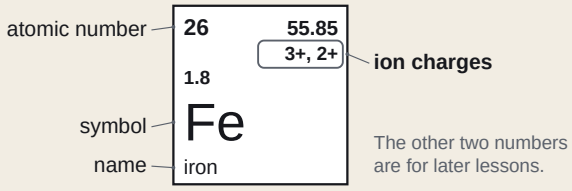
A1 · Recall: ions, and names and formulas · Notes

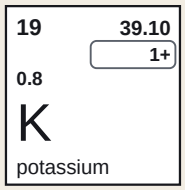
Goals: Find an ion's charge using the Data Booklet and the group number. Write formulas and names for ionic compounds, including metals with more than one charge and polyatomic ions. Write formulas and names for molecular compounds, and tell the two kinds of compound apart.

Name: _____ Date: _____

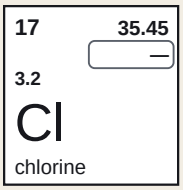
Slide 1 of 7 · Ion charges in the Data Booklet

In Science 10 you met ions. Today you find their charges in the Data Booklet. Every formula in this lesson starts from those charges.





K^+, a metal ion



group 17
17 − 18 = −1

Cl^-, a non-metal ion

Key ideas

An _____ is an atom with a charge. It has lost or gained _____.

In an element box, the ion charges are under the number at the _____.

A metal atom _____ electrons, so its ion is _____.

A non-metal atom gains electrons, so its ion is _____. Its charge is the group number minus _____.

Example

Sulfur is in group 16. What is the charge of a sulfide ion?

Try it

Nitrogen is in group 15. What is the charge of a nitride ion? Write its symbol.

Slide 2 of 7 · An ionic formula adds to zero

On the last slide you found ion charges. Now you use them to write a formula. The plus and minus charges in a formula must add to zero.

two Al^{3+}



three O^{2-}



6+ and 6− add to zero.

Al_2O_3

the formula

Key ideas

An _____ is made of positive ions and negative ions.

The plus and minus charges must add to _____.

A small number after a symbol is a _____. It says how many of that ion there are.

A formula uses the _____ whole-number ratio of ions.

Example

Strontium is Sr^{2+} and chloride is Cl^{-}. Write the formula of strontium chloride.

Try it

Potassium is K^{+} and sulfide is S^{2-}. Write the formula of potassium sulfide.

Slide 3 of 7 · Method: how to write an ionic formula

You just wrote three formulas with charge blocks. You did the same four things each time. Here they are as steps.

1. **Find** each ion's charge.
2. **Balance** the charges to zero.
3. **Write** the positive ion first, with subscripts.
4. **Reduce** to the simplest ratio.



Check: positive total and negative total add to zero.

Used again in: lessons A3 and A4, and Unit D

Key ideas

Step 1: _____ the charge of each ion.

Step 2: _____ the charges so they add to zero.

Step 3: write the _____ ion first, with subscripts.

Step 4: _____ to the simplest ratio.

Example

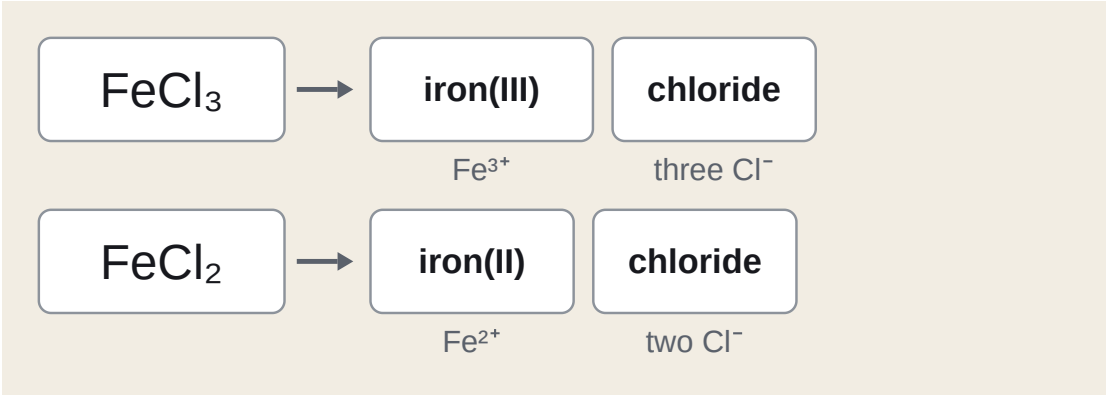
Use the four steps to write the formula of aluminium sulfide.

Try it

Use the four steps to write the formula of magnesium nitride.

Slide 4 of 7 · Naming ionic compounds

You can now write an ionic formula. Next you give the compound a name. The name has two parts, in the same order as the formula.



Key ideas

Name the _____ ion first. A metal ion keeps the name of the metal.

Name the negative ion second. Change its ending to _____.

A _____ gives the charge of a metal that has more than one charge.

A _____ is a group of atoms that shares one charge.

Example

The ions of copper are Cu^{2+} and Cu^{+}. What is the name of Cu_2O?

Try it

The ions of iron are Fe^{3+} and Fe^{2+}. What is the name of FeS?

Slide 5 of 7 · Molecular formulas and names

Every compound so far had a metal in it. Now look at compounds made of two non-metals. They are built and named in a different way.

1	2	3	4	5	6	7	8	9	10
mono	di	tri	tetra	penta	hexa	hepta	octa	nona	deca

CCl_4 → **carbon tetrachloride**

NF_3 → **nitrogen trifluoride**

Key ideas

Two non-metals join into a _____, a group of atoms joined together.

A _____ counts the atoms in one molecule. Its numbers are never _____.

A molecular name counts the atoms with _____.

Seven elements exist as _____ molecules, such as H_2 and O_2.

Example

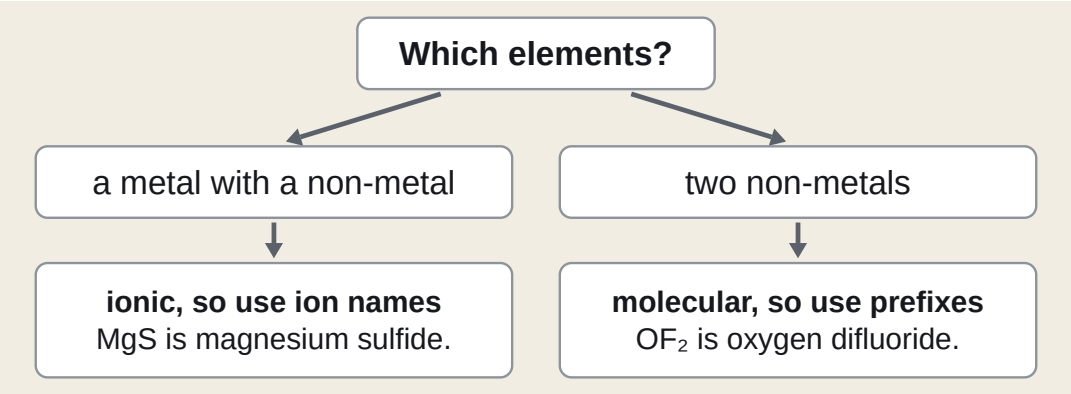
What is the name of CS_2?

Try it

What is the name of SF_2?

Slide 6 of 7 · Ionic or molecular?

You now have two ways to name a compound. Slide 3 used ion names and slide 4 used prefixes. Before you name a compound, decide which way fits.



Key ideas

Look at the _____ in the formula first.

A metal with a non-metal makes an _____ compound. Use ion names.

Two non-metals make a _____ compound. Use prefixes.

Example

Is PCl_3 ionic or molecular? What is its name?

Try it

Is $CaBr_2$ ionic or molecular? What is its name?

Slide 7 of 7 · Method: how to name a compound

On the last slide you sorted a compound, then named it. These four steps put the sorting and the naming in order.

1. **Sort** the compound. Does it have a metal?
2. **Use** ion names if it has a metal.
3. **Add** a Roman numeral if the metal has two charges.
4. **Use** prefixes if it has two non-metals.



Check: the name leads back to one formula only.

Used again in: lesson A3 and Units C and D

Key ideas

Step 1: _____ the compound. Does it have a metal?

Step 2: use _____ if it has a metal.

Step 3: add a _____ if the metal has two charges.

Step 4: use _____ if it has two non-metals.

Example

Use the four steps to name Fe_2O_3.

Try it

Use the four steps to name $SiCl_4$.