

14–16 years

Key terms accessible glossary: atomic model

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For how to use, metacognitive prompts, ideas for support and challenge and linked resources, visit: rsc.li/3XTkheu

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(Atomic) nucleus

the positively charged centre of the atom consisting of protons and neutrons

In other words...

the centre of an atom, made of protons and neutrons

Sign it

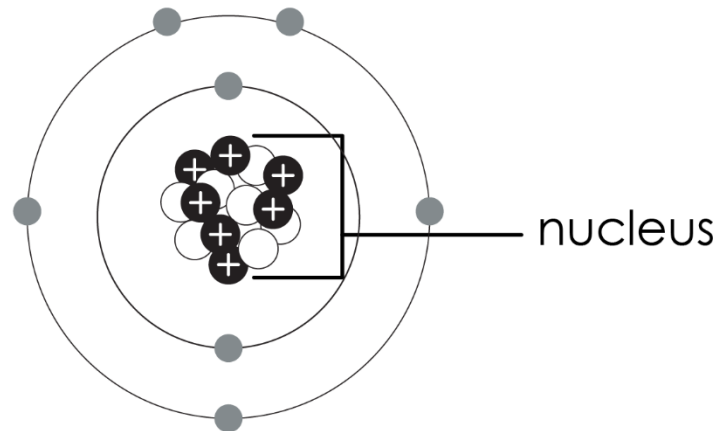
Watch a video: 
bit.ly/3RfRpJL

Say it

Nee-uw-clee-us

Example

The nucleus of nitrogen contains 7 protons and 7 neutrons. The atomic nucleus will always be shown at the centre of any atoms in diagrams



Don't confuse with...

the nucleus of a cell in biology. A cell nucleus is significantly larger than an atomic nucleus

Other contexts

In physics you will study how the atomic nucleus changes during nuclear fusion and nuclear fission

Atomic number

the number of protons in the nucleus of an atom of a particular element

In other words...

how many protons
an atom of an
element has

Sign it

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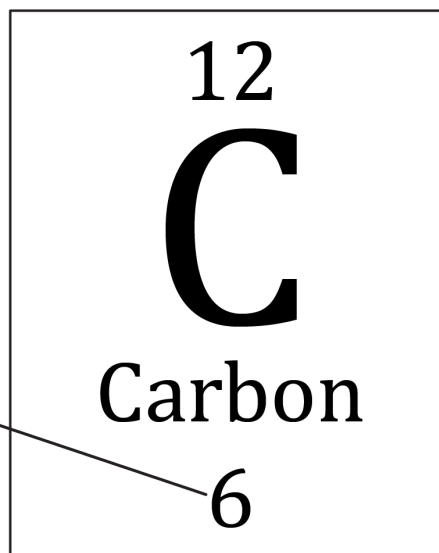


bit.ly/4ieBlxm

Say it

A-tom-ik num-bur

atomic
number



Similar words

Proton number

Example

The atomic number of carbon is six because a carbon atom has six protons in the nucleus

Don't confuse with...

number of electrons.
The number of electrons will only be equal to the atomic number for neutral atoms. Ions will have a different number of electrons

Compound

a pure substance made of two or more different elements whose atoms are joined by chemical bonds; the atoms are in a fixed ratio

In other words...

two or more different elements chemically bonded

Sign it

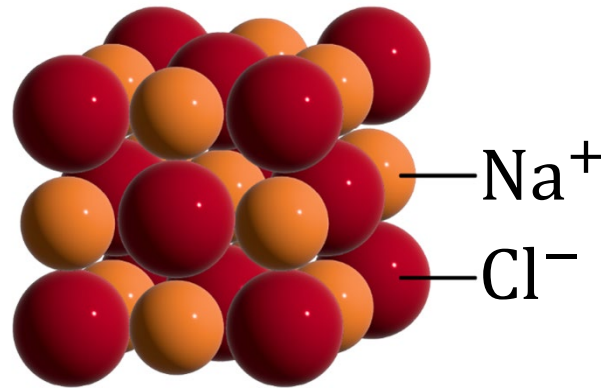
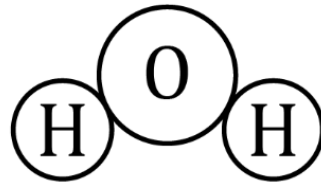
Watch a video:



bit.ly/4jDLKJD

Say it

Com-pound



Example

Water and sodium chloride are common compounds

Don't confuse with...

mixture. Not all of the atoms in a mixture will be chemically bonded together

Other contexts

In biology you will study the importance of glucose, carbon dioxide and many other compounds

Electron

a negatively charged subatomic particle with very little mass found in the electron shells/energy levels of atoms

In other words...

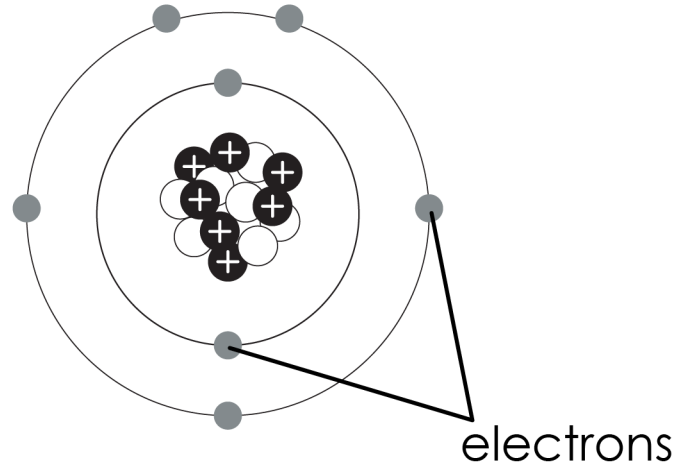
negative subatomic particles found within atoms

Sign it

Watch a video: 
bit.ly/4lxieqC

Say it

Eh-lek-tron



Example

Nitrogen atoms will contain seven electrons because the atomic number of nitrogen is 7

Don't confuse with...

ion. Electrons are found within atoms and ions

Other contexts

In physics you will study electrons in the context of electrical circuits

Electron configuration (or structure)

gives the number of electrons in each shell/energy level around the nucleus of an atom

In other words...

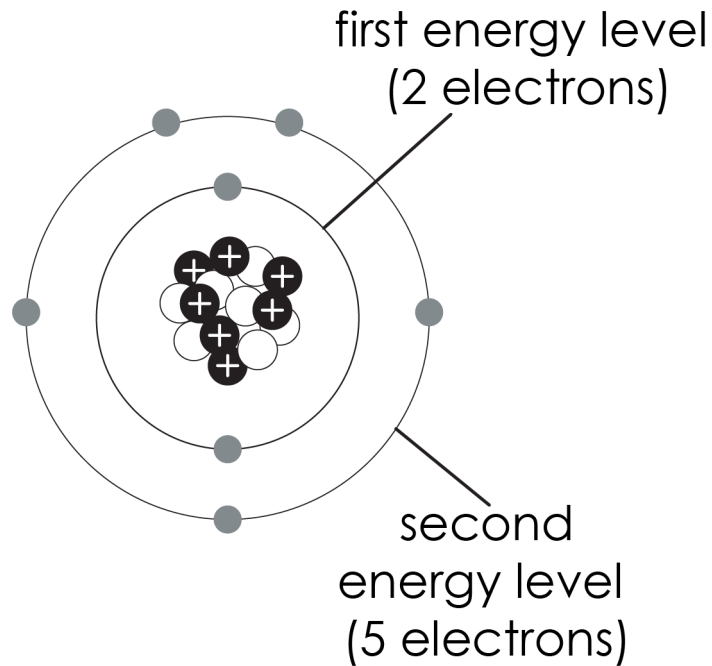
how the electrons are arranged around the nucleus

Sign it

Watch a video: 
bit.ly/3Ep2TaW

Say it

Eh-lek-tron
con-fig-yur-ay-shuhn



Example

The elements of group 18 (also known as group 0) have a stable electron configuration (a full outer shell)

Don't confuse with...

group number. The group number can indicate the number of electrons on the outer shell of an atom of an element. The full electron configuration represents the arrangement of all electrons across all shells

Electron shell (or energy level)

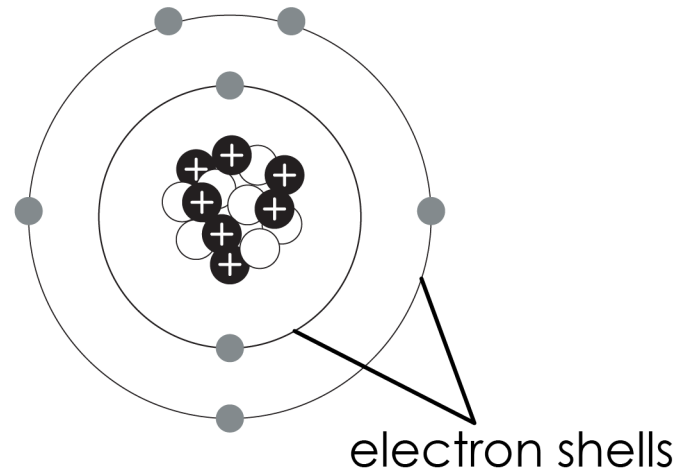
a region surrounding the nucleus of an atom where electrons are found; each level has a maximum number of electrons it can hold

In other words...

where electrons are found in an atom

Say it

Eh-lek-tron sh-ells



Example

An atom of nitrogen has two electron shells, so it is located in the second period of the periodic table

Don't confuse with...

delocalised electrons. They are not in the electron shells of any particular atom. Unless they are delocalised, electrons occupy space in an electron shell/energy level

Element

a pure substance made of only one type of atom

Sign it

Watch a video: 

bit.ly/4jAYL6M

| | | |
|-------------------------|---------------------------|------------------------------|
| O Oxygen 8 | Na Sodium 11 | P Phosphorus 15 |
|-------------------------|---------------------------|------------------------------|

Example

Oxygen, sodium and phosphorus are pure substances made of only one type of atom, so they are found on the periodic table

Say it

Eh-le-ment

Other contexts

In biology you will study how oxygen, carbon, nitrogen and several other elements are necessary for life

Don't confuse with...

atoms, which are the individual particles that make up an element or compound

Isotopes

atoms with the same number of protons but different numbers of neutrons

Sign it

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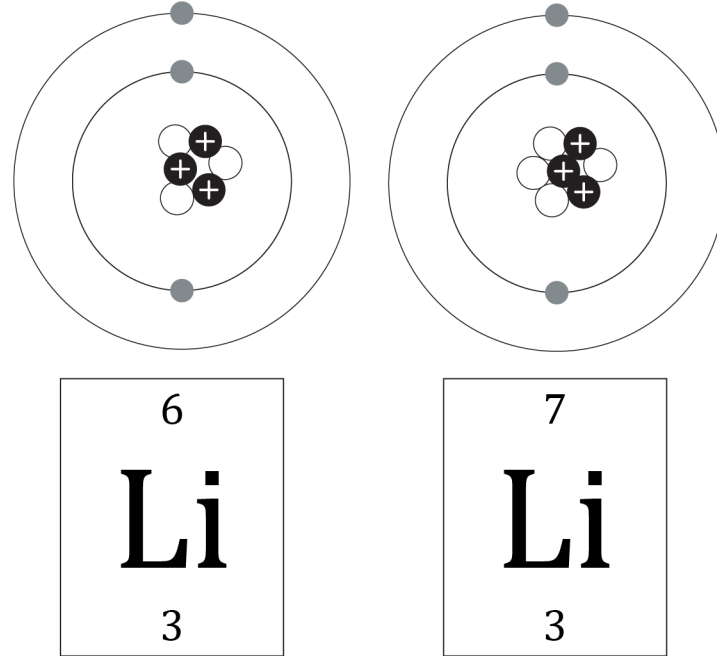
bit.ly/44dm8in

Say it

Eye-so-toh-ps

Other contexts

In physics you will study radioactive isotopes of different elements



Example

Carbon-12 and Carbon-13 are both isotopes of carbon because they have the same number of protons (6), but a different number of neutrons (6 vs 7)

Don't confuse with...

allotropes, which have the same number of subatomic particles. Isotopes have different numbers of neutrons. Neutrons are neutral, so isotopes have the same overall (neutral) charge

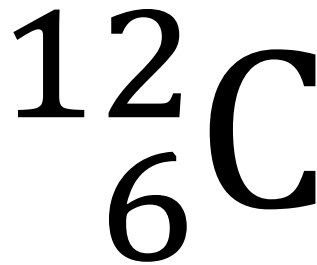
Mass number

the total number of protons and neutrons in the nucleus of an atom of a particular element

In other words...

the total number of protons and neutrons found in an atom

mass number



Example

A carbon atom always contains 6 protons and 6 neutrons within its atomic nucleus, so carbon atoms have a mass number of $6 + 6 = 12$

Sign it

Watch a video: 
bit.ly/3EonhJe

Say it

Mah-ss num-bur

Other contexts

In physics you will use mass number in the same way as it is used in chemistry

Don't confuse with...

atomic number. The mass number will be the greater of the two values for any given element within the periodic table

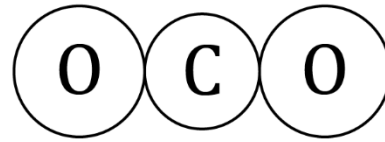
Molecule

two or more atoms connected by chemical bonds

Sign it

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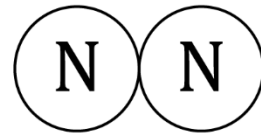
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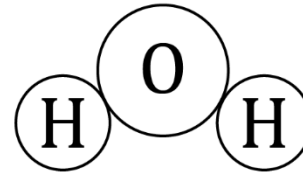
carbon dioxide
molecule



hydrogen
molecule



nitrogen
molecule



water
molecule

Example

Carbon dioxide (CO_2),
water (H_2O) and all other
compounds are molecules

Say it

Mol-eh-kyul

Don't confuse with...

elements and compounds.
A molecule can be either
an element or a
compound

Similar words

Molecules of gases and
liquids could also be
described as gas and
liquid particles

Other contexts

In biology you will study
many different molecules
found within living
organisms, such as glucose
and carbon dioxide

Neutron

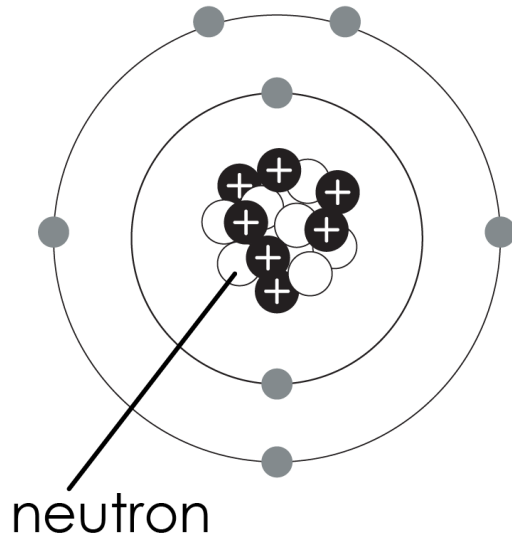
a subatomic particle with no charge and a relative mass of 1, found in the nucleus of an atom

In other words...

a neutral subatomic particle found in the nucleus

Sign it

Watch a video: 
bit.ly/3Rm4fGI



Example

The number of neutrons in the nucleus of an atom can be calculated by subtracting the atomic number from the mass number

Don't confuse with...

negative. Neutrons have no charge. Electrons have a negative charge

Say it

Nee-uw-tron

Other contexts

In physics you will calculate the number of neutrons in different isotopes, in the same way that it is done in chemistry

Proton

a positively charged subatomic particle with a relative mass of 1, found in the nucleus of an atom

In other words...

a positive subatomic particle found in the nucleus

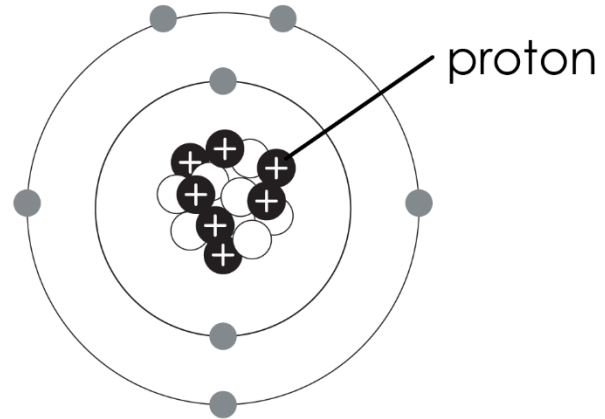
Sign it

Watch a video: 

bit.ly/4cy6LTJ

Say it

Pro-ton



Example

The atomic number of nitrogen is 7 because a nitrogen atom will contain 7 protons within its atomic nucleus

Don't confuse with...

positive ion/cation – both have a positive relative charge

Other contexts

In physics you will study a similar topic about atomic structure

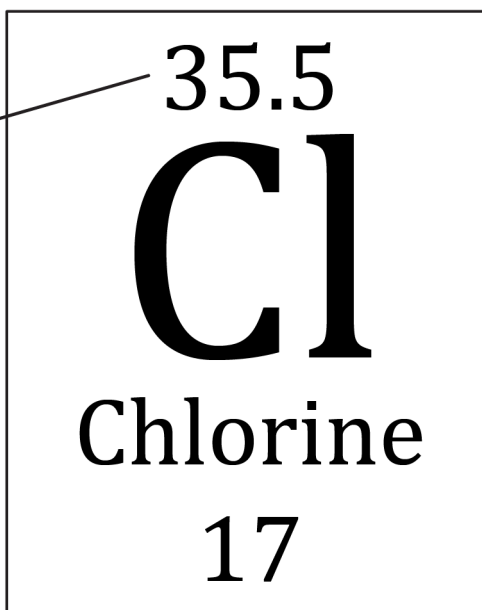
Relative atomic mass (A_r)

the average mass of an atom of an element taking into account the naturally occurring percentages of its isotopes

In other words...

the average mass of one atom of an element

relative atomic mass



Sign it

Watch a video:



bit.ly/4cullG6

Say it

Reh-lah-tiv a-tom-ik
mah-ss

Similar words

Relative mass

Example

The relative atomic mass of chlorine on some periodic tables is 35.5 because it is an average of the two isotopes of chlorine: chlorine-35 (^{35}Cl) and chlorine-37 (^{37}Cl)

Don't confuse with...

mass number. Relative atomic mass is an average so it can be a decimal value. An individual atom can only contain a whole number of protons and neutrons

Relative charge

In other words...

how positive or negative a particle is

Sign it

Watch a video:

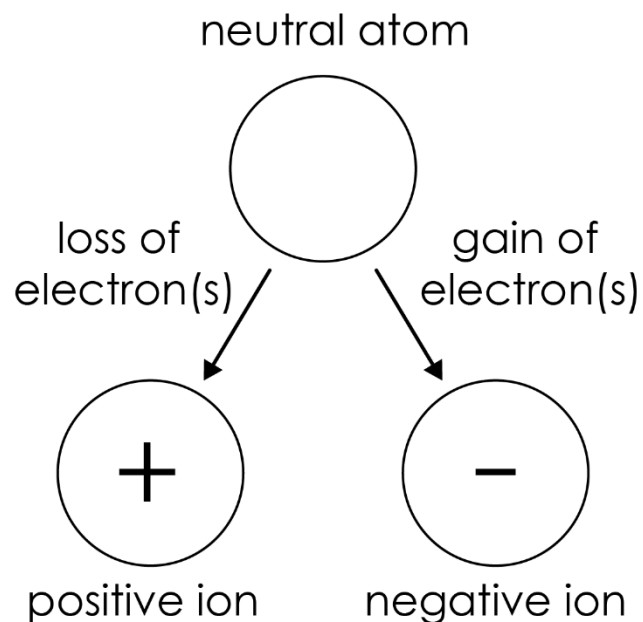
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Say it

Reh-lah-tiv ch-ar-j

the positive (+) or negative (-) charge of a particle compared to the charge of a single proton



Example

A sodium ion has 11 positive protons in the nucleus, but only 10 negative electrons, so the relative charge of the particle is +1

Don't confuse with...

relative mass. The relative charge of a particle can be positive or negative, relative mass will always be a positive value

Other contexts

In physics you will also learn about the relative charge of protons, neutrons and electrons

Relative mass

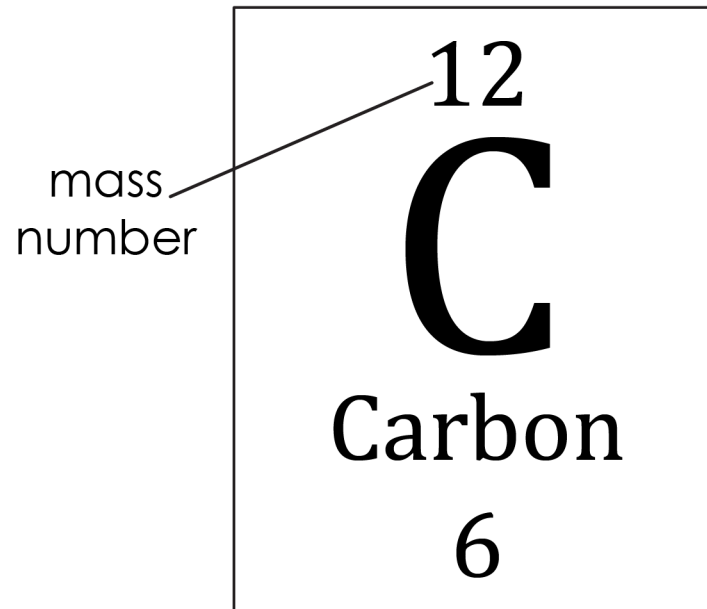
the mass of a particle relative to $1/12$ of the mass of a ^{12}C atom

In other words...

the number of times heavier a particle is compared to another

Say it

Reh-lah-tiv mah-ss



Example

A carbon atom will have a relative mass of 12 because it is 12 times heavier than a hydrogen atom

Don't confuse with...

Relative charge – the relative charge of a particle can be positive or negative, the relative mass will always be a positive value

Subatomic particle

a particle smaller than an atom

In other words...

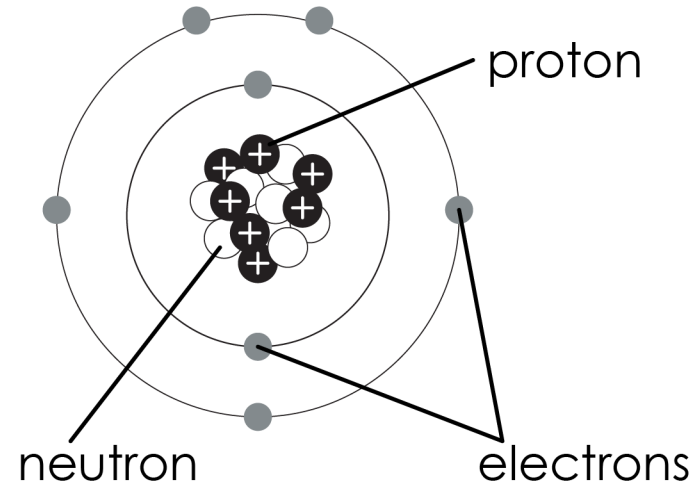
small particles that make up all elements

Say it

Sub-a-tom-ik par-ti-kuhl

Break it down

'Sub' means lower



Example

Protons, neutrons and electrons are subatomic particles

Don't confuse with...

atoms. Subatomic particles are what atoms are made from. They are found within the atom, not outside it

Other contexts

In physics you will encounter the same three subatomic particles that we learn about in chemistry: protons, neutrons and electrons

Atom

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

Sign it

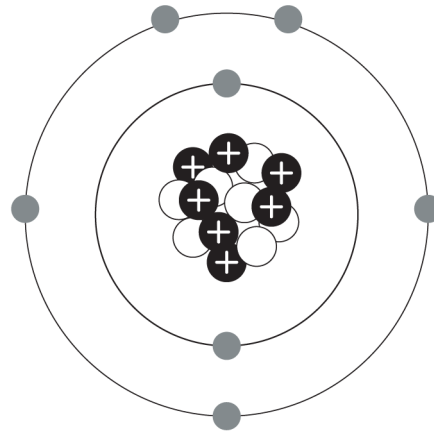
Watch a video:



bit.ly/3G7XpSi

Say it

A-tuhm



Example

One individual atom of nitrogen is the smallest form of nitrogen that can exist

Don't confuse with...

ions. Atoms have an equal number of protons and electrons. Atoms can form ions when they lose or gain electrons.

Other contexts

In physics you will study similar topics about atomic structure and particles

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

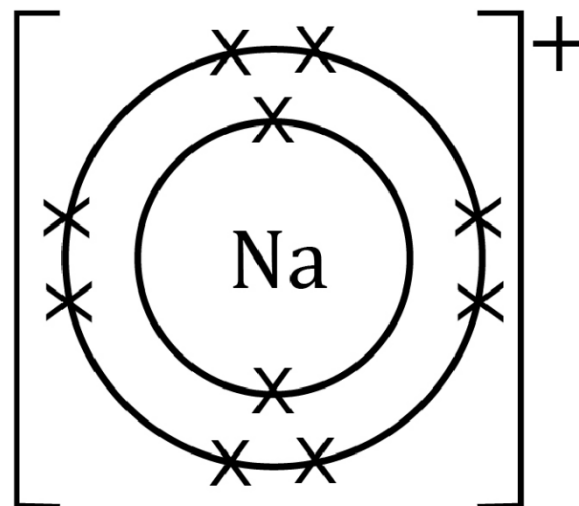
Watch a video:



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...

protons (positive) or electrons (negative)

Similar words

Cations are ions with a positive charge, and anions are ions with a negative charge

Other contexts

In physics you may discuss ions when learning about electricity

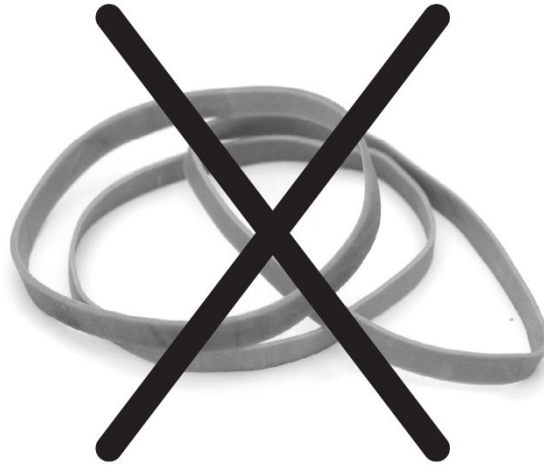
Inelastic

is not flexible

In other words...
will not stretch or
bend

Say it
In-el-as-tik

Break it down
'In' means not



Example
Metal drinks cans and glass
bottles are common
inelastic materials

Other contexts
An inelastic object changes shape permanently
when a force is applied to it. In physics you will
investigate the properties of elastic and inelastic
objects

Intermolecular forces

the relatively weak attractive and repulsive forces between molecules

Say it

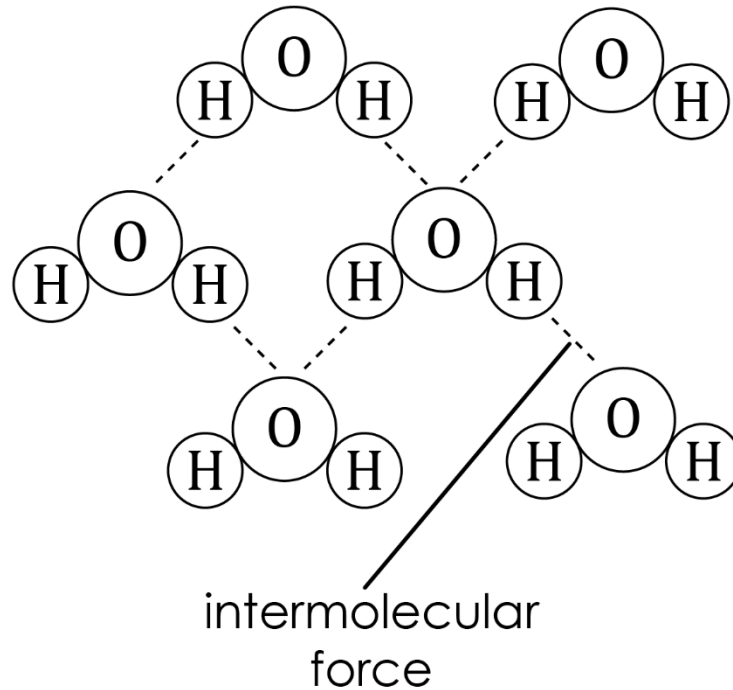
In-tur-mol-leh-kyu-lar
for-sez

Break it down

'Inter' means
between or among

Other contexts

In physics you may discuss intermolecular forces when learning about the particle model



Example

The water molecules in ice are held together by attractive forces between the molecules

Don't confuse with...

chemical bonds. No covalent bonds are broken when substances made of small covalent molecules undergo melting or boiling – it is the intermolecular forces that are overcome

Kinetic energy

the energy an object has because of its motion

In other words...

the faster a particle is moving, the more kinetic energy it has

Sign it

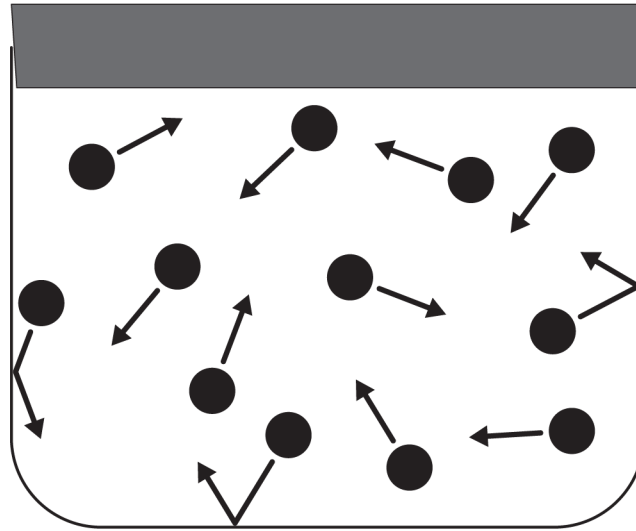
Watch a video:

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

Other contexts

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

Don't confuse with...

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

Latent heat

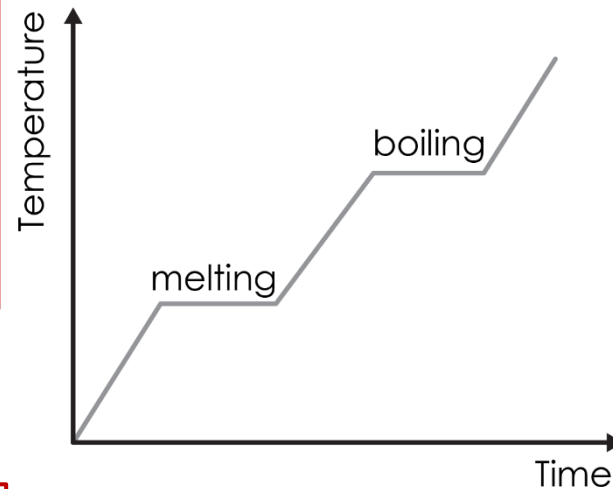
energy transferred to or from a substance during a change in its physical state that occurs without changing its temperature

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

Other contexts

In physics you will calculate the latent heat of fusion and vaporisation for different substances

Model

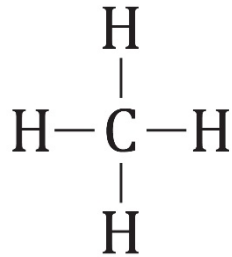
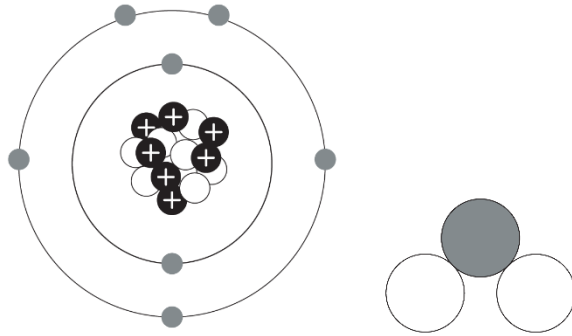
a simple representation of something or a way of explaining something complicated

Sign it

Watch a video: 
bit.ly/4ihX9xx

Say it

Moh-dul



Example

In chemistry, atoms are often modelled as circles or spheres and chemical bonds are often modelled as straight lines between atoms

Other contexts

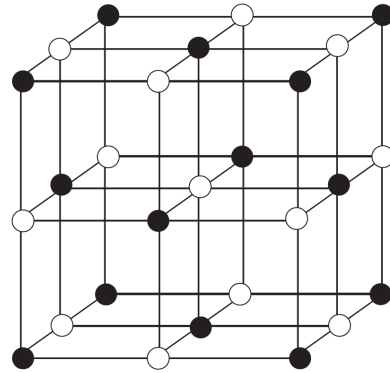
Across all three sciences your teacher will often use models to help explain complex and abstract ideas

Regular lattice

an arrangement of repeating atoms or ions that form a 3D structure

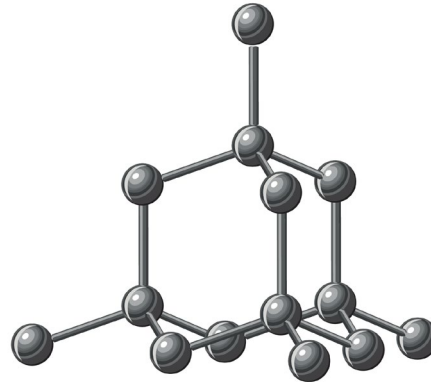
In other words...

particles arranged in a 3D repeating structure



Say it

Reh-gyu-lar lah-tiss



Other contexts

In physics you will learn about the arrangement of particles in solids

Example

Sodium chloride and diamond are substances that you will study that have a regular lattice structure

Don't confuse with...

simple molecules.

Acknowledgements

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SSC BSL Glossaries of Curriculum Terms

(<https://www.ssc.education.ed.ac.uk/BSL/>)