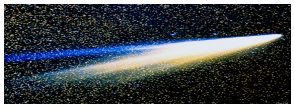
What Is Plasma | Properties of Matter | Chemistry | FuseSchool - YouTube

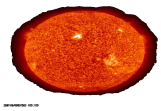
Plasma is superheated matter – so hot that the electrons are ripped away from the atoms forming an ionized gas.

It makes up over 99% of the visible universe.

Plasma is often called "the fourth state of matter," along with solid, liquid and gas.

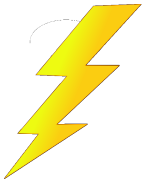
Just as a liquid will boil, changing into a gas when energy is added, heating a gas will form a plasma – a soup of positively charged particles (ions) and negatively charged particles (electrons).





In the night sky, plasma glows in the form of stars, nebulas, and even the auroras that sometimes ripple above the north and south poles.

That branch of lightning that cracks the sky is plasma, so are the neon signs along our city streets. And so is our sun, the star that makes life on earth possible. Here are 10 examples of forms of plasma:



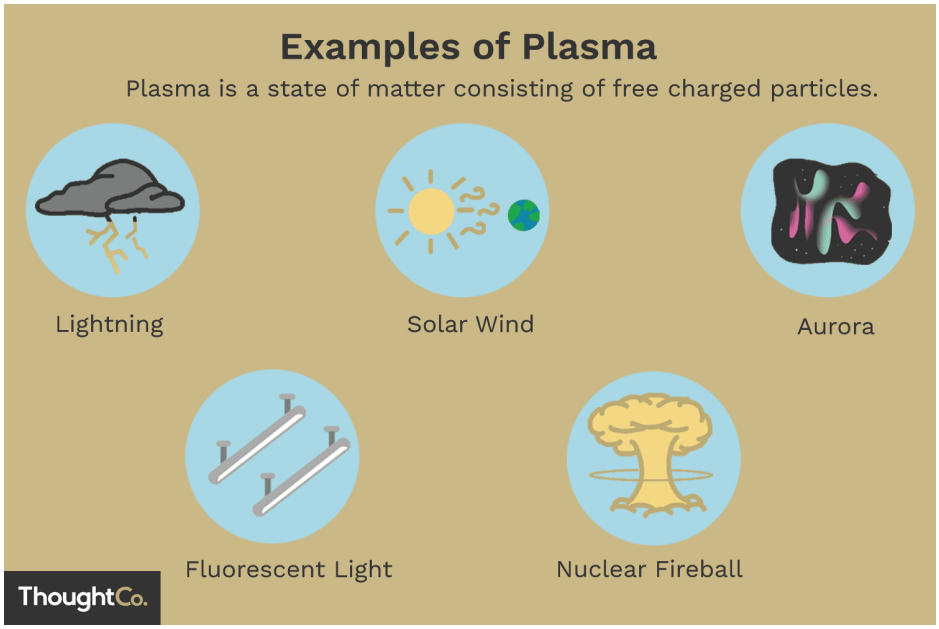
1. lightning
2. aurorae Northern Lights

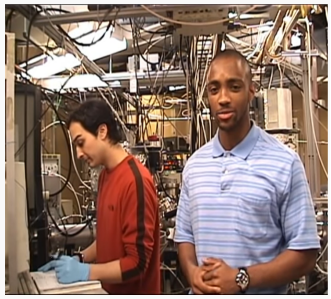
3. the excited low-pressure gas inside neon signs and fluorescent lights
4. solar wind

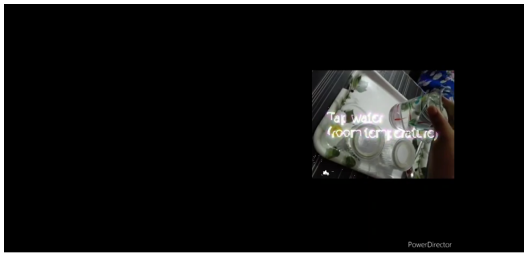
5. welding arcs
6. the Earth's ionosphere
7. stars (including the Sun)
8. the tail of a comet
9. interstellar gas clouds
10. a fireball of a nuclear explosion

Because so much of the universe is made of plasma, its behavior and properties are of intense interest to scientists in many disciplines. Importantly, at the temperatures required for the goal of practical fusion energy, all matter is in the form of plasma.

Researchers have used the properties of plasma as a charged gas to confine it with magnetic fields and to heat it to temperatures hotter than the core of the sun. Other researchers pursue plasmas for making computer chips, rocket propulsion, cleaning the environment, destroying biological hazards, healing wounds and other exciting applications.

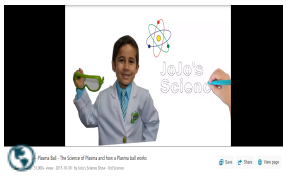

Examples of Plasma
Plasma is a state of matter consisting of free charged particles.
Lightning
Solar Wind
Aurora
Fluorescent Light
Nuclear Fireball
ThoughtCo.





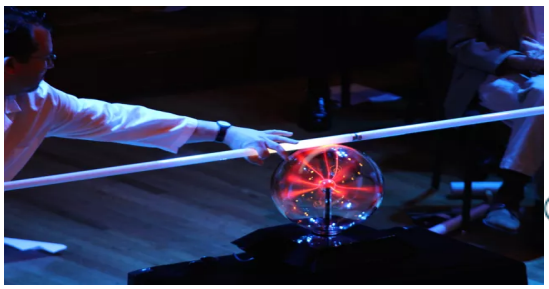
Plasma Experiment|4th state of matter| How to make plasma at home
YouTube · 102 views · 2021-05-16 · by Fun N Learn with Shrishti Srivastava

How It`s Made Neon Signs - YouTube



Plasma Experiment

Plasma Ball and Fluorescent Light Experiment (thoughtco.com)



Here are the materials you will need for the experiment:

- Plasma ball
- Fluorescent light bulb (any type)

Plasma Ball and Fluorescent Tube experiment - YouTube

Steps for the Experiment

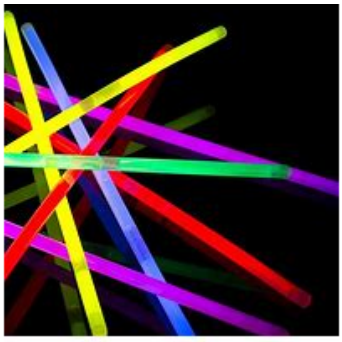
Turn on the plasma ball.

Bring the fluorescent bulb close to the plasma ball. As you near the plasma, the bulb will light up.

If you are using a long fluorescent stick, you can control how much of the bulb is lit using your hand. The portion of the bulb close to the plasma ball will remain lit, while the outer portion will stay dark. You can see evanescence or fading of the light as you pull the light further from the plasma ball.

How does glow sticks work?

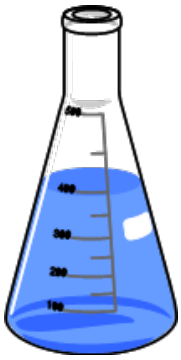
-Chemical reactions of 2 liquids



How it works

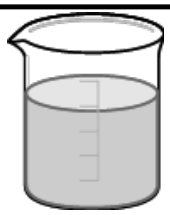
A plasma ball is a sealed glass containing low-pressure noble gases. A high voltage electrode sits in the center of the ball, connected to the power source. When the ball is turned on, electrical current ionizes the gas in the ball, creating plasma. When you touch the surface of the plasma ball, you can see the path of the plasma filaments running between the electrode and the insulating glass shell. Although you cannot see it, the high-frequency current extends beyond the surface of the ball. When you bring a fluorescent tube near the ball, the same energy excites the mercury atoms in the fluorescent bulb. The excited atoms emit ultraviolet light that is absorbed into the phosphor coating inside the fluorescent light, converting the ultraviolet light into visible light.

Mixtures



Whenever you see materials that has more than one set of properties, you know that it is a mixture.

Mixture: a material made up of several different types of materials (2 or more). In a mixture each material retains it's own properties.

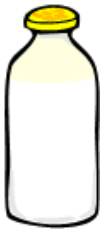


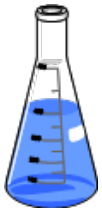
Mixtures can be of the following type:

1) Heterogeneous: made up of parts or mixed that can be seen.

https://www.youtube.com/watch?v=bKcGHO6b1So

Homogenous: every part of the material is the same.





https://www.youtube.com/watch?v=-r_9QZXwT2c

https://www.youtube.com/watch?v=veXy9PNwSSI

Smog is a heterogeneous mixture of various particles suspended in the air. The dirty particles that make up the **smog** can be removed from the air and breathed into the lungs, making **smog** quite a problematic heterogeneous mixture.

What Causes Smog? - YouTube

The science of smog - Kim Preshoff - YouTube

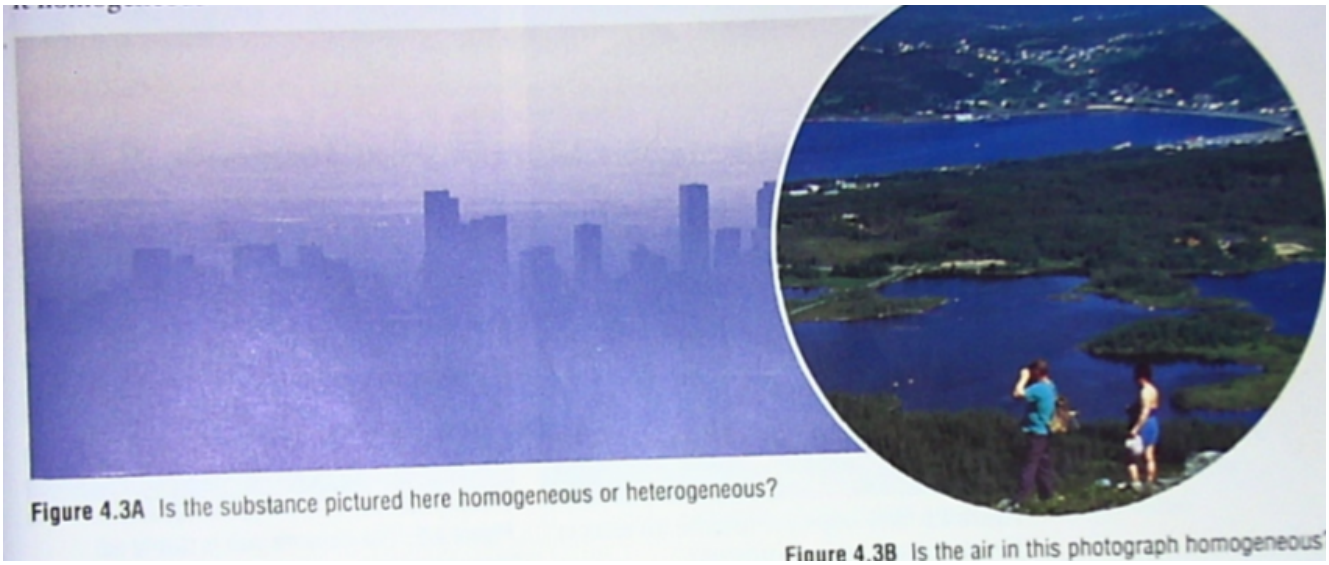


Figure 4.3A Is the substance pictured here homogeneous or heterogeneous?

Figure 4.3B Is the air in this photograph homogeneous

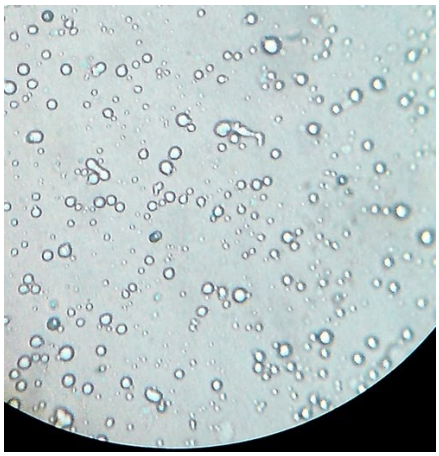
Any gas mixture is a solution, that is, a **HOMOGENEOUS mixture**. Of course, in practice air contain very small solid particles in suspension (dust, pollen) and thus it becomes heterogeneous. Since we can see the dust particles in the air so it is cleared that they are not dissolved in the air.

Weather explained: What's the difference between fog, mist and haze? - YouTube

This is an image of milk

What do you notice?

under a microscope



What do you notice?

Now read Page 106 together

-These are fat globules.

https://www.youtube.com/watch?v=NoMeoMygVy0

Years ago they did not homogenized milk and this would cause for the fat to float to the top of the milk, leaving a layer of yellow cream.

Today's milk is homogenized What is Homogenized milk? | Ask Organic Valley - YouTube

Homogenized- specially prepared so that the fat globules remain mixed with the rest of the liquids.

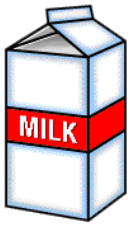
The Milk Processing Plant at McCarty Family Farms - YouTube

So milk appears homogenous with the naked eye but with the help of a microscope you can see it has other pieces.

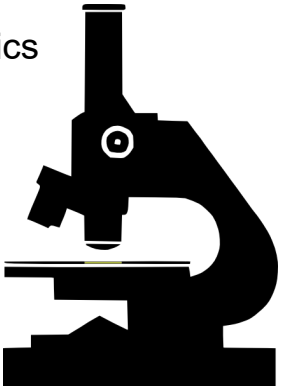
Pasteurization - is heating a fluid to make sure you kill any bacteria.

What is a mixture? 307-1

Anything that is made of 2 or more materials and has at least 2 distinct sets of properties.



characteristics



Mechanical Mixtures

Materials such as pizza, salad, and pop all have easily identifiable properties with the unaided eye.

When Mixtures can be identified this easily they are called **Mechanical Mixtures**

Properties means do they have the exact same color, texture, shininess in all parts of the mixture.

What Other Mechanical Mixtures can you Identify?

1)

2)

3)

Even homogenized milk, we found out is heterogeneous mixture.

Homogenous Mixtures

A Homogenous mixtures is called a solution.

They are everywhere the earth is surrounded by them.

To be considered a solution the combination of materials must be the same.

Video:

6 min

https://www.youtube.com/watch?v=t0iHbY9sjDc

Solutions of the Earth.

Earth is surrounded by a gas solution we call air. A homogenous mixture of oxygen, nitrogen and other gases.

two thirds of the earth is a liquid solution; salty water of oceans).

Solid solutions such as sterling silver which is a mixture of silver and copper.

You are examining a glass that contains a liquid. You think the glass contains a mixture of water and salt. Your lab partner thinks the glass contains pure water. How can you find out who is correct, without tasting the liquid?

Recall

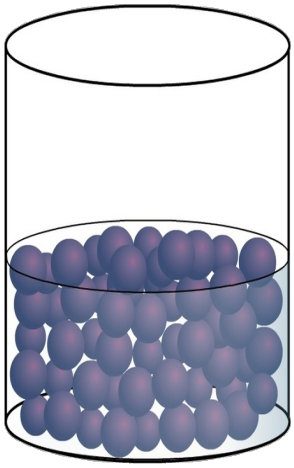
A Homogenous mixtures is called a solution.

Add to your notes

- Solutions have properties that blend together. This depends on how much of one material and how much of the other material are in the mixture.

ex) Salt in water will mix so that the salt will disappear and cannot be seen (As long as you have lots of water) Ice tea, Kool-aid...

Explaining Mixtures and Pure Substances



The Theory that scientist use to explain the properties of various mixtures and substances we use the Particle Theory of Matter

1) All matter is made up of extremely tiny particles with spaces between them

-Each pure substance has it's own type of pure particle, different from the particles of other pure substances.

Pure Substance vs Mixture MOO Moo Math - YouTube

2) Particles are always moving (More energy = faster moving)

3) Particles are attracted to each other (some more than others)

Pure Substances: is a material made up of only one kind of extremely small particle. Different from all other pure substance

Examples of pure substance are:

water, gold, copper, silver, and sugar.
Elements or compounds

A drop of water from a glass will look identical to another drop of water from the same glass.

Fun Note

There are 1.67 sextillion water molecules in a water drop. Now, the number of atoms in a droplet of water

1 670 000 000 000 000 000 000

P. 115 Find Out Activity

on your test

Differences Between Pure Substance & Mixtures

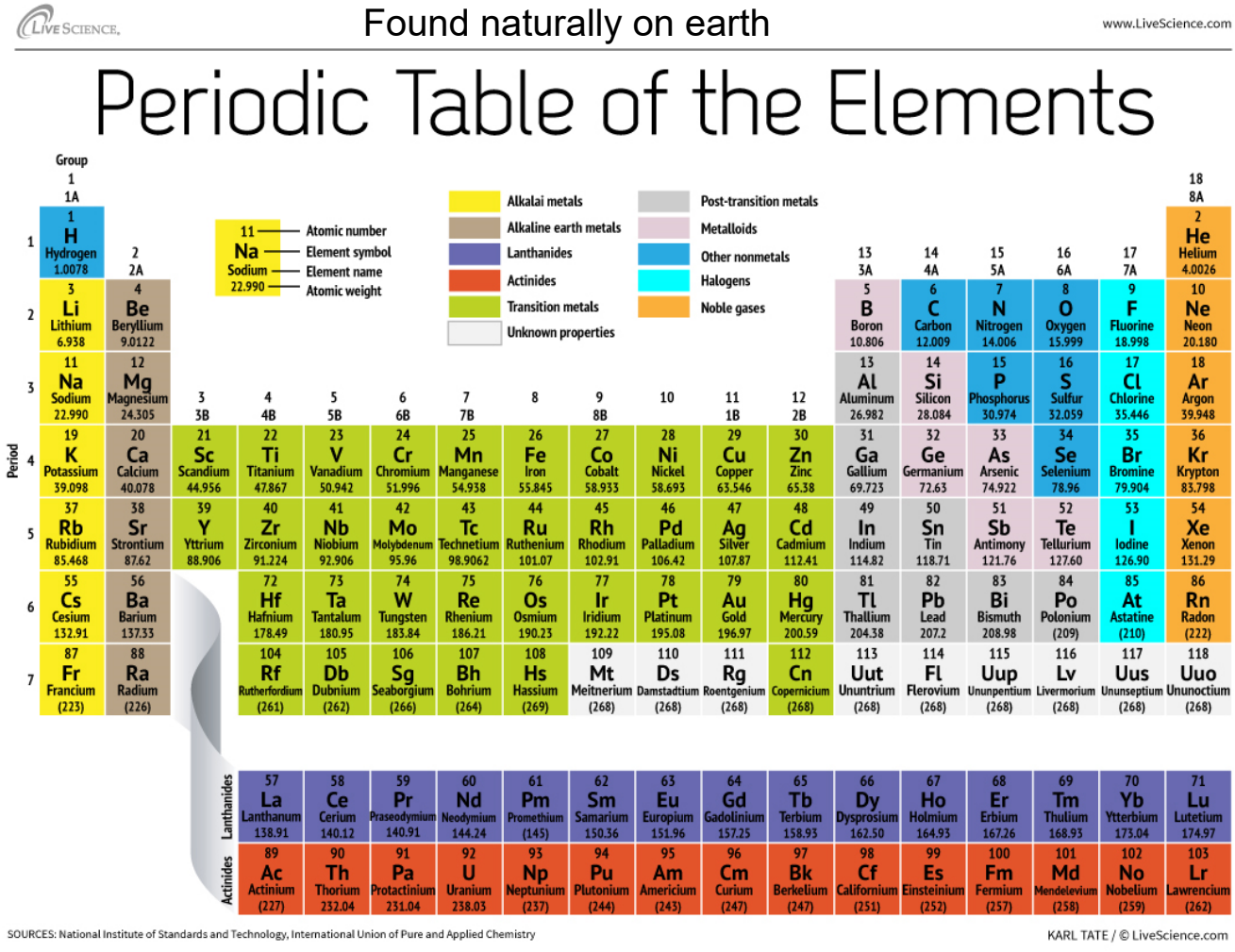
need to check it all over world. world is HUGE

Are NOT easy to observe. Scientist took hundreds of thousands of years of investigating to figure out if pure substance existed

- Must investigate the properties of material to find out that they are always the same. If they are the exact same in all parts of the material, no matter what part of the world the material comes from, then you say you have a pure substance.

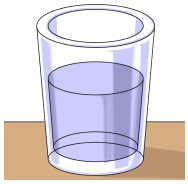
This ring is gold and if you turned it over, you would expect to see the same propertied on the reverse- the same colour, texture, and shininess.

Found naturally on earth



109-14 - 307-1

What Makes Materials Dissolve?



We can form solutions by mixing one or more materials together (like sugar and water). This is dissolving.

Not all mixtures form solutions.

What other things get dissolved?

The Attraction of Particles when Dissolving can be explained by the Particle Theory

Particles stay together because

i) they are attracted to each other. Sometimes particles can become attracted to other particles (like sugar and water).

ii)Particles are always moving.

https://phet.colorado.edu/en/simulation/legacy/soluble-salts

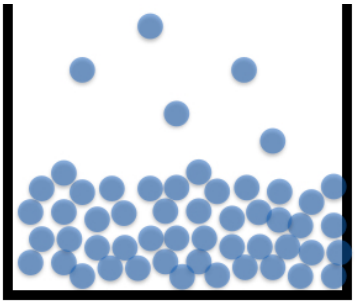
Molecules of water and salt combining - advanced

Why'd the Ocean Stop Getting Saltier? - YouTube

Why is the Dead Sea so salty? - YouTube

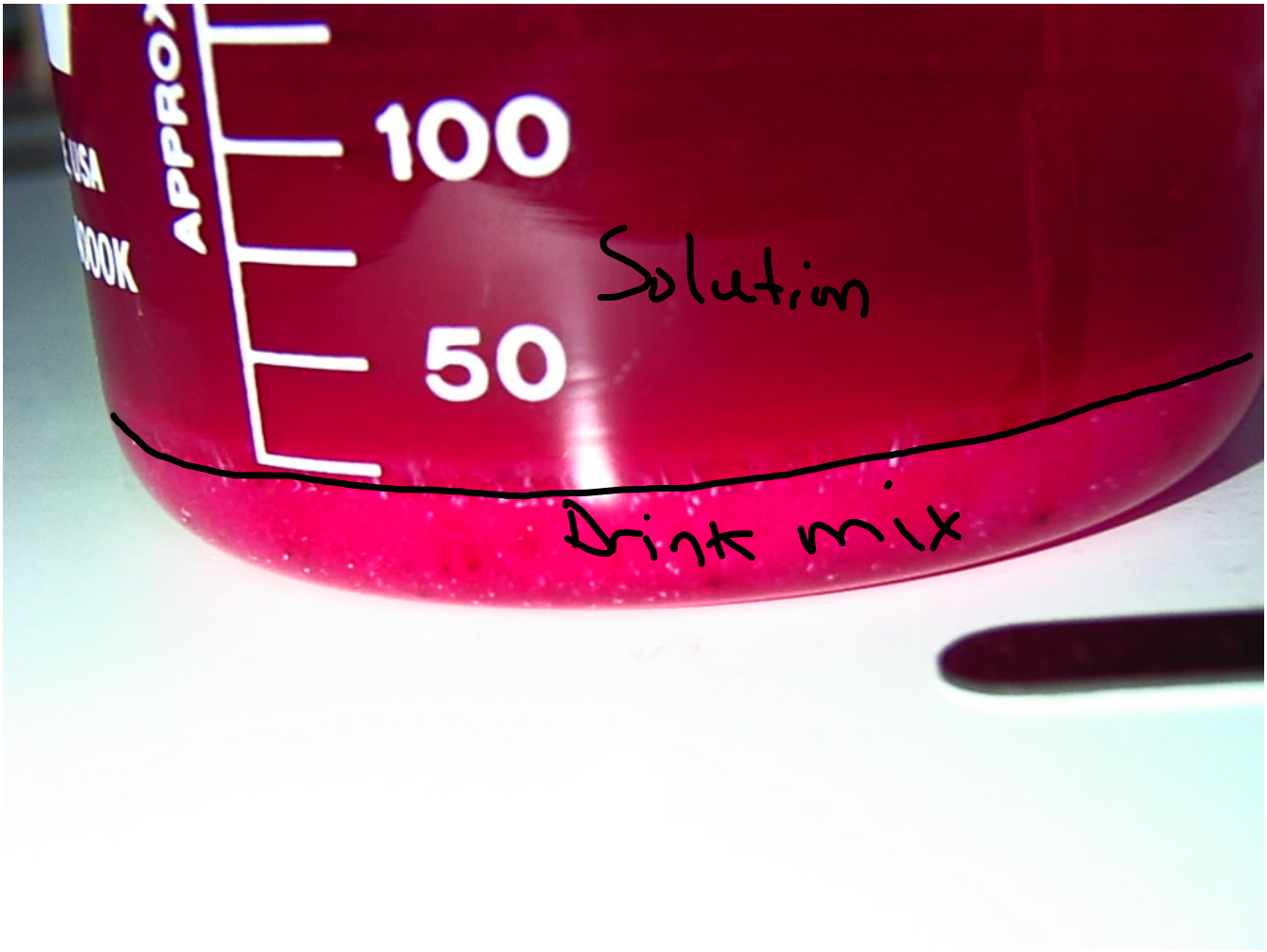
The Dead Sea Is DYING - YouTube

The Benefits of Dead Sea Products on The Doctors TV Show - YouTube

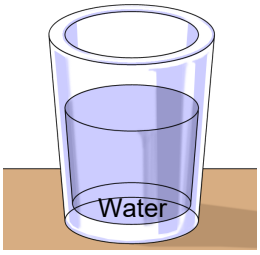


A drop of water of water evaporates into gas.

The particles are always moving, however, and some are always on the outside of the drop. These outside particles occasionally jump off into the air. Overtime, all the particles jump off. They still exist, but they are independent and free to move about as gas.


100
50
Solution
Drink mix

Why Do Some Materials NOT Dissolve?



Solvent

Solute

There is usually less solute than solvent in a solution (more solvent than solute.)

Solute - is the substance that dissolves in a solvent to form a solution (ex. the salt in water)

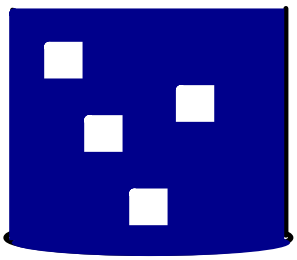
Solvent - is the substance that dissolves a solute to form a solution (Ex. usually water)

Water

Solvent

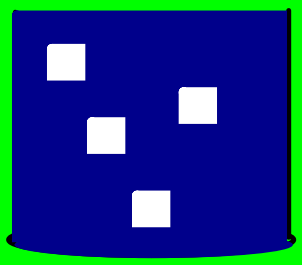
Sugar Cube

Solute



Sugar Water

Solution



Sugar Dissolves in Water

or

Sugar is Soluble in Water

Soluble - means able to be dissolved in a particular solvent

Insoluble - means not able to be dissolved in a particular solvent

Solubility

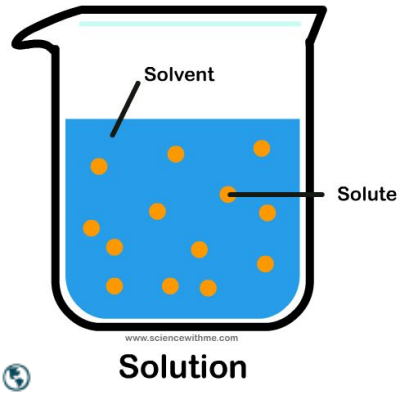
- **The ability of a particular substance to dissolve.**

Separating Mixtures | Chemistry Matters - YouTube

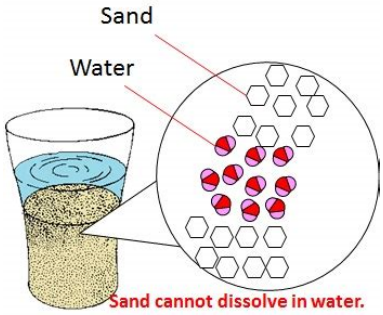
Mixtures & Solutions - YouTube

When something is insoluble that means it will not dissolved in a solvent.

In order for materials to dissolve that have to be more attracted to solvent than other particles.



Solution



Video

Why is it so hard to get Grass Stains out of your pants?

1. Because of the Attraction that the Chlorophyll particles have to each other

2. Because Water is not soluble (Insoluble) to Chlorophyll

3. Grass Stains actually need a solvent different then water to remove the stain.

REMEMBER

In order for particles to dissolve those particles NEED to more attracted to the water than attracted to their other particles.

Got any ideas of what can take the stains out?

Dissolving Salt in water

Let's design an experiment using this question

9) Jill wanted to see how much salt could be dissolved in water of different temperatures. She had four beakers of water that she filled from the tap as she counted to five. They were at different temperatures: $1°C$, $5°C$, $20°C$ *and* $32°C$. She put 2 tablespoons of salt in each beaker and each beaker was stirred at th same rate. Why was this not a fair test? (204-7)

a) The temperatures were the same.

b) She didn't measure the amount of water in each beaker.

c) She put different amounts of salt in each beaker.

d) She didn't stir all of the beakers.

Review next page

Quiz Part 1

Science 7 Unit 1: Matter Quiz

Outline

Be able to discuss 3 parts of the 5 parts theory of matter.

Know the 3 states of matter and how their particles behave

Know 2 examples of Plasma

Know the definition of Heterogeneous and Homogenous mixtures and be able to give one example of each.

We watched a video on Pasteurization of Apple juice, why is this important?

Know the diagram of the earth with the solutions around it.

What is a pure substance found on earth and why is it hard for scientist to determine if something is a pure substance.

Know the difference of solute and solvent

Know definitions of soluble and insoluble