

Chemistry 11 (1) - Unit 4 Notes

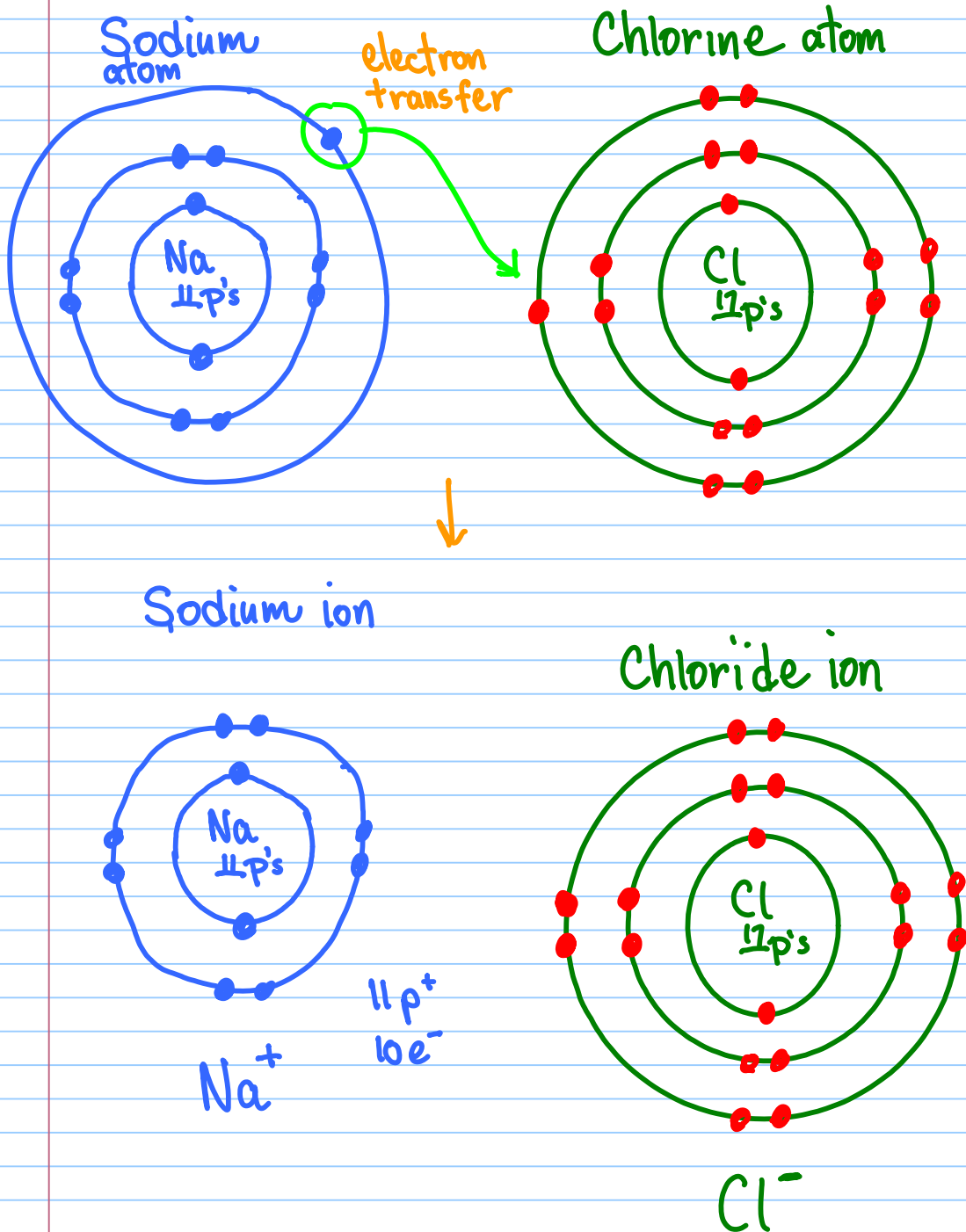
Note Title

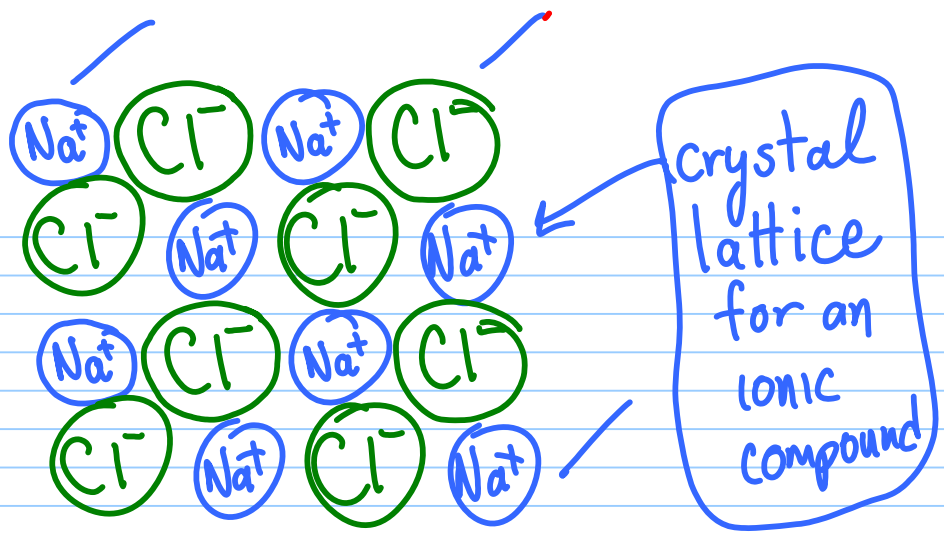
2/28/2008

Thurs Feb 28/08

FORMULAS AND NAMES

Bohr Models

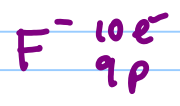
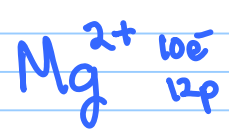
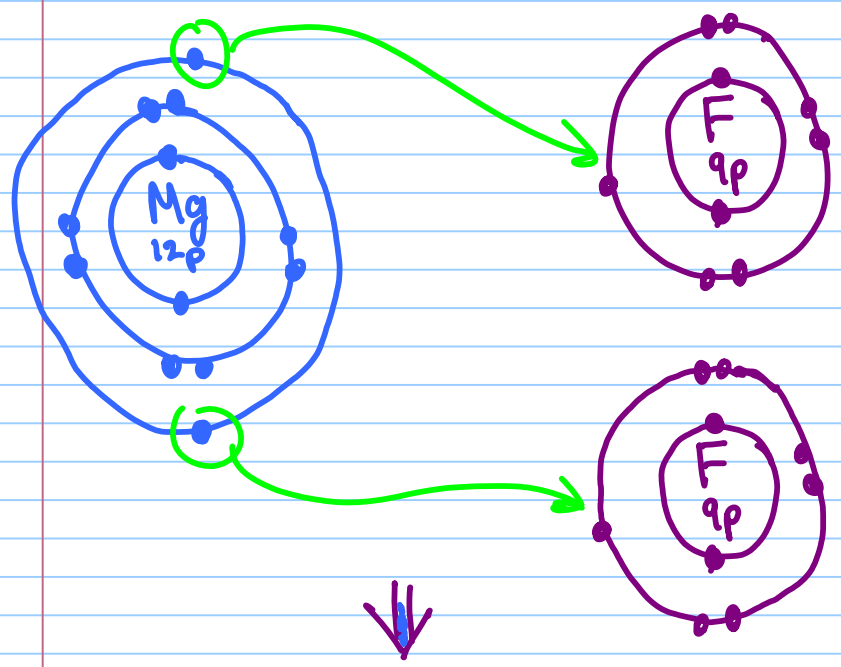




tastes salty

Formula for sodium chloride
 NaCl

Consider $\text{Mg} \begin{matrix} 12e \\ 12p \end{matrix}$



Chemical formula for
magnesium fluoride

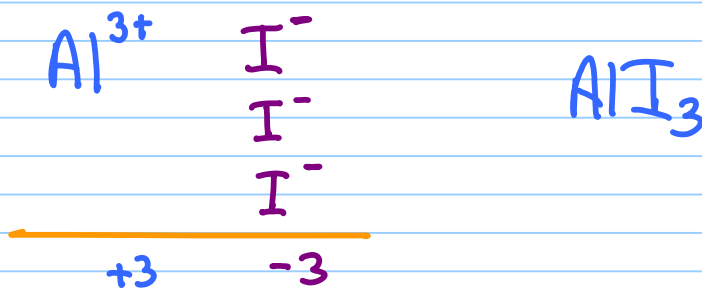
Friday Feb 29



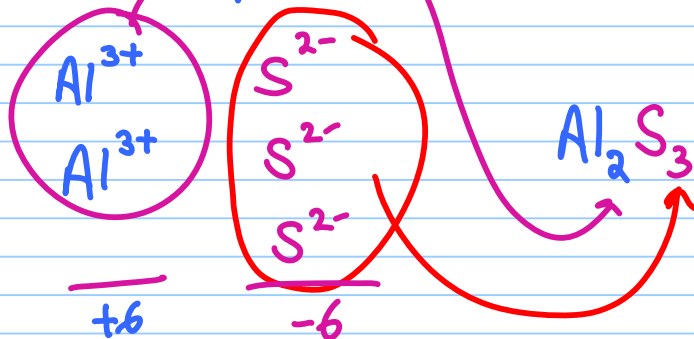
2 methods

⊕ & ⊖ charges must add up to "0"

eg) aluminum iodide

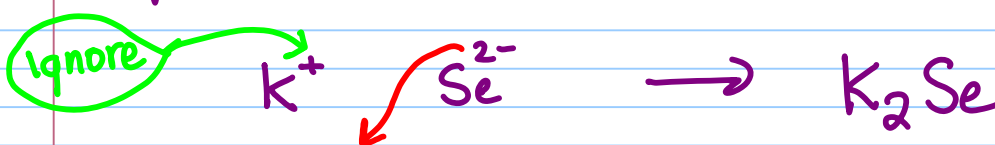


aluminum sulphide

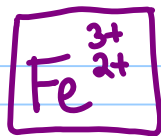


Drop & Swap

potassium selenide



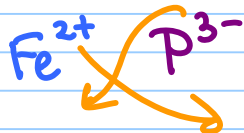
Elements with more than one charge (multivalent)



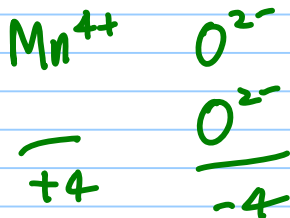
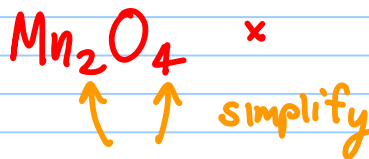
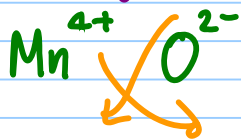
iron(III) bromide



iron(II) phosphide

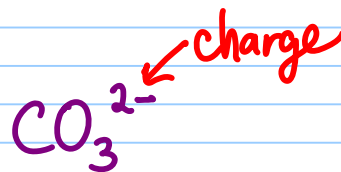
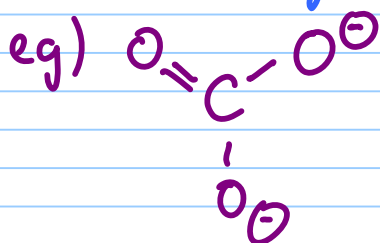


manganese(IV) oxide



Polyatomic Ions (PAI's)

Groups of different atoms with a net charge



NOT the charge !!

Name: Carbonate

Mon Mar 3 / 08

NEVER change

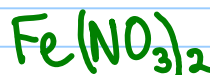
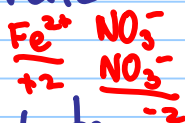
the subscripts on a PAI!!!

eg) nitrate NO_3^- ← charge

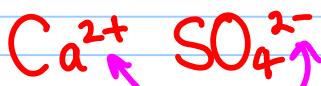
↑ Don't mess with this!!

examples

iron (II) nitrate Fe^{2+} NO_3^-



calcium sulphate



equal & opposite → cancel

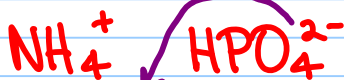


If there is a # here a PAI needs brackets

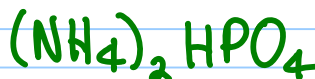
potassium dichromate



ammonium monohydrogen phosphate



↑
PAI

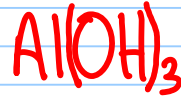


Hydroxide Issues

aluminium hydroxide

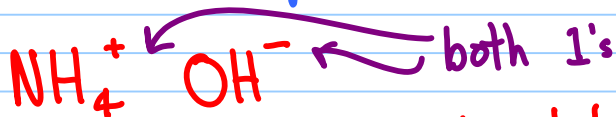


This IS
a PAI

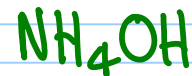


you **MUST**
have brackets

ammonium hydroxide



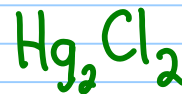
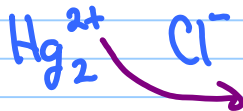
both 1's
no brackets



Ex 4 a-t p. 71 (due Tues Mar 4)

Note: mercury (I) is Hg_2^{2+}

eg) mercury (I) chloride



In this case
we don't
simplify!

mercury (II) is normal

eg) mercury (II) nitrate



NAMING IONIC COMPOUNDS

Two Types → Binary (2 Elements Only)
→ With PAI's (>2 elements)

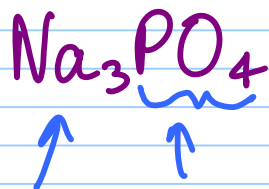
Binary

Metal
(written first) + non-metal
(ends in ide)

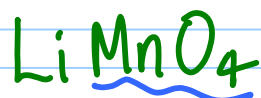
eg) Na_3P	sodium phosphide
K_2O	potassium oxide
AlI_3	aluminium iodide 😞
CaSe	calcium selenide
NaF	sodium fluoride

Compounds With PAI's

PAI's do **NOT**
change their names!



sodium phosphate

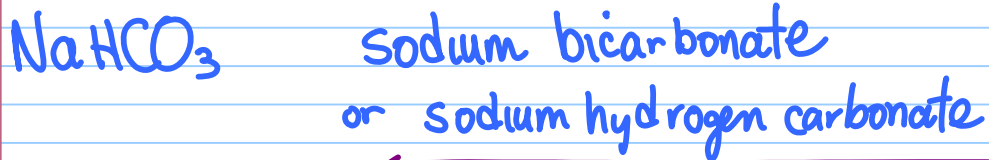


lithium permanganate

if > 2 cap. letters
there must be a PAI



Calcium dihydrogen phosphate

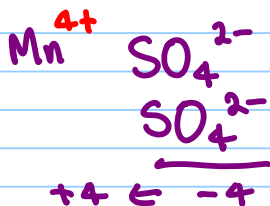
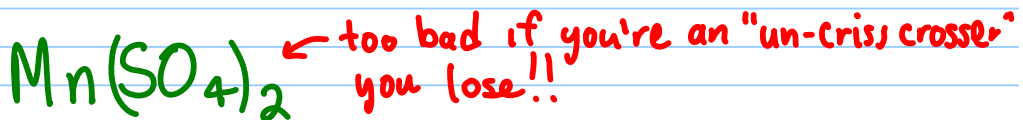
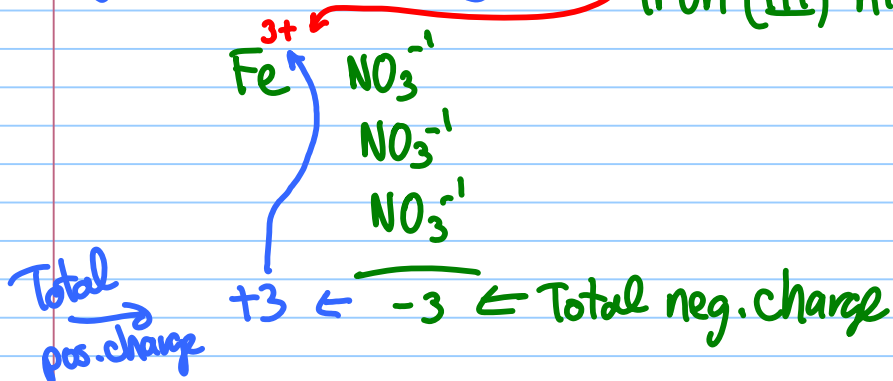
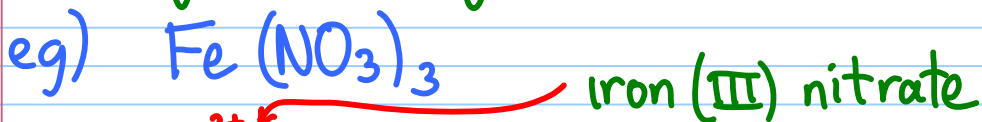


When the metal has > 1 charge

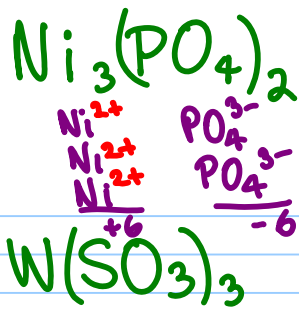


indicate the charge with a Roman Numeral!

Finding the charge:



Ans. manganese (IV) sulphate



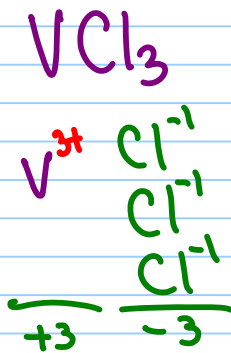
nickel(II) phosphate

tungsten sulphite
 ↑
 no Roman numeral

If only 1 possible charge
 (Groups 1 and 2 on per. table)
 also Al^{3+} , Zn^{2+} , Ag^+ , Sc^{3+} etc.

No Roman Numeral.

Do #5 a-t p. 72



23	5+
V	4+
Vanadium	
50.9	

Ans. vanadium(III) chloride
 (regardless of what the table says)

Tues Mar 04/08

Properties of Acids

- ① Tastes sour
- ② Litmus is red
- ③ Bromthymol blue is yellow
- ④ Phenolphthalein is colourless
- ⑤ Good conductor in aqueous solution
- ⑥ React with active metals (Zn, Mg)
(Aluminium)
to form H₂ gas
- ⑦ Neutralized by a base
- ⑧ Formulas start with H

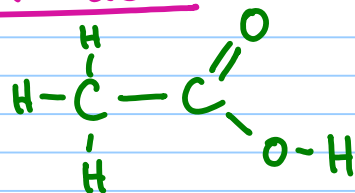
Properties of Bases

- ① Taste bitter
- ② Feel slippery (base + fat → soap + glycerol)
- ③ litmus is blue
- ④ bromthymol blue is blue
- ⑤ phenolphthalein is pink (magenta)
- ⑥ good conductors in aq solution
- ⑦ Don't react with active metals (in general)
- ⑧ neutralized by acids
- ⑨ Formulas end in OH

Some Common Acids

Name	Formula
hydrochloric acid	HCl
nitric acid	HNO ₃
sulphuric acid	H ₂ SO ₄
acetic acid	CH ₃ COOH
phosphoric acid	H ₃ PO ₄

acetic acid



Hydrated Compounds

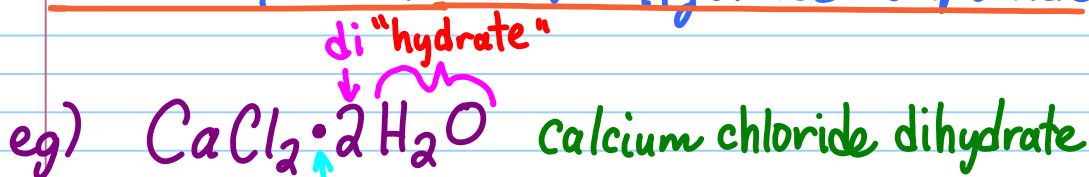
- even in their solid dry form, they contain "H₂O" in their crystal structure
- The "H₂O" is released when these are heated.

Naming System - uses pre-fixes

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

Wed Mar 5/08

Names & Formulas for Hydrated Compounds

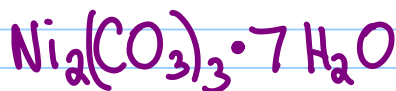
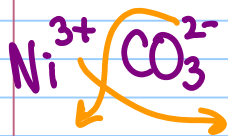


di "hydrate"

weak bond
to H_2O



Give the formulas for:



- Do ex 6 & 7 esl p.73

- Do Hand-In # 3

- due Thurs. Mar 6

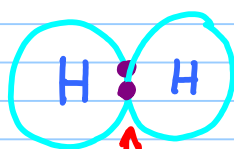
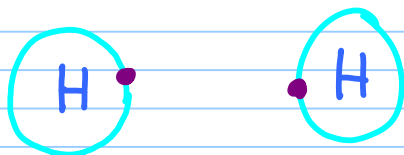
Thurs Mar 6/08

Covalent Bonds

- formed when electrons are shared between two atoms.

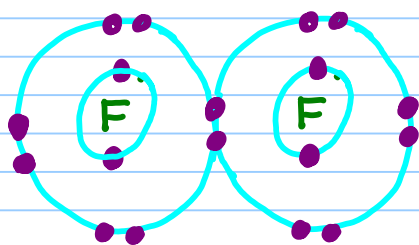
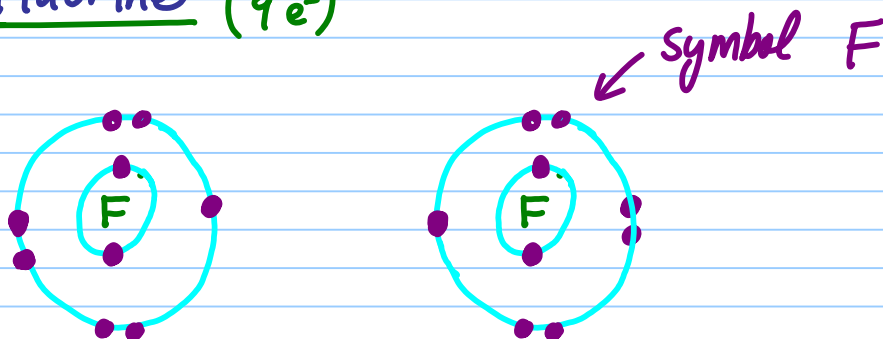
Diatomic Elements

Hallan Often Needs Halogens
↑ ↑ ↑ F₂ Cl₂ Br₂ I₂ At₂
H₂ O₂ N₂



↑
covalent bond

Fluorine (9e⁻)



formula F₂

Covalent Compounds

Summary

Ionic → Metal & Non Metal
eg) NaCl, CaS

→ Metal & PAI
eg) $Mg(NO_3)_2$

→ PAI & non-metal
NH₄Cl

→ PAI & PAI
(NH₄)₂CO₃

Covalent - non-metal & non-metal
eg) PCl₃ NO₂ CO

have their own naming system
TYVM. { hydrocarbons (C & H & O etc)
C₂H₆ CH₄ C₁₂H₂₂O₁₁

When writing formulas & names for
Covalent Compounds:

IGNORE

charges !!!

eg) carbon dioxide

C

O²⁻

← who cares??

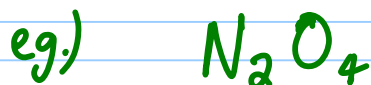
For Covalent Compounds

use prefixes

#	prefix	Example
1	mono	CO carbon monoxide
2	di	CO ₂ carbon dioxide
3	tri	PCl ₃ phosphorus trichloride
4	tetra	CCl ₄ carbon tetrachloride
5	penta	NF ₅ nitrogen pentafluoride
6	hexa	XeF ₆ xenon hexafluoride

More stuff:

1. If more than 1 atom of the first element
- use a prefix

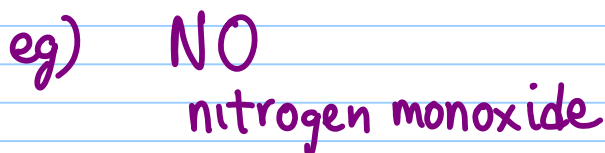


dinitrogen tetroxide
(or tetraoxide)

2. If only one atom of the first element
No prefix



3. If only one atom of the second element
MUST use "mono"



Ex 8-9 (all) p. 74 due Fri Mar 7

first element \rightarrow no change in ending
second element \rightarrow ends in ide

unit 4 Review (10 marks)

ex 15 - 160 (every fifth one minimum)

p. 75 - 76

15, 20, 25, 30, ...

unit 4 Test Mon Mar 10

Note: SO_3^{2-} \leftarrow PAI called sulphite

\nwarrow in a compd. will appear with something else

Na_2SO_3 sodium sulphite

SO_3 \leftarrow a gas called sulphur trioxide

by itself
- a compound
- no charge

also: NO_2^- nitrite

eg) KNO_2
potassium nitrite

by itself \rightarrow NO_2 nitrogen dioxide

Also: Trivial Names

H_2O - water

NH_3 - ammonia

