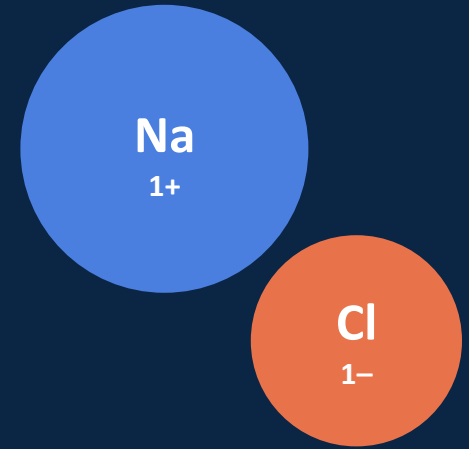


IONIC BONDING

The Jagged Edge Puzzle

Build compounds by matching every charge, tab for notch.



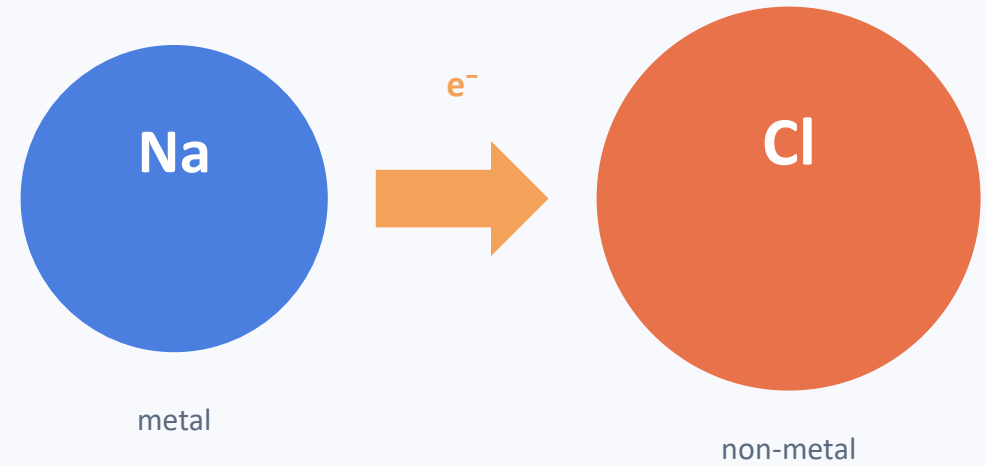
THE BIG IDEA

What Is an Ionic Bond?

A metal atom loses one or more electrons to become a positively charged **cation**.

A non-metal atom gains those electrons to become a negatively charged **anion**.

The oppositely charged ions attract each other — that electrostatic attraction is the ionic bond.



Cations Wear Their Charge as Tabs

Each jagged tab sticking out of a cation tile equals one unit of positive charge.



Sodium



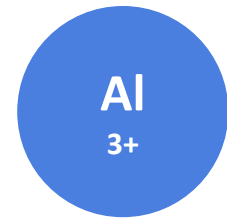
1 tab = 1+



Magnesium



2 tabs = 2+



Aluminium

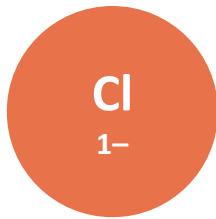


3 tabs = 3+

MEET THE TILES

Anions Wear Their Charge as Notches

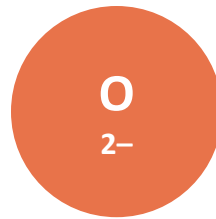
Each jagged notch carved into an anion tile equals one unit of negative charge.



Chloride



1 notch = 1-



Oxide



2 notches = 2-



Nitride



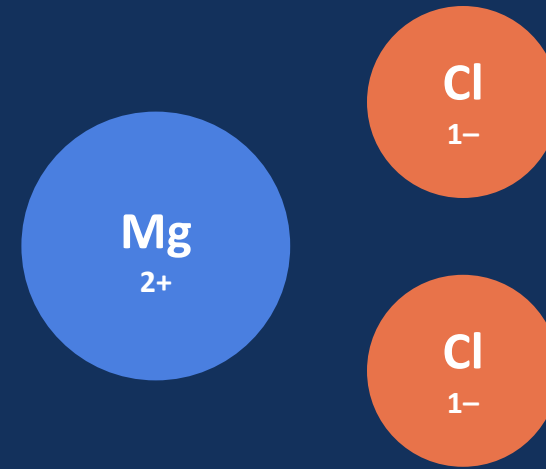
3 notches = 3-

THE CORE RULE

Every Tab Needs a Notch

Ions can only lock together into a stable compound when **every jagged tab is filled by a notch** — nothing left sticking out.

That physical fit is a stand-in for a chemistry rule: the total positive charge must exactly equal the total negative charge. This is **electrical neutrality**.



2 tabs, 2 notches — balanced

$$\text{Total (+)} = \text{Total (-)}$$

That balance is the only requirement for a valid ionic formula.

WORKED EXAMPLE

Building MgCl_2 Step by Step

1

Start with Mg^{2+}

Magnesium has a 2+ charge, so its tile has 2 jagged tabs to fill.

2

Bring in Cl^- tiles

Each chloride ion has 1 notch. One Cl^- can only fill one tab.

3

Check the balance

2 tabs need 2 notches — so exactly two Cl^- ions are needed.

4

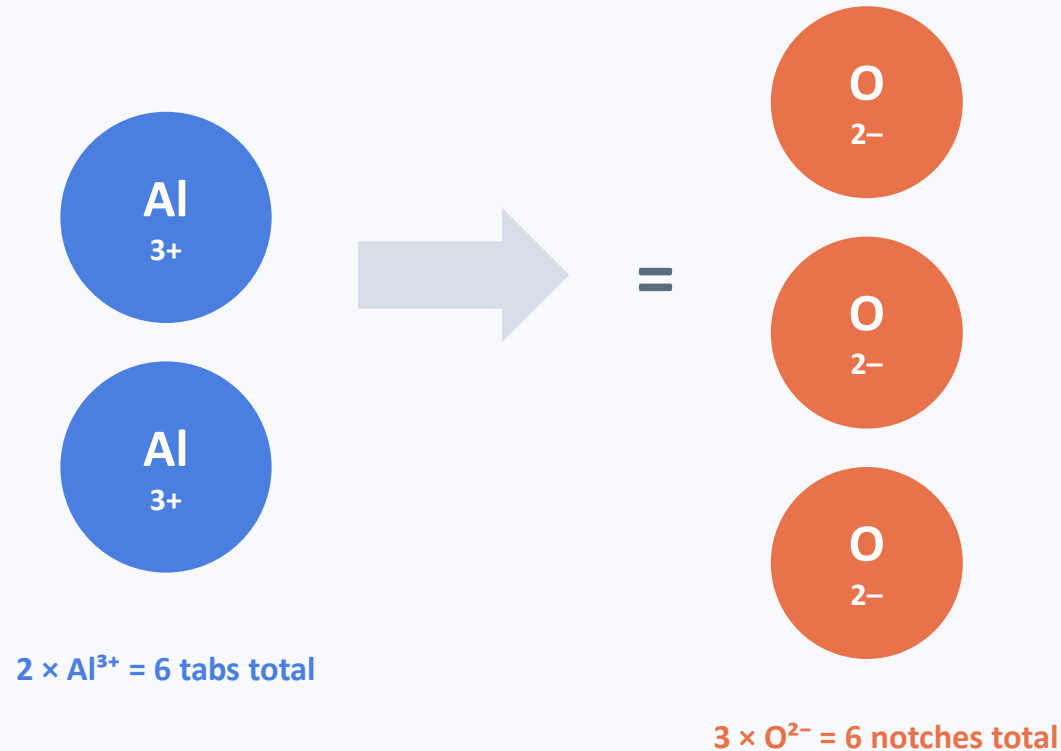
Lock it in

Every tab meets a notch. The compound formula is MgCl_2 .

WORKED EXAMPLE — HARDER CASE

When Both Sides Need Multiples: Al_2O_3

Al^{3+} has 3 tabs. O^{2-} has 2 notches. Neither number divides evenly into the other — so this time, **both** ions need multiples.



6 tabs meet 6 notches exactly — the compound locks with 2 aluminium ions for every 3 oxide ions. This is the trickiest ratio type in the activity, and it scores the most points in Timed Mode.

Three Ways to Practise

1

Guided Activity

8 target compounds, from NaCl through to Al_2O_3 . You're told which ions to use — you work out the ratio.

TAB IN THE APP

2

Playground

Full palette of 6 cations and 6 anions.
Build any valid compound you can think of, freely.

TAB IN THE APP

3

Check Understanding

A 5-question quiz on naming, formulas, and the logic behind ionic ratios.

TAB IN THE APP

The 3-Minute Challenge

Build as many different valid compounds as you can before the clock runs out. Points scale with how tricky the ratio is.

+10

Simple 1:1 ratio

e.g. NaCl

+15

1:n or n:1 ratio

e.g. MgCl₂, AlCl₃

+25

Both sides multiply

e.g. Al₂O₃, Mg₃N₂

Re-locking a compound you've already found this round scores 0 — so hunt for something new each time.

KEY TAKEAWAYS

Na
1+

Charge Balance Is the Whole Game

- 1 Tabs on a cation and notches on an anion each equal that ion's charge.
- 2 A compound only locks when total positive charge equals total negative charge.
- 3 The formula must always be written in the simplest whole-number ratio.
- 4 Practise it three ways: Guided, Playground, and the Check Understanding quiz.

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