

11–14 years

Key terms accessible glossary: particle model

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For how to use, metacognitive prompts, ideas for support and challenge and linked resources, visit: rsc.li/4cmvSbS

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Concentration

the amount of solute present in a known volume of solution

In other words ...

how many particles there are in a specific space

Sign it

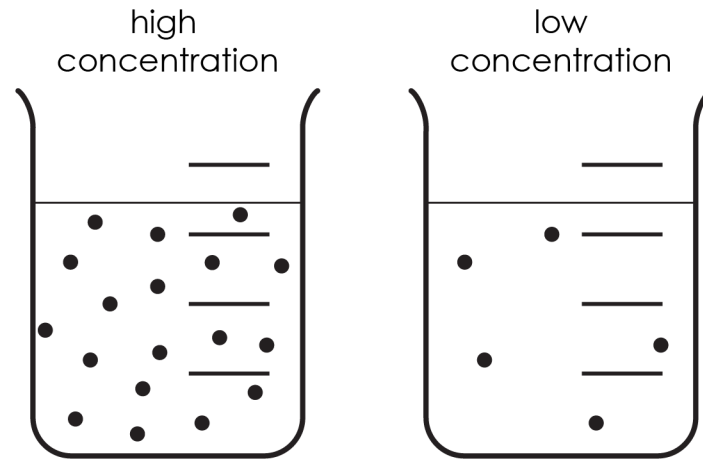
Watch a video:

bit.ly/43P87HI



Say it

Kon-suhn-trey-shuhn



Example

The concentration of the salt solution was 10 g/dm^3

Don't confuse with ...

strength – just because something is concentrated doesn't necessarily make it stronger

Diffusion

the movement of a substance from an area of high concentration to an area of low concentration

In other words ...

particles will move away from an area where they are in a high concentration

Sign it

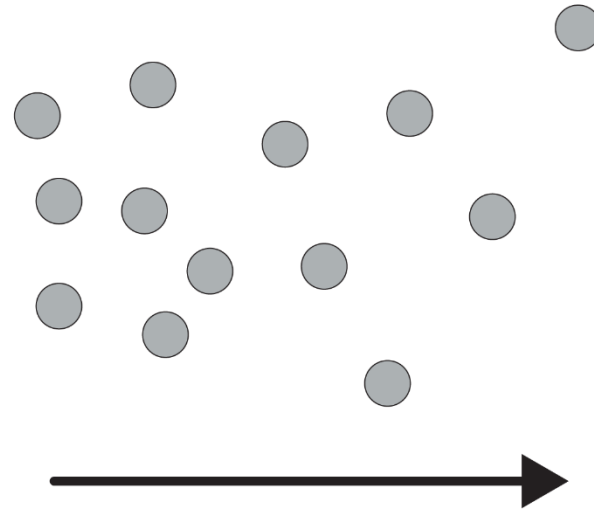
Watch a video:

bit.ly/4luPJtt



Say it

Dih-fyoo-shuhn



Example

When you spray air freshener, it diffuses throughout the room.

Similar words

Diffuse is the verb e.g. the oxygen molecules diffuse through the air

High concentration

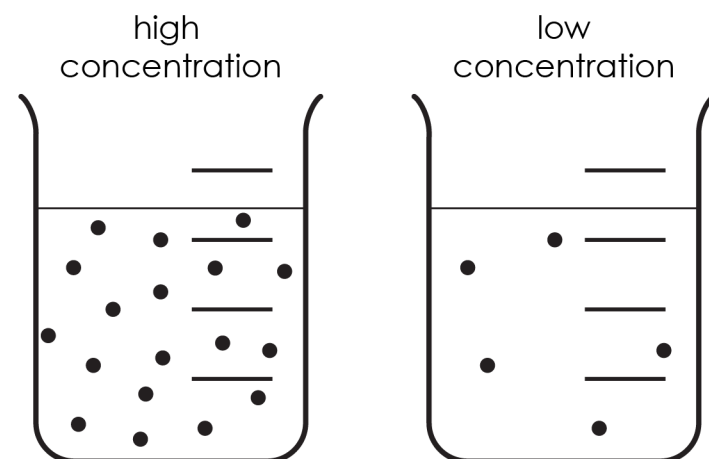
In other words ...

when there are a large number of particles in a relatively small space

Say it

Hai kon-suhn-trey-shuhn

a large amount of solute present in a known volume of solution



Similar words

Concentrated; this is another way of describing a solution with a high concentration

Example

The hydrochloric acid needed to be at a high concentration for the reaction to work

Don't confuse with ...

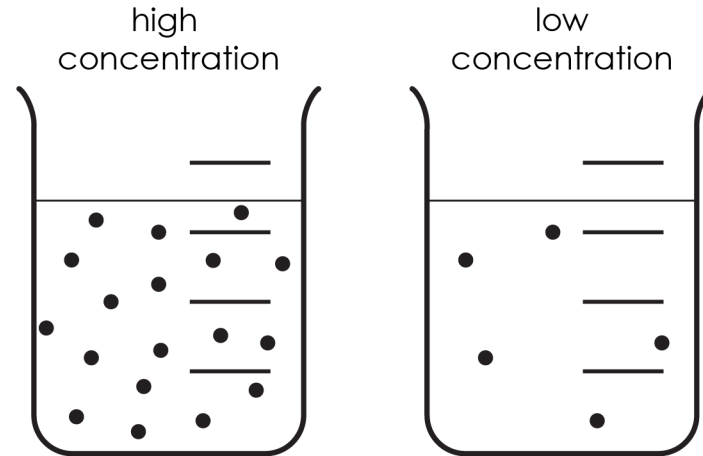
volume – a high concentration of a substance is not the same as a large amount of a substance

Low concentration

a low amount of solute present in a known volume of solution

In other words ...

where there are a small number of particles in a relatively large space



Example

The oxygen was at a low concentration in the water

Similar words

Dilute; this is another way of describing a solution with a low concentration

Don't confuse with ...

volume – a low concentration of a substance is not the same as a small amount of a substance

Say it

Loh con-suhn-trey-shuhn

Boil

when a liquid is heated, gains energy and turns into a gas, at its boiling point

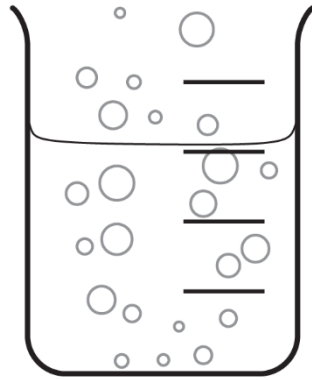
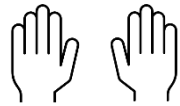
In other words ...

when a liquid turns into a gas

Sign it

Watch a video:

bit.ly/4cK2KM2



Example

When water is heated to 100°C it will boil

Don't confuse with ...

a high temperature - when something boils it does not have to be hot. Oxygen boils at -183°C

Say it

Boyl

Boiling point

the temperature at which a pure substance changes from a liquid to a gas or from a gas back to a liquid

In other words ...

the temperature that a substance boils or condenses

Sign it

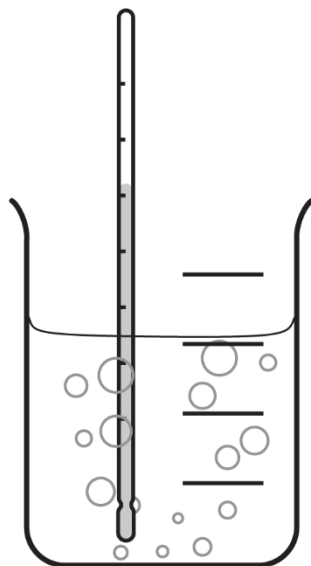
Watch a video:

bit.ly/4444xcp



Say it

Boyl-ing poynt



Example

The boiling point of water is 100°C

Don't confuse with ...

a high number - a boiling point is not always a high number. Oxygen has a boiling point of -183°C

Condense

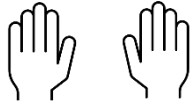
In other words ...

when a gas cools and turns into a liquid

Sign it

Watch a video:

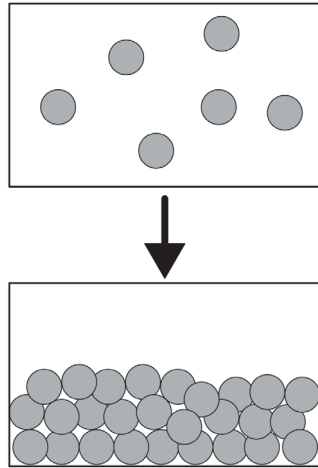
bit.ly/3Y2ECxX



Say it

Kon-den-ss

when a gas is cooled, energy is transferred from the gas to the gas' surroundings and the gas turns into a liquid



Example

When steam cools down, condensation occurs and liquid water is formed

Don't confuse with ...

rain. Condensation is often used to talk about the production of rain because water vapour in clouds condenses into rain droplets

Endothermic

In other words ...

when a reaction transfers thermal energy into a substance

Sign it

Watch a video:

bit.ly/44di8OT



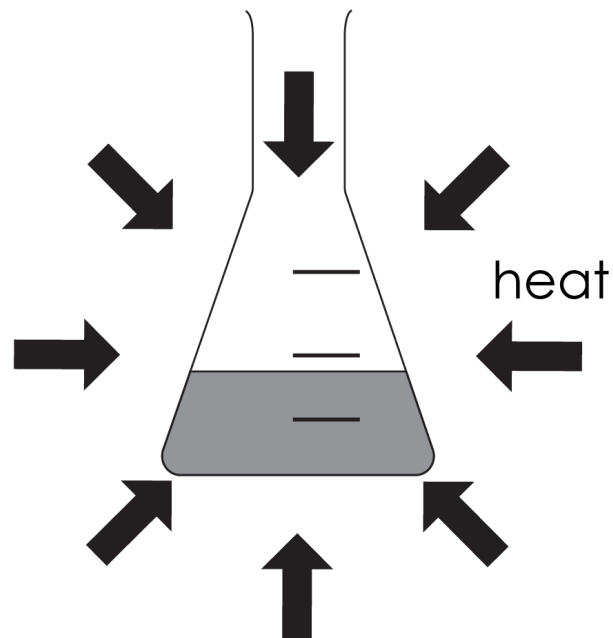
Say it

En-doh-thur-mik

Break it down

Endo (inside),
thermal (temperature,
heat)

a physical change or chemical reaction which transfers energy from its surroundings, causing the surroundings to get cooler



Example

When ethanoic acid and sodium carbonate are reacted together the temperature falls

Don't confuse with ...

cooling down – the area around the reaction gets cooler because energy is moving into the reactants

Evaporate

when the surface of a liquid gains energy and turns into a gas; this can happen below the boiling point

In other words ...

when a liquid turns into a gas

Sign it

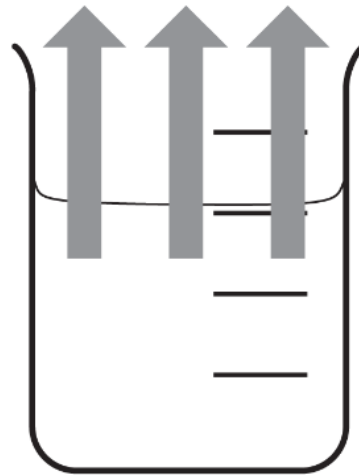
Watch a video:

bit.ly/42tpPOe



Say it

lh-vap-uh-rayt



Example

Steam rising from the surface of a hot drink

Don't confuse with ...

heat - when something evaporates it does not have to be hot

Exothermic

a physical change or chemical reaction which transfers energy to its surroundings, causing the surroundings to get hotter

In other words ...

when a reaction transfers thermal energy to the surroundings

Sign it

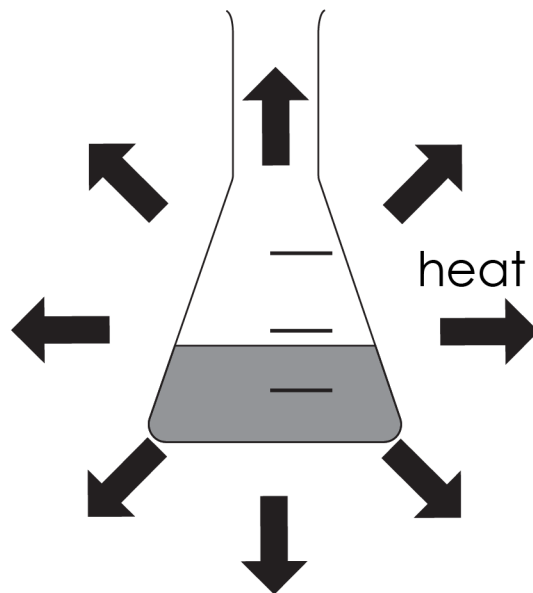
Watch a video:



bit.ly/43Wj9e0

Say it

Ex-oh-thur-mik



Example

When calcium chloride and water react, the temperature of the solution increases. This is an exothermic reaction

Similar words

'Exo' means outside.
Thermal links to temperature and heat.
Exothermic means heat outside

Don't confuse with ...

heating up – the area around the reaction gets warmer because energy is being transferred

Freeze

when a liquid is cooled, energy is transferred from the liquid to the liquid's surroundings and the liquid turns into a solid

In other words ...

when a liquid cools and becomes a solid

Sign it

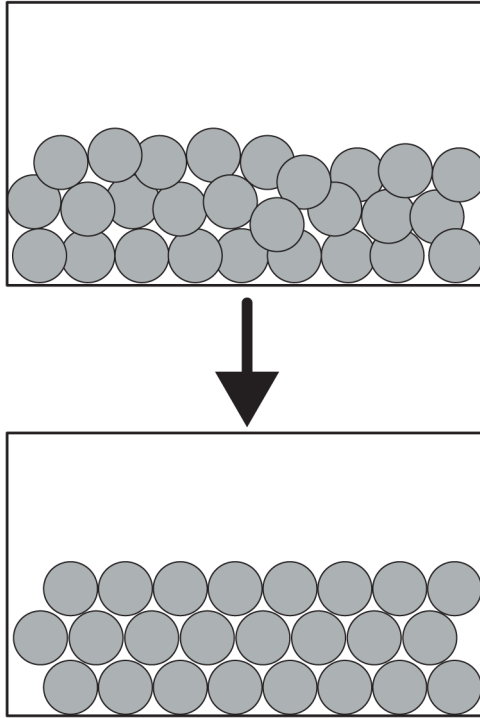
Watch a video:

bit.ly/3GzGo3y



Say it

Free-z



Example

When oxygen is cooled to -218.8°C it will freeze and become solid

Don't confuse with ...

cold - a substance does not have to be cold to freeze, copper freezes at 1085°C

Melt

when a solid is heated, gains more energy and turns into a liquid, at or above its melting point

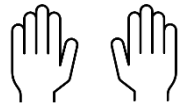
In other words ...

when a solid becomes a liquid

Sign it

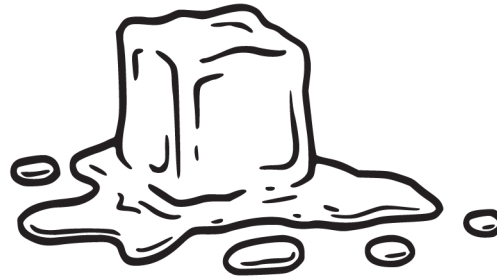
Watch a video:

bit.ly/4jrUsdK



Say it

Mel-t



Example

The ice cubes started to melt when they were taken out of the freezer

Don't confuse with ...

high temperature -
substances don't always
melt at high temperatures.
Nitrogen melts at -210°C

Melting point

the temperature at which a pure substance melts and changes from a solid to a liquid, or from a liquid back to a solid

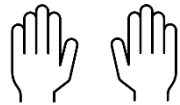
In other words ...

the temperature a substance melts or freezes

Sign it

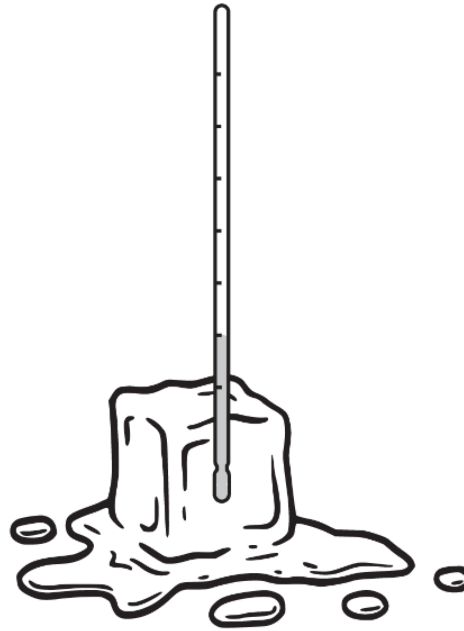
Watch a video:

bit.ly/4jfIZ1f



Say it

Mel-ting poynt



Example

The melting point of water is 0°C

Similar words

Freezing point is the same as melting point

Sublime

when a solid is heated, gains energy and turns into a gas, without turning into a liquid first

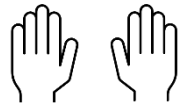
In other words ...

when a substance turns straight from a solid to a gas

Sign it

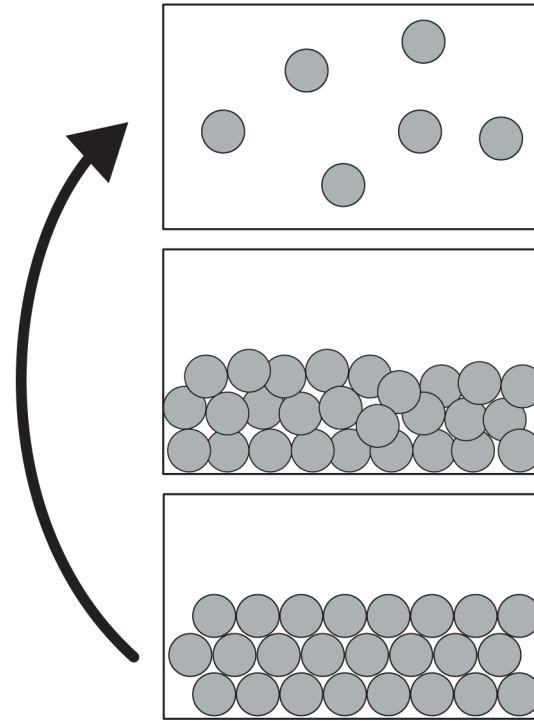
Watch a video:

bit.ly/42v8moJ



Say it

Suhb-lah-eem



Example

Solid carbon dioxide (dry ice) will undergo sublimation and become a gas

Don't confuse with ...

melt – when a substance sublimates there is no liquid phase at all

Dissolve

when a solute is added to a solvent and the solute breaks into much smaller particles and spreads out

In other words ...

when a solid mixes with a liquid and spreads out until it looks like it has disappeared

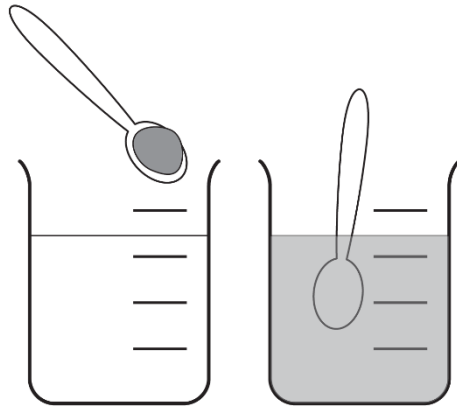
Sign it

Watch a video:
bit.ly/3G7Xdm2



Say it

Dih-zolv



Example

A spoonful of sugar dissolves easily in a cup of tea



Don't confuse with ...

melt – this is a change of state where a solid becomes a liquid

Insoluble

In other words ...

a substance that does not dissolve and will either sink to the bottom or float on top of the liquid

Sign it

Watch a video:

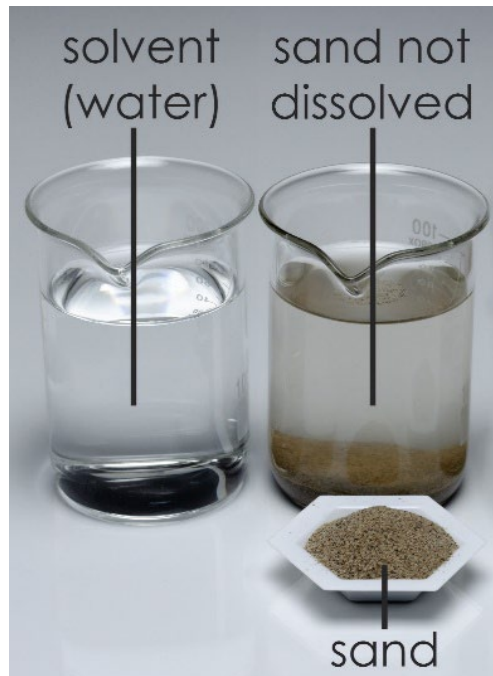
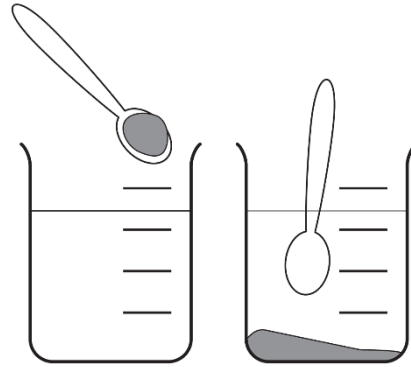
bit.ly/4lx9wlQ



Say it

In-sol-yuh-buhl

describes a substance which does not dissolve in a particular solvent



Example

Sand is insoluble in water

Don't confuse with ...

soluble - they have opposite meanings

Break it down

This word has the prefix 'in' which means not. Insoluble means not soluble

Miscible

when two liquids can mix and do not separate out into layers

In other words ...

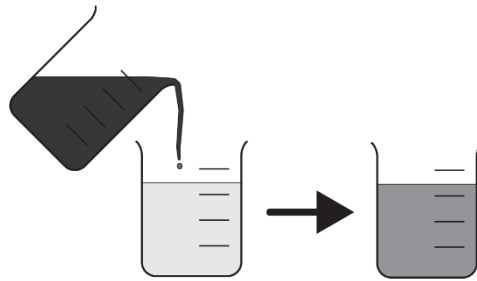
two or more liquids that can mix together

Say it

Mis-uh-buhl

Similar words

Mixable also means that two or more things can be mixed together



Example

Milk is added to tea because it is miscible in water, so the two liquids are easily mixed



Don't confuse with ...

immiscible - two liquids that cannot mix together like oil and water

Soluble

describes a substance which dissolves in a particular solvent

In other words ...

this is a substance that will dissolve

Sign it

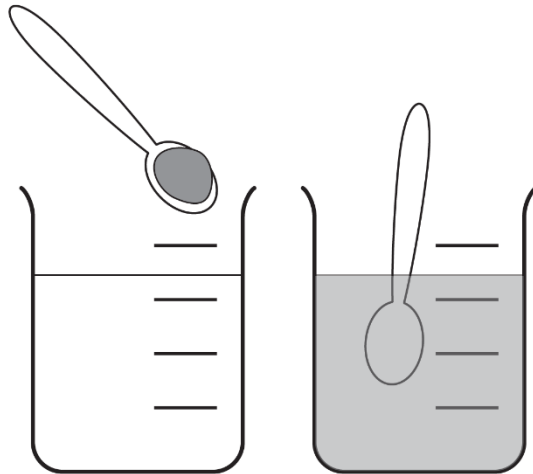
Watch a video:



bit.ly/3YdfXH3

Say it

Sol-yuh-buhl



Example

Salt is soluble in water

Don't confuse with ...

disappeared - a soluble substance hasn't disappeared, it is just really spread out

Solute

a substance that dissolves in a solvent to make a solution

In other words ...

The solute is the substance that is dissolved in a liquid

Sign it

Watch a video:

bit.ly/3S6Ttnv



Say it

Sol-yoot



Example

When salt is dissolved in water the salt is the solute

Don't confuse with ...

solvent – this is the liquid the solute is dissolved in

Solution

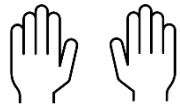
the mixture produced when a solute dissolves in a solvent

In other words ...

a mixture of a solvent and a solute such as water and salt

Sign it

Watch a video:



bit.ly/44uofhF

Say it

Suh-loo-shuhn



Example

In a solution of salt water the solute is salt and the solvent is water

Other meanings

Solution can also mean the answer to a problem. In maths and physics, you may be asked to work out the solution to a question

Solvent

a substance that dissolves the solute to make a solution

In other words ...

the solvent is normally a liquid that other substances can dissolve into

Sign it

Watch a video:
bit.ly/4czJbWG



Say it

Sol-vunt



Example

When salt is dissolved in water the water is the solvent

Don't confuse with ...

solute – this is the substance dissolved in the solvent

Atom

the smallest possible particle of an element;
atoms are made up of protons, neutrons and
electrons

Sign it

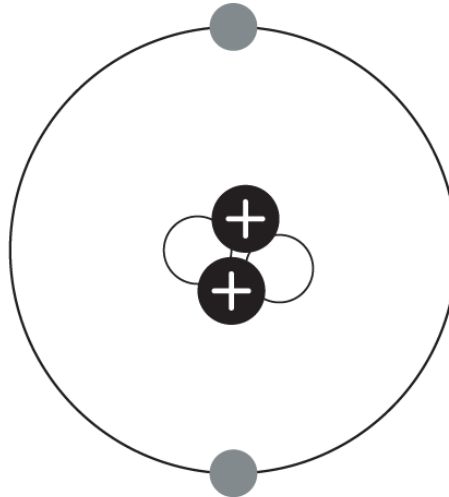
Watch a video:

bit.ly/3G7XpSi



Say it

A-tuhm



Example

Helium is an element; it is
made up of helium atoms

Don't confuse with ...

particle, compound or
molecule

Chemical bond

a strong (electrostatic) force of attraction holding atoms together

In other words ...

a force that holds atoms together

Sign it

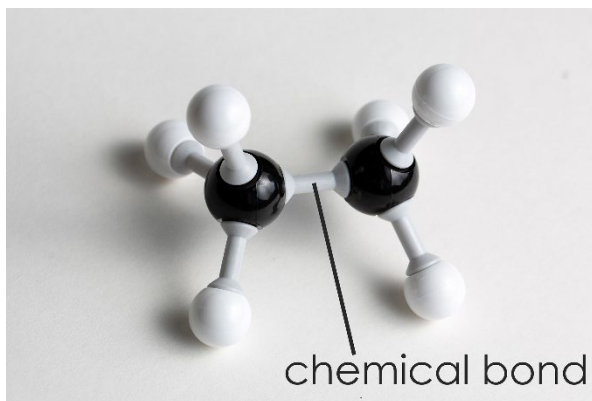
Watch a video:

bit.ly/4lydvVG



Say it

Kem-ih-kuhl bond



Example

Chemical bonds in ethane connect each carbon atom to three hydrogen atoms and to another carbon atom

Similar words

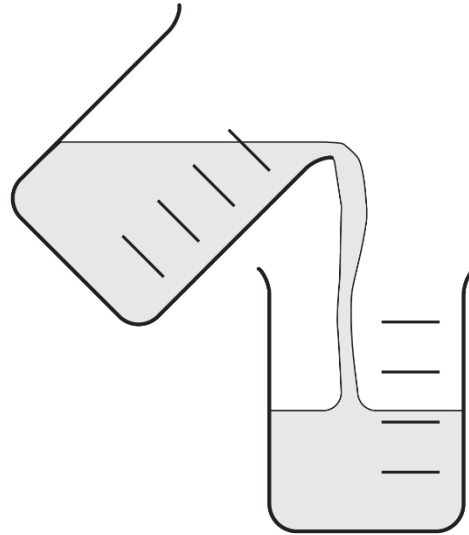
Force of attraction

Flow

when a gas or liquid moves steadily and continuously

In other words ...

when a gas or liquid moves from one place to another



Example

The water flows to fill its container

Say it

Floh

Similar words

Move

Don't confuse with ...

Diffusion - a specific example of liquid and gas particles moving

Force

the attraction (pull) and repulsion (push) between objects; in chemistry, these objects are particles

In other words ...

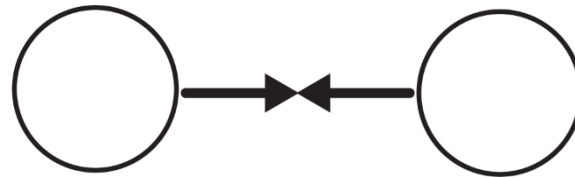
something that pulls two objects together or pushes them apart

Sign it

Watch a video: 
bit.ly/4lsBd5P

Say it

For-ss



Example

The forces in ionic compounds are very strong which gives them a high melting and boiling point

Don't confuse with ...

bond – this is a specific type of force between particles

Other meanings

You may hear in your physics lessons that a force can also change the shape of an object, or change its speed or direction

Gas

a state of matter with no defined shape or volume and where the particles move randomly and have a large distance between them

In other words ...

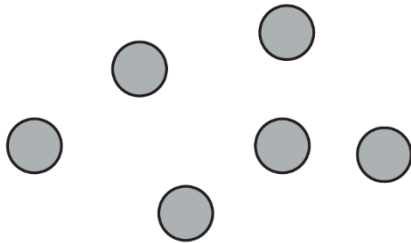
a substance that is not solid or liquid and can change its shape to fill its container

Sign it

Watch a video:



bit.ly/42V6mr1



Example

When a liquid is heated it evaporates and becomes a gas

Don't confuse with ...

a hot substance - oxygen is a gas at room temperature

Other meanings

Natural gas is a fossil fuel used to generate electricity. It is a mixture of gases including methane

Say it

Ga-ss

Ion

a charged particle formed when one or more electrons are lost or gained from an atom or molecule

In other words ...

a particle with a positive or negative charge

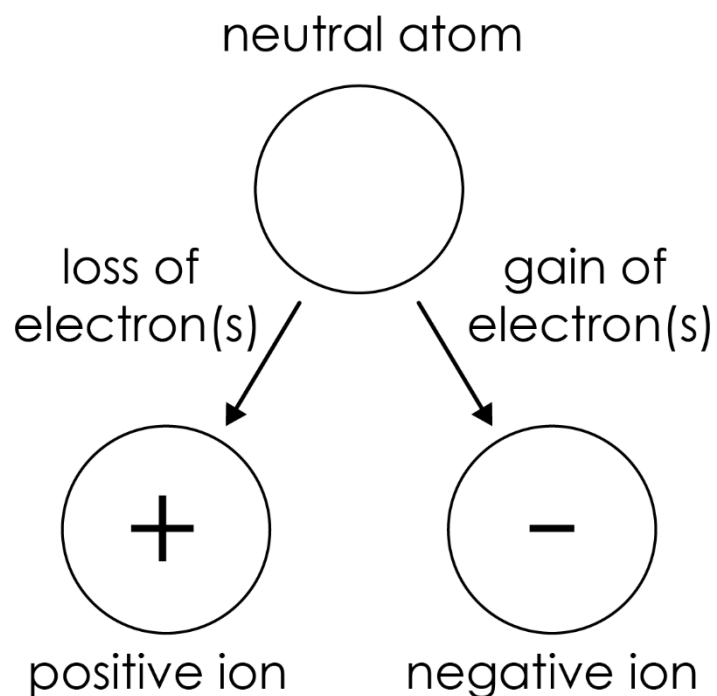
Sign it

Watch a video:
bit.ly/3Yv76R2



Say it

Eye-on



Example

When a sodium atom loses an electron, it becomes a positively charged ion

Don't confuse with ...

electron – these are the negatively charged particles in an atom

Other contexts

Ions can be formed by radioactivity; you will study this in physics

Kinetic energy

the energy an object has because of its motion

In other words ...

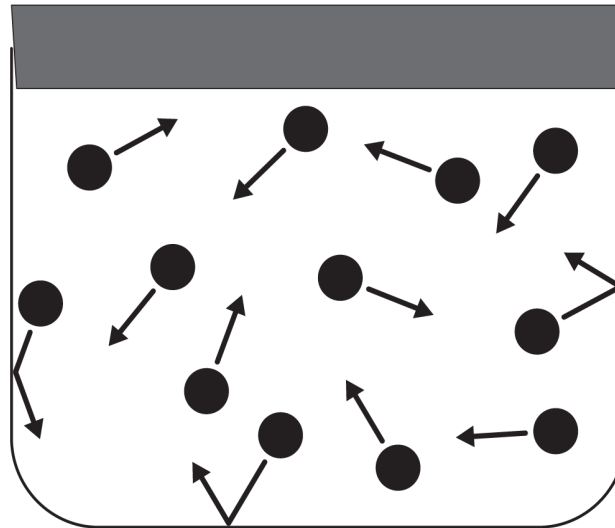
moving objects
have kinetic energy

Sign it

Watch a video: 
bit.ly/4jaZCev

Say it

Kih-neh-tik eh-nur-jee



Example

When a substance is heated the particles gain a greater kinetic energy store, so they will vibrate or move faster

Don't confuse with ...

movement you can visibly see. The particles of a solid have kinetic energy too, not just liquids and gases

Other contexts

In physics you will calculate a value for the kinetic energy stores of moving objects

Latent heat

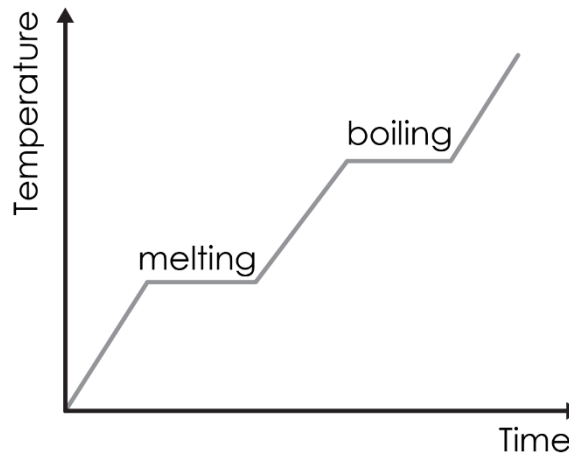
energy transferred to or from a substance during a change in its physical state that occurs without changing its temperature

In other words ...

the energy needed to melt or boil a substance, or the energy released when a substance condenses or freezes

Say it

Lay-tent hee-t



Example

As ice melts the temperature will remain at zero degrees until all of the solid ice has melted into liquid water

Don't confuse with ...

temperature change: 'getting hotter' or 'getting colder'. There is no temperature change while a substance is changing state

Liquid

a state of matter with a defined volume but not a defined shape and where the particles are touching and moving randomly

In other words ...

a substance which can change its shape and flows because the particles can move over one another

Sign it

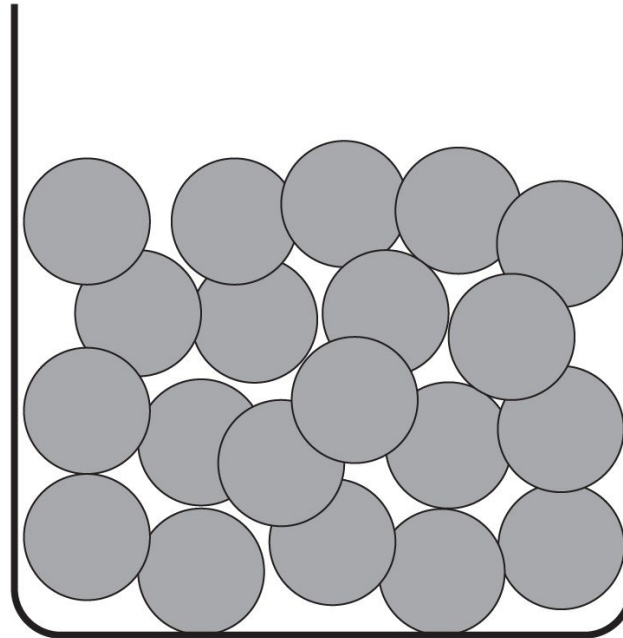
Watch a video:

bit.ly/4cuQXB0



Say it

Lik-wid



Example

When a solid melts it becomes a liquid

Don't confuse with ...

fluid – this is a term used to describe liquids and gases

Molecule

two or more atoms connected by chemical bonds

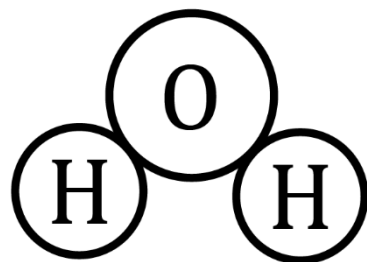
In other words ...

two or more atoms
joined together

Sign it

Watch a video:

bit.ly/4lBjGbG



water molecule



hydrogen molecule

Example

Water is a molecule made from two hydrogen atoms and one oxygen atom. Hydrogen is an element which forms a molecule of two hydrogen atoms

Don't confuse with ...

compound – all compounds are molecules, but elements like oxygen can also be a molecule

Say it

Mol-eh-kyul

Particle

a small portion of matter; examples include atoms, molecules or ions

In other words ...

particles are small units such as atoms or molecules

Sign it

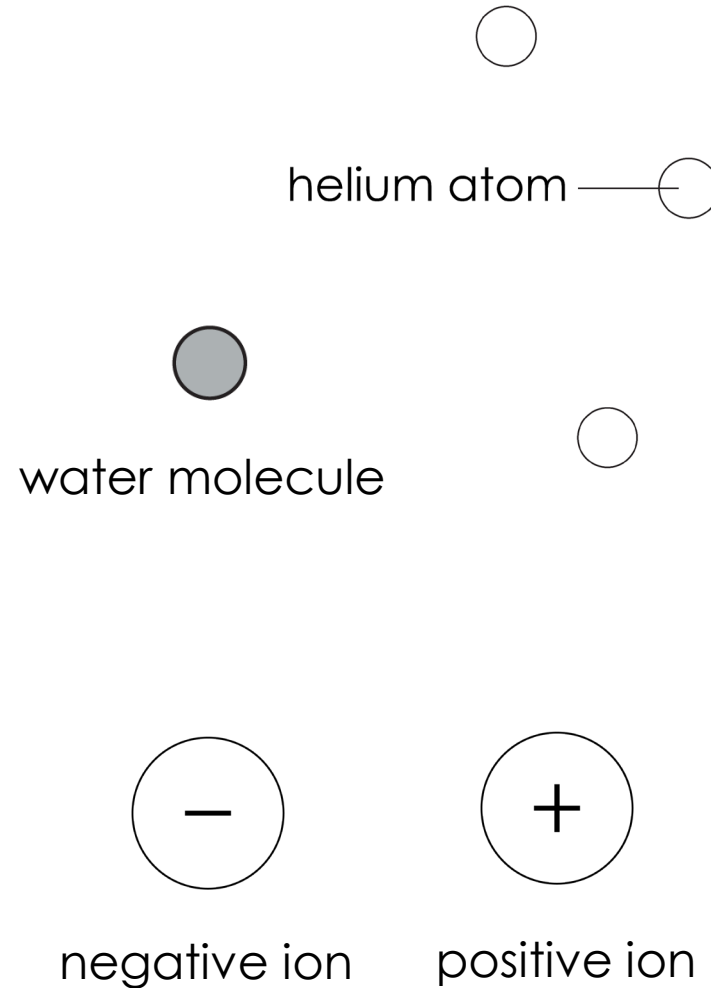
Watch a video:

bit.ly/42x2z1E



Say it

Par-tih-kuhl



Example

Electrons are particles in an atom

Don't confuse with ...

atom, molecule or ion – these are types of particle.

Also, particulate is a small particle produced when fuel burns

Other meanings

Sometimes we talk about larger objects being particles, such as dust particles

Solid

a state of matter with a defined shape and volume and where the particles are touching and vibrating

In other words ...

substances with a specific shape

Sign it

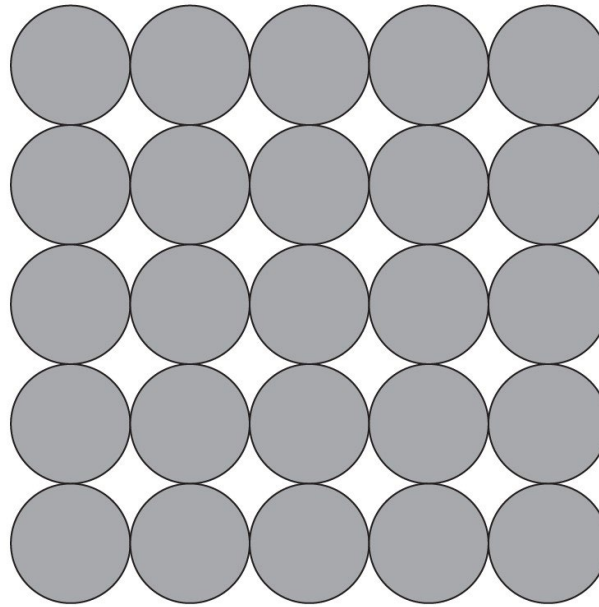
Watch a video:

bit.ly/3YsVvC8



Say it

Sol-ihd



Example

Ice is the solid form of water

Don't confuse with ...

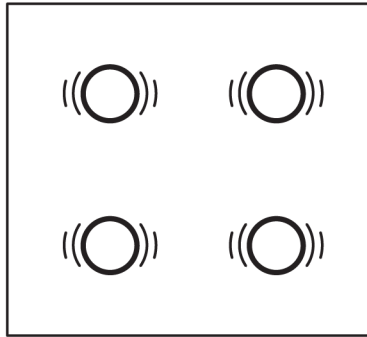
hard – not all solids are hard for example paper or fabric

Vibrate

move repetitively and rapidly to and fro

In other words ...

something moving
quickly from side to side



Example

The particles vibrate on
the spot in a solid

Say it

Vai-brayt

Similar words

Vibration

Don't confuse with ...

move – particles stay in
the same spot when
they vibrate

Acknowledgements

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