

14–16 years

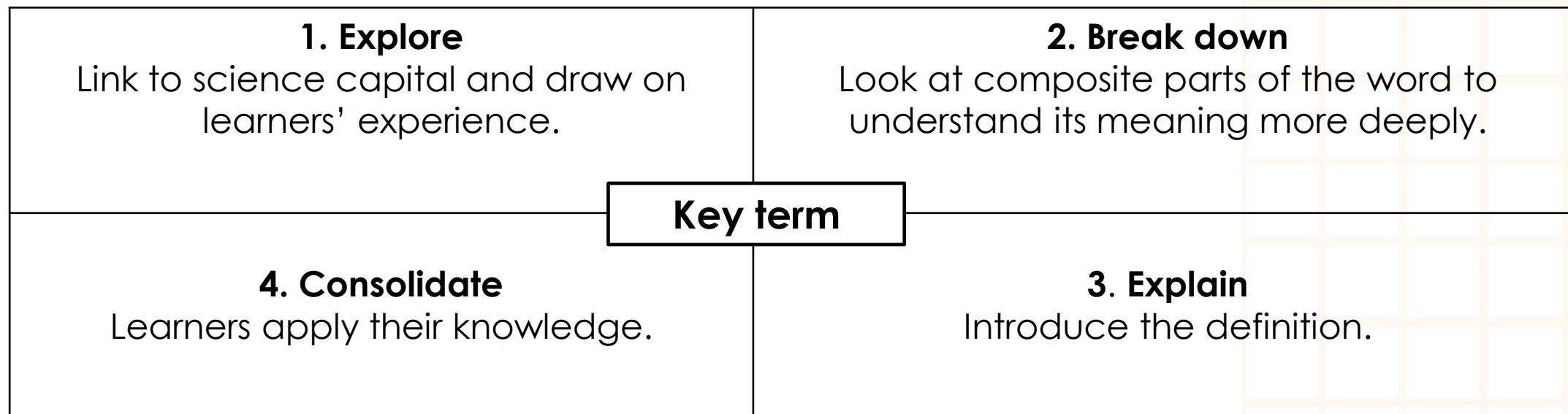


Structure and bonding: Frayer models

Frayer models

Frayer models are a simple but effective way to develop learners' understanding of a new piece of vocabulary. You will see what your learners already know and identify any misconceptions they have.

There are four stages learners can work through, but you can adapt this model to best suit your learners. You can guide learners through all quadrants, but particularly quadrant 2 works best as a teacher-led discussion.



Find more guidance, including tips, adaptations and further reading, in the teacher notes:

[rsc.li/444TbFh](https://www.rsc.li/444TbFh)



1. What does the word atom mean to you? Where have you come across this word (or parts of this word) before?

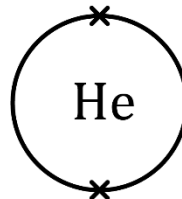
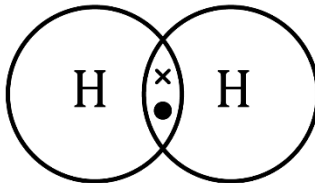
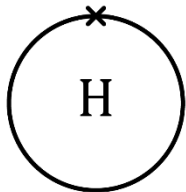
2. Break down atom

a

tom

Atom

4. Circle the diagram below that best illustrates a single atom of hydrogen



3. Write down what you think atom means

Copy the definition from the key terms list



1. What does the word compound mean to you? Where have you come across this word (or parts of this word) before?

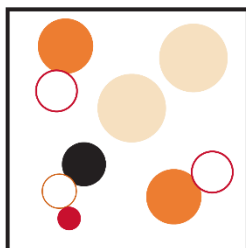
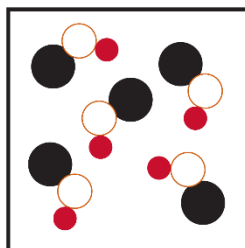
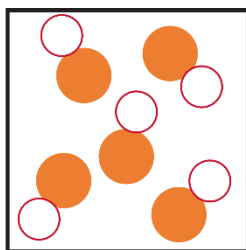
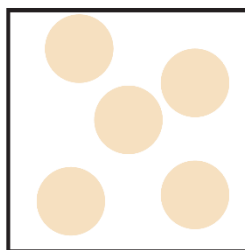
2. Break down compound

com

pound

Compound

4. Circle the boxes that contain only one compound



3. Write down what you think compound means

Copy the definition from the key terms list



1. What does the word molecule mean to you? Where have you come across this word (or parts of this word) before?

2. What do we know about molecules?

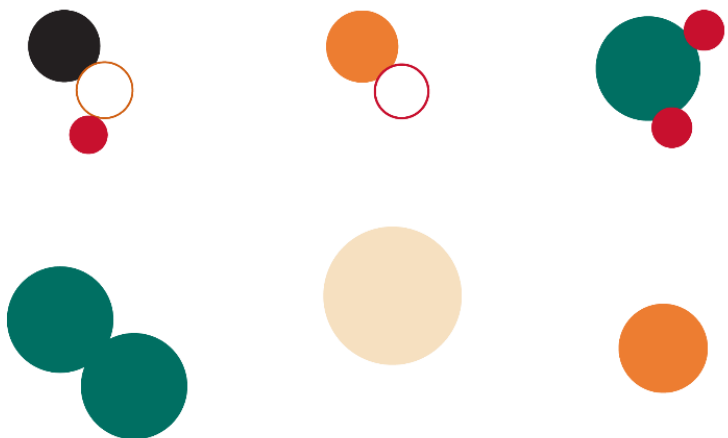
Molecules are made up of atoms.

They can be big (can you think of an example?) or small (can you think of an example?)

Molecules contain chemical bonds.

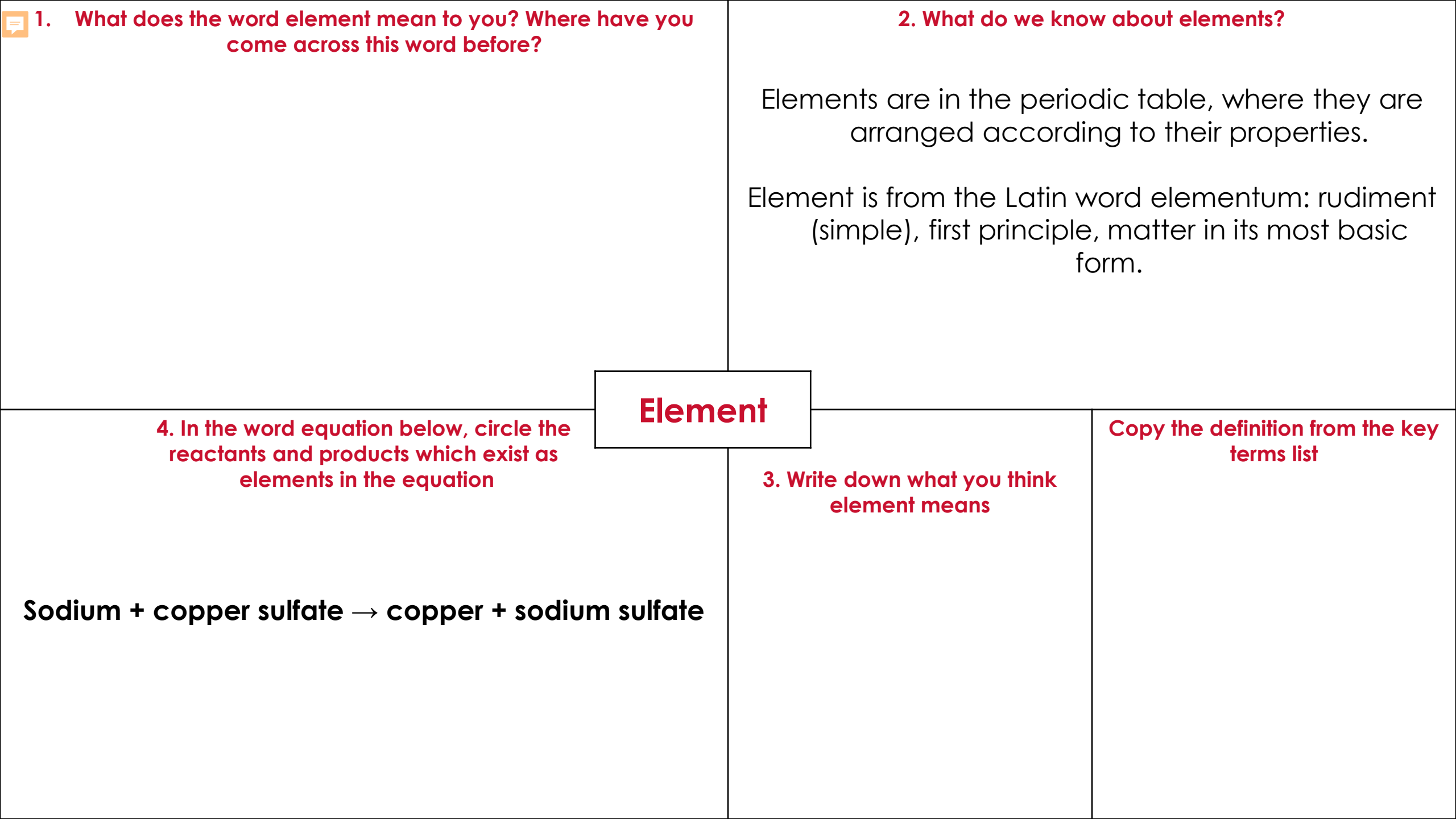
Molecule

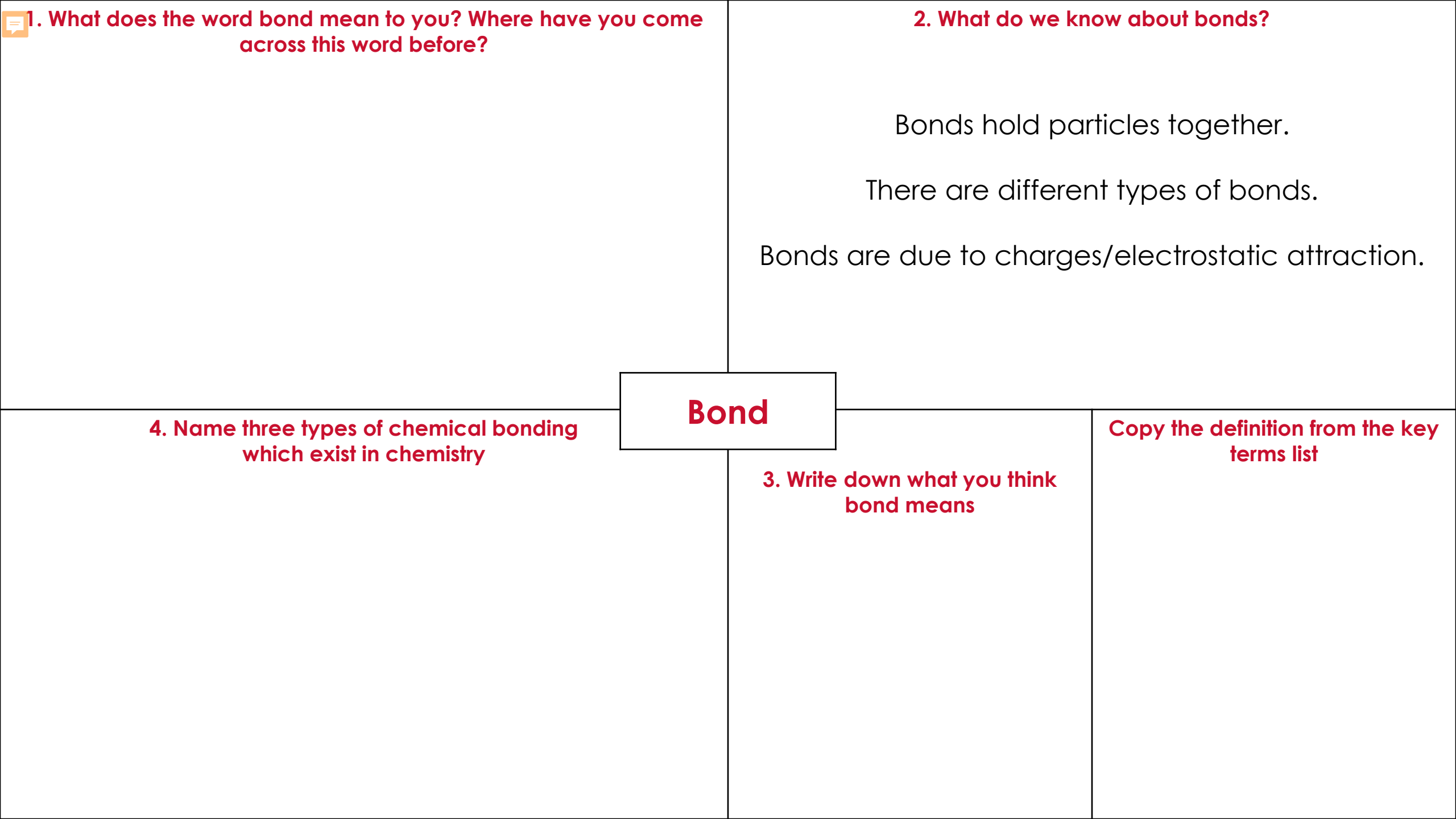
4. Draw a ring around the images which represent molecules below




3. Write down what you think molecule means

Copy the definition from the key terms list





 1. What does the word bond mean to you? Where have you come across this word before?

2. What do we know about bonds?

Bonds hold particles together.

There are different types of bonds.

Bonds are due to charges/electrostatic attraction.

Bond

4. Name three types of chemical bonding which exist in chemistry

3. Write down what you think bond means

Copy the definition from the key terms list



1. What does the word ion mean to you? Where have you come across this word (or parts of this word) before?

2. What do we know about ions?

Ions are charged.

Ions form ionic compounds.

Ions are attracted to opposite charges.

Ion

4. Draw the electron configuration diagram for a magnesium ion

3. Write down what you think ion means

Copy the definition from the key terms list

1. What does the word atom mean to you? Where have you come across this word (or parts of this word) before?

2. Break down atom

A

Not

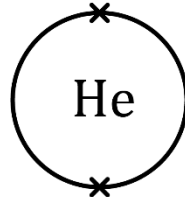
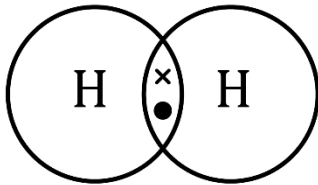
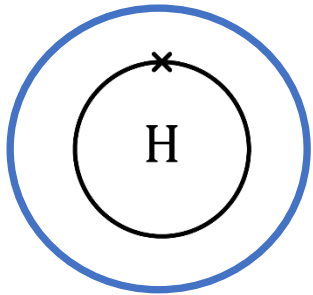
tom

From word 'tomos' meaning to cut

Overall meaning: uncuttable or indivisible

Atom

4. Circle the diagram below that best illustrates a single atom of hydrogen



3. Define atom, in a chemistry context

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

1. What does the word compound mean to you? Where have you come across this word (or parts of this word) before?

2. Break down compound

com

With, together

pound

Originally from 'position', meaning 'to put'

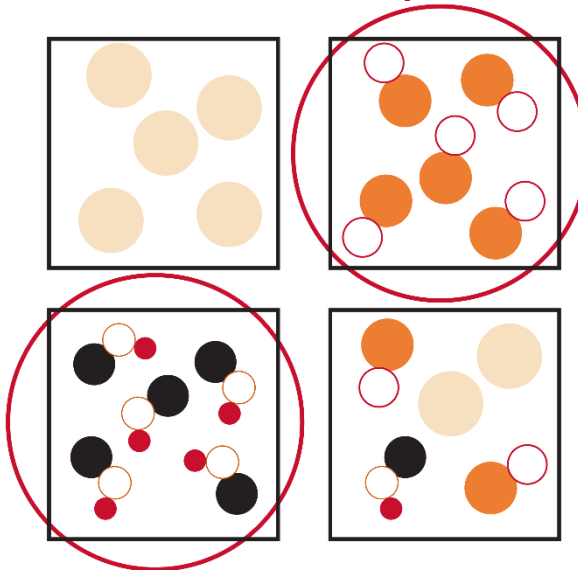
Overall meaning: to put together

Compound

3. Define compound, in a chemistry context

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

4. Circle the boxes that contain only one compound



1. What does the word molecule mean to you? Where have you come across this word (or parts of this word) before?

2. What do we know about molecules?

Molecule

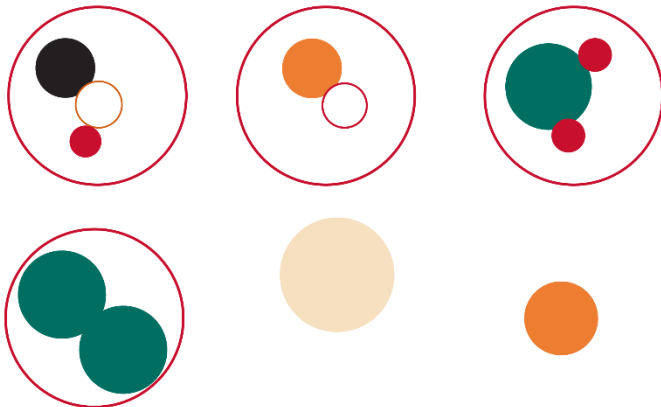
From French word 'molécule'

Means 'extremely minute particle'

First used as a scientific word by Amedeo Avogadro in 1811

Molecule

4. Draw a ring around the images which represent molecules below



3. Define molecule, in a chemistry context

Two or more atoms connected by chemical bonds.

1. What does the word element mean to you? Where have you come across this word before?

2. What do we know about elements?

Element

From Latin word 'elementum'

Rudiment (simple), first principle, matter in its most basic form

Element

4. In the word equation below, circle the reactants and products which exist as elements in the equation

3. Define element, in a chemistry context

A pure substance made of only one type of atom.

Sodium + copper sulfate → **copper** + sodium sulfate

1. What does the word bond mean to you? Where have you come across this word before?

2. What do we know about bonds?

Bond

From Proto-Indo-European word 'bhendh '

Meaning 'to bind or fasten'

Comes from the same root word as band, bandage, bandana, bundle and ribbon

Bond

4. Name three types of bonding which exist in chemistry

Ionic
Covalent
Metallic

3. Define bond, in a chemistry context

A strong (electrostatic) force of attraction holding atoms together.

1. What does the word ion mean to you? Where have you come across this word (or parts of this word) before?

2. What do we know about ions?

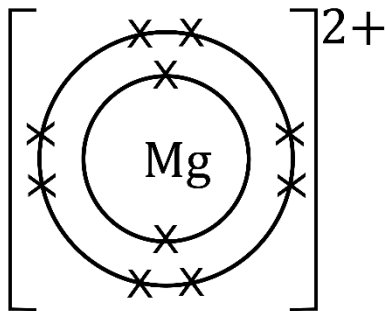
Ion

Meaning 'to go'

It is called this because ions move towards the opposite charge

Ion

4. Draw the electron configuration diagram for a magnesium ion



3. Define ion, in a chemistry context

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

1. Explore

Link to science capital and draw on learners' experience.

2. Break down/'what do we know about X'?

Look at composite parts of the word to help unpack its meaning.

Or invite learners to suggest what, as a class, they already know about the key term (with the help of a few bullet points).

**<Select
your key
term>**

4. Consolidate

Learners apply their knowledge.

3. Explain

Introduce the definition.