
NANYANG
GIRLS' HIGH

Elements

Compounds

Mixtures

Comment on what you observe in this photograph.

How do the sweets in this photograph model the idea of elements, compounds and mixtures?


NANYANG
GIRLS' HIGH

Elements, Compounds & Mixtures

By the end of this topic students should be able to…

- Identify elements, compounds and mixtures.
- Define and explain the terms element, compound and mixture.
- Give examples of elements, compounds and mixtures.
- Describe the similarities and differences between elements, compounds and mixtures.

Elements, Compounds & Mixtures

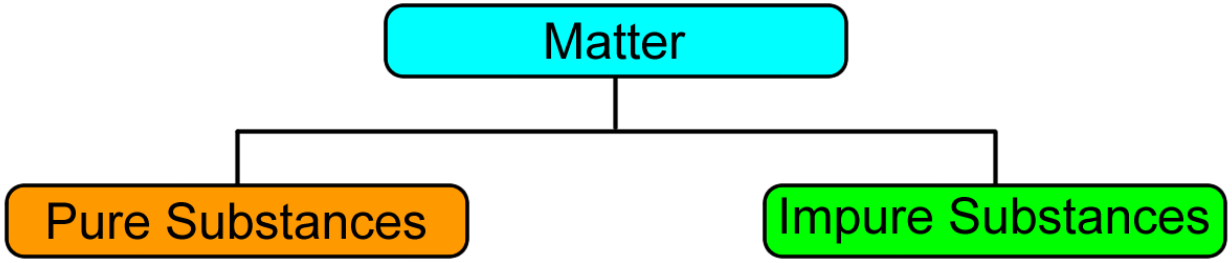
How can I classify the different materials in the world around me?

Elements, Compounds & Mixtures

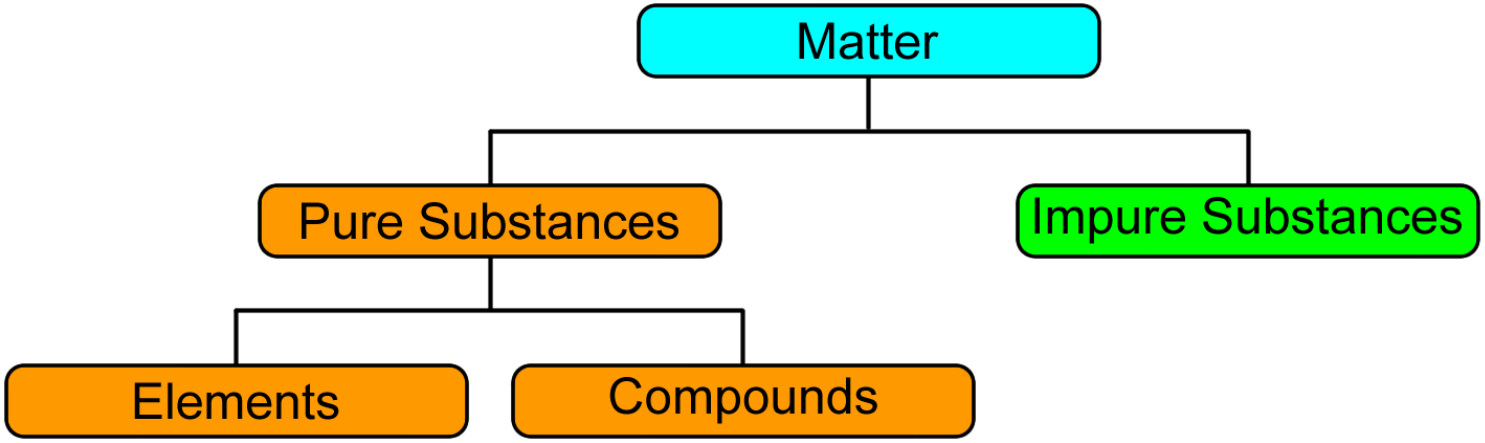
Elements, Compounds & Mixtures

Matter

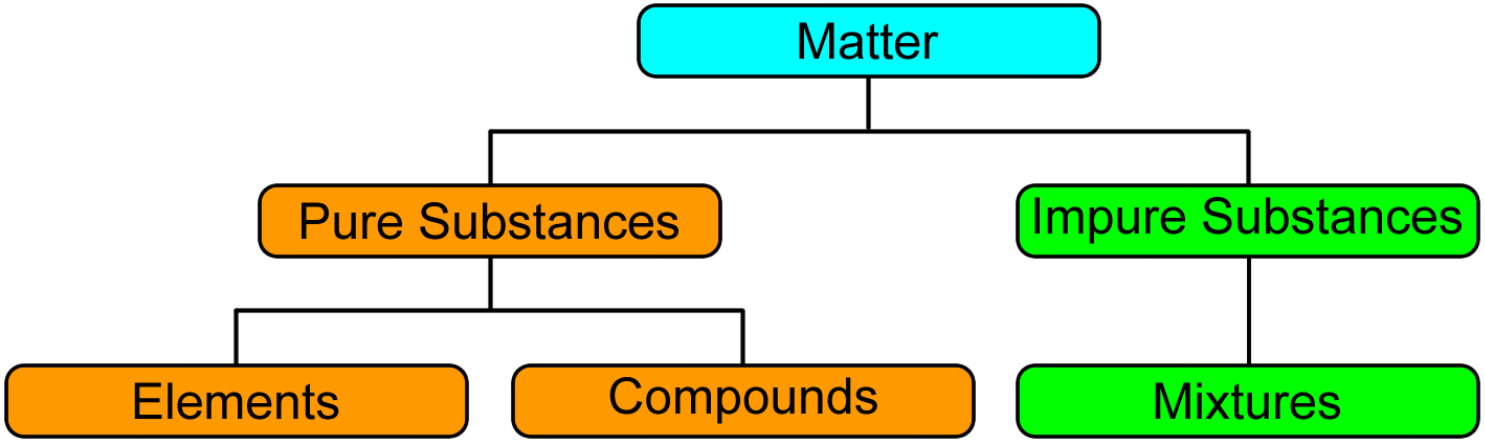
Elements, Compounds & Mixtures



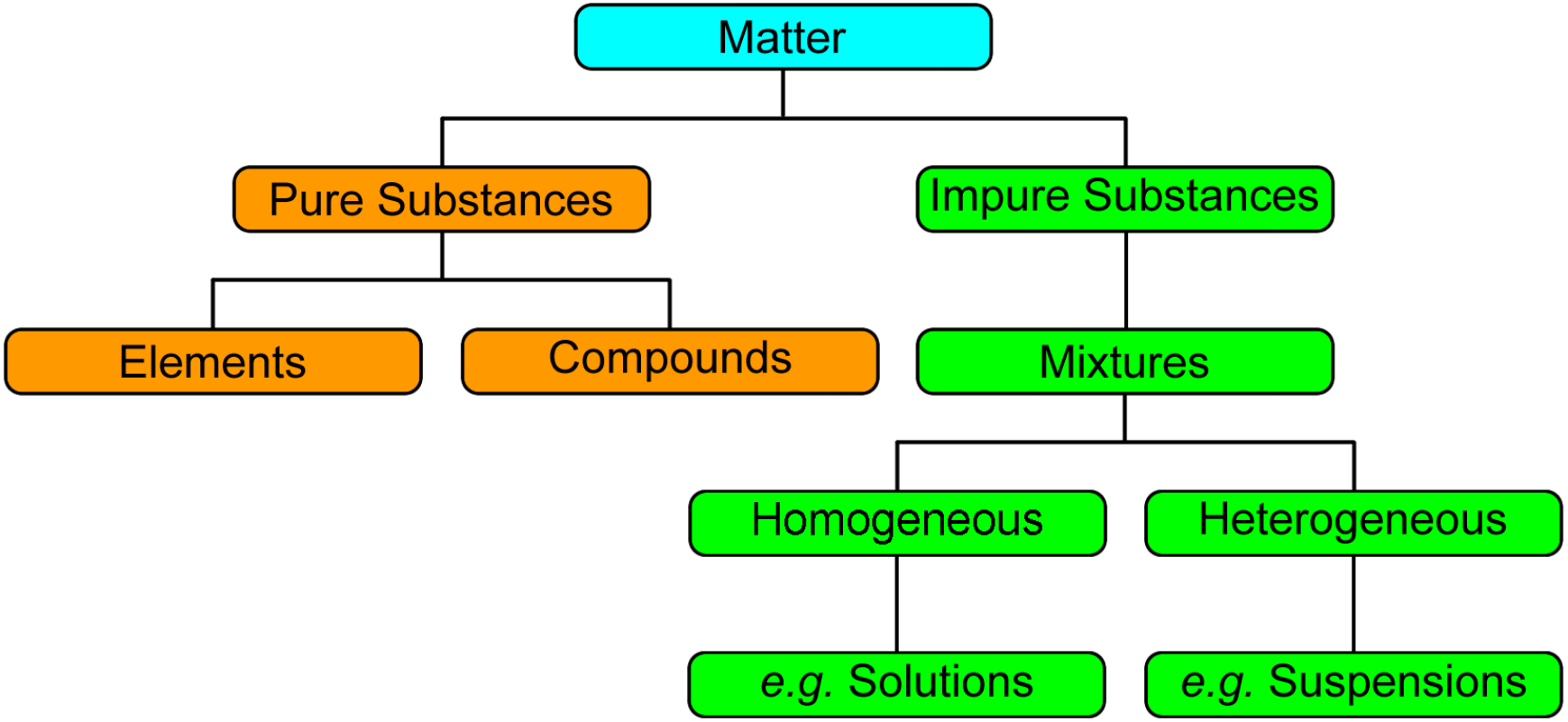
Elements, Compounds & Mixtures



Elements, Compounds & Mixtures



Elements, Compounds & Mixtures



- What other classification *systems* do scientists use?
  - One example is the classification of plants and animals in biology.

Elements, Compounds & Mixtures

Could I have a brief introduction to elements, compounds and mixtures?

Elements, Compounds & Mixtures

- Iron and sulfur are both chemical *elements*.
- A *mixture* of iron and sulfur can be separated by a magnet because iron can be magnetised but sulfur cannot.

Elements, Compounds & Mixtures

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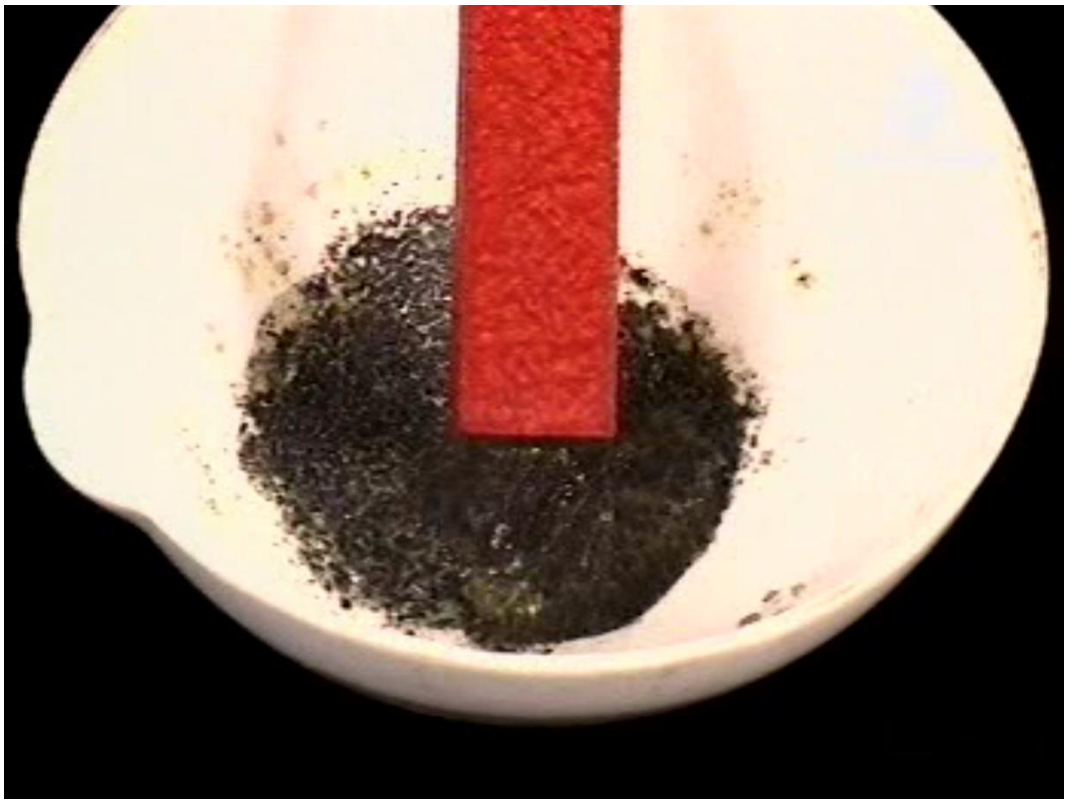
- A *mixture* of iron and sulfur can be separated by a magnet because iron can be magnetised but sulfur cannot.

Elements, Compounds & Mixtures

- Iron and sulfur react to form the *compound* iron(II) sulfide.
- The compound iron(II) sulfide has new properties that are different to those of iron and sulfur, *e.g.* iron(II) sulfide is not attracted towards a magnet.

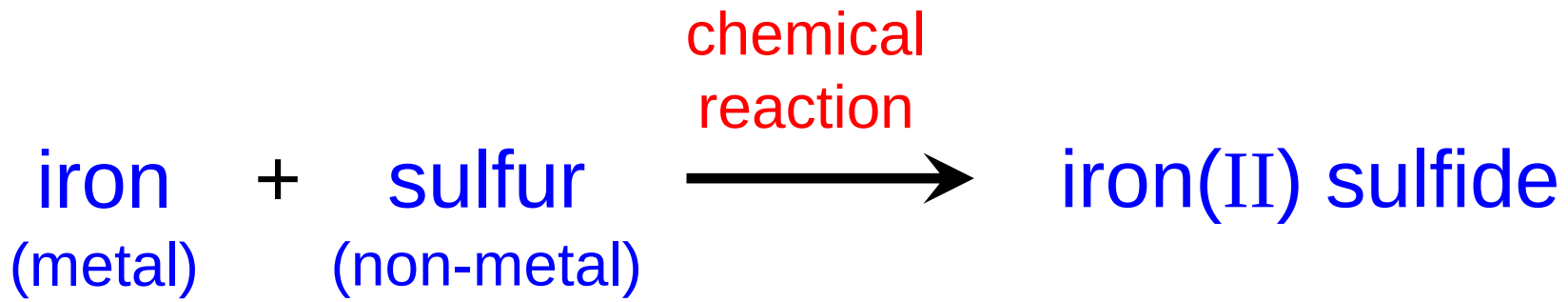
Elements, Compounds & Mixtures



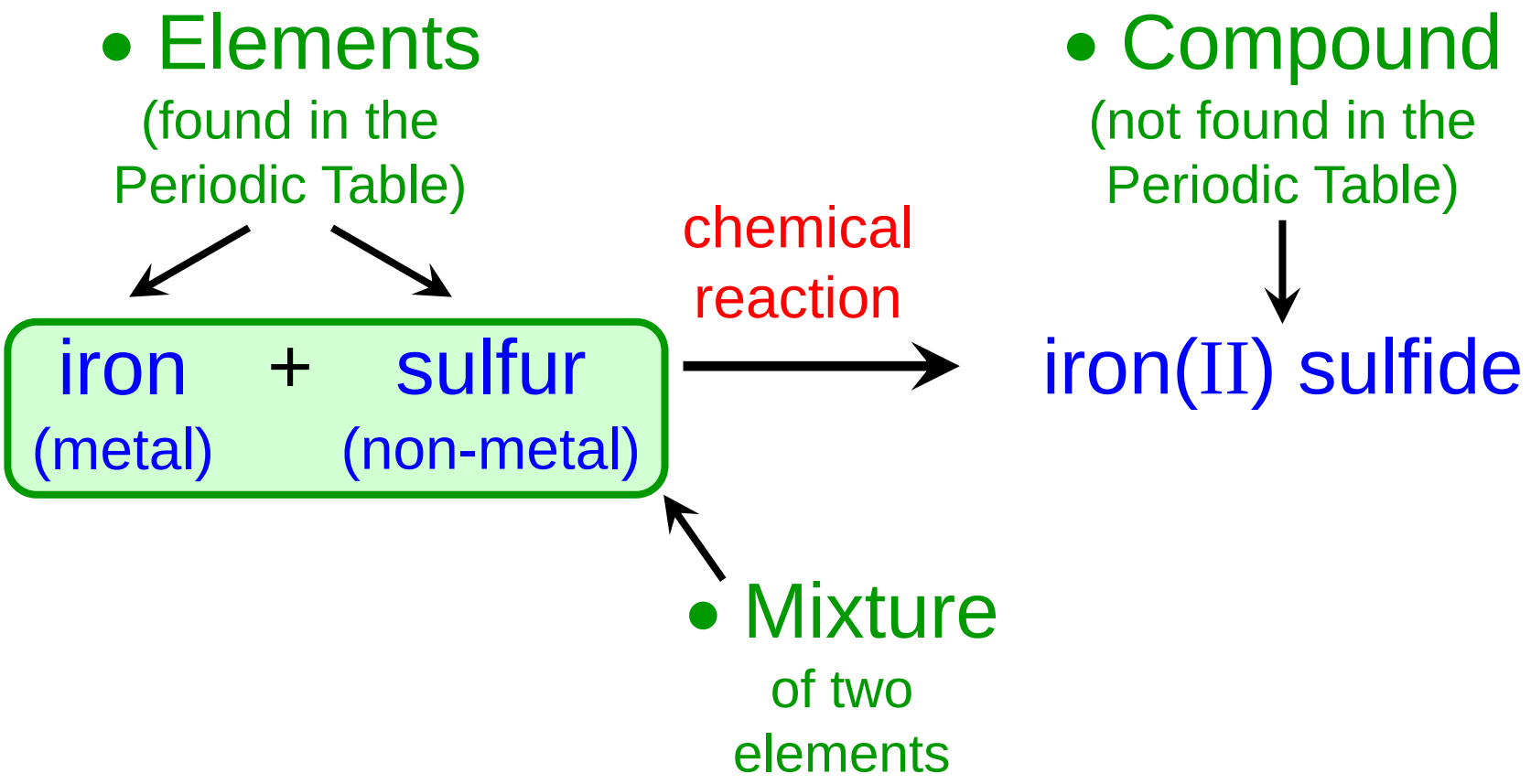
Duration 25 seconds.

- Iron and sulfur react to form the *compound* iron(II) sulfide.
- The compound iron(II) sulfide has new properties that are different to those of iron and sulfur, *e.g.* iron(II) sulfide is not attracted towards a magnet.

Elements, Compounds & Mixtures



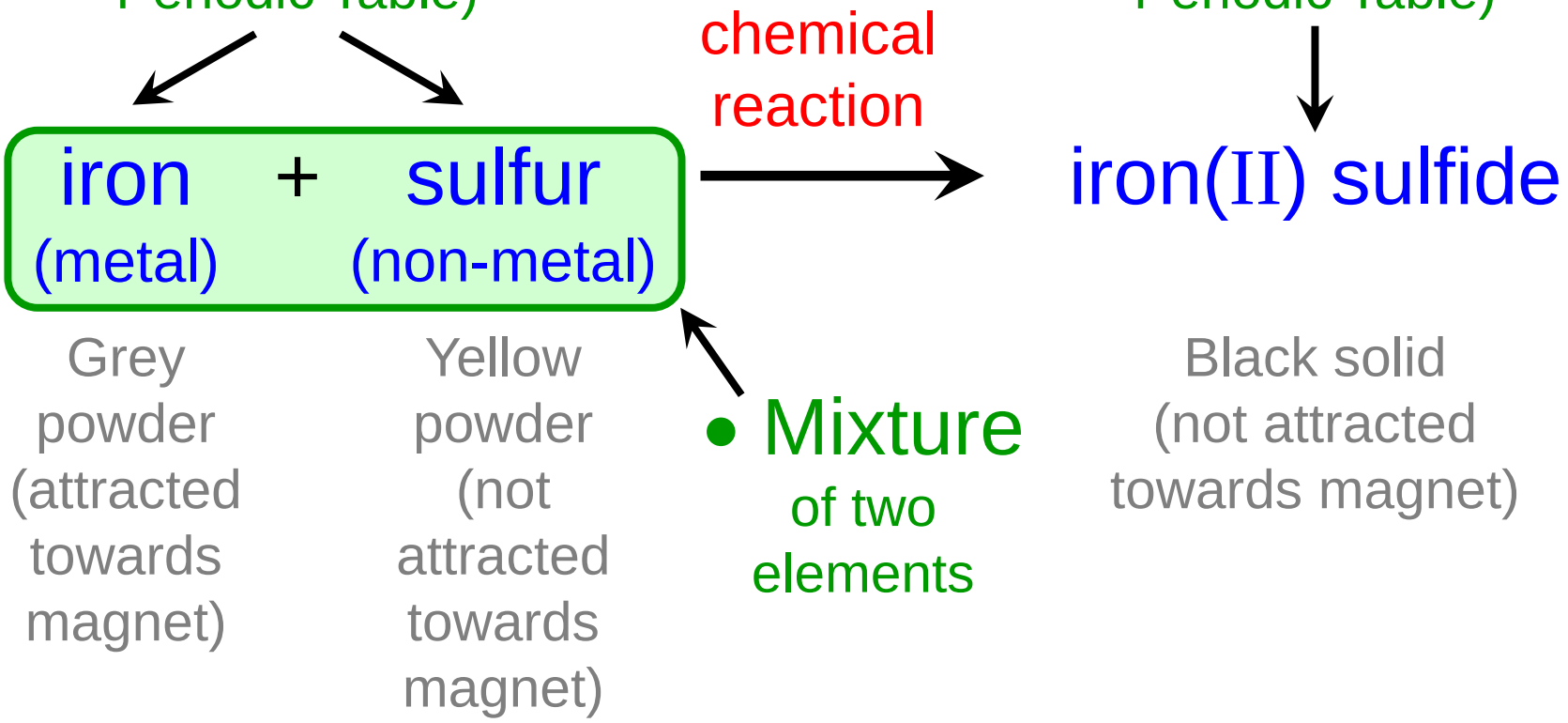
Elements, Compounds & Mixtures



Elements, Compounds & Mixtures

- **Elements**
  (found in the Periodic Table)

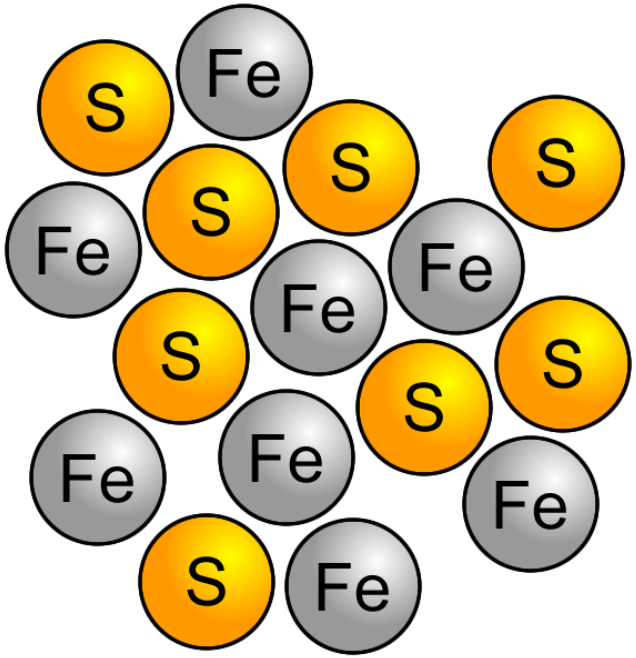
- **Compound**
  (not found in the Periodic Table)



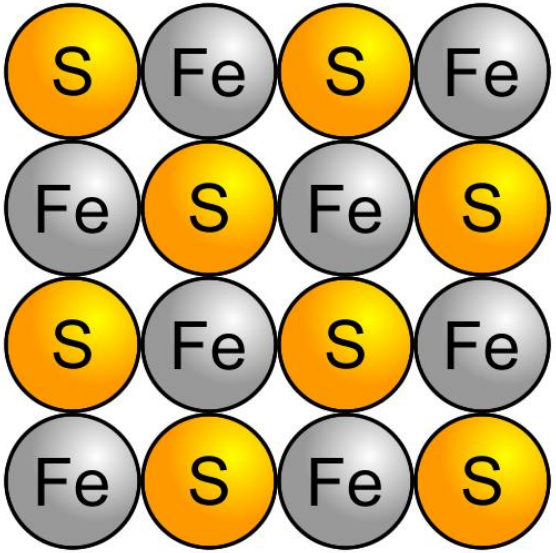
- **Mixture**
  of two elements

- A reaction causes a *change* in the properties of the chemicals.

Elements, Compounds & Mixtures



- A *mixture* of the two *elements*, iron and sulfur. The atoms of iron and sulfur are not bonded together. The mixture can be easily separated by a physical process. The ratio between iron and sulfur can vary, *i.e.* it is not fixed.



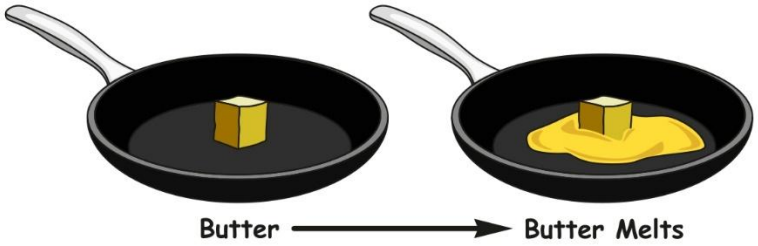
- The *compound* iron(II) sulfide. The atoms of iron and sulfur are bonded together and cannot be easily separated by a physical process. Properties of the compound are different to those of the mixture. The ratio between iron and sulfur is fixed.

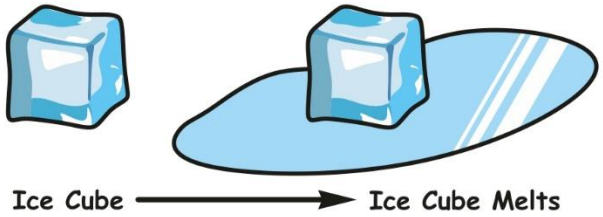
Note: Iron(II) sulfide is actually composed of Fe^{2+} ions and S^{2-} ions, covered at Upper Secondary.

Elements, Compounds & Mixtures

Physical and Chemical Changes of Matter

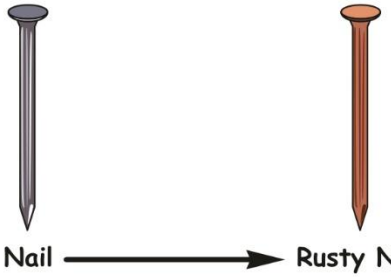
Physical Changes of Matter

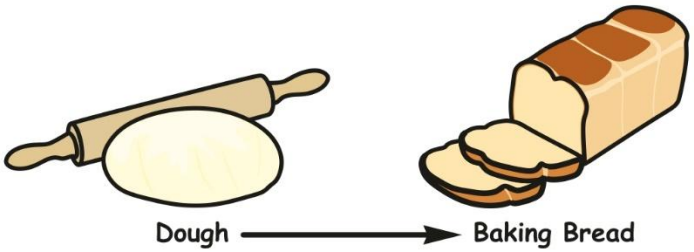




* Gives a substance different state of matter.
* No change in its chemical composition.
* Does not destroy substance or produce new one.
* Reversible.

Chemical Changes of Matter





* Turns one substance into another substance.
* Changing its chemical composition.
* New substance has different properties from original substance.
* Irreversible.

Elements, Compounds & Mixtures

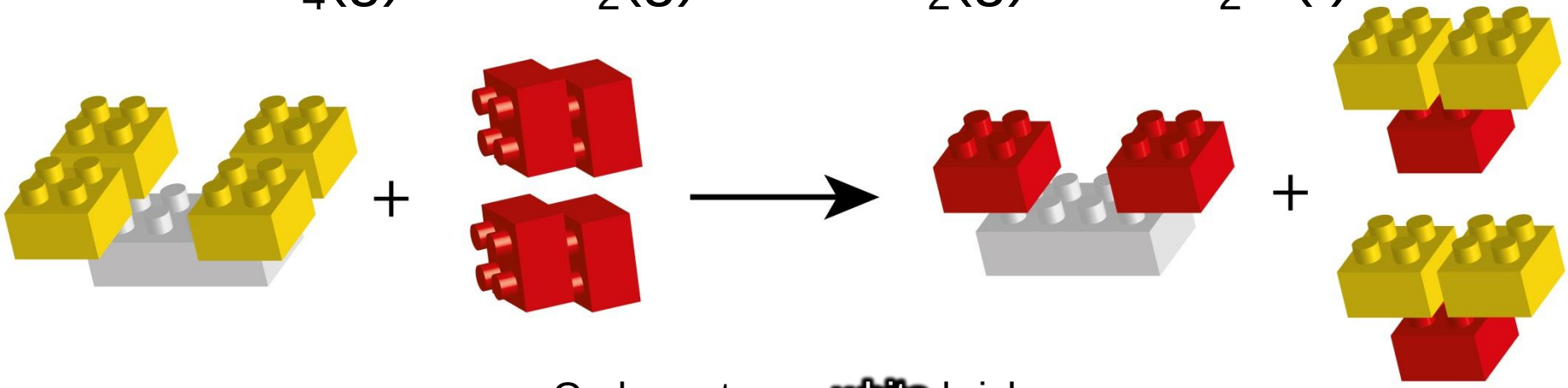
How can models help me to understand elements, compounds and mixtures?

Elements, Compounds & Mixtures

- *Models* are often used in Chemistry to represent, explain and understand things that cannot be observed directly.

methane + oxygen → carbon dioxide + water

$$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$$



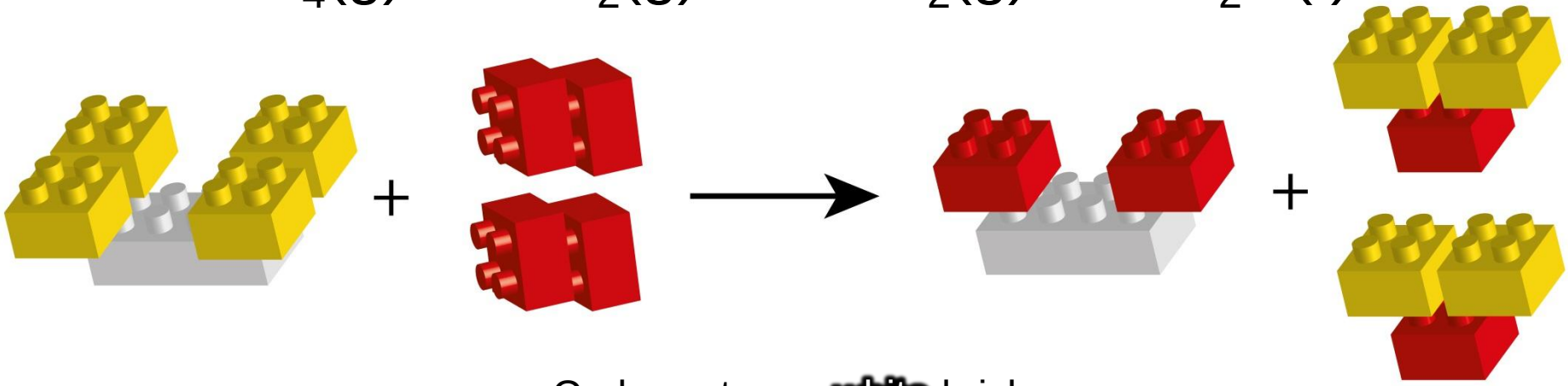
- Carbon atom = white brick.
- Hydrogen atom = yellow brick.
- Oxygen atom = red brick.

Elements, Compounds & Mixtures

- In the diagram shown below, Lego® bricks are used to represent atoms to illustrate the reaction between methane and oxygen.

methane + oxygen → carbon dioxide + water

$$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$$



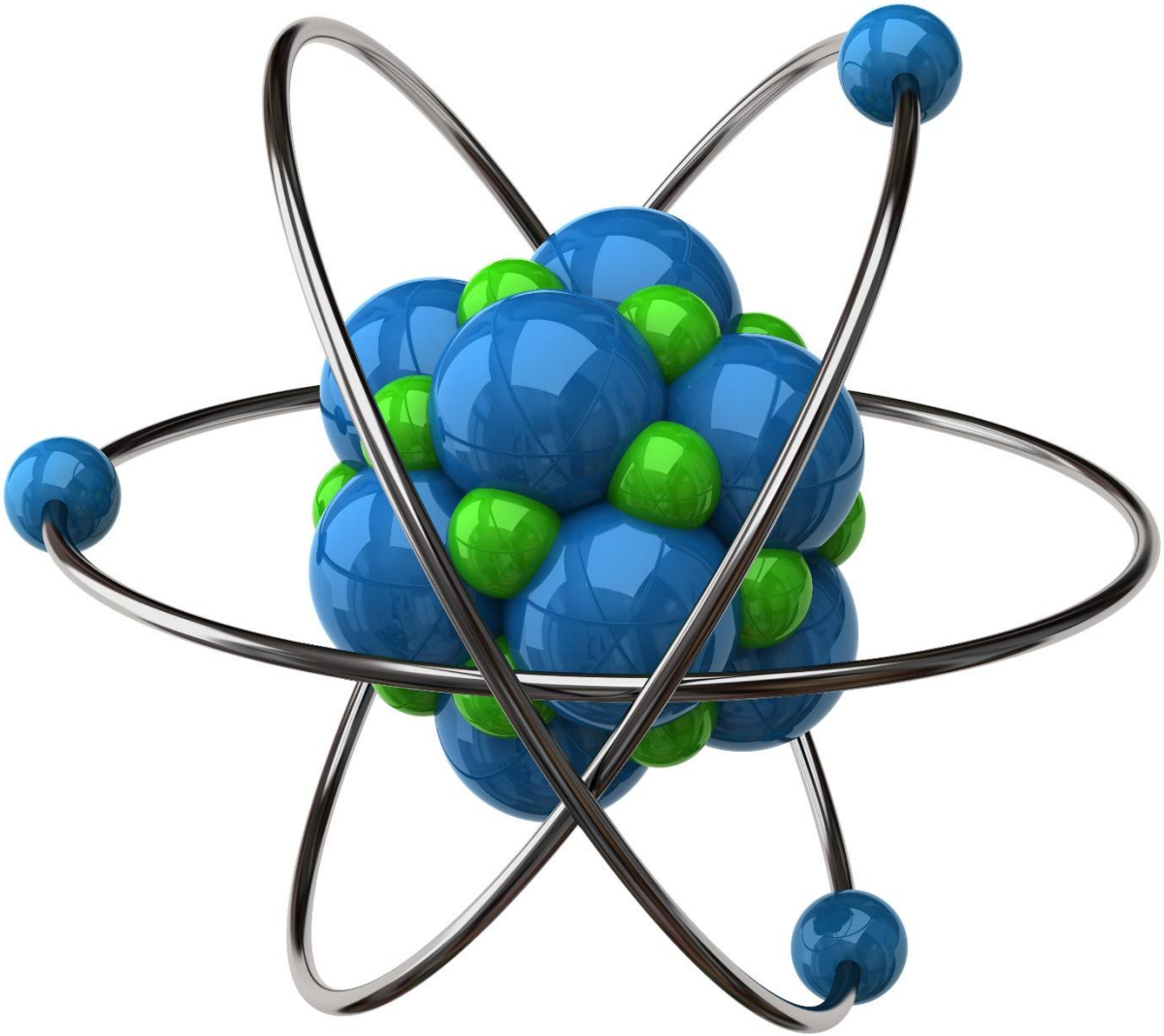
- Carbon atom = white brick.
- Hydrogen atom = yellow brick.
- Oxygen atom = red brick.

Elements, Compounds & Mixtures

What are elements, compounds and mixtures?

To develop the ideas of elements, compounds and mixtures into *concepts*, we need to consider examples of each one and then identify the ways in which they are similar to each other.

Elements, Compounds & Mixtures



Elements, Compounds & Mixtures

- All matter is composed of *tiny particles* that are in a *constant state of motion*.

- The smallest particles are given names such as *proton*, *neutron* and *electron*.

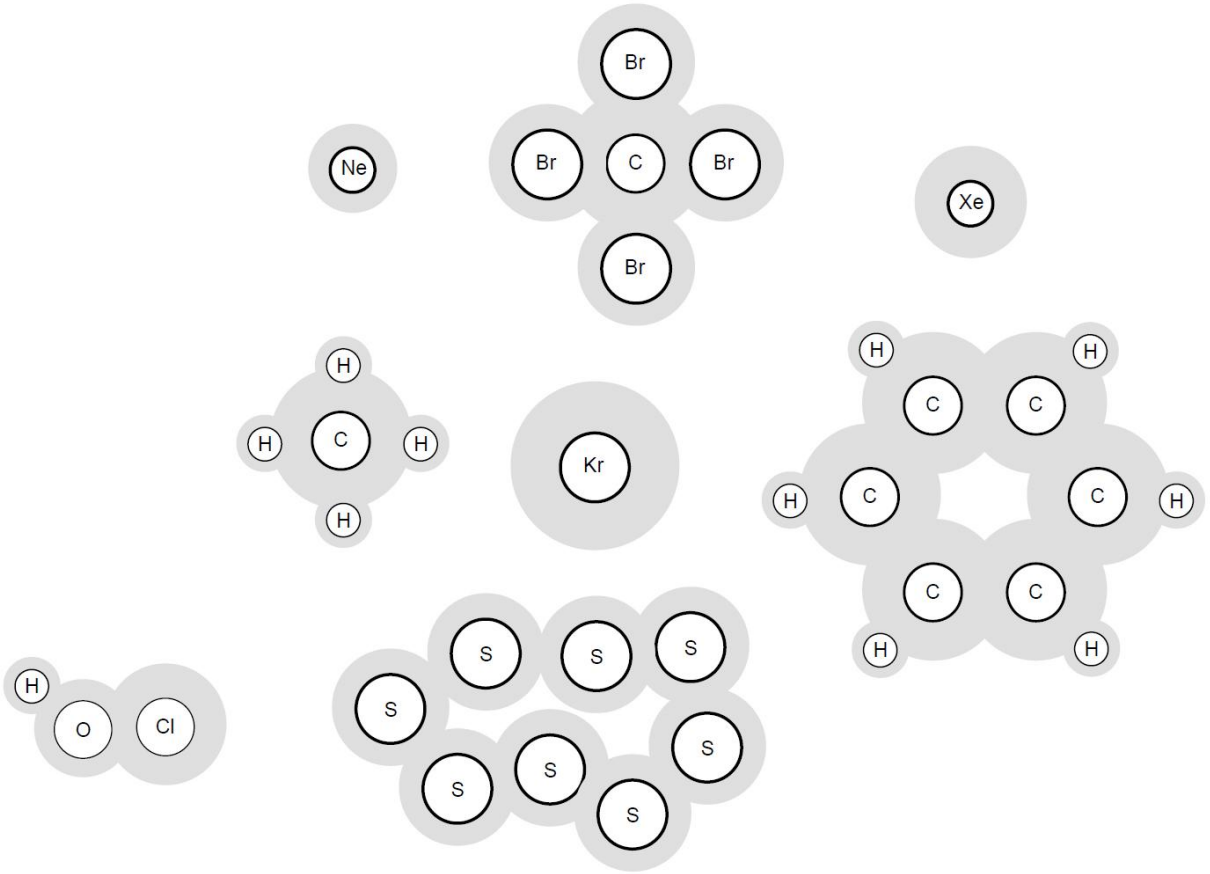
These are arranged into slightly larger (but still very small) particles called *atoms*, *ions* and *molecules*.

Elements, Compounds & Mixtures

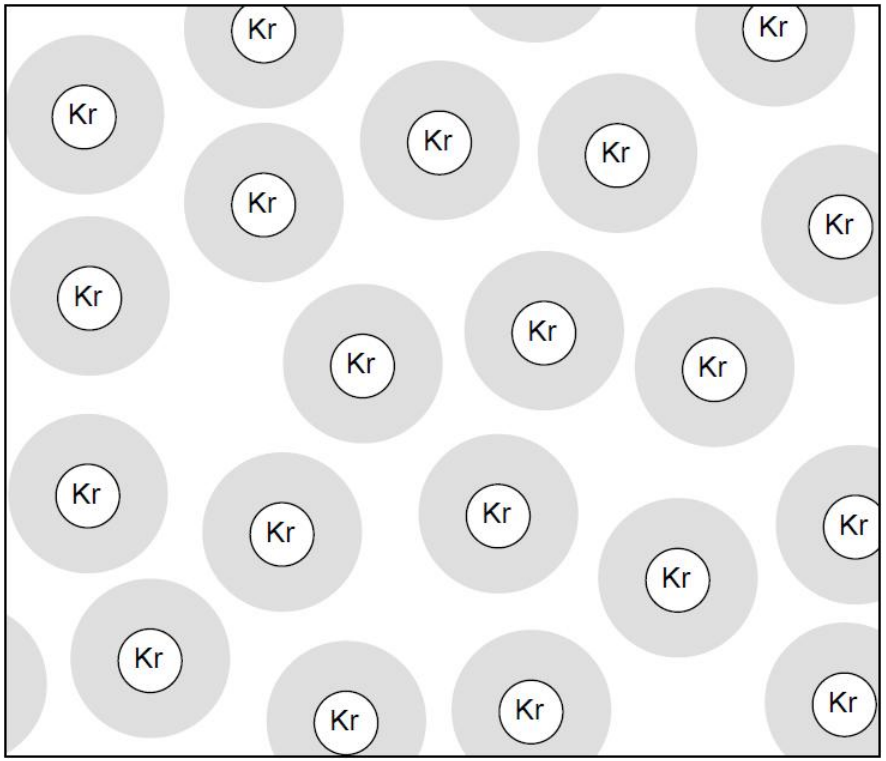
- Here are some diagrams that Chemists might use to represent atoms and molecules.

- The letters are *symbols* that are used by Chemists to identify different atoms.

- There are many different types of atoms and molecules, and these diagrams show just a few examples.



Elements, Compounds & Mixtures

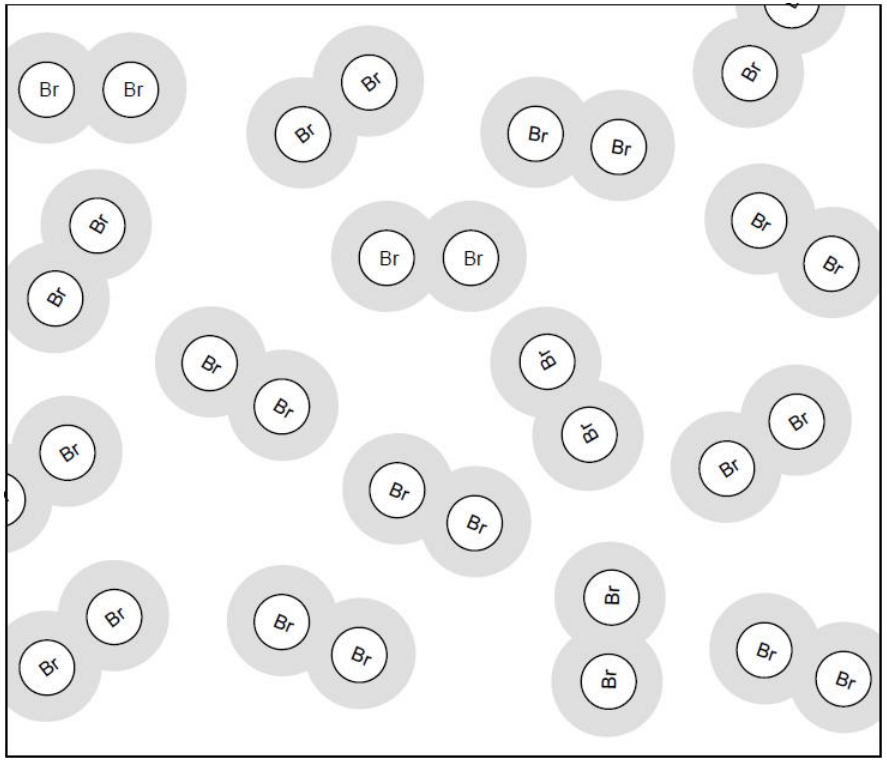


Kr = Krypton (Group 18)

- This is an example of…

A pure chemical element.

Elements, Compounds & Mixtures

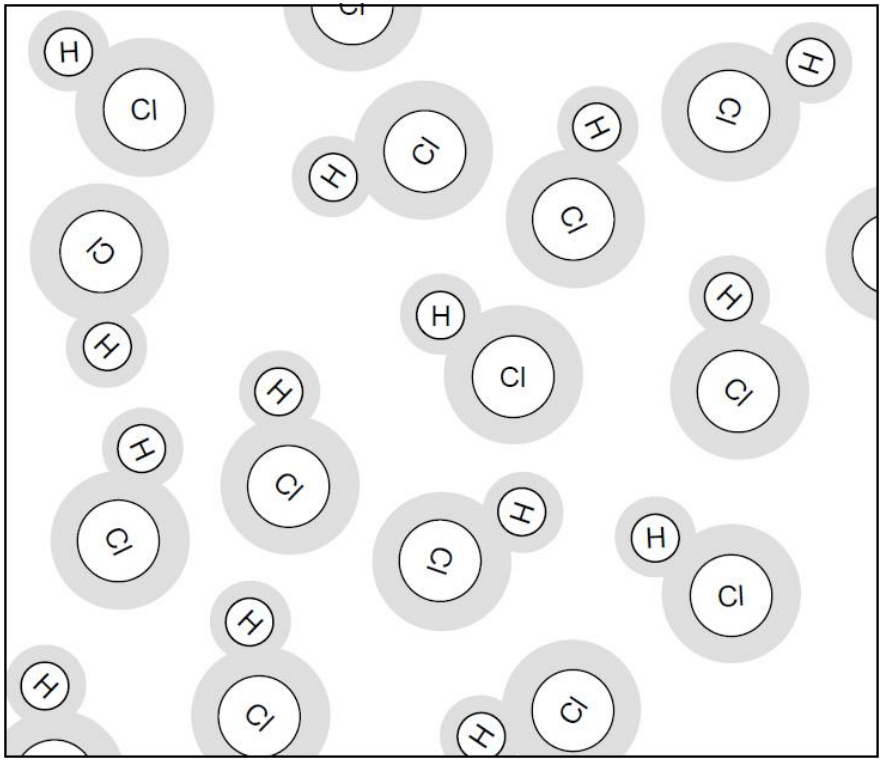


Br_2 = Bromine (Group 17)

- This is an example of…

A pure chemical element.

Elements, Compounds & Mixtures

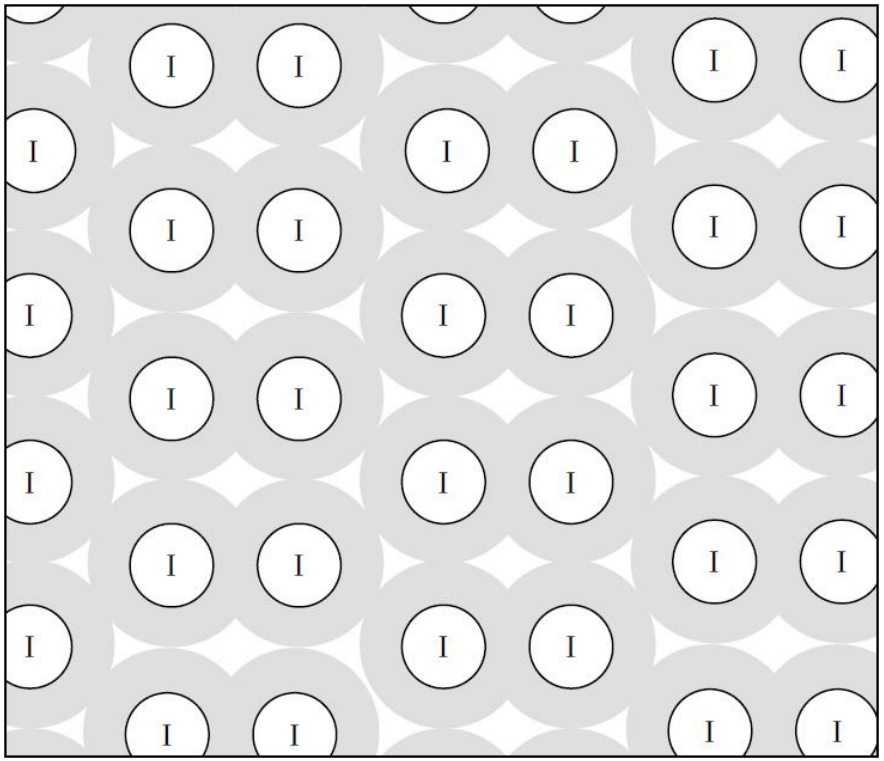


HC*l* = Hydrogen Chloride

- This is an example of…

A pure compound.

Elements, Compounds & Mixtures

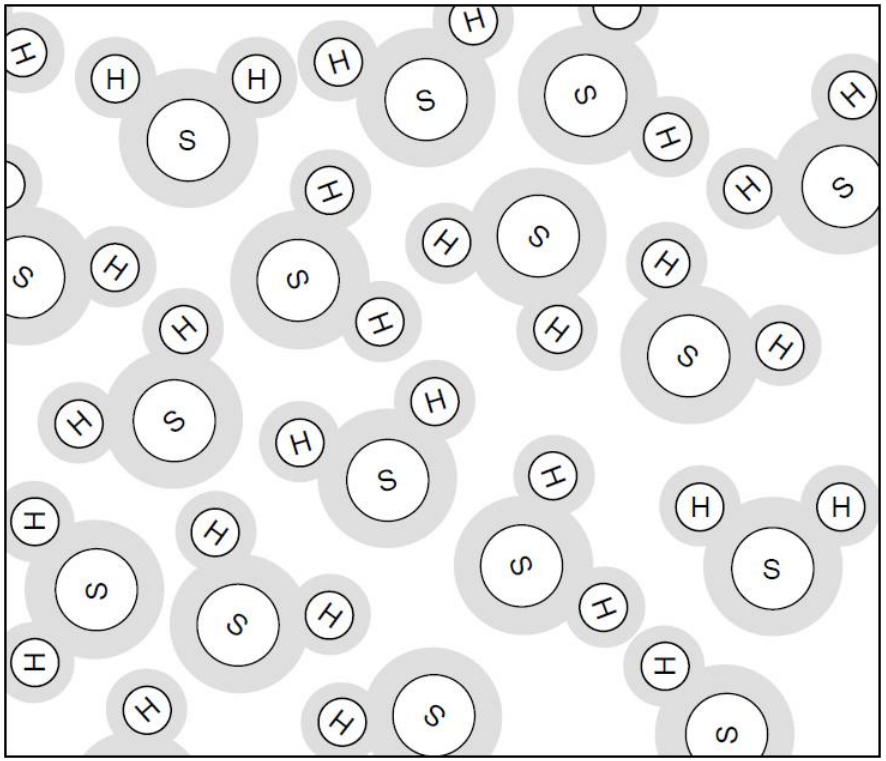


I_2 = Iodine (Group 17)

- This is an example of…

A pure chemical element.

Elements, Compounds & Mixtures

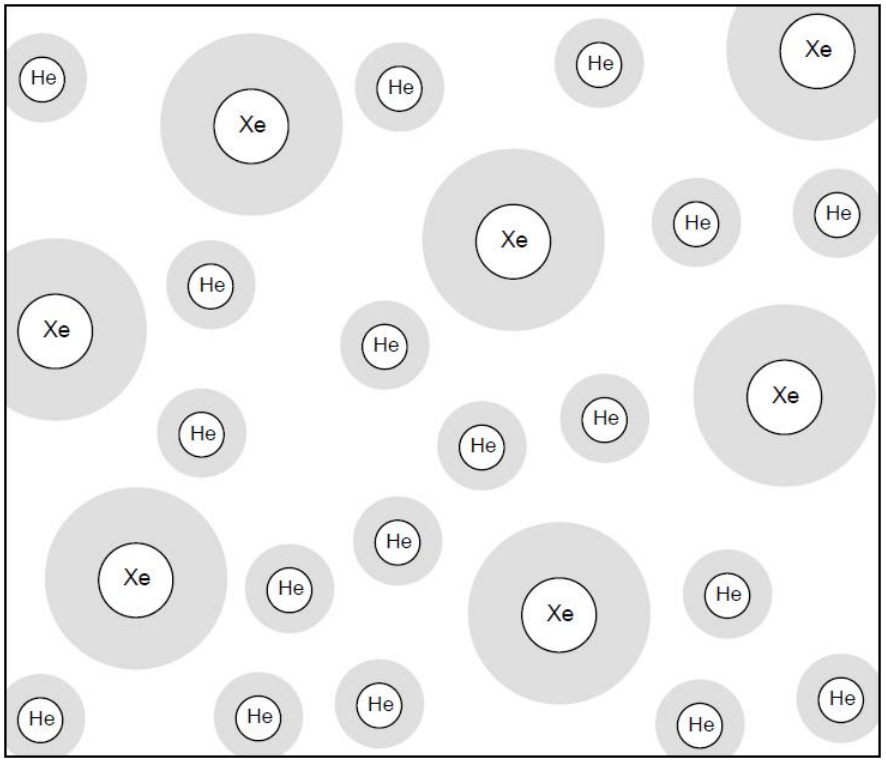


H_2S = Hydrogen Sulfide

- This is an example of…

  A pure compound.

Elements, Compounds & Mixtures

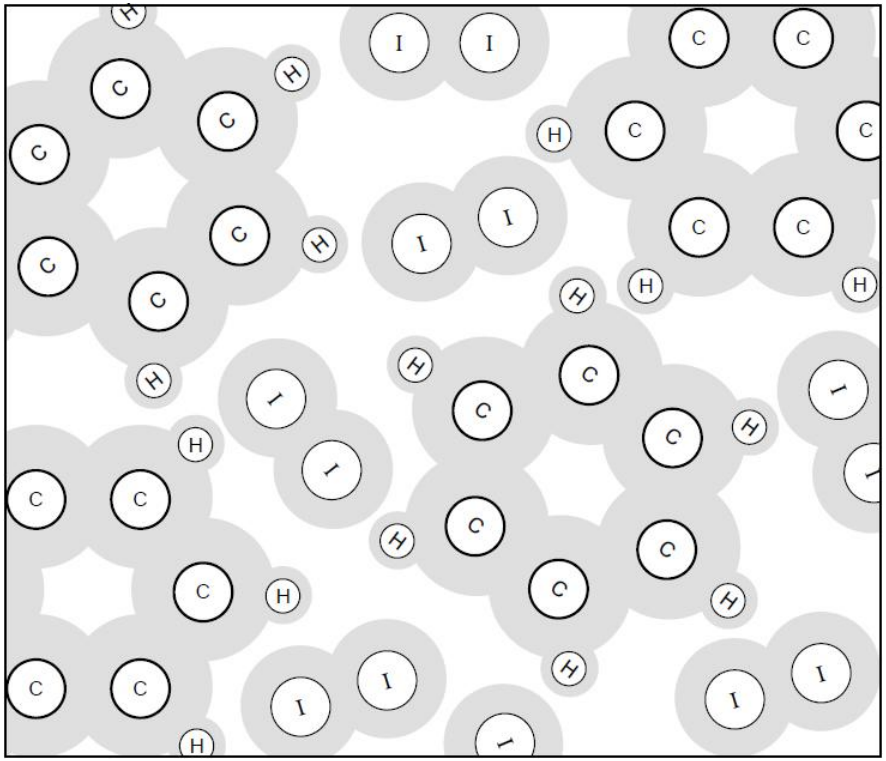


He = Helium (Group 18)
Xe = Xenon (Group 18)

- This is an example of…

A mixture of two chemical elements.

Elements, Compounds & Mixtures



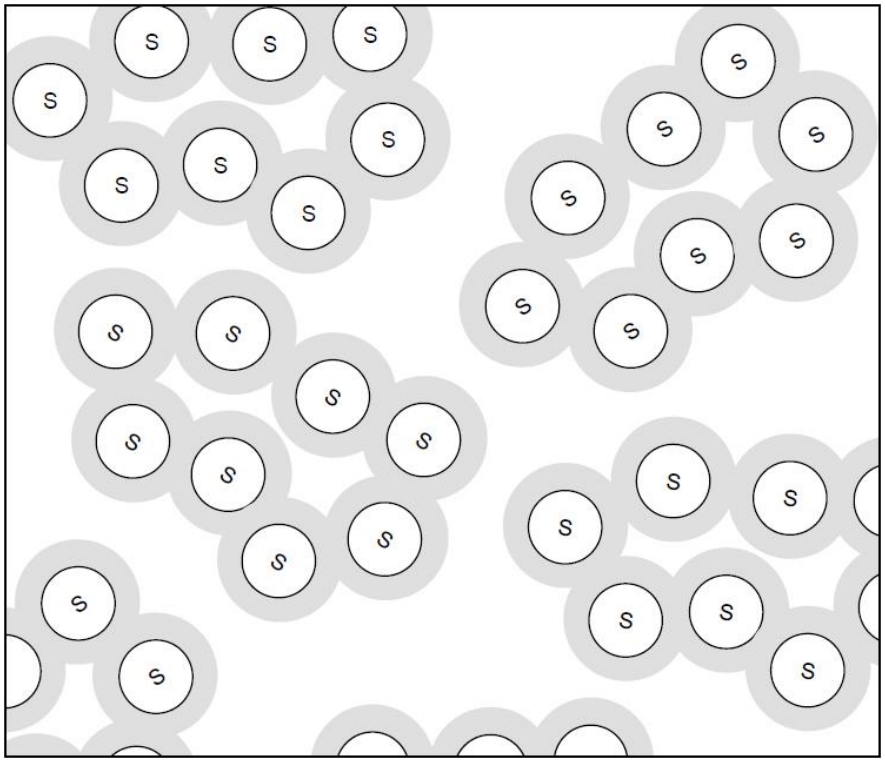
I_2 = Iodine (Group 17)

C_6H_6 = Benzene

- This is an example of…

A mixture of a chemical element and a compound.

Elements, Compounds & Mixtures

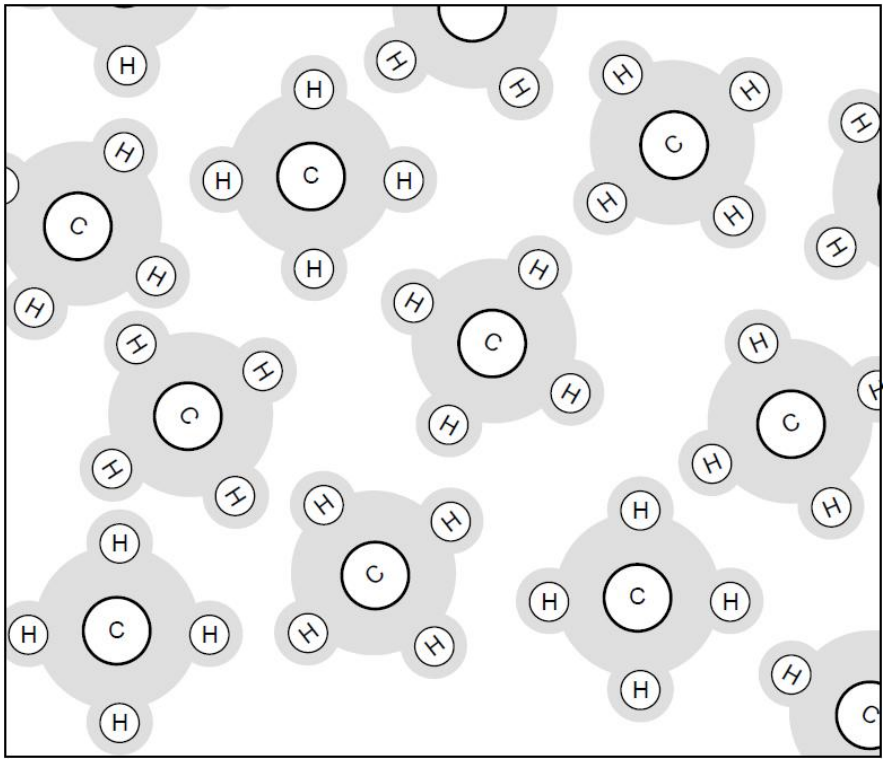


S (or S_8) = Sulfur (Group 16)

- This is an example of…

A pure chemical element.

Elements, Compounds & Mixtures

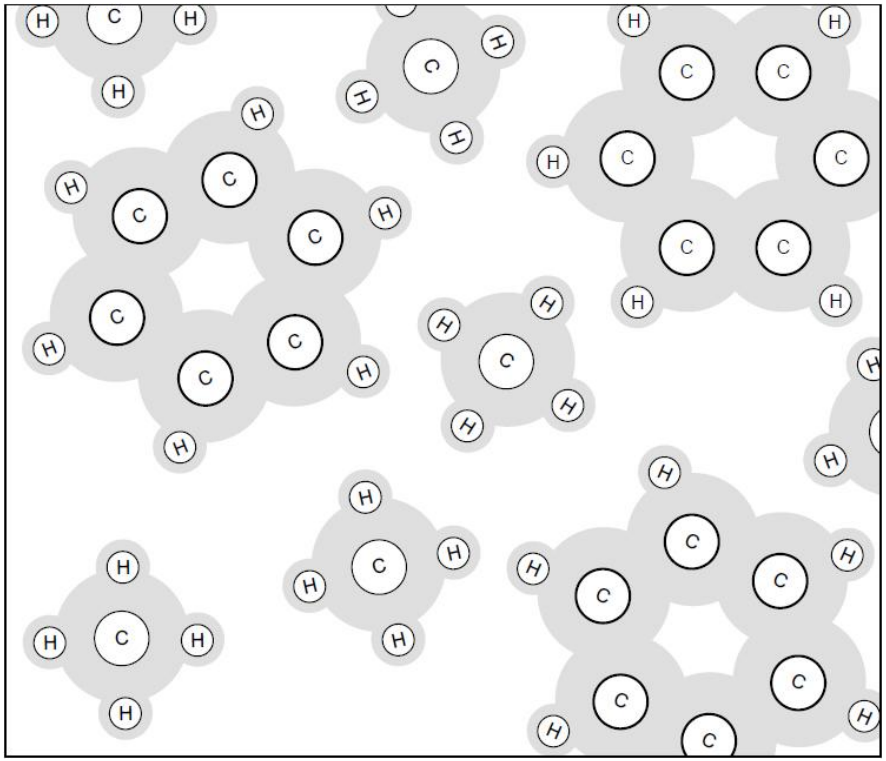


CH_4 = Methane

- This is an example of…

  A pure compound.

Elements, Compounds & Mixtures



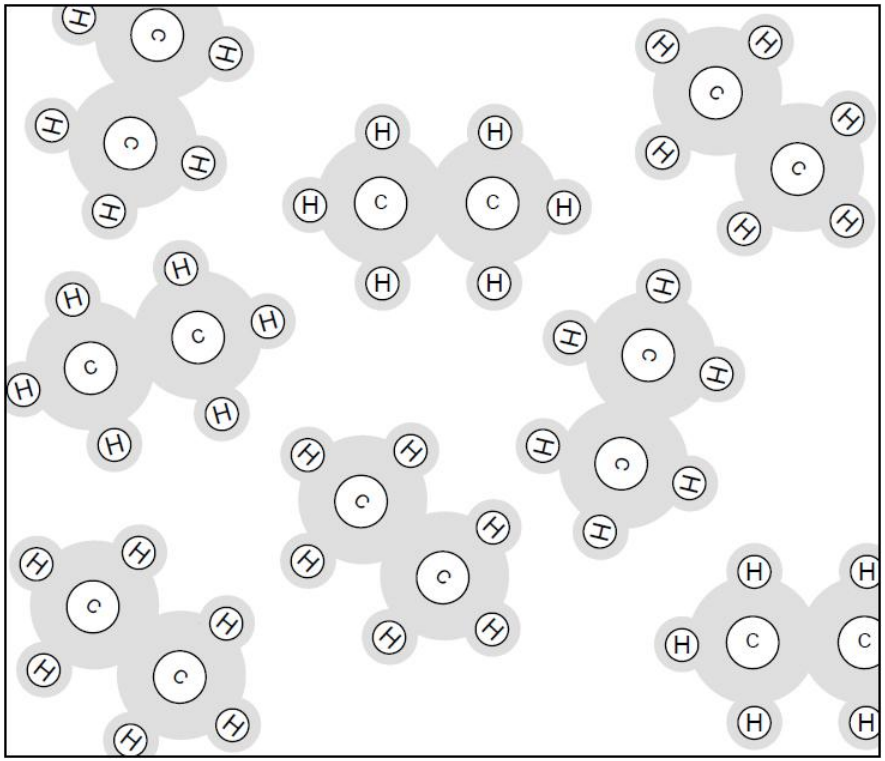
CH_4 = Methane

C_6H_6 = Benzene

- This is an example of…

A mixture of two compounds.

Elements, Compounds & Mixtures

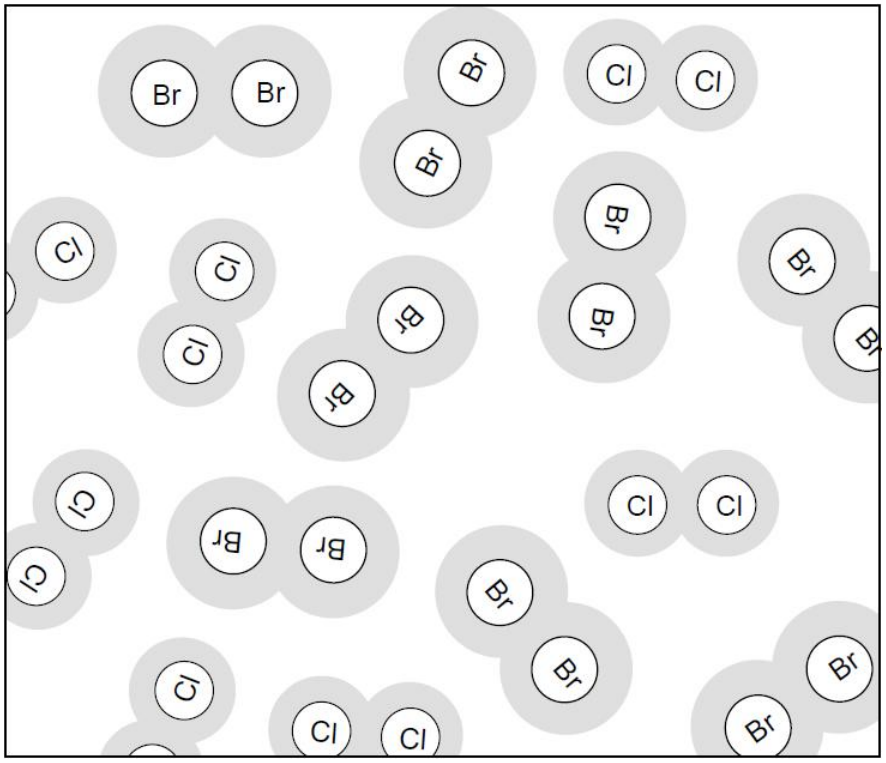


C_2H_6 = Ethane

- This is an example of…

A pure compound.

Elements, Compounds & Mixtures



Br_2 = Bromine (Group 17)

Cl_2 = Chlorine (Group 17)

- This is an example of…

A mixture of two chemical elements.

Elements, Compounds & Mixtures

What are molecules? Are they elements, compounds or can they be both?

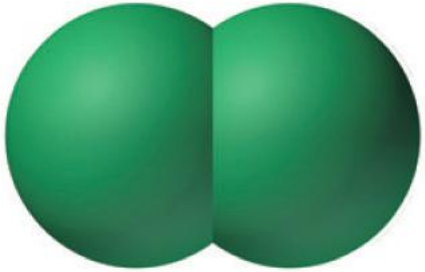
Elements, Compounds & Mixtures

- A molecule is group of two or more atoms that are chemically bonded together.

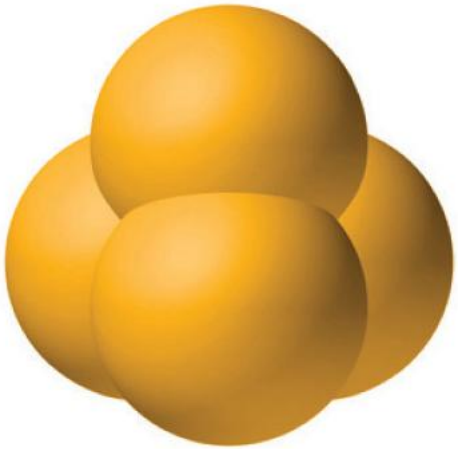
- The atoms that are bonded together maybe the same (*i.e.* an element) or different (*i.e.* a compound).

- A molecule makes-up the smallest identifiable unit of an element or a compound that retains the typical composition and chemical properties of that element or compound.

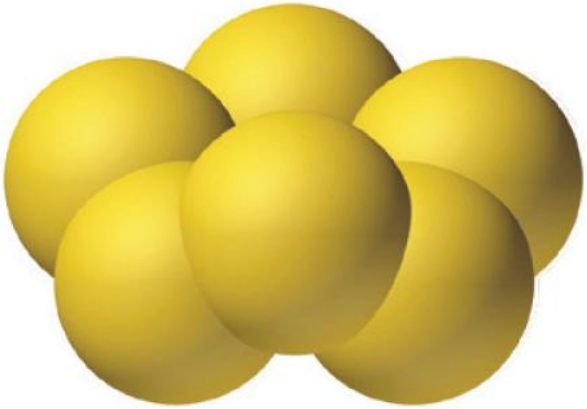
Elements, Compounds & Mixtures



- Example:
A *molecule* of the chemical *element* chlorine, Cl_2, composed of two chlorine atoms only.

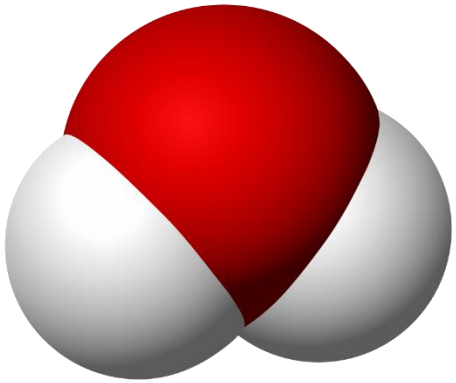


- Example:
A *molecule* of the chemical *element* phosphorus, P_4, composed of four phosphorus atoms only.

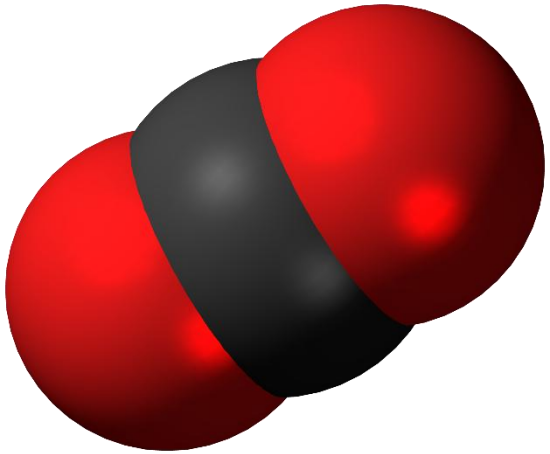


- Example:
A *molecule* of the chemical *element* sulphur, S_8, composed of eight sulfur atoms only.

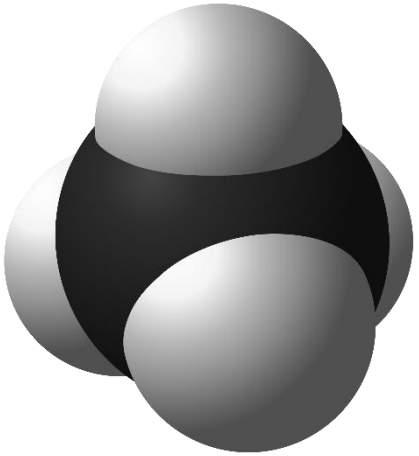
Elements, Compounds & Mixtures



- Example:
A *molecule* of the *compound* water, H_2O, composed of two atoms of hydrogen and one atom of oxygen.



- Example:
A *molecule* of the *compound* carbon dioxide, CO_2, composed of one atom of carbon and two atoms of oxygen.



- Example:
A *molecule* of the *compound* methane, CH_4, composed of one atom of carbon and four atoms of hydrogen.

Elements, Compounds & Mixtures

Now describe the properties of elements, compounds and mixtures using clear and concise scientific language.

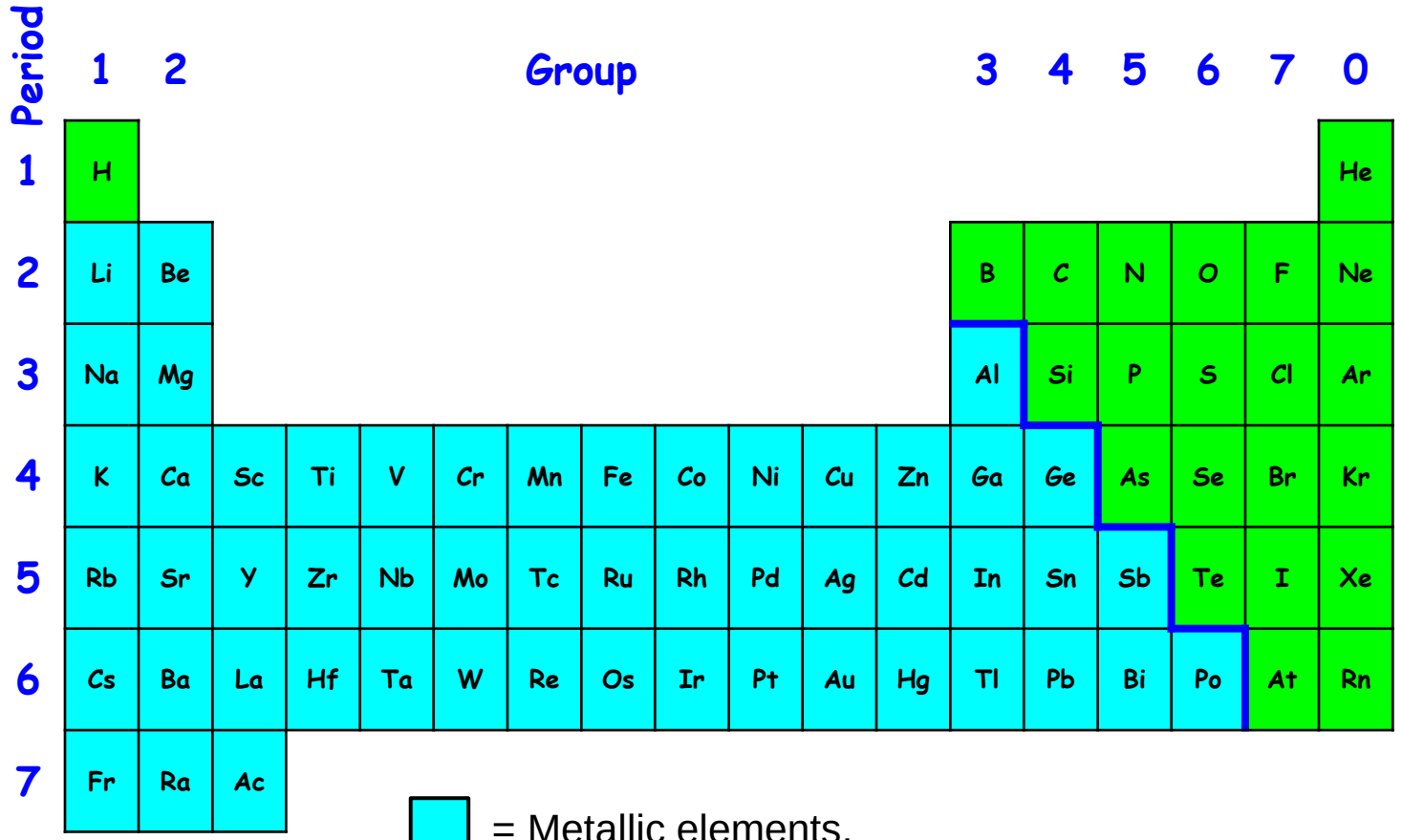
Elements, Compounds & Mixtures

Summary of the properties of *elements*:

- A chemical element is a *pure* substance.
- A chemical element is composed of only *one* type of atom.
- A chemical element cannot be converted into anything more simple by a chemical reaction or *electrolysis* (can not be broken down by electricity).
- All known chemical elements are listed in the *Periodic Table*.

Elements, Compounds & Mixtures

The Periodic Table of Chemical Elements



= Metallic elements.

= Non-metallic elements.

• Element Song

Elements, Compounds & Mixtures

- The General Properties of *Metals*

→ Good conductors of electricity, in both the solid and molten states.

→ Good conductors of heat.

→ Shiny in appearance (metallic lustre).

→ Sonorous (ring when struck).

→ Malleable (can be bent without breaking).

→ Ductile (can be drawn-out to form wires).

→ High melting and boiling points (except Group I metals).

→ Hard and strong (except Group I metals).

→ High density (except Group I metals).

→ Metal oxides tend to be basic in nature.

✶ Note: Not all metals are magnetic.

Elements, Compounds & Mixtures

- The General Properties of *Non-metals*

→ Do not conduct electricity in either the solid or molten states (except graphite).

→ Usually poor conductors of heat.

→ Usually dull in appearance (except crystals).

→ Not sonorous (do not ring when struck).

→ Not malleable or ductile. Non-metals are usually brittle and break easily when bent or stretched.

→ Usually have low melting and boiling points (compared to metals).

→ Usually weak and soft (compared to metals).

→ Usually have low densities (compared to metals).

→ Non-metal oxides tend to be acidic in nature.

Elements, Compounds & Mixtures

Summary of the properties of *compounds*:

- A compound is a *pure* substance.

- A compound is composed of *two or more* different chemical elements that react and *bond* together in a *fixed ratio*. The ratio is given by the compound's *formula*, *e.g.* the formula of ammonia is NH_3 which means that one atom of nitrogen (N) is bonded to three atoms of hydrogen (H).

- A compound can only be converted into more simple substances by a *chemical reaction*.

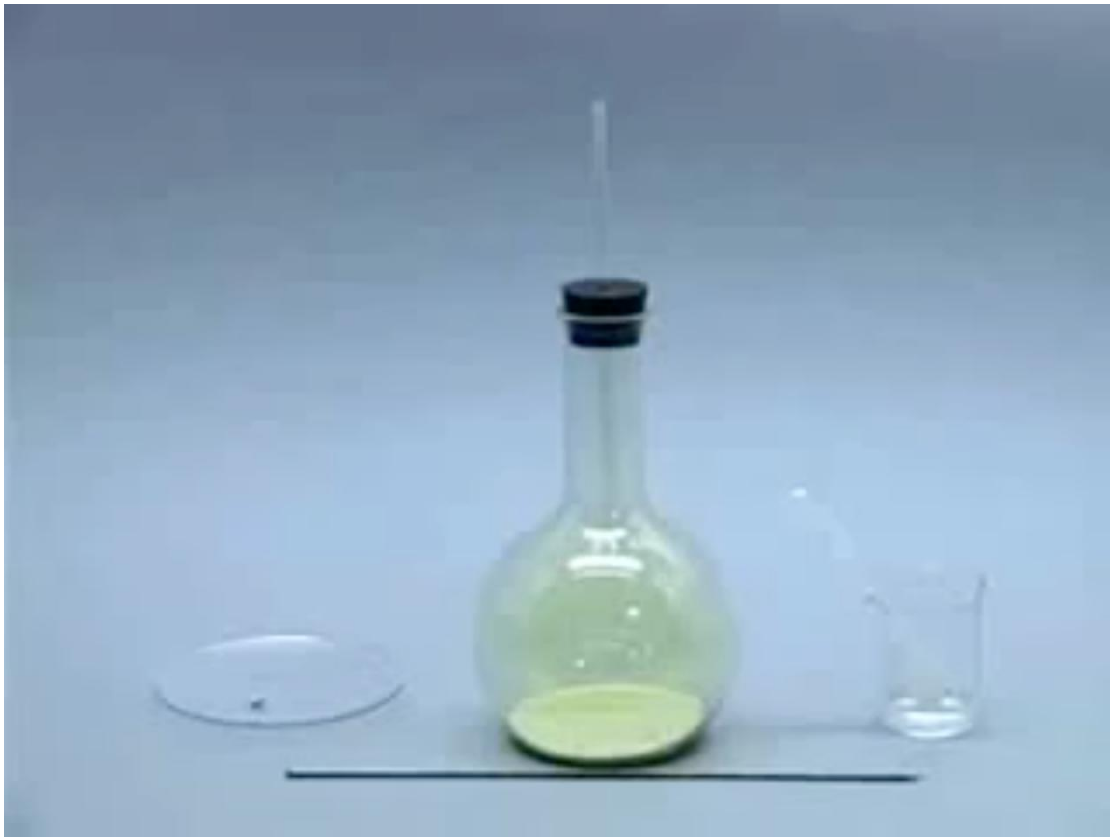
Elements, Compounds & Mixtures

Summary of the properties of *compounds*:

- A compound has unique chemical and physical properties that are *different* from those of the chemical elements that it is composed of.

- For example, *sodium* is a highly reactive metal that would burn your skin on contact and *chlorine* is a highly reactive non-metal that would also burn your skin on contact. When sodium and chlorine react, they form the *compound sodium chloride* (common table salt) which is safe enough to eat!

Elements, Compounds & Mixtures



Duration = 51 seconds.

- The extremely reactive and harmful *elements sodium* and *chlorine* react to form the *compound sodium chloride* (common table salt) which is safe enough to eat!

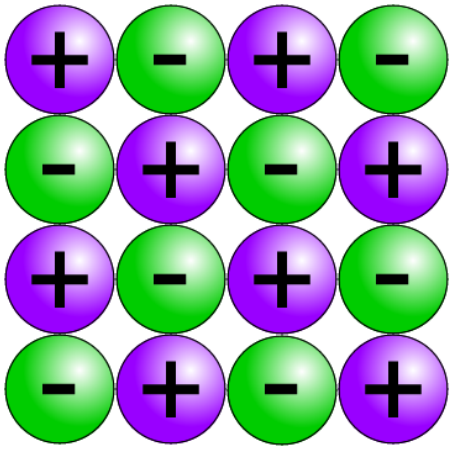
Elements, Compounds & Mixtures

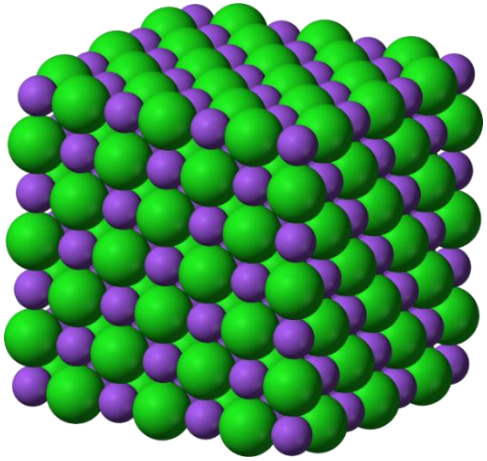
Duration = 51 seconds.

- The extremely reactive and harmful *elements sodium* and *chlorine* react to form the *compound sodium chloride* (common table salt) which is safe enough to eat!

Elements, Compounds & Mixtures

Summary of the properties of *compounds*:

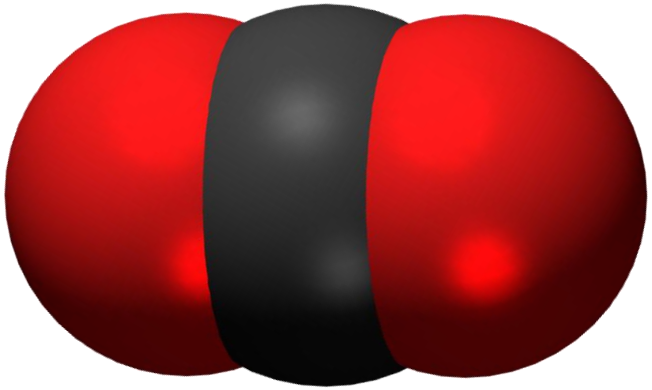




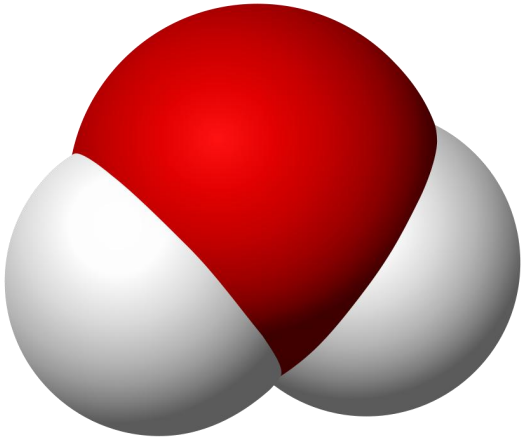
- A crystal of sodium chloride (common table salt, NaC*l*) is composed of positive sodium ions (Na^+) and negative chloride ions (Cl^-).
- Compounds that contain a *metallic element* bonded to a *non-metallic element* are described as *ionic*. They contain positive metal ions (*cations*) and negative non-metal ions (*anions*) arranged in a *crystal lattice*.

Elements, Compounds & Mixtures

Summary of the properties of *compounds*:



- A molecule of carbon dioxide – CO_2



- A molecule of water – H_2O

- Compounds that contain a *non-metallic element* bonded to another *non-metallic element* are described as *covalent molecules*. They are composed of neutral atoms held together by shared pairs of electrons.

Elements, Compounds & Mixtures

Summary of the properties of *mixtures*:

- A mixture is *not* a pure substance.
- Two or more different chemicals (elements or compounds) are added together, but do *not* react and chemically bond together.
- The components of a mixture can be easily separated by a *physical process*, *e.g*. distillation or filtration.

Elements, Compounds & Mixtures

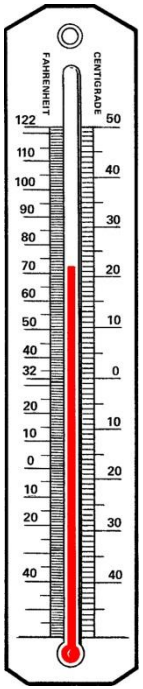
Summary of the properties of *mixtures*:

- The ratio of chemicals in a mixture can vary, *i.e*. it is not fixed.

- The mixture has the same chemical and physical properties as the individual chemicals that it is composed of.

Elements, Compounds & Mixtures

Did you know? ○ ○ ○

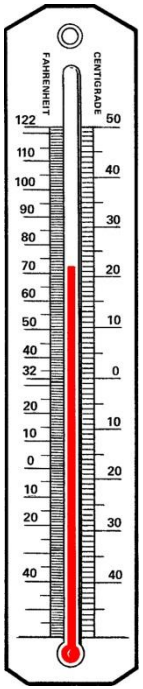


A pure chemical has a sharp melting point and a sharp boiling point.

NANYANG GIRLS' HIGH

Elements, Compounds & Mixtures

Did you know?

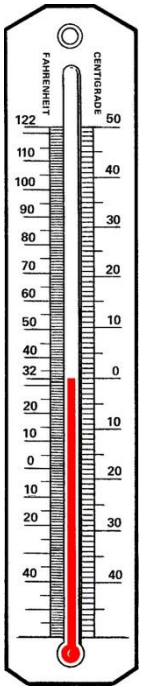


Adding an impurity to a pure chemical will *lower* the *melting point* of the chemical.

NANYANG GIRLS' HIGH
南洋女中
勤慎端禮

Elements, Compounds & Mixtures

Did you know? ○ ○ ○



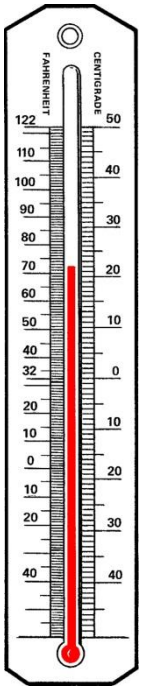
m.p.

Adding an impurity to a pure chemical will *lower* the *melting point* of the chemical.

NANYANG GIRLS' HIGH

Elements, Compounds & Mixtures

Did you know? ○ ○ ○

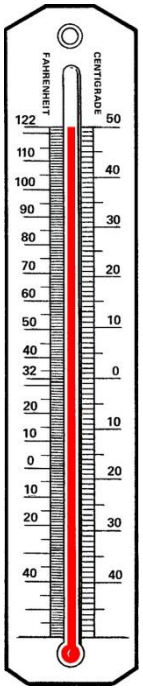


Adding an impurity to a pure chemical will *increase* the *boiling point* of the chemical.

NANYANG GIRLS' HIGH

Elements, Compounds & Mixtures

Did you know?



b.p.

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NANYANG GIRLS' HIGH

Elements, Compounds & Mixtures

Question: Why is table salt (sodium chloride) added to water that is used for cooking?

Question: Why is table salt (sodium chloride) added to snow and ice on frozen roads during winter time?

Elements, Compounds & Mixtures

Question: Why is table salt (sodium chloride) added to water that is used for cooking?

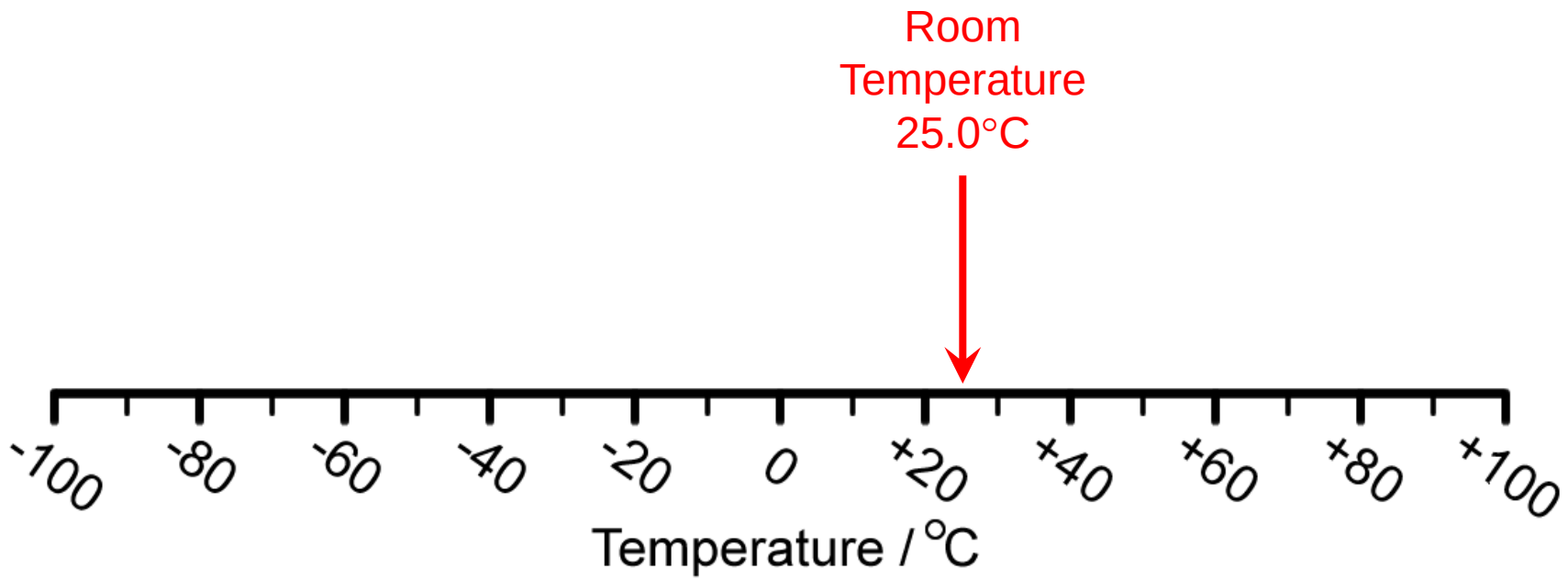
Answer: The sodium chloride is an *impurity* that will *increase* the *boiling point* of the water. The food will cook at a faster rate.

Question: Why is table salt (sodium chloride) added to snow and ice on frozen roads during winter time?

Answer: The sodium chloride is an *impurity* that will *decrease* the *melting point* of the ice. The ice will therefore melt at low temperatures, even lower than 0.0°C, thus making the roads safer to drive on.

Elements, Compounds & Mixtures

- A chemical melts at –20°C and boils at +40°C. What is the chemical's physical state (solid, liquid or gas) at room temperature (25.0°C) and pressure?



Elements, Compounds & Mixtures

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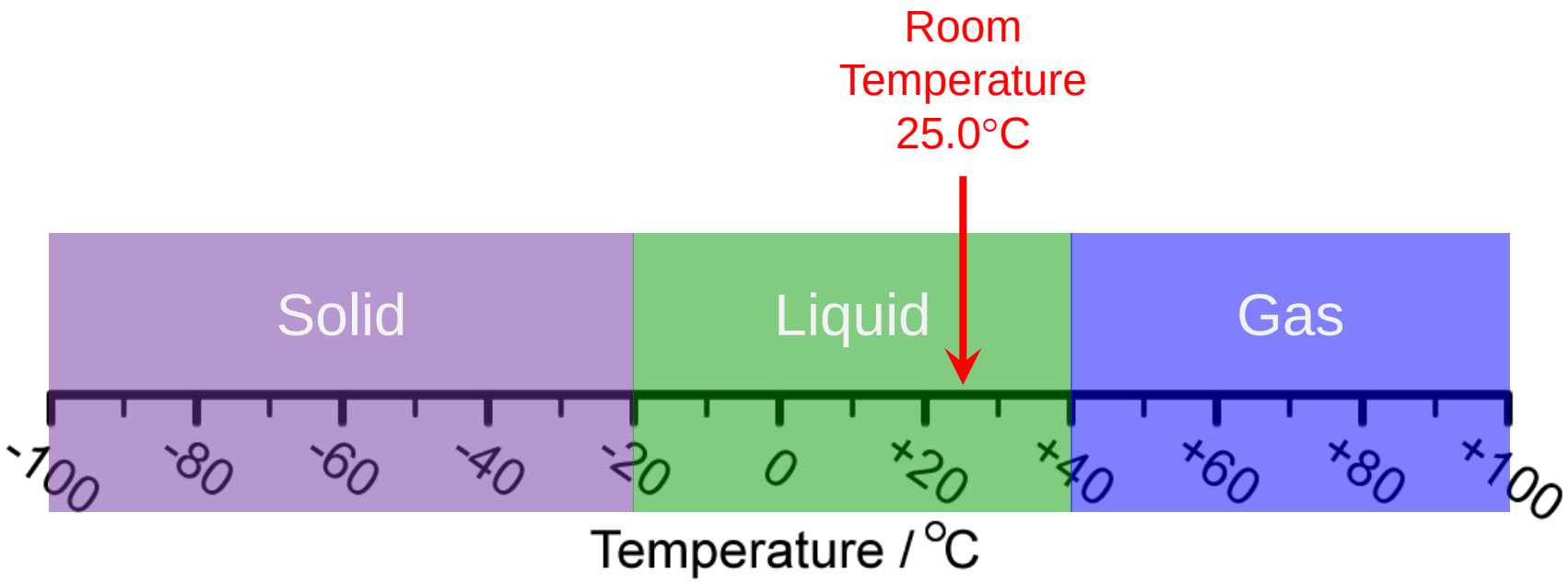
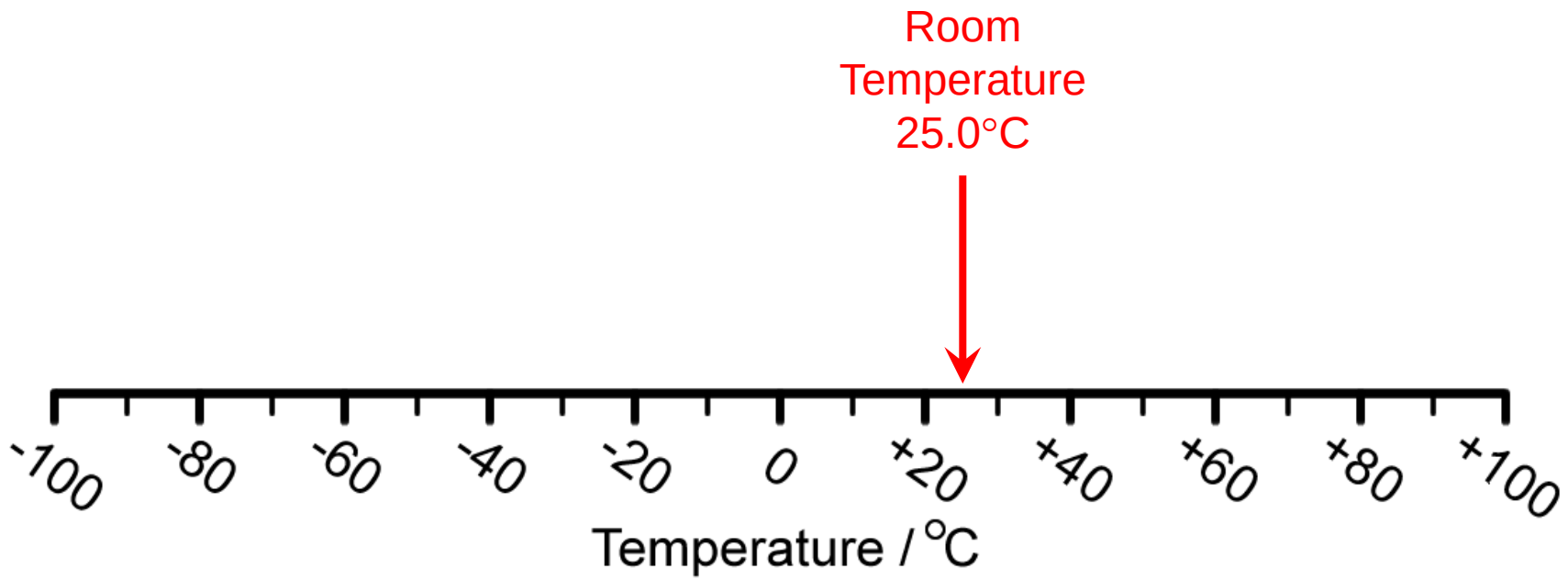


- Liquid

Elements, Compounds & Mixtures

- A chemical melts at +40°C and boils at +80°C. What is the chemical's physical state (solid, liquid or gas) at room temperature (25.0°C) and pressure?



Elements, Compounds & Mixtures

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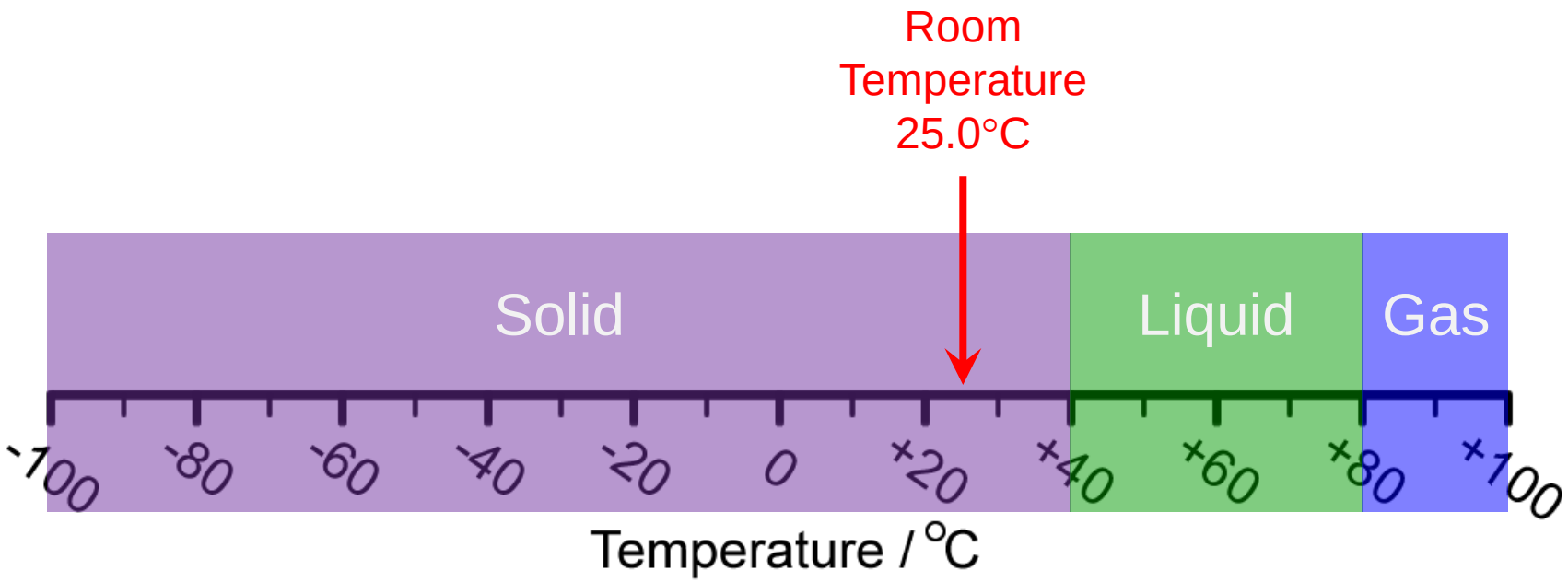
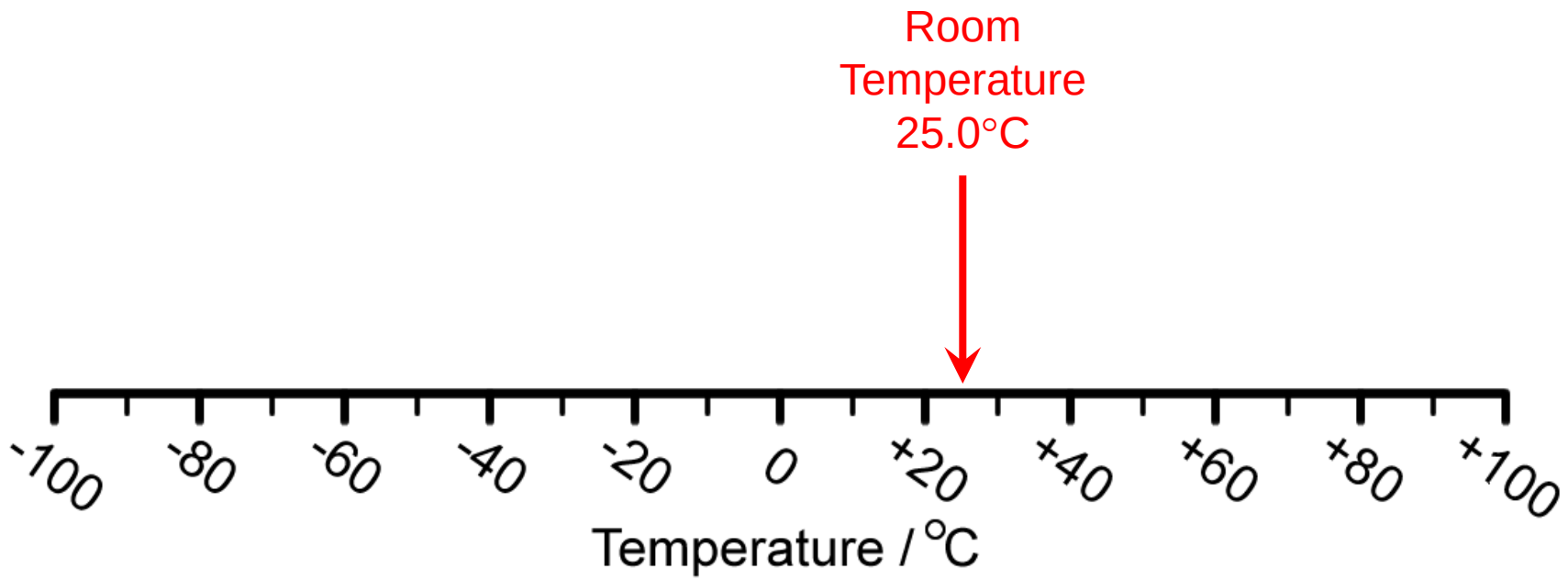


- Solid

Elements, Compounds & Mixtures

- A chemical melts at –60°C and boils at –10°C. What is the chemical's physical state (solid, liquid or gas) at room temperature (25.0°C) and pressure?



Elements, Compounds & Mixtures

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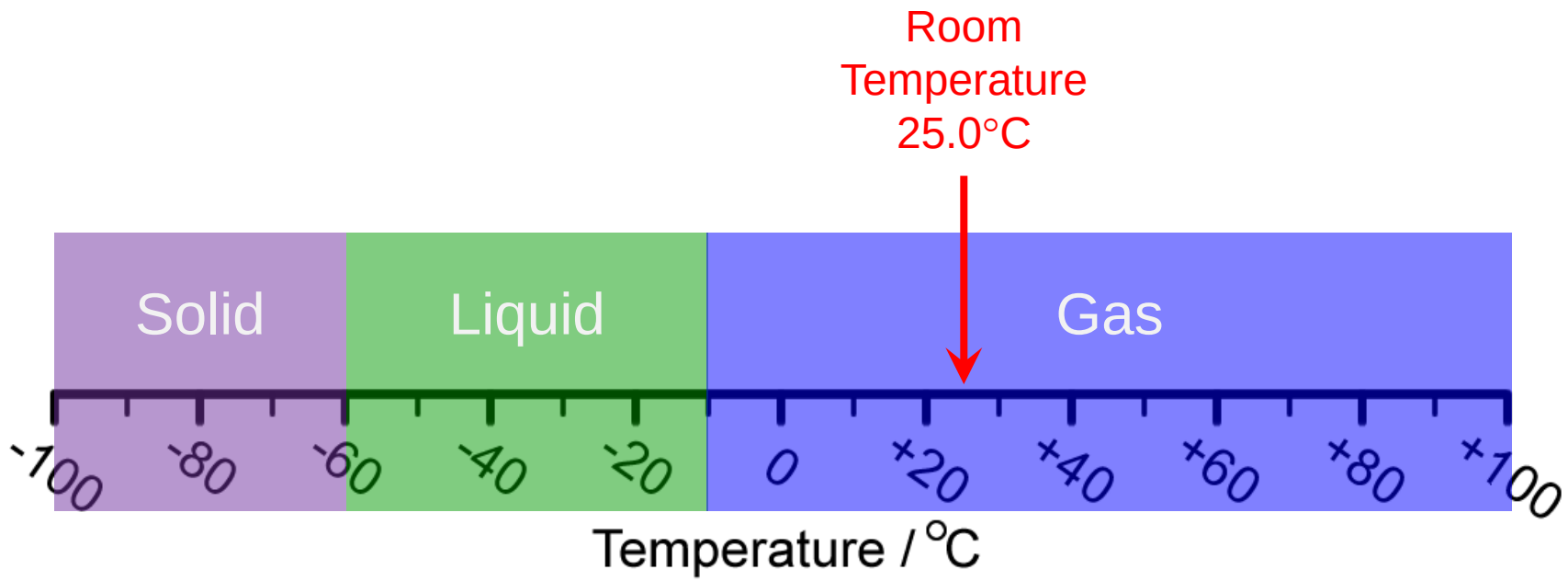


- Gas

Elements, Compounds & Mixtures

What is an alloy?

Elements, Compounds & Mixtures

Elements, Compounds & Mixtures

- An alloy is a *mixture* of two or more metals, or a mixture containing a metallic element and a non-metallic element.

- Common alloys include...

→ Brass – copper (70%) and zinc (30%).

→ Bronze – copper (88%) and tin (12%).

→ Pewter – tin (94%), copper (2%) and antimony (4%).

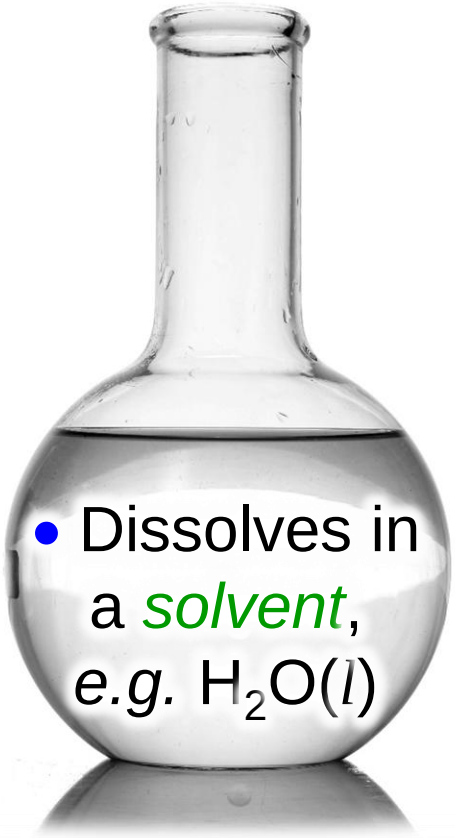
→ Stainless Steel – iron (88%) and chromium (12%).

Elements, Compounds & Mixtures

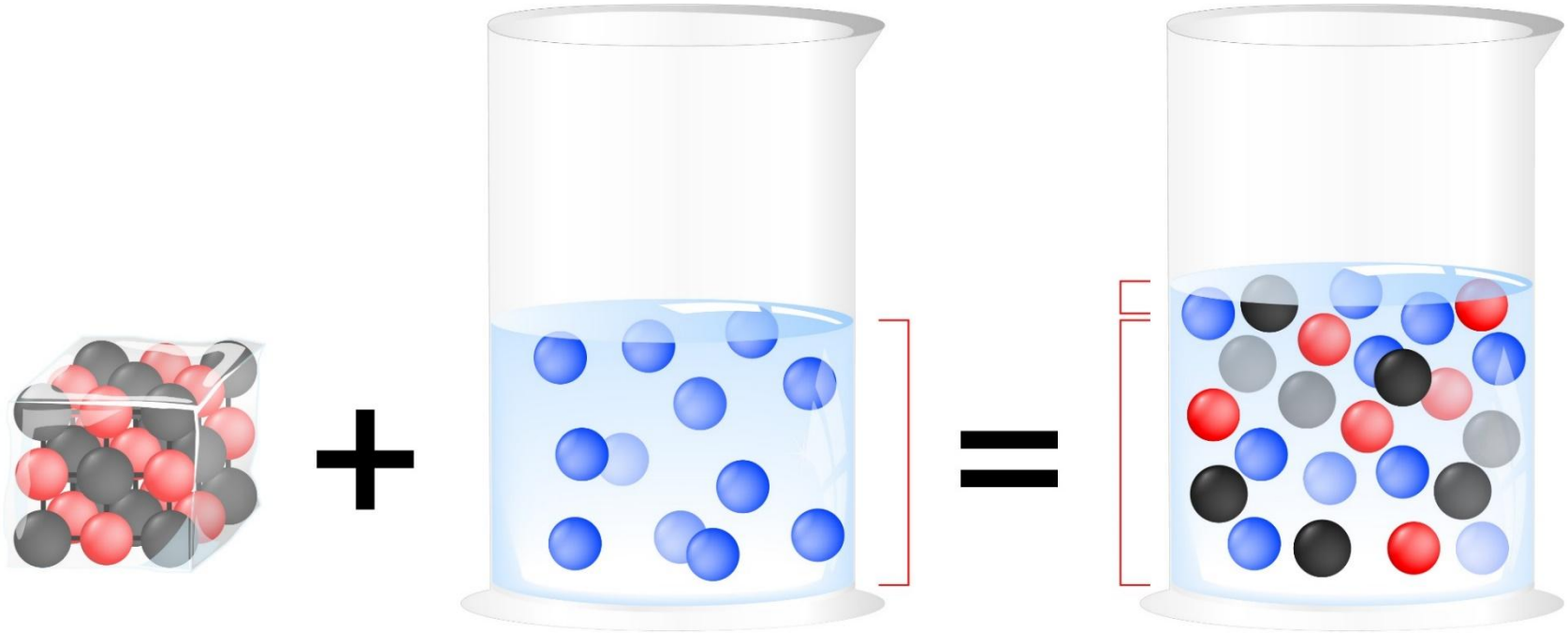
What is the difference between a solution and a suspension?

Elements, Compounds & Mixtures

- A *solute*, *e.g.* $CuSO_4(s)$



Elements, Compounds & Mixtures



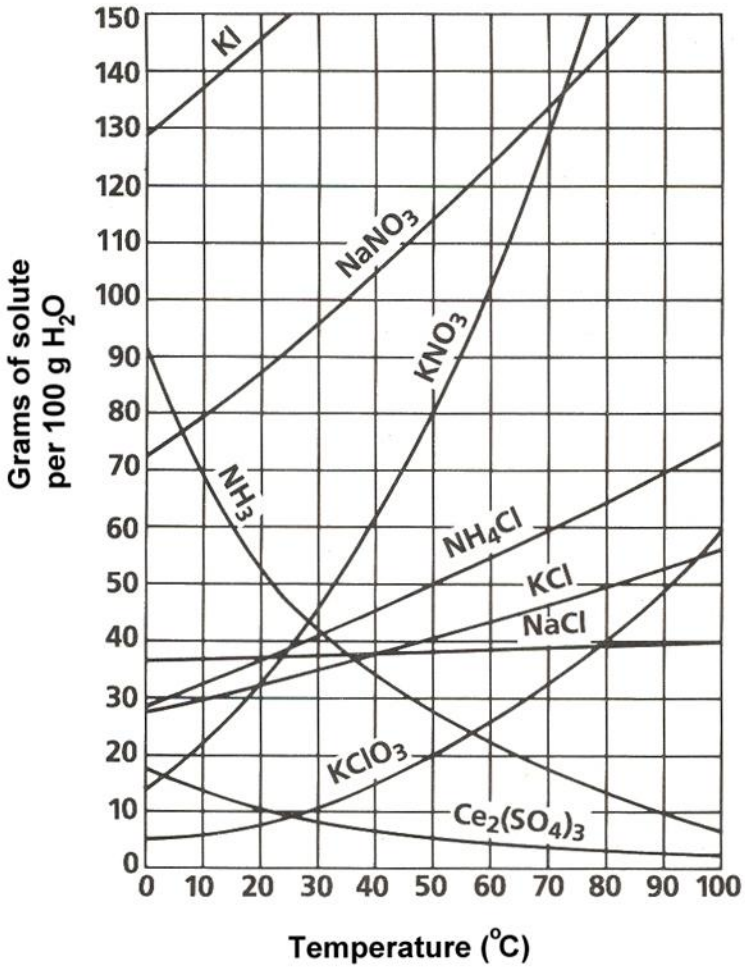
Elements, Compounds & Mixtures

- A *solution* is a *mixture* of a *solvent* and a *solute* (a chemical that dissolves in the solvent).
- The solvent is usually a liquid but the solute maybe a solid, liquid or a gas. If the solvent is *water*, then the solution is described as an *aqueous solution*.
- A solution is a *homogeneous* mixture, meaning that it is the same composition throughout.

Elements, Compounds & Mixtures

- All solutions are *clear*, *i.e.* it is possible to see through a solution.
- Solutions can either be *colourless* or *coloured*. Sodium chloride (table salt) dissolved in water is an example of a colourless solution.
- Examples of coloured solutions include copper(II) sulfate (*blue*) and potassium manganate(VII) (*purple*).

Elements, Compounds & Mixtures

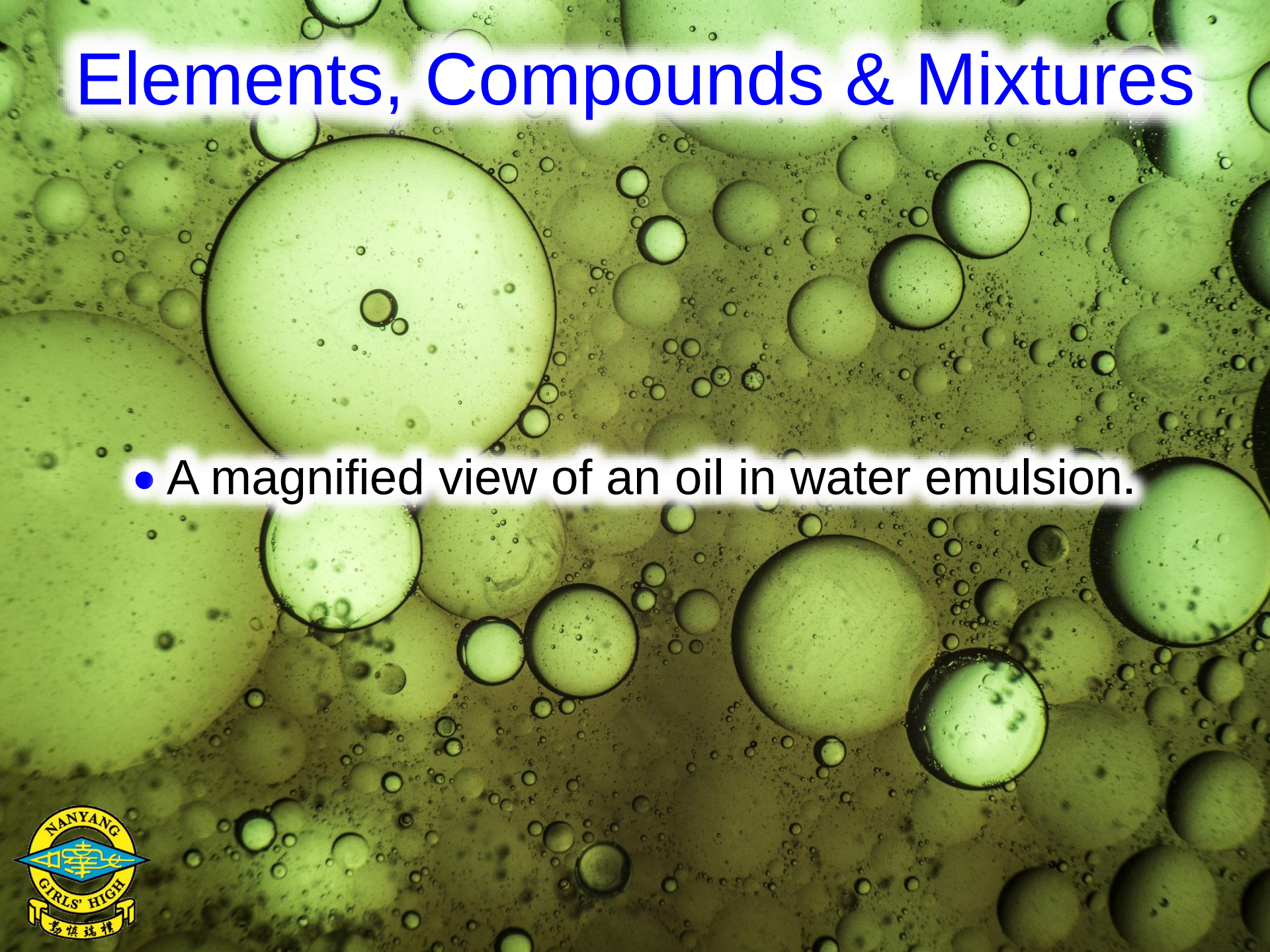


- Solubility is a chemical property. It measures the ability of a substance (solute) to dissolve in a liquid (solvent).
- Solubility is normally expressed as the mass of solute, in grams, that will dissolve in 100 g of solvent.
- For most chemicals, solubility *increases* with temperature, except for gases (*e.g.* NH_3) whose solubility *decreases* as temperature increases.

Elements, Compounds & Mixtures

- A *suspension* is a *mixture* in which very small particles of a solid or a liquid are suspended in either a liquid or a gas.
- Examples of suspensions include chalk dust suspended in water and mud suspended in water.
- Small droplets of one liquid suspended in another liquid is called an *emulsion*. Small droplets of a solid or a liquid suspended in a gas is called an *aerosol*.

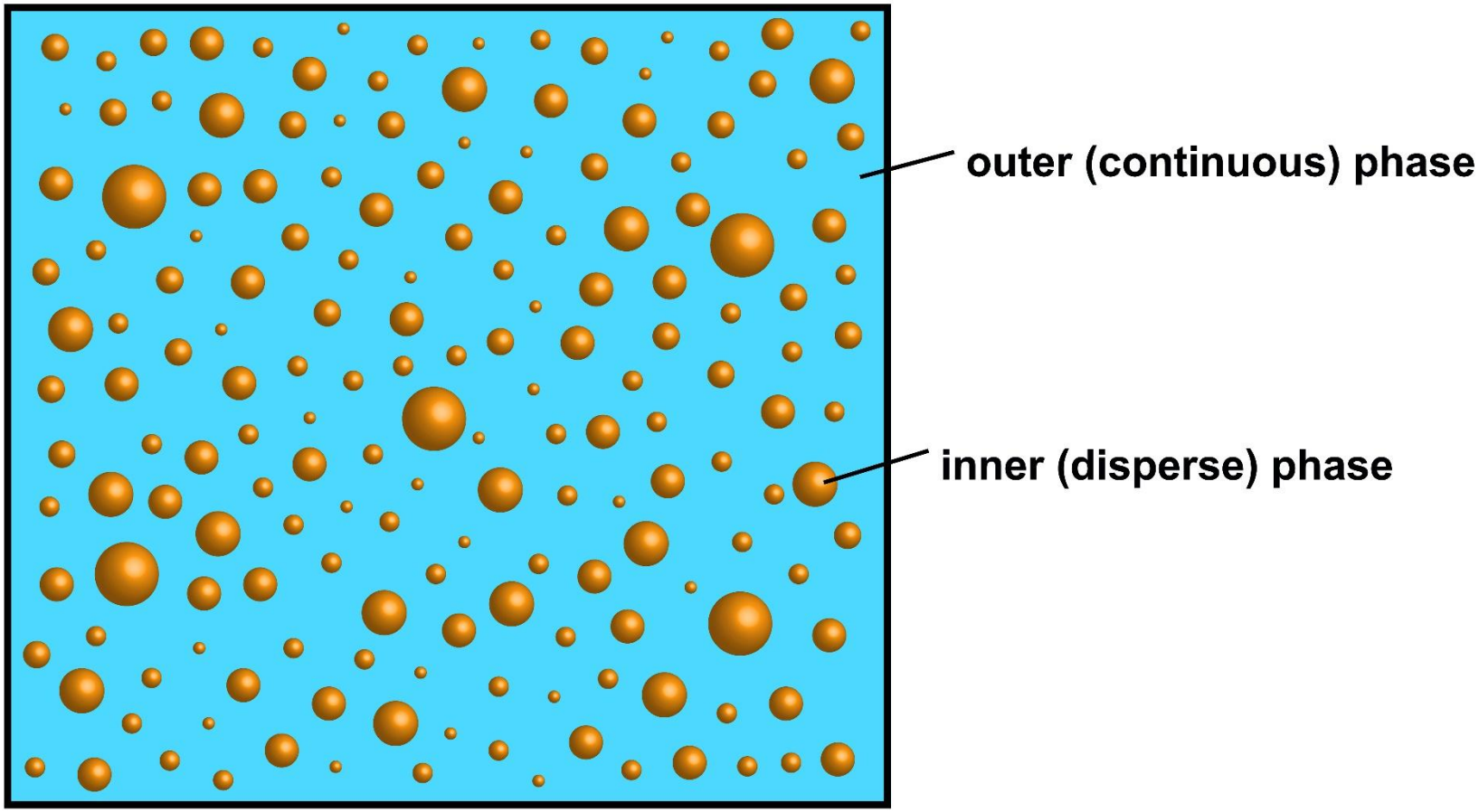
Elements, Compounds & Mixtures



- A magnified view of an oil in water emulsion.

Elements, Compounds & Mixtures

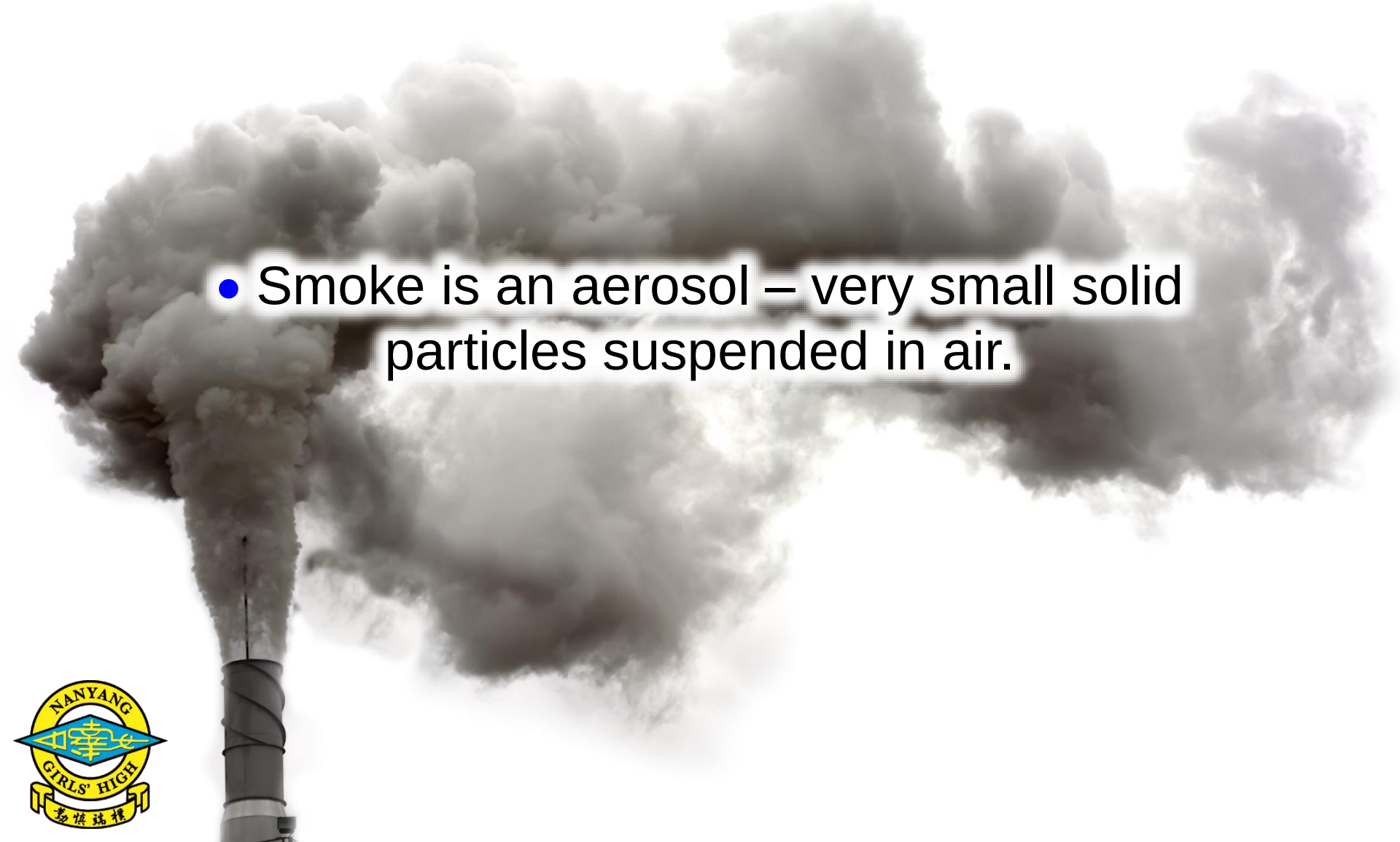
formation of emulsions



Elements, Compounds & Mixtures

- Clouds are aerosols – very small droplets of water suspended in air.

Elements, Compounds & Mixtures



- Smoke is an aerosol – very small solid particles suspended in air.

Elements, Compounds & Mixtures

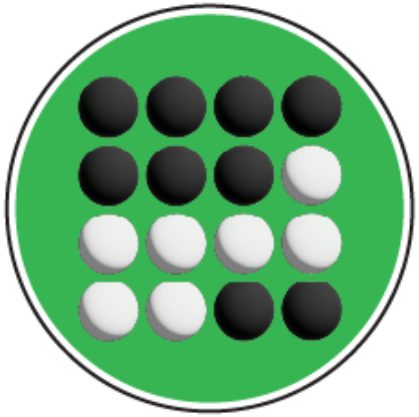
- A suspension is a *heterogeneous* mixture because it does not have a consistent / uniform composition throughout. Colour, density and other properties may vary throughout the suspension.

- The insoluble particles in a suspension are large enough to prevent light passing through. Suspensions are therefore *translucent* or *opaque*.

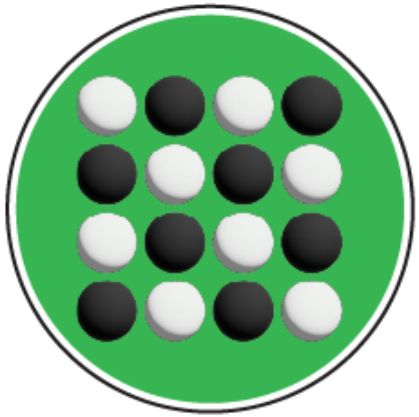
Elements, Compounds & Mixtures

Mixtures

Heterogeneous Mixture

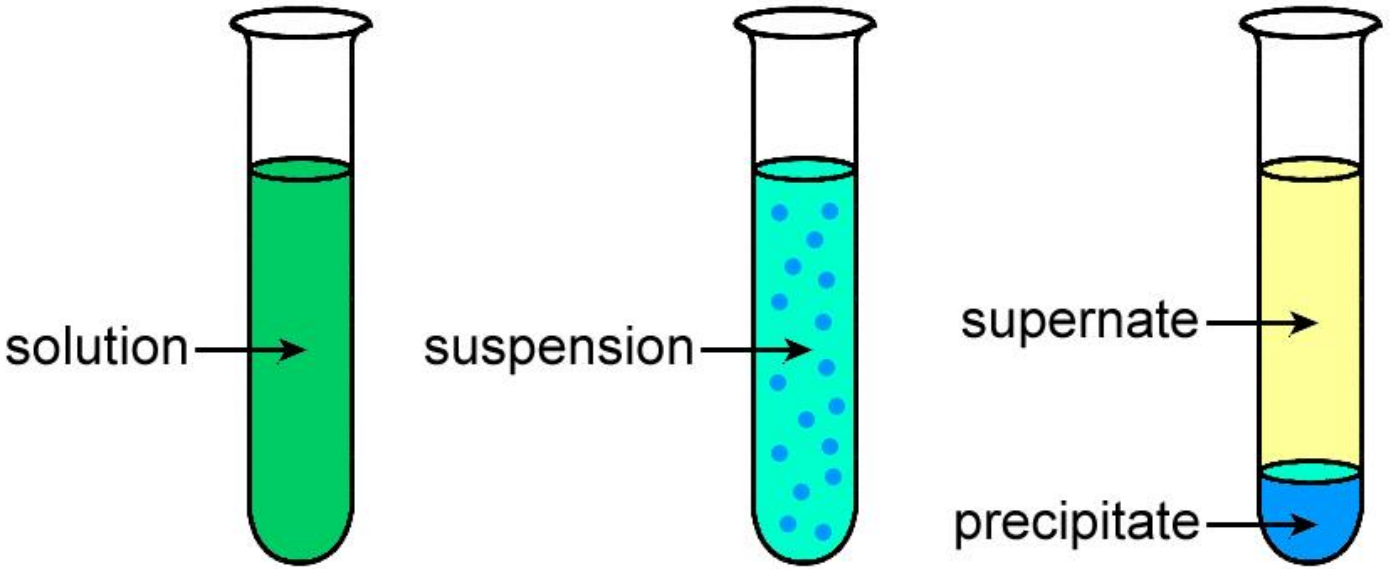


Homogeneous Mixture



Elements, Compounds & Mixtures

- Over a period of time, the particles in a suspension my settle to the bottom of the container due to the effect of gravity.



Elements, Compounds & Mixtures

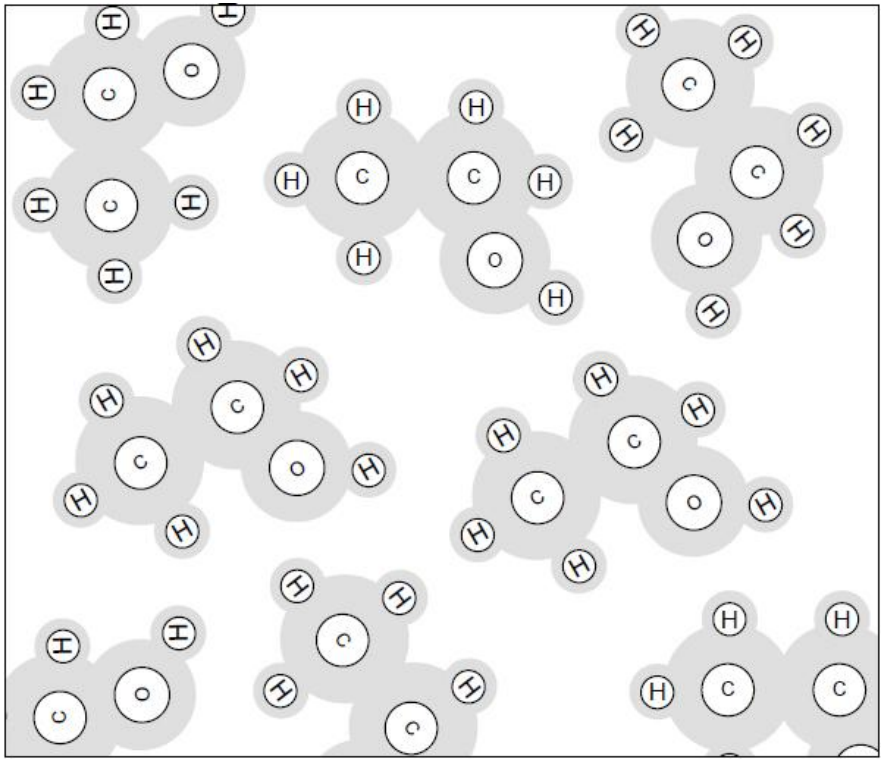
- Over a period of time, the particles in a suspension may settle to the bottom of the container due to the effect of gravity.

- This is why some drinks and medication must be *shaken* before they are consumed. Shaking will make the suspension more homogeneous, so the drink will taste nice to the consumer, and the patient will get the correct dose of medication.

Elements, Compounds & Mixtures

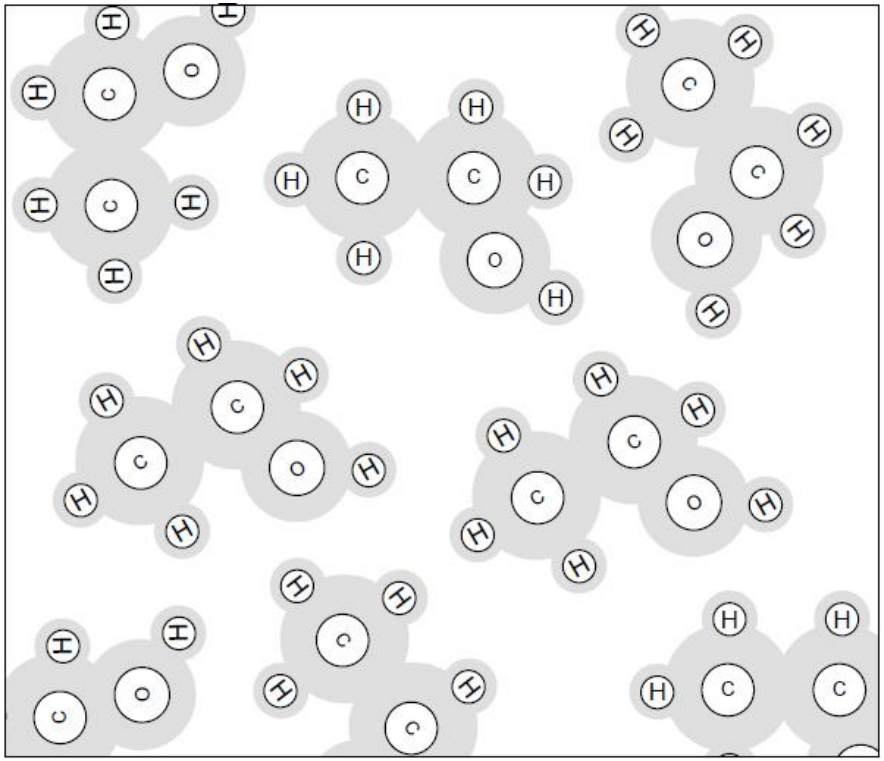
Double check your definitions and understanding by classifying the following substances as either elements, compounds or mixtures.

Elements, Compounds & Mixtures



- This is an example of…

Elements, Compounds & Mixtures

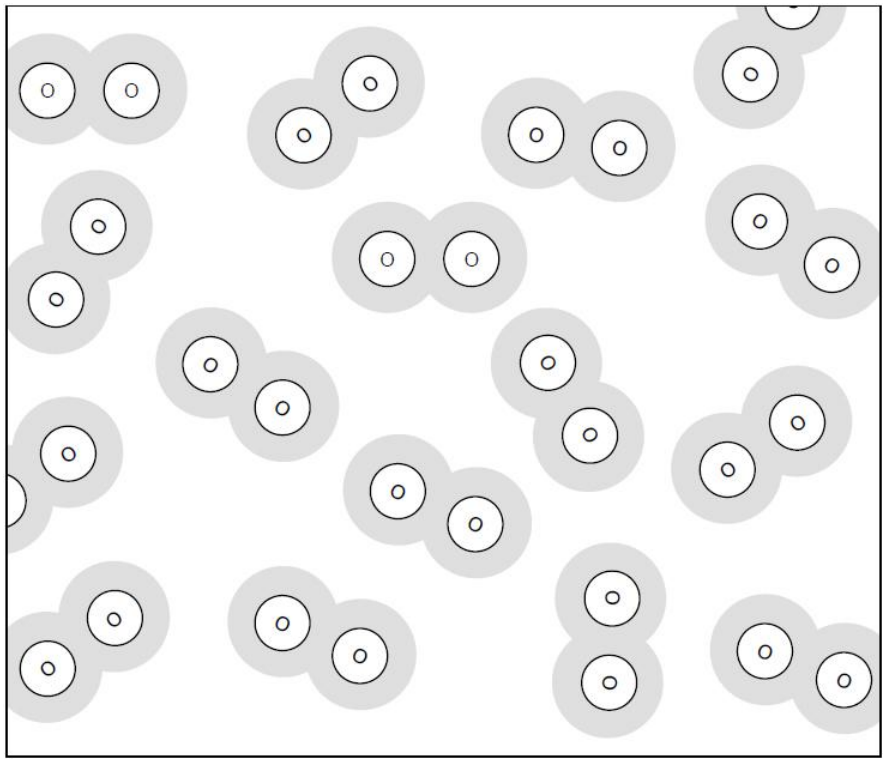


C_2H_5OH = Ethanol

- This is an example of…

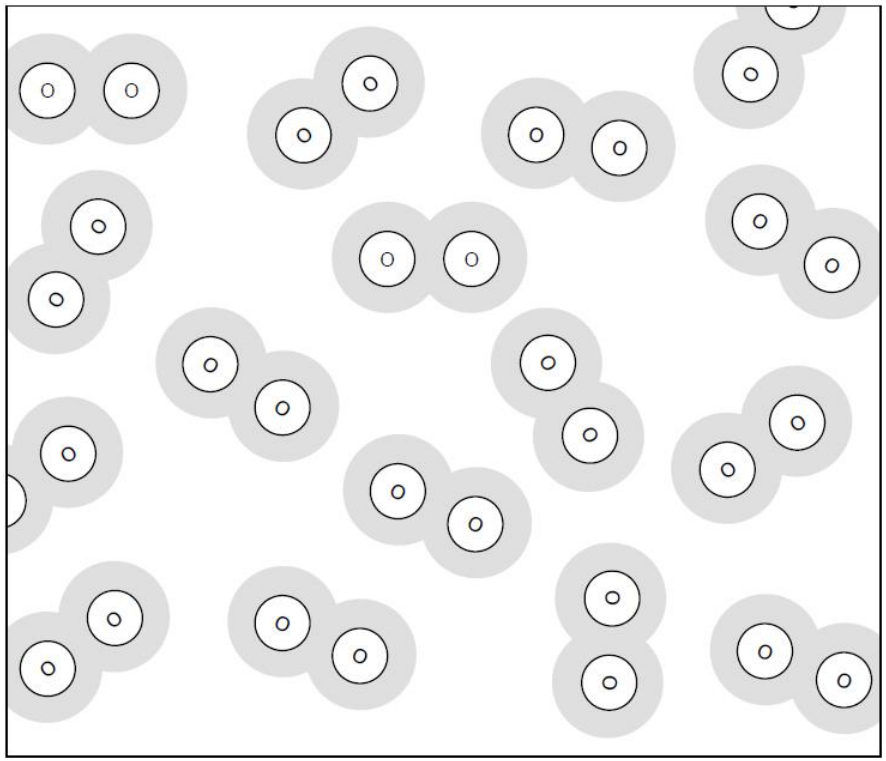
  A pure compound.

Elements, Compounds & Mixtures



- This is an example of…

Elements, Compounds & Mixtures

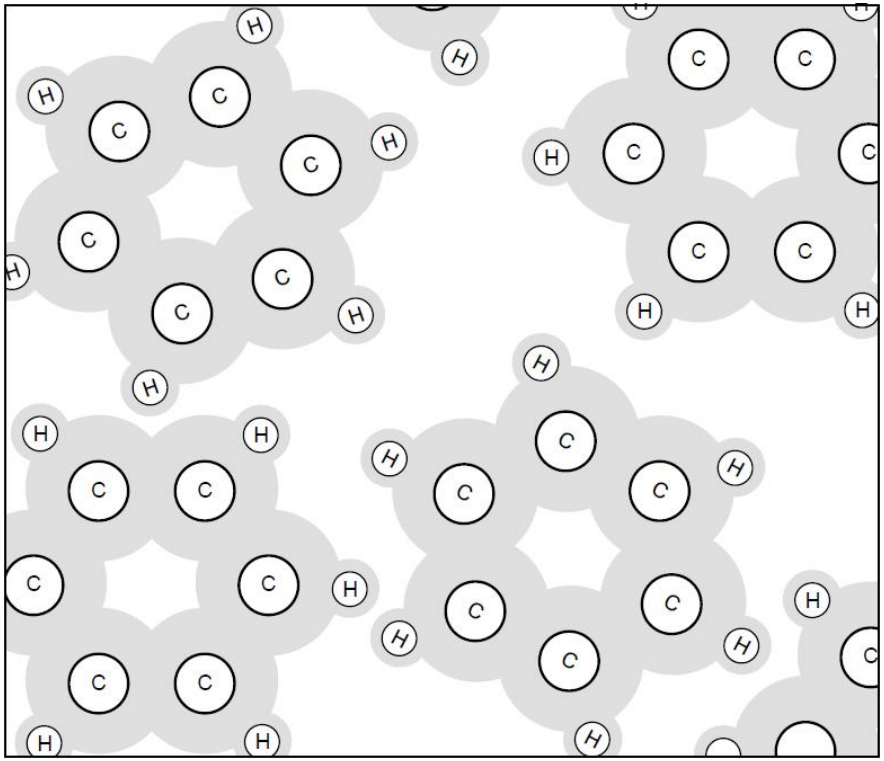


O_2 = Oxygen (Group 16)

- This is an example of…

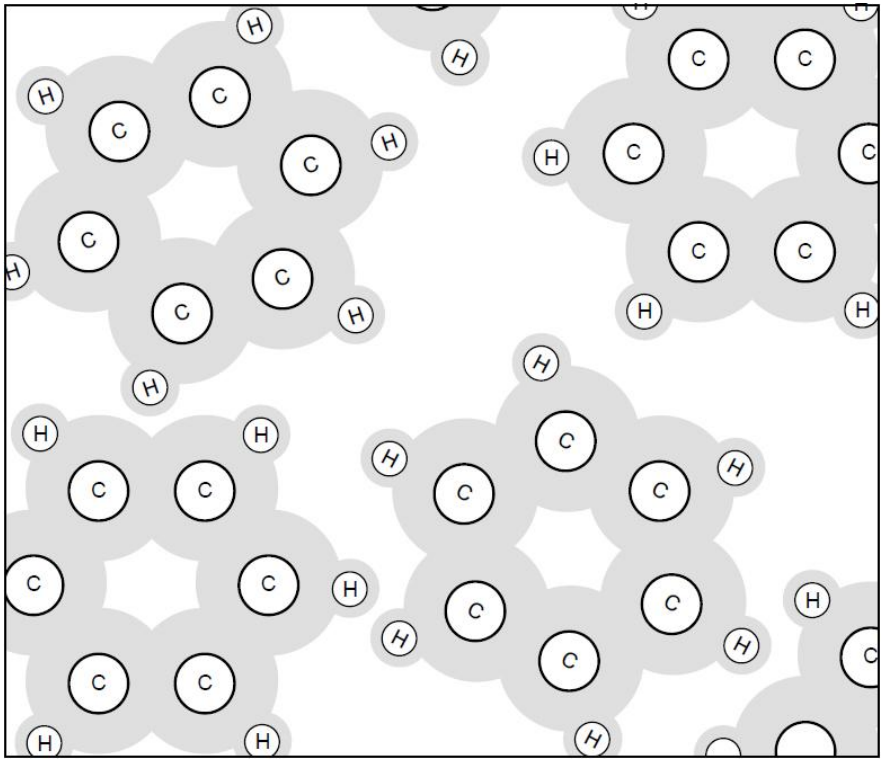
A pure chemical element.

Elements, Compounds & Mixtures



- This is an example of…

Elements, Compounds & Mixtures

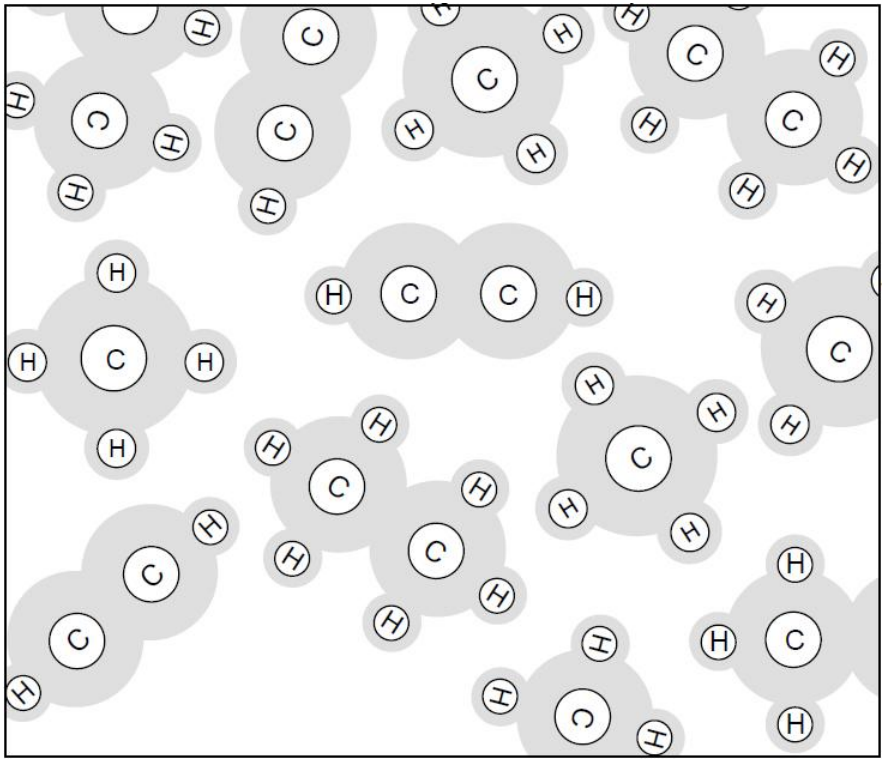


C_6H_6 = Benzene

- This is an example of…

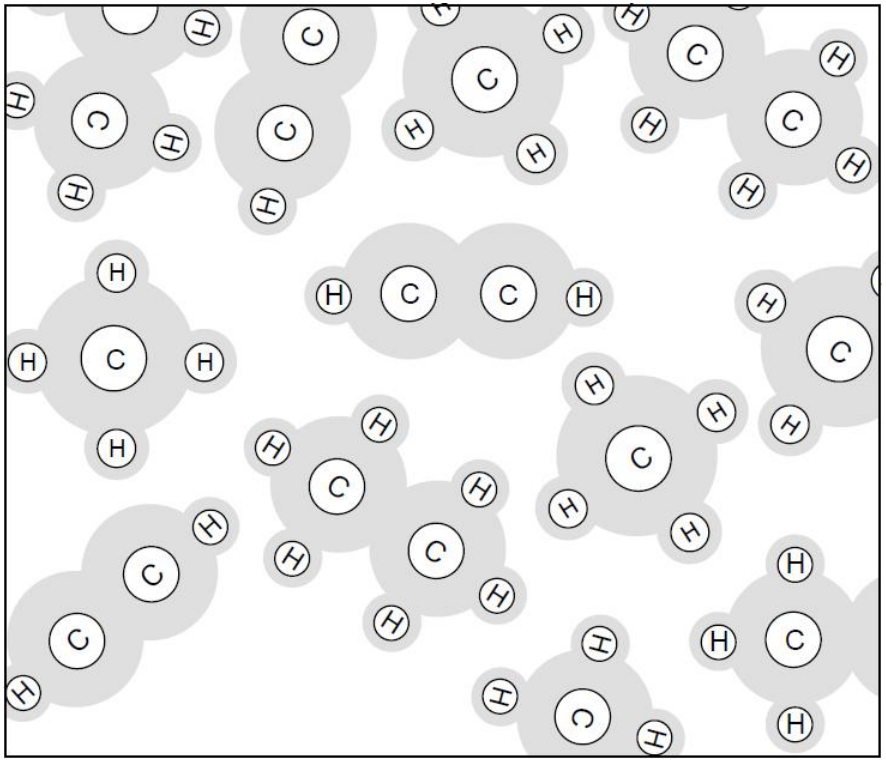
A pure compound.

Elements, Compounds & Mixtures



- This is an example of…

Elements, Compounds & Mixtures

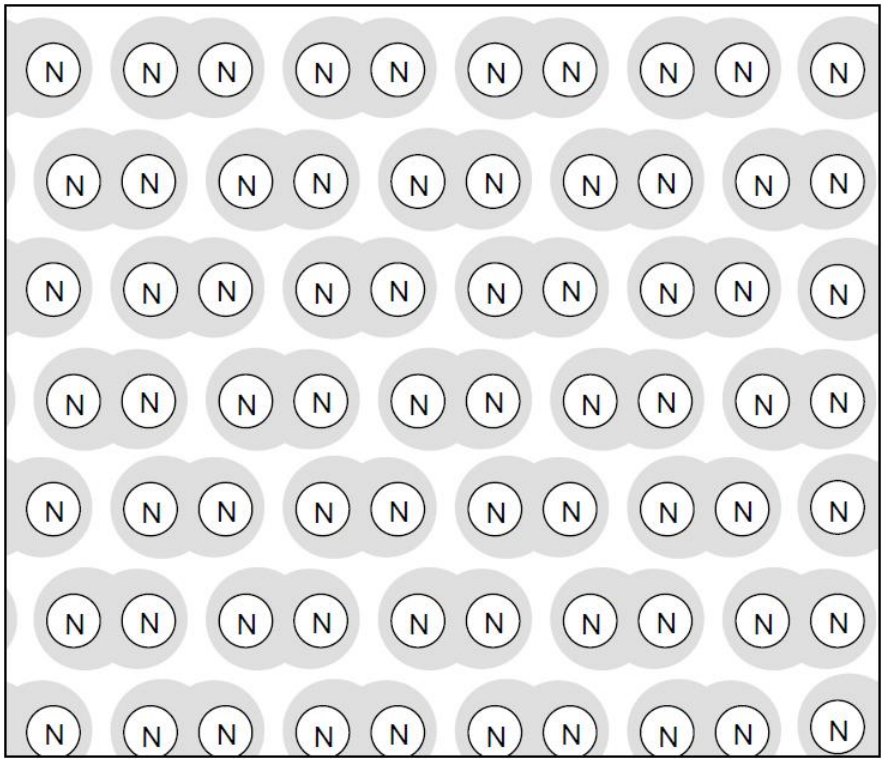


CH_4 = Methane, C_2H_2 = Ethyne
C_2H_6 = Ethane

- This is an example of…

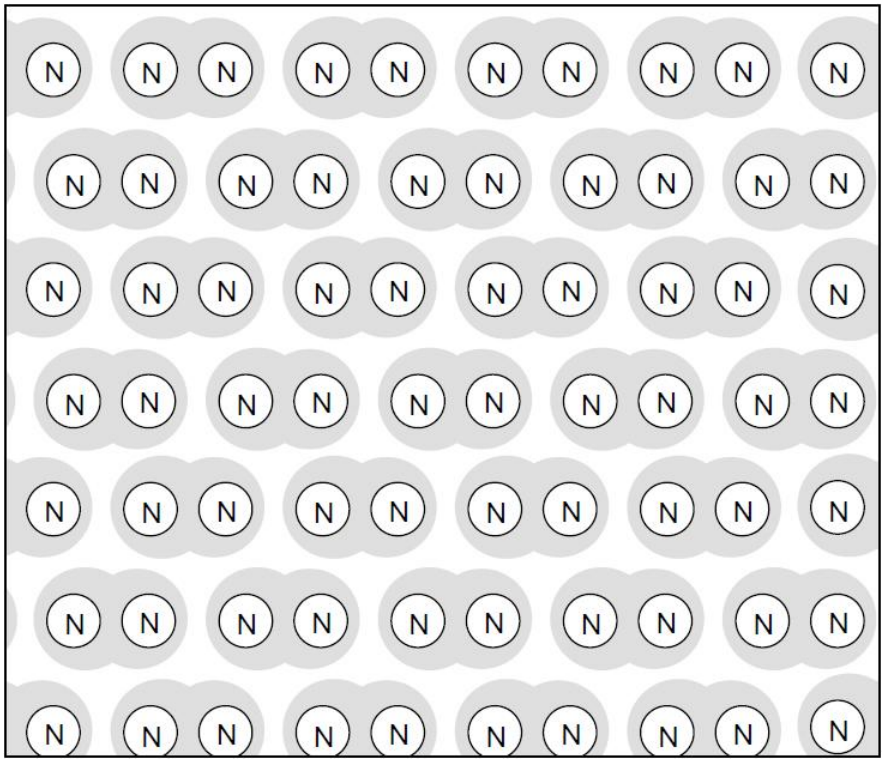
A mixture of three compounds.

Elements, Compounds & Mixtures



- This is an example of…

Elements, Compounds & Mixtures



N_2 = Nitrogen (Group 15)

- This is an example of…

A pure chemical element.

Elements, Compounds & Mixtures

Elements, Compounds & Mixtures

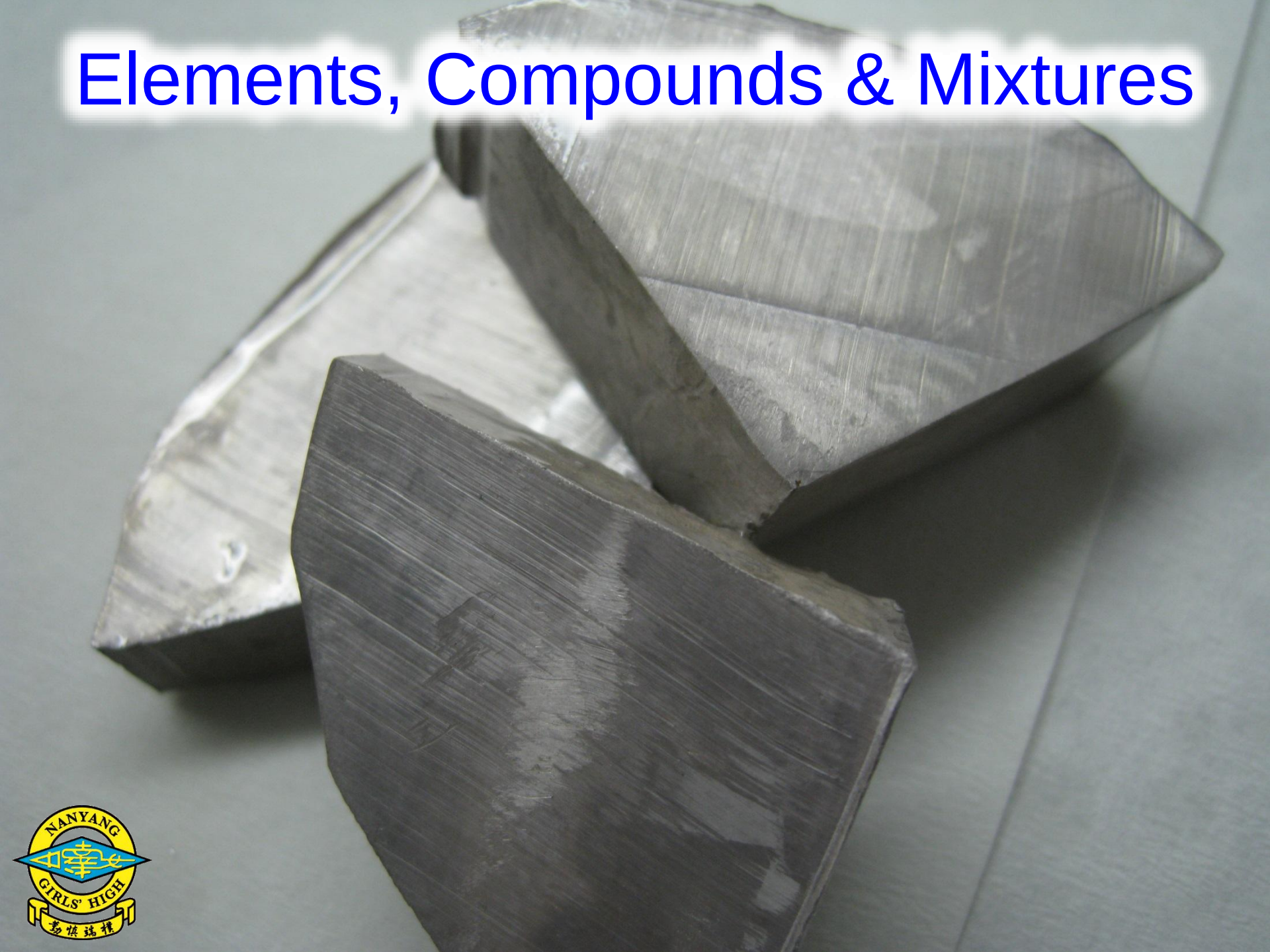
- The reaction of the element sodium with water.

- Time: 11 seconds.

sodium + water → sodium hydroxide + hydrogen

$$2Na\ (s) + 2H_2O\ (l) \rightarrow 2NaOH\ (aq) + H_2\ (g)$$

Elements, Compounds & Mixtures



Elements, Compounds & Mixtures

- How small could you cut the piece of sodium and still get the same reaction to occur?

Elements, Compounds & Mixtures

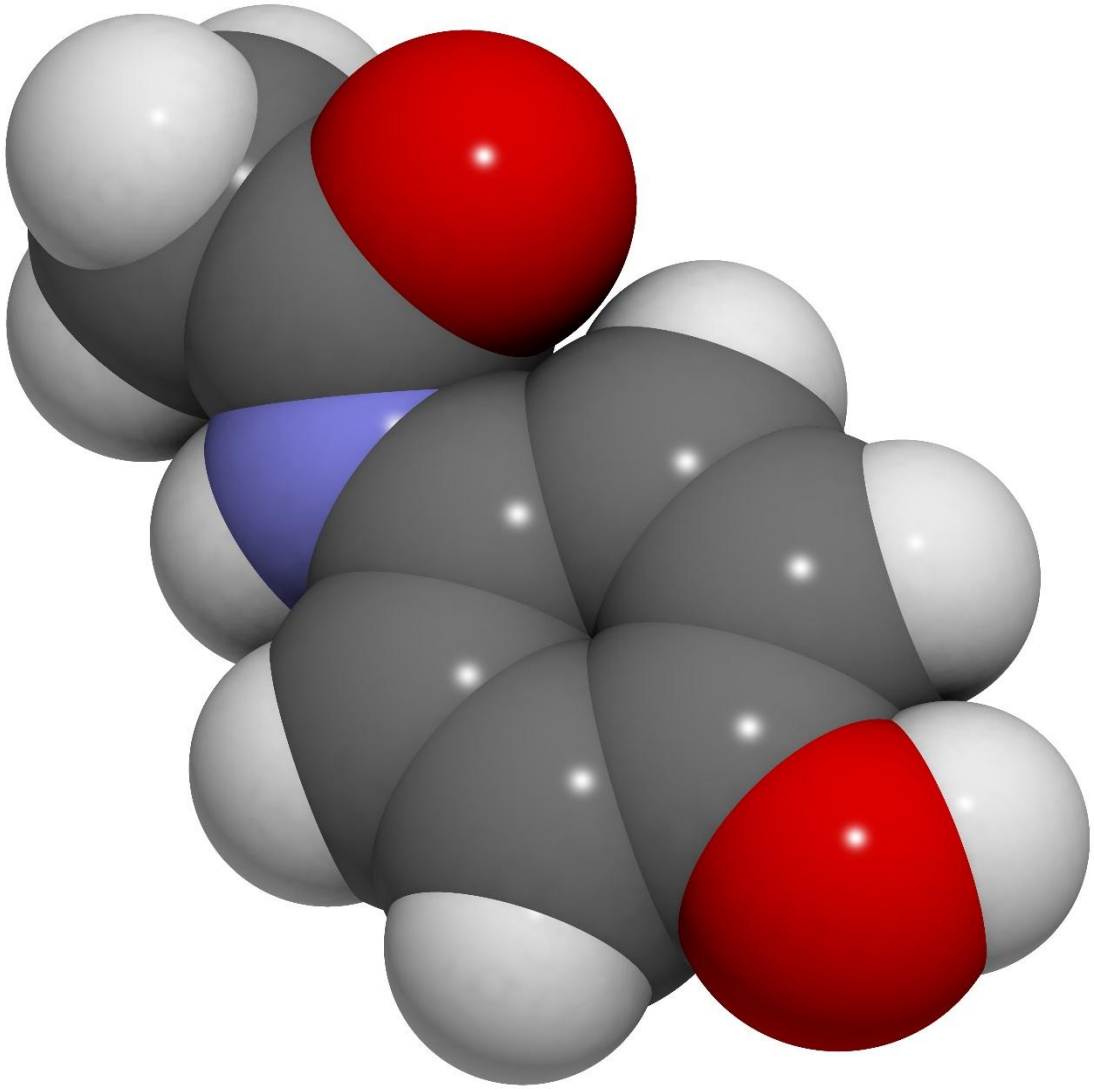
- The smallest piece of sodium that would react with water in the same way as a lump of sodium is a *sodium atom*.

- An *atom* is the smallest part of an element that demonstrates all of the typical properties of that element.

Elements, Compounds & Mixtures

What is
a molecule?
Part #2

Elements, Compounds & Mixtures



Elements, Compounds & Mixtures

- A molecule is a group of two or more non-metallic elements that are held together by covalent bonds.
- Examples of simple molecules include:

→ The element nitrogen, N_2.

→ The element oxygen, O_2.

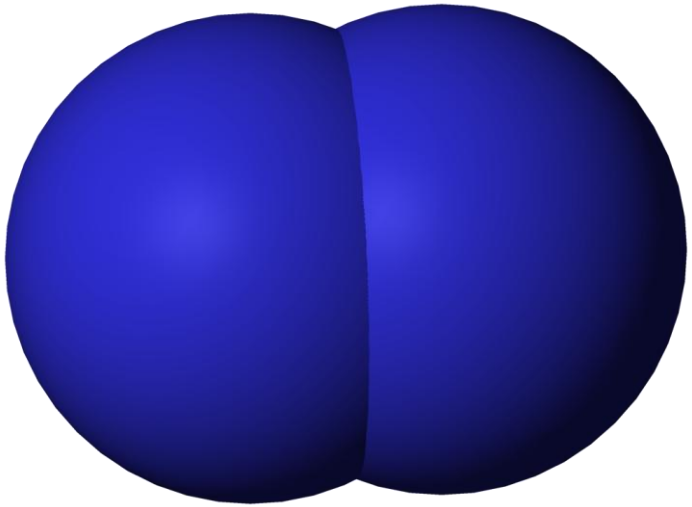
→ The compound ammonia, NH_3.

→ The compound methane, CH_4.

Elements, Compounds & Mixtures

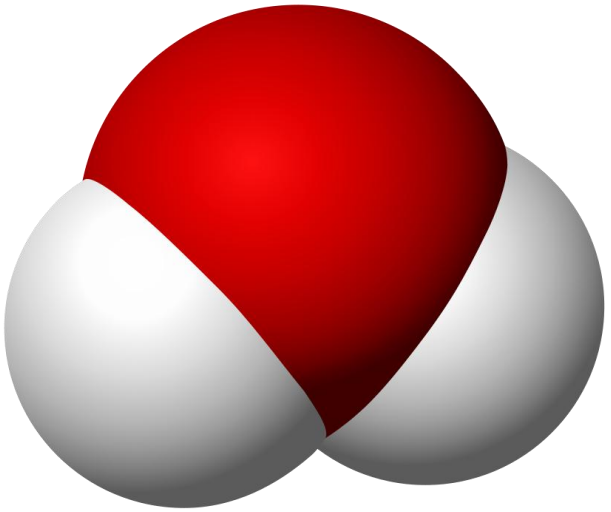
- A *single* atom is said to be *monatomic*, *e.g.* the noble gases, He and Ne.
- Molecules that contain *two* atoms bonded together are said to be *diatomic*, *e.g.* nitrogen – N_2.
- Molecules that contain *three* atoms bonded together are said to be *triatomic*, *e.g.* water – H_2O.
- Molecules that contain *more than three* atoms bonded together are said to be *polyatomic*, *e.g.* methane – CH_4.

Elements, Compounds & Mixtures



- A *diatomic* molecule of the element nitrogen – N_2

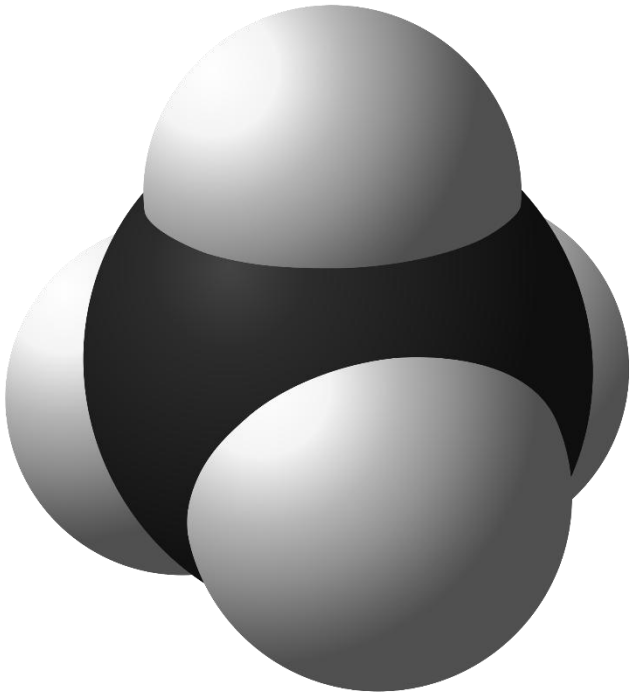
Note: This is described as a *homonuclear* molecule because the atoms are all of the same element.



- A *triatomic* molecule of the compound water – H_2O

Note: This is described as a *heteronuclear* molecule because the atoms are of different chemical elements.

Elements, Compounds & Mixtures



- A *polyatomic* molecule of methane – CH_4

Note: Molecules that are composed of *more than three* atoms covalently bonded together are usually described as *polyatomic*, which literally means *many atoms*.

Elements, Compounds & Mixtures

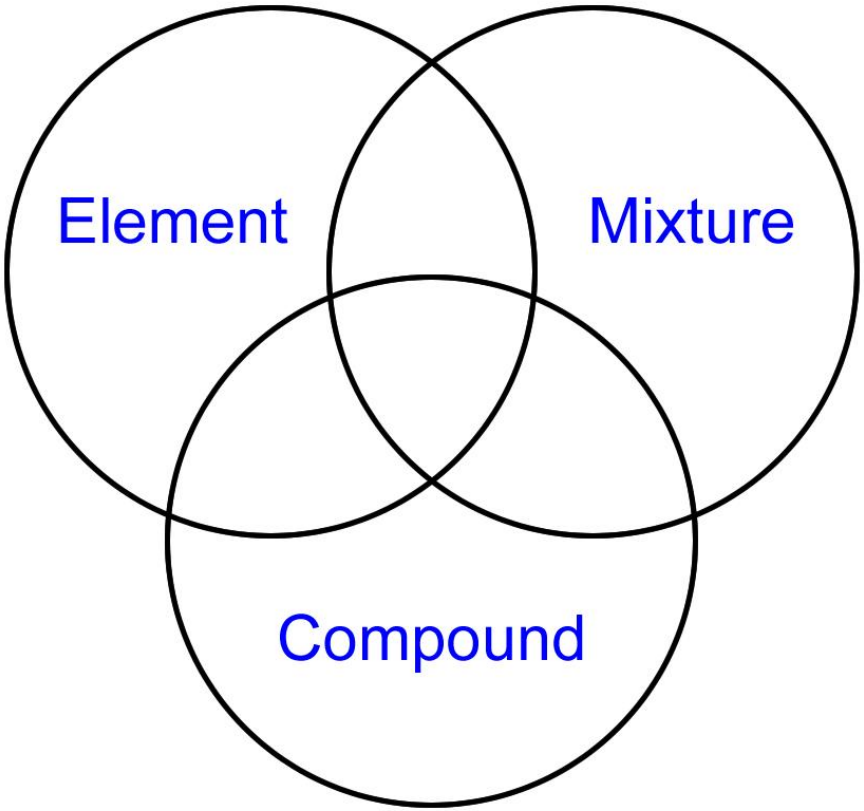
Higher Order Thinking Skills

Compare and contrast the properties of elements, compounds and mixtures.

You can use a graphic organiser, like the following Venn Diagram, to help organise your thoughts and ideas.

Elements, Compounds & Mixtures

Higher Order Thinking Skills

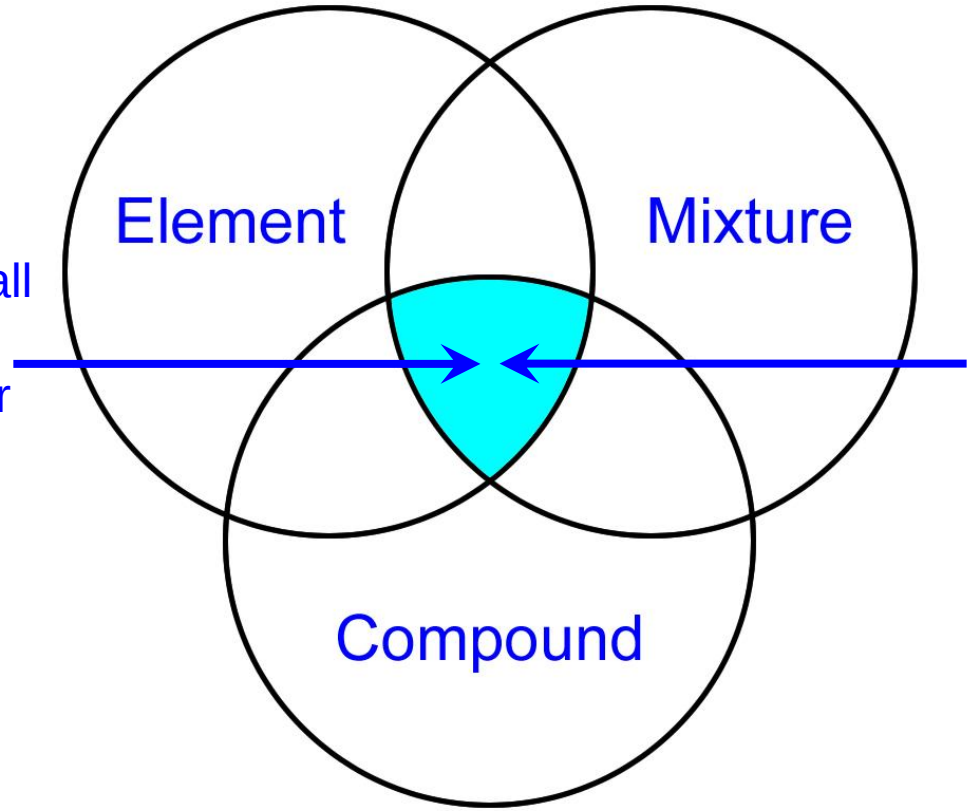


Elements, Compounds & Mixtures

Higher Order Thinking Skills

- In what ways are elements, compounds and mixtures *all similar* to each other?

e.g. They are all composed of atoms, ions or molecules.

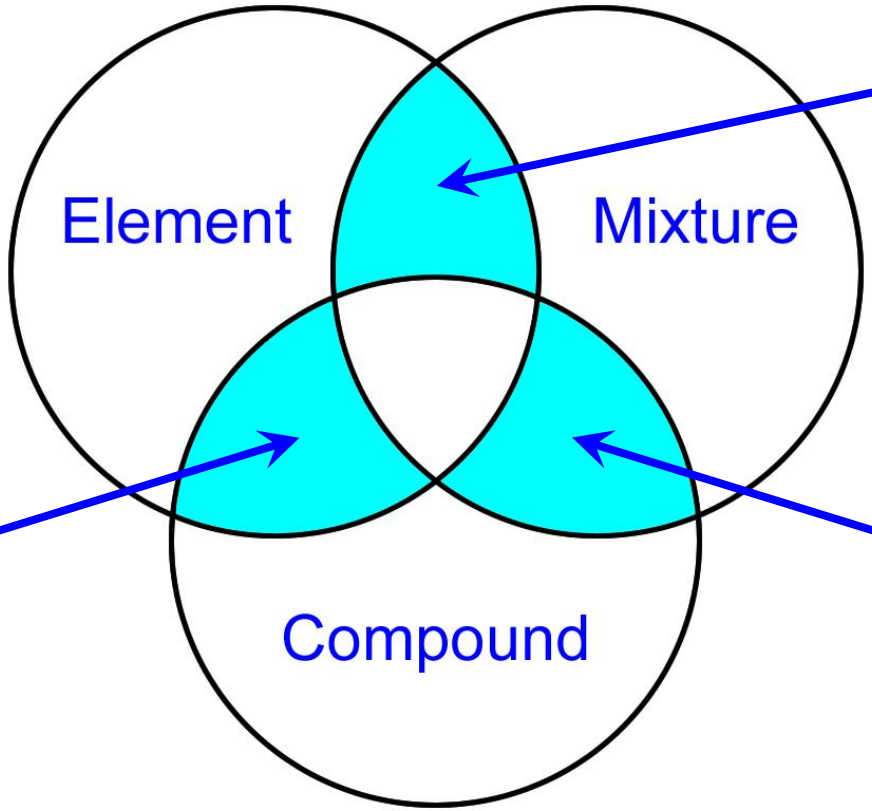


e.g. Compounds and mixtures are composed of different chemical elements which may or may not be chemically bonded together.

Elements, Compounds & Mixtures

Higher Order Thinking Skills

- In what ways are the *pairs similar* to each other?



e.g. A simple mixture is composed only of only two chemical elements.

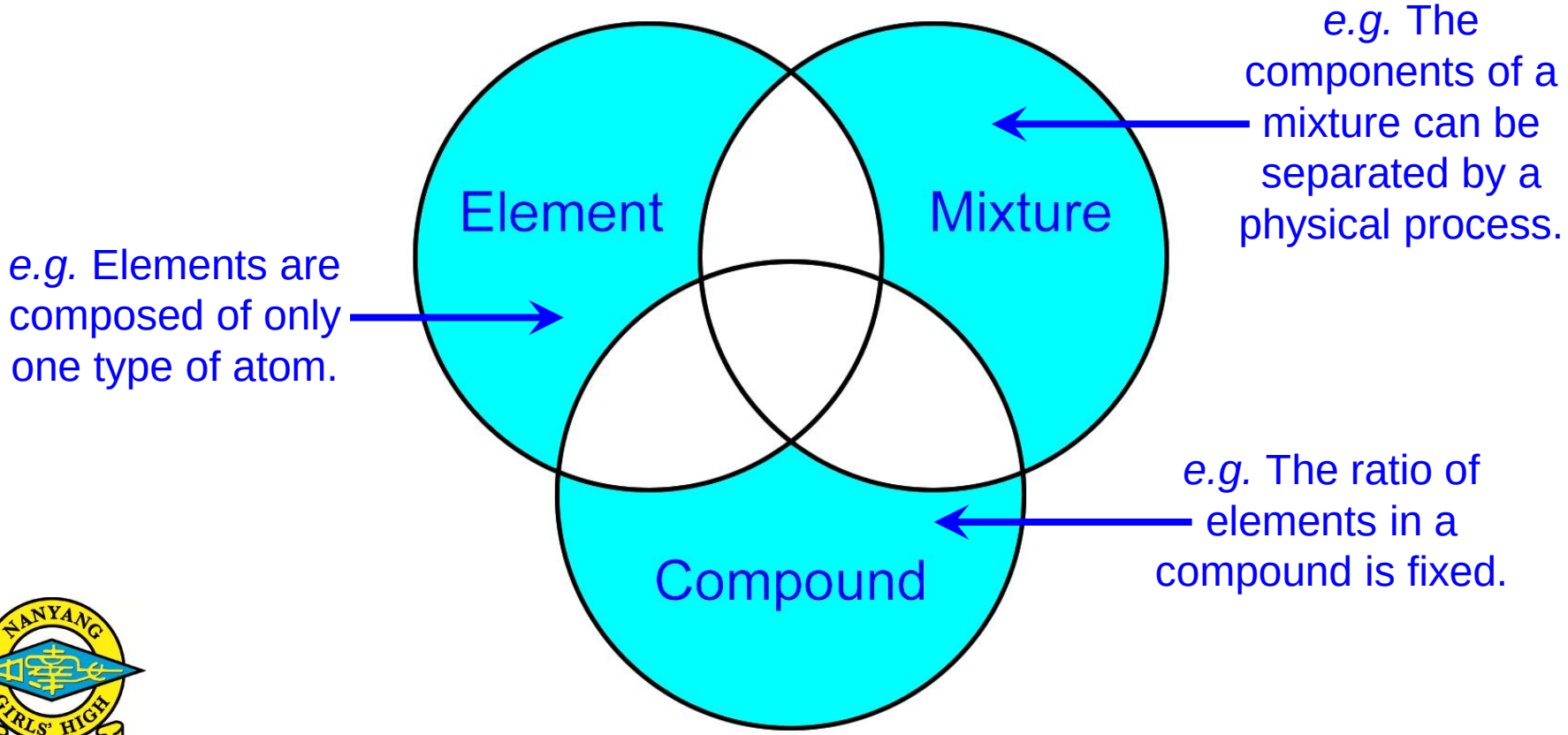
e.g. They are both pure substances.

e.g. They are both composed of more that one chemical element.

Elements, Compounds & Mixtures

Higher Order Thinking Skills

- In what ways are elements, compounds and mixtures *different* from each other?



Elements, Compounds & Mixtures

Flow diagram!

- Design a flow diagram that will allow you to logically and systematically classify a substance as either an element, compound, mixture of elements, mixture of compounds or a mixture of an element and an compound.

Elements, Compounds & Mixtures

Example Flow Diagram to Classify Elements, Compounds and Mixtures

Elements, Compounds & Mixtures

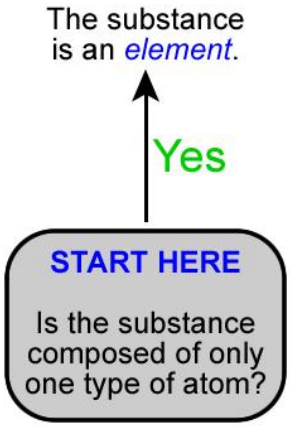
Example Flow Diagram to Classify Elements, Compounds and Mixtures

START HERE

Is the substance composed of only one type of atom?

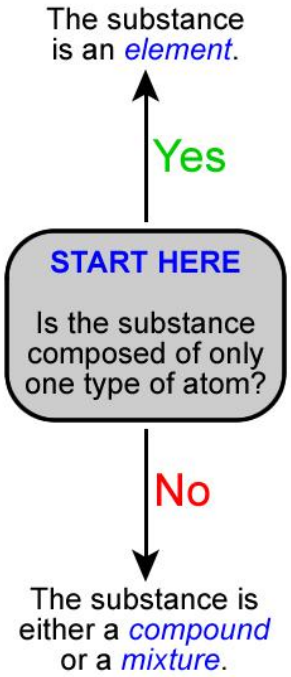
Elements, Compounds & Mixtures

Example Flow Diagram to Classify Elements, Compounds and Mixtures



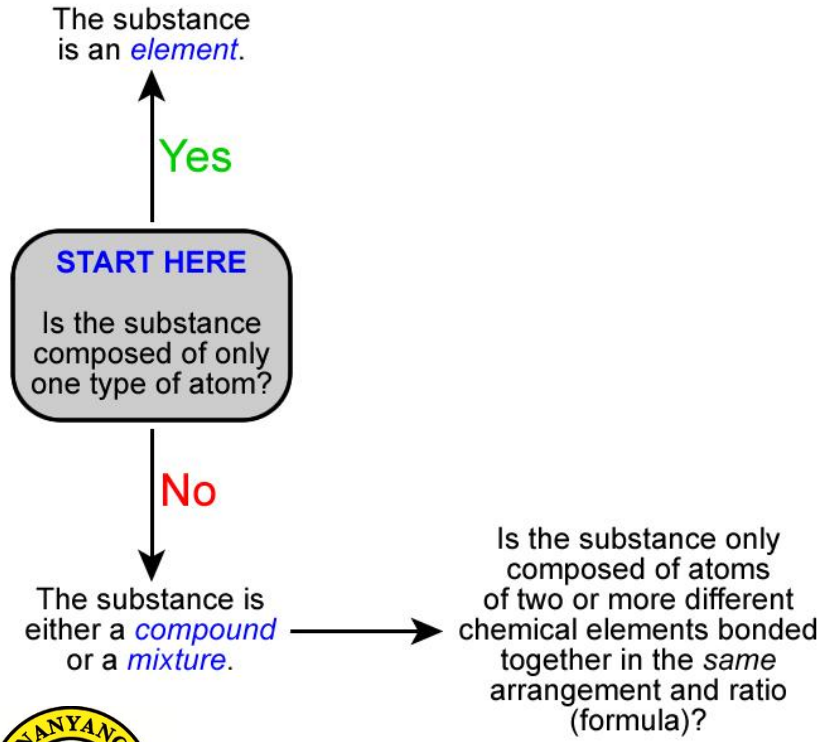
Elements, Compounds & Mixtures

Example Flow Diagram to Classify Elements, Compounds and Mixtures



Elements, Compounds & Mixtures

Example Flow Diagram to Classify Elements, Compounds and Mixtures



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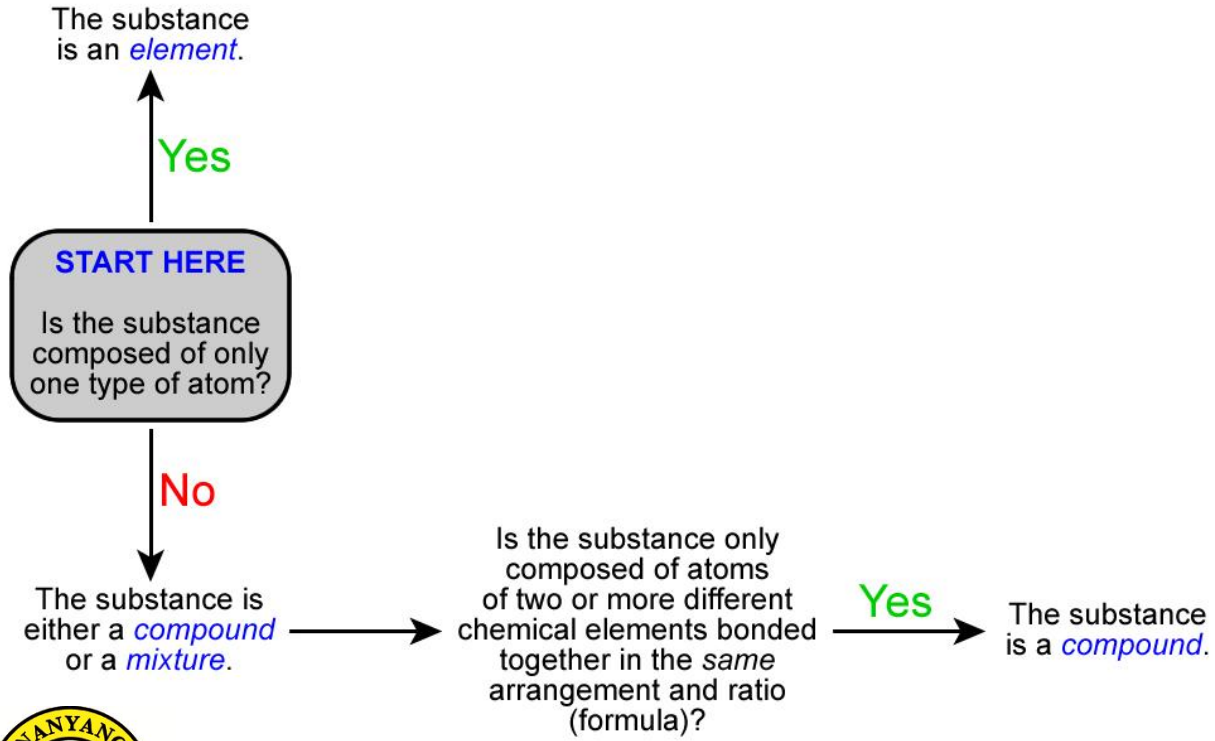
Example Flow Diagram to Classify Elements, Compounds and Mixtures



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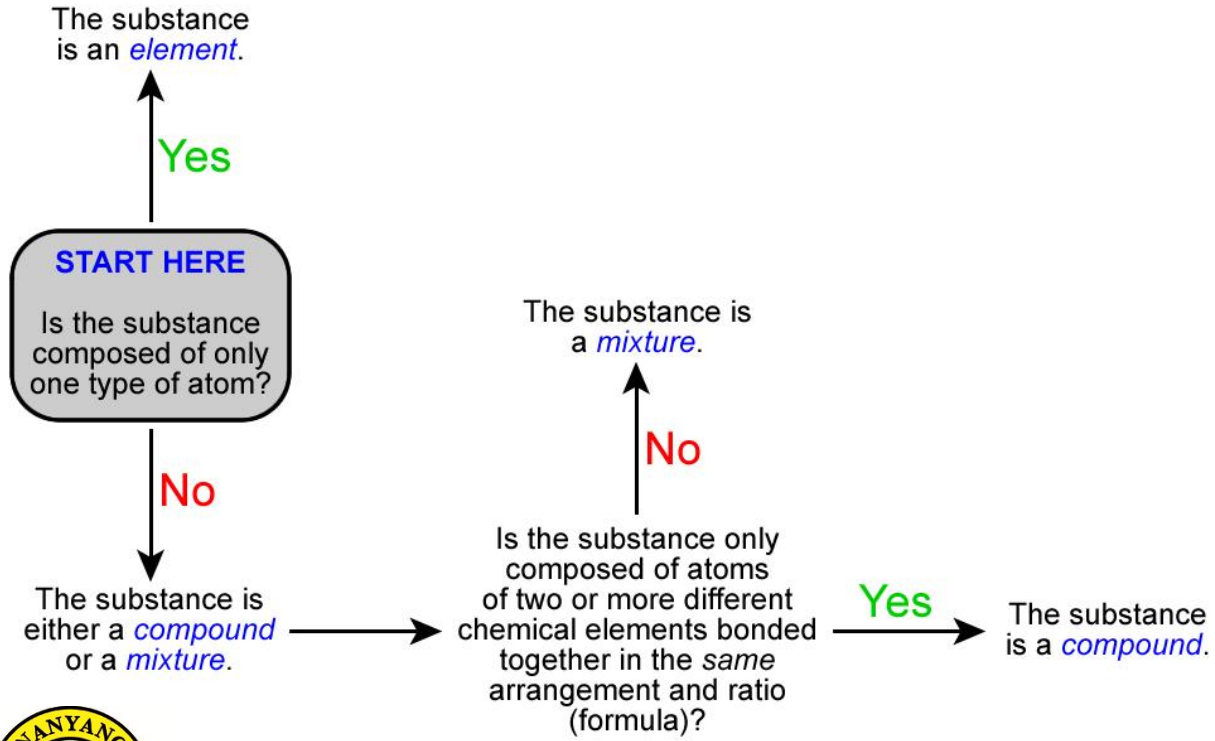

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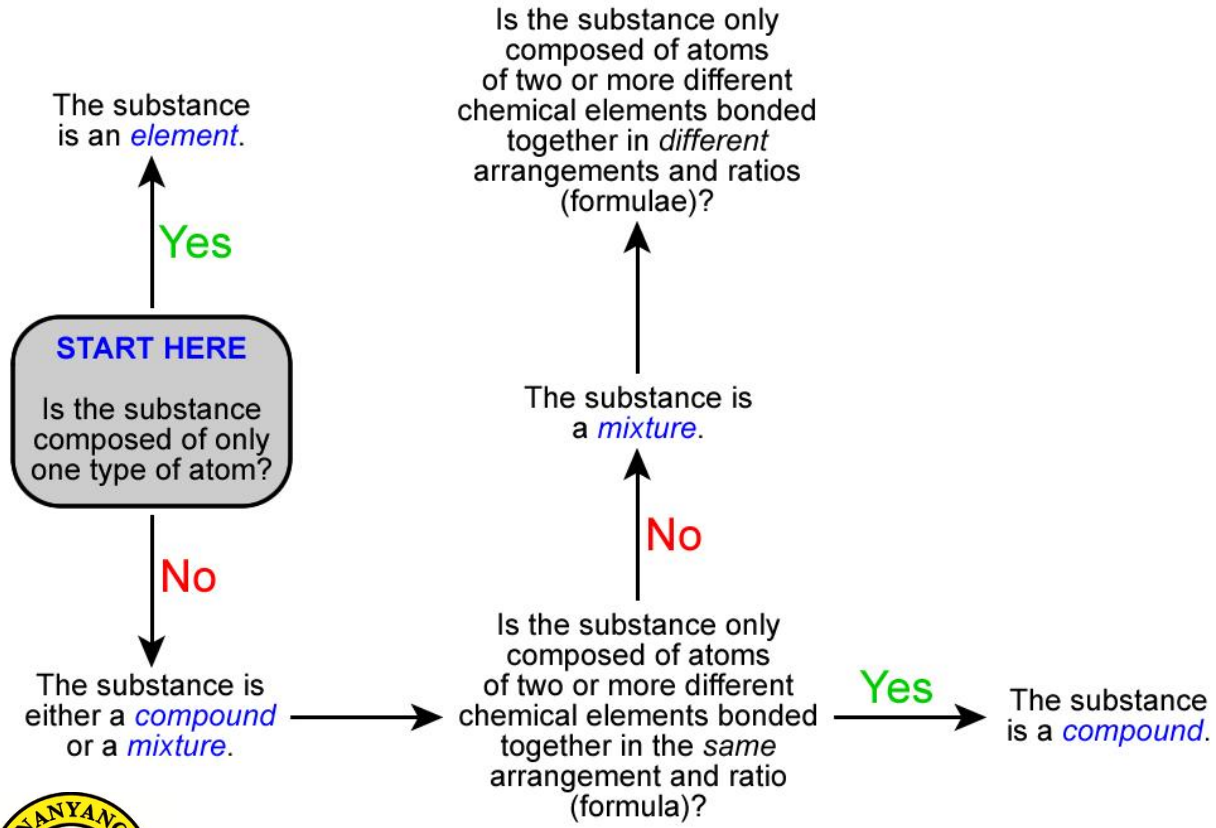

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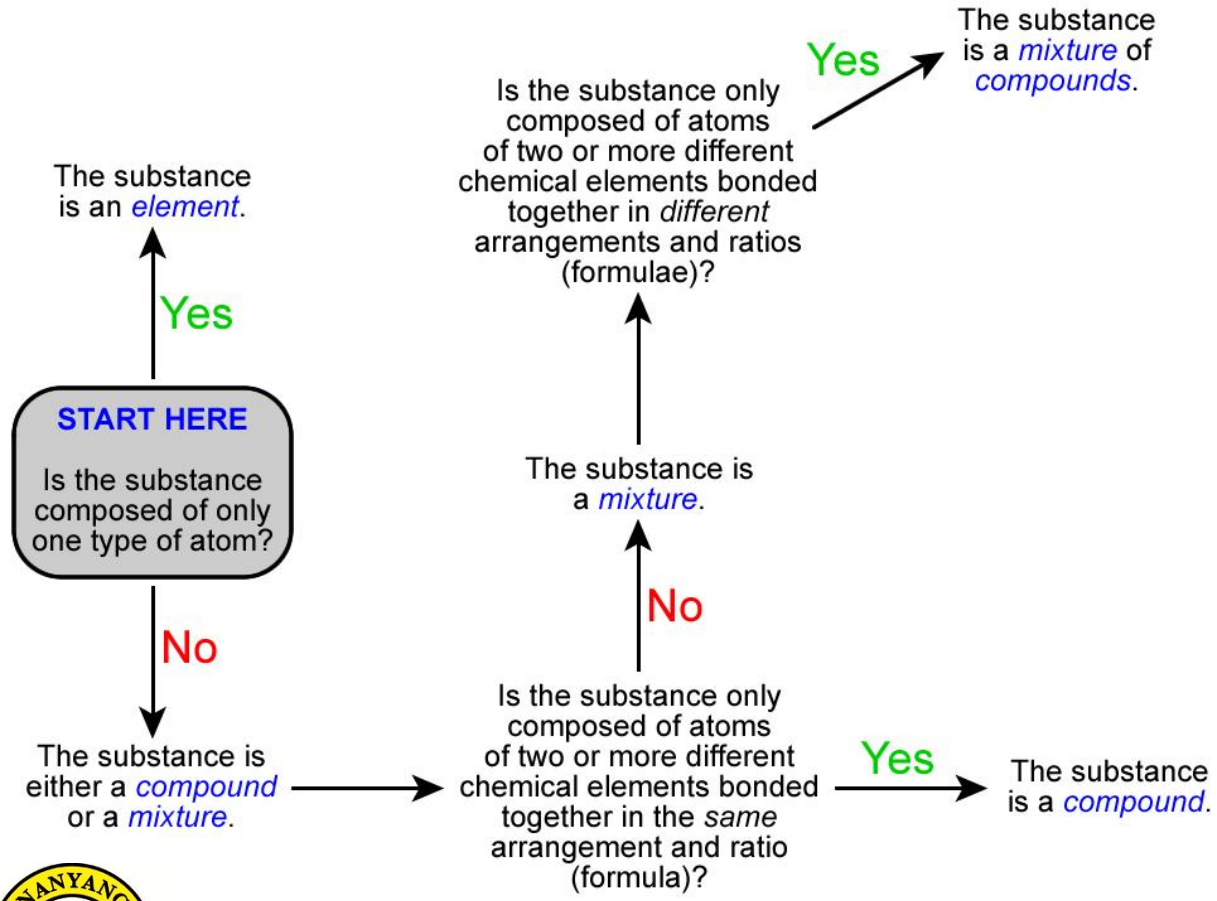
Example Flow Diagram to Classify Elements, Compounds and Mixtures



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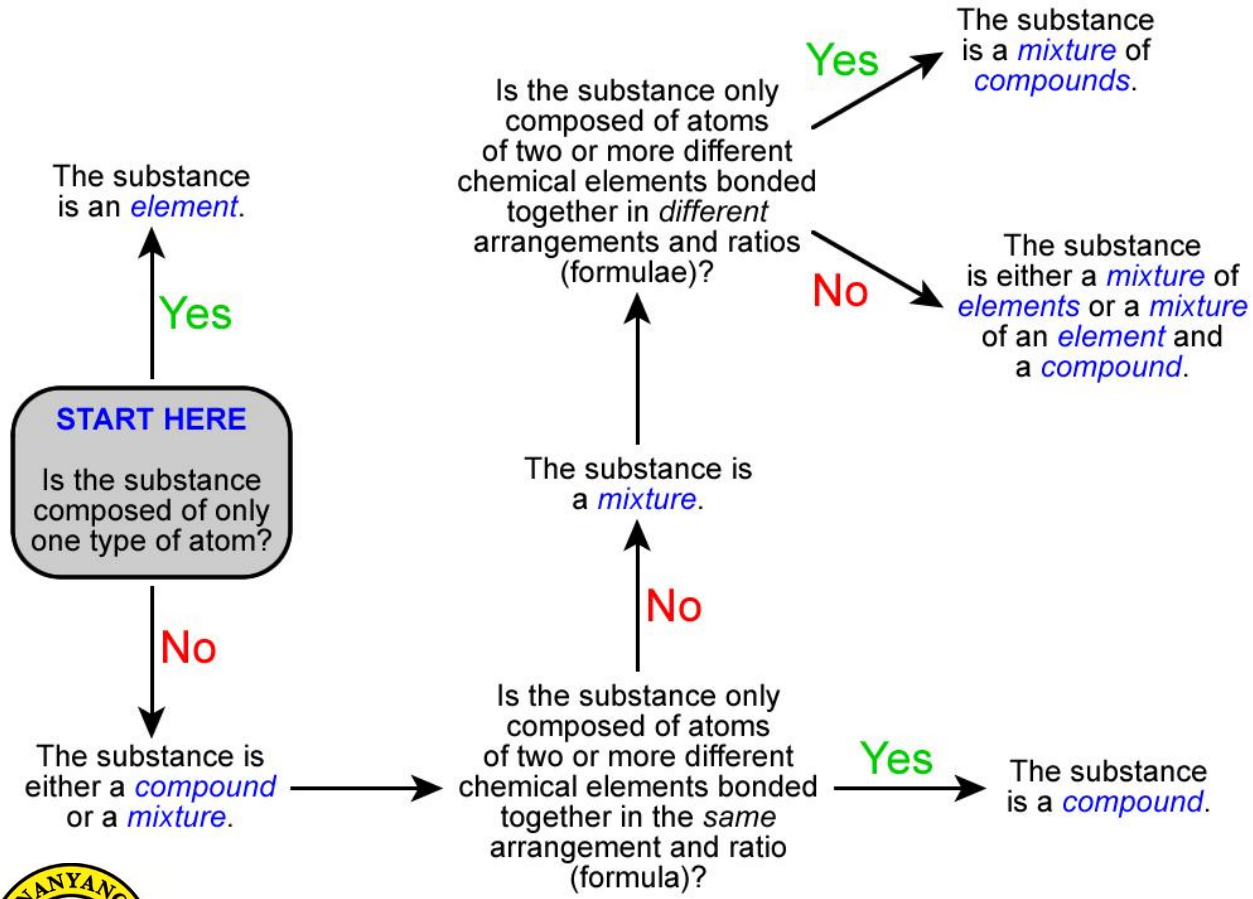

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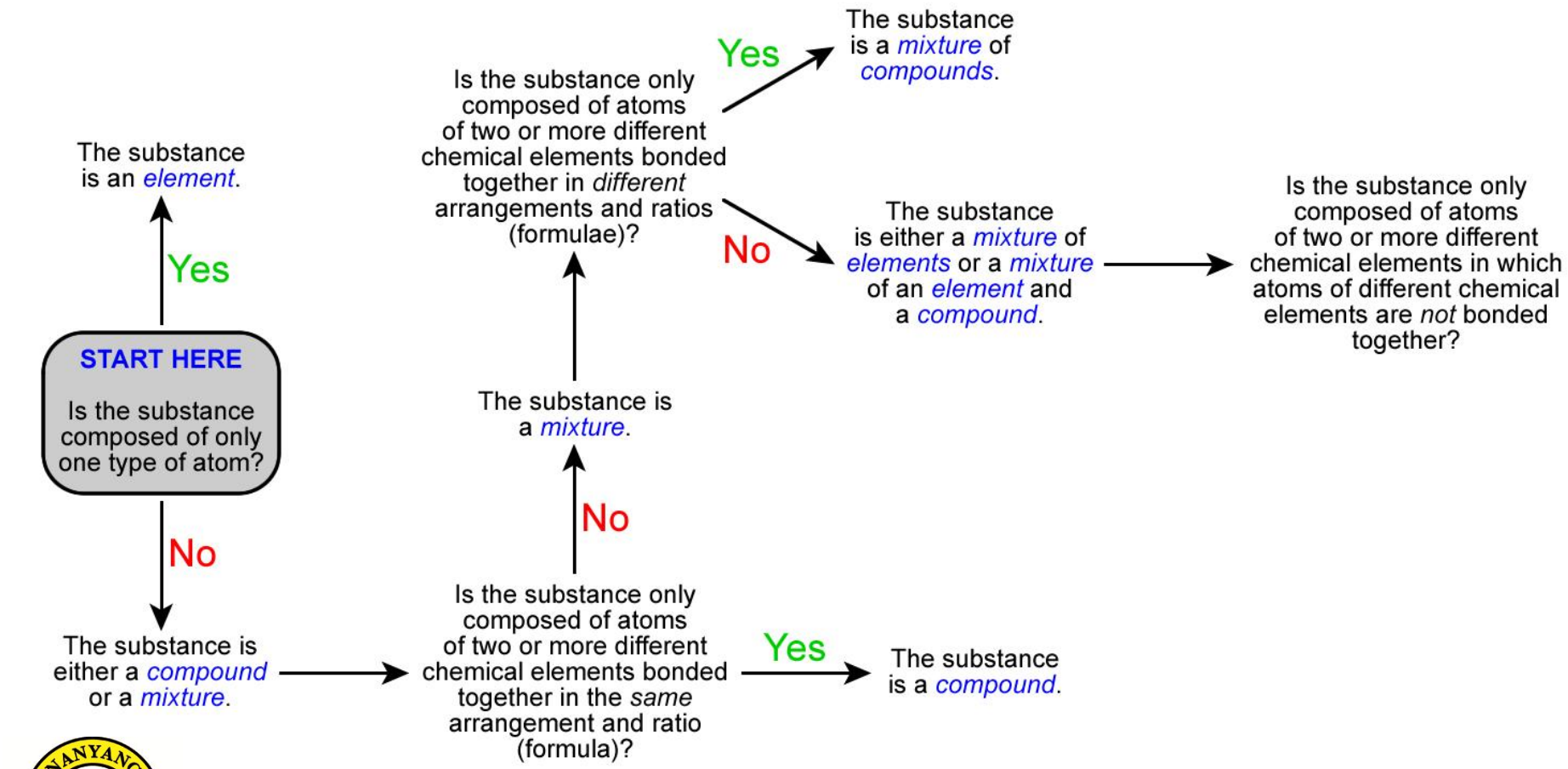

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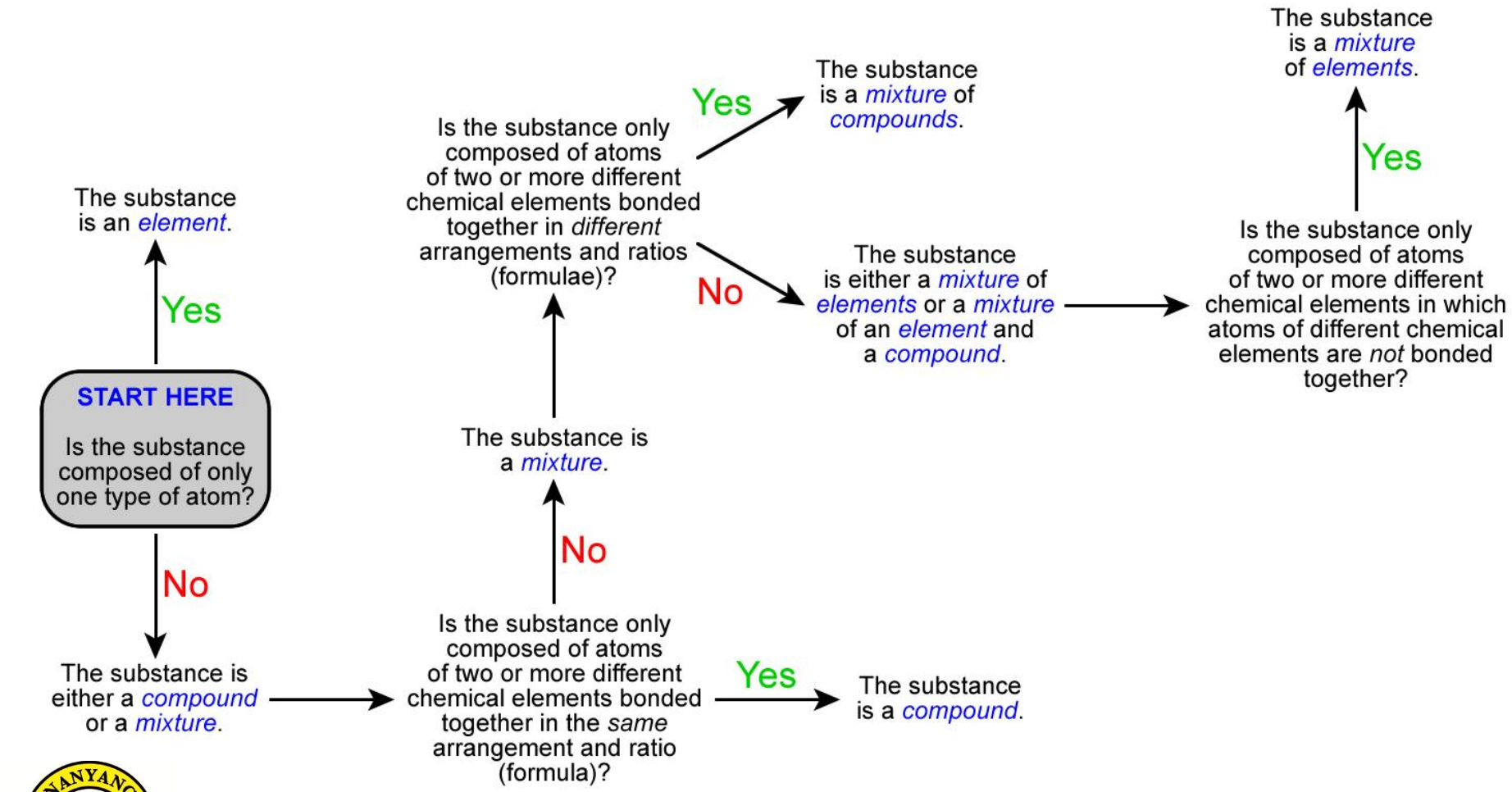

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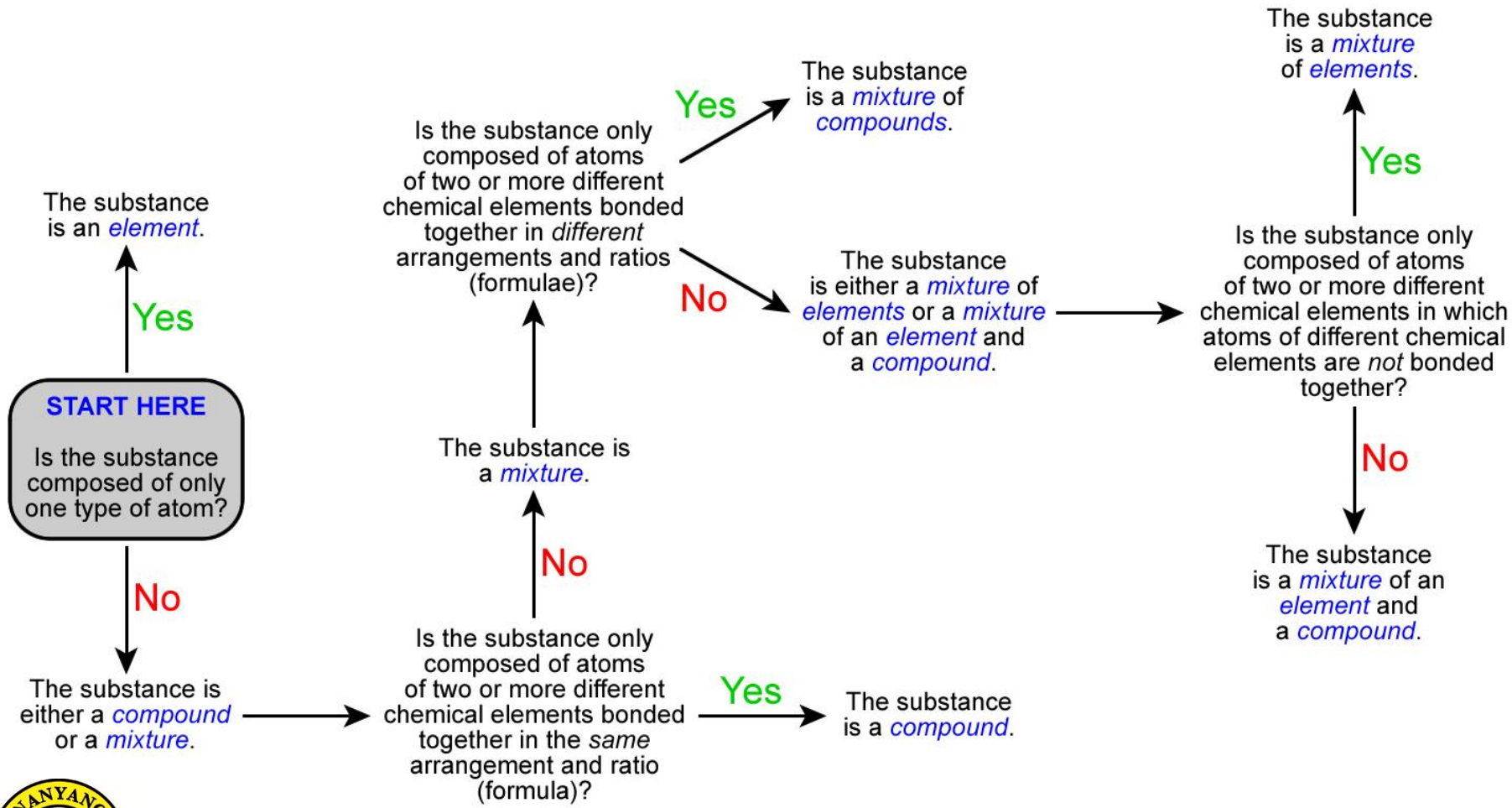


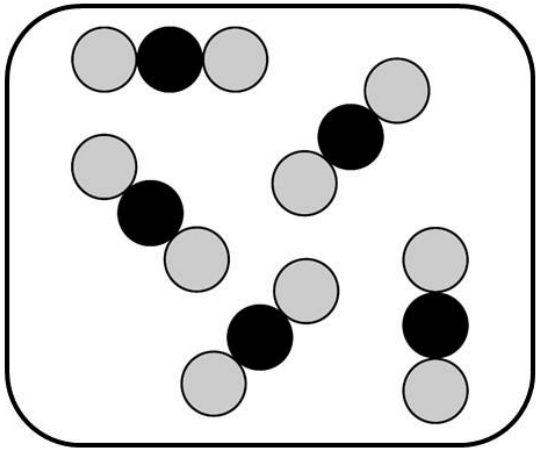
Elements, Compounds & Mixtures

Could I have some questions to check my understanding?

Elements, Compounds & Mixtures

Alison
Substance **X** is a mixture because more than one element is present.

Barbara
The elements in substance **X** can be easily separated by filtration, distillation or chromatography.



Substance **X**

Claire
Substance **X** will have a sharp melting point and boiling point.

Debbie
Substance **X** is an impure compound.

Elements, Compounds & Mixtures

- Question One: Which one of the following is a list of *elements*?

A) Air, carbon dioxide, hydrogen and silver.

B) Calcium oxide, petrol, pure water and zinc.

C) Copper, iron, oxygen and sulfur.

D) Mercury, nitrogen, salt water and steel.

Elements, Compounds & Mixtures

- Question One: Which one of the following is a list of *elements*?

A) Air, carbon dioxide, hydrogen and silver.

B) Calcium oxide, petrol, pure water and zinc.

C) Copper, iron, oxygen and sulfur. ✓

D) Mercury, nitrogen, salt water and steel.

Elements, Compounds & Mixtures

- Question Two: Which one of the following is a list of *compounds*?

A) Aluminium, carbon dioxide, pure water and zinc.

B) Copper(II) oxide, pure water, sodium chloride and sugar.

C) Brass, carbon, iron(II) sulphide and salt water.

D) Gold, polluted air, steel and sulfur.

Elements, Compounds & Mixtures

- Question Two: Which one of the following is a list of *compounds*?

A) Aluminium, carbon dioxide, pure water and zinc.

B) Copper(II) oxide, pure water, sodium chloride and sugar. ✓

C) Brass, carbon, iron(II) sulphide and salt water.

D) Gold, polluted air, steel and sulfur.

Elements, Compounds & Mixtures

- Question Three: Which one of the following is a list of *mixtures*?

A) Air, bronze, steel and tap water.

B) Copper, gold, platinum and silver.

C) Iron, pewter, sodium chloride and sulfur.

D) Oxygen, stainless steel, sugar and zinc oxide.

Elements, Compounds & Mixtures

- Question Three: Which one of the following is a list of *mixtures*?

A) Air, bronze, steel and tap water. ✓

B) Copper, gold, platinum and silver.

C) Iron, pewter, sodium chloride and sulfur.

D) Oxygen, stainless steel, sugar and zinc oxide.

Elements, Compounds & Mixtures

Presentation on
Elements, Compounds and Mixtures
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Elements, Compounds & Mixtures

- Answers to the Card Sorting Activity

→ Elements Cards…	→ Compounds Cards…	→ Mixtures Cards…
3	2	1
5	4	10
6	8	12
7	15	13
9	16	14
11	18	17
19	21	22
20	23	
24	25	

Elements, Compounds & Mixtures

- Answers to the Card Sorting Activity

→ Mixture of Elements	→ Mixture of Compounds	→ Mixture of Elements and Compounds
Cards…	Cards…	Cards…
12	13	1
14	22	10
17		