

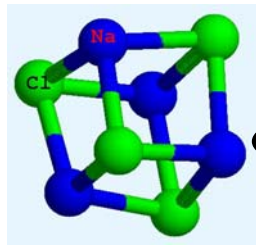
BAB 4

IKATAN KIMIA

~ 100 UNSUR KIMIA

JUTAAN SENYAWA KIMIA

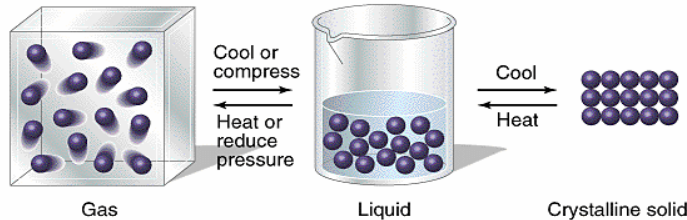
GAYA YANG MENGIKAT ATOM YANG SATU DENGAN ATOM YANG LAIN



IKATAN KIMIA

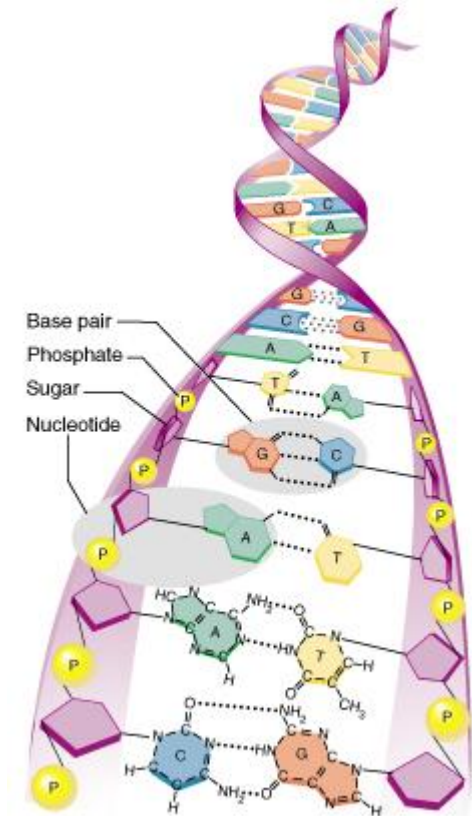
• PERANAN DALAM PENENTUAN KEADAAN BAHAN

- AIR - CAIRAN
- CO₂ - GAS
- NaCl - PADATAN



• MANIPULASI STRUKTUR SENYAWA

- DINAMIT
- PIL KB
- SERAT SINTETIK



MOLEKUL DNA: DALAM IKATANNYA MEMBAWA PESAN GENETIK

KONFIGURASI ELEKTRON STABIL

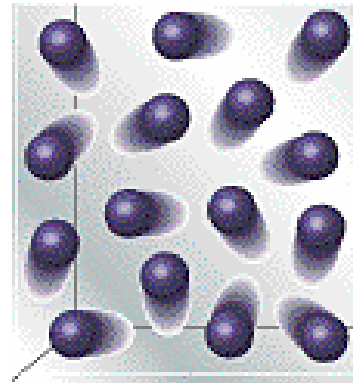
GAS MULIA: $ns^2 np^6$

Na ($\Sigma e = 11$)
 $1s^2 2s^2 2p^6 3s^1$

ATOM Na MELEPAS 1 ELEKTRON
→ KONFIGURASI ELEKTRON = Na

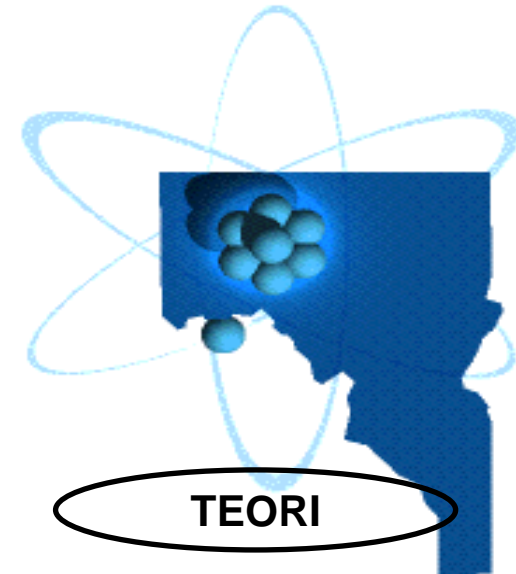
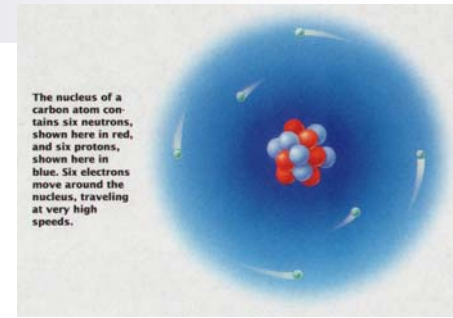
FAKTA

**GAS MULIA – LEMBAM
SUKAR TERJADI REAKSI**



DEDUKSI

JIKA UNSUR LAIN DAPAT BERUBAH KONFIGURASI ELEKTRON
→ SEPERTI GAS MULIA AKAN MENJADI KURANG REAKTIF



**KELEMBAMAN GAS MULIA
KARENA KONFIGURASI ELEKTRONNYA**

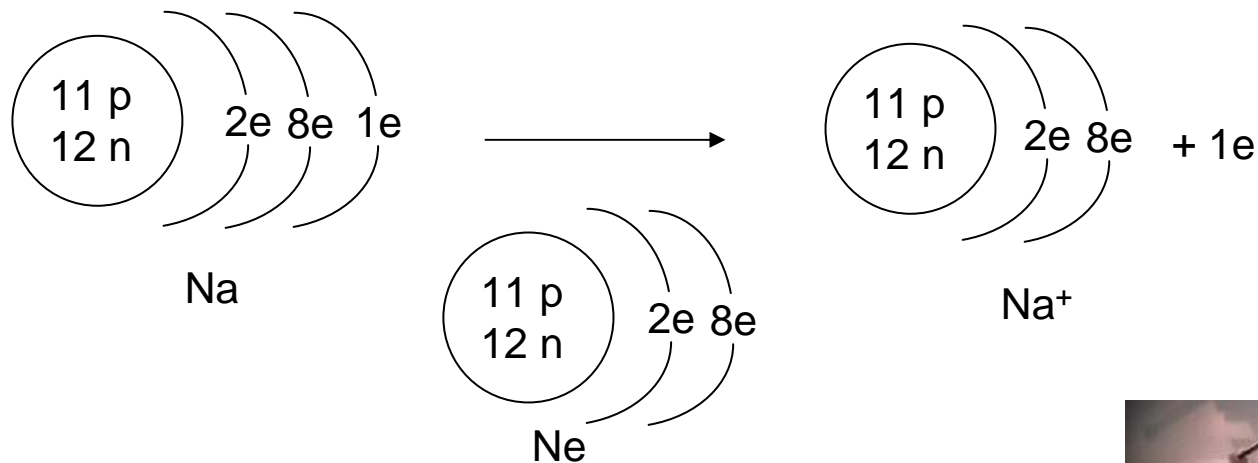
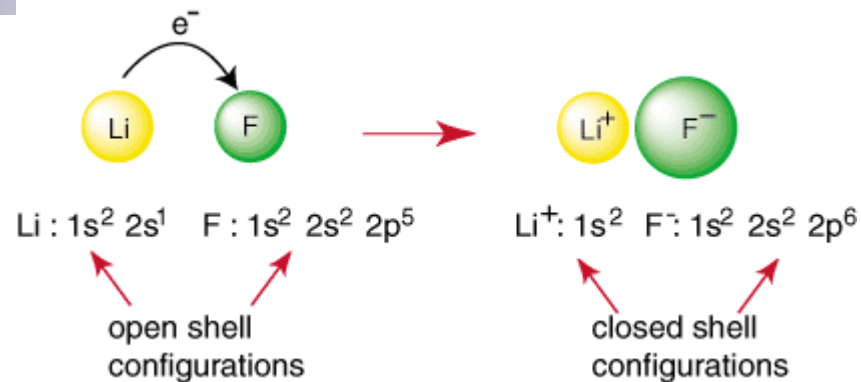


KONFIGURASI ELEKTRON

Na : $1s^2 2s^2 2p^6 3s^1$

Na⁺ : $1s^2 2s^2 2p^6$

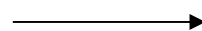
Ne : $1s^2 2s^2 2p^6$



- KONFIGURASI ELEKTRON SAMA
- INTI DAN MUATAN TIDAK SAMA

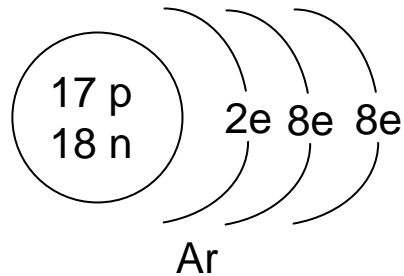
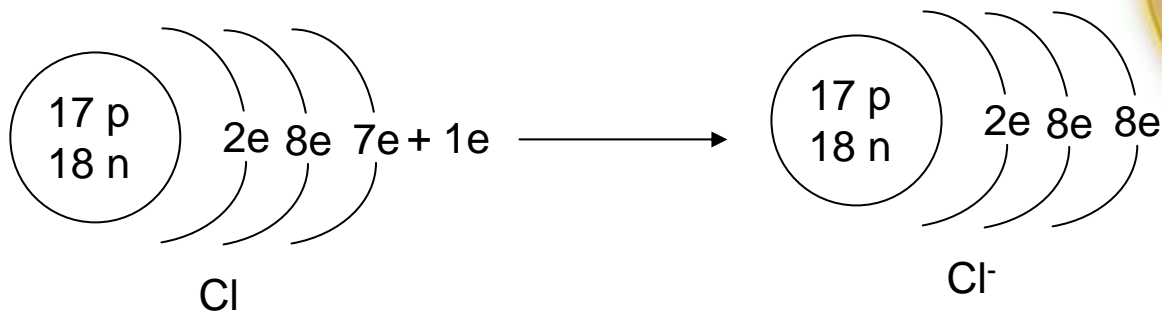
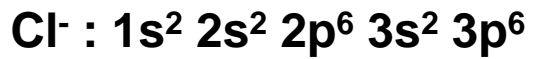
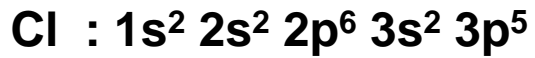
ION Na⁺ }
 ATOM Ne }

ATOM NATRIUM
(Na)



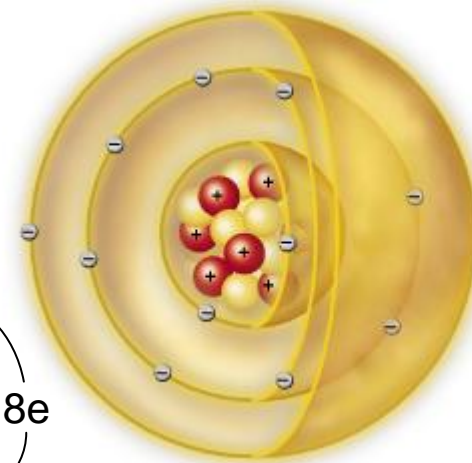
ION NATRIUM
(Na⁺)



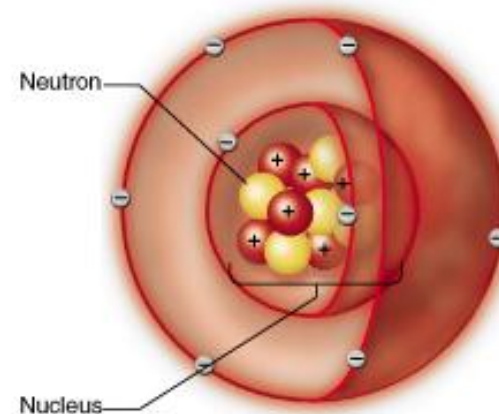


Cl⁻ 17 PROTON (+)
 18 ELEKTRON (-)

ATOM KLOR (Na) → ION KLORIDA (Na⁺)



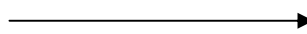
(c) Sodium
 11 protons
 11 neutrons
 11 electrons
 in 3 shells



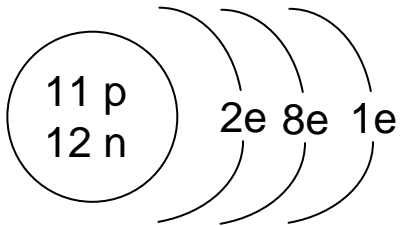
(b) Oxygen
 8 protons
 8 neutrons
 8 electrons
 in 2 shells

SIMBOL DOT ELEKTRON

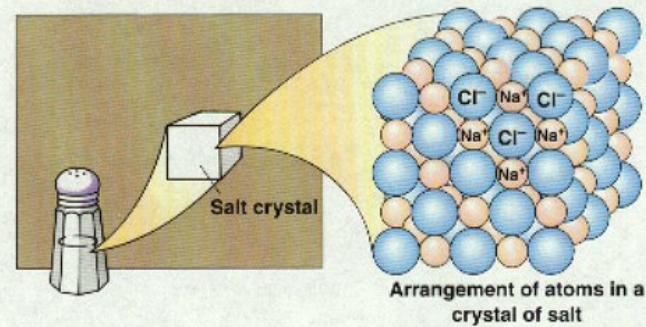
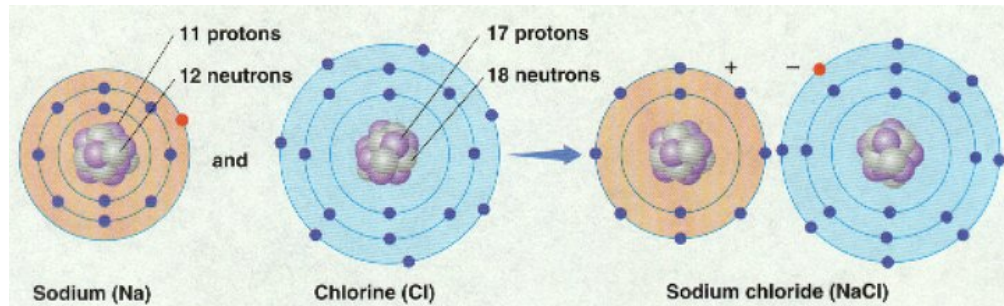
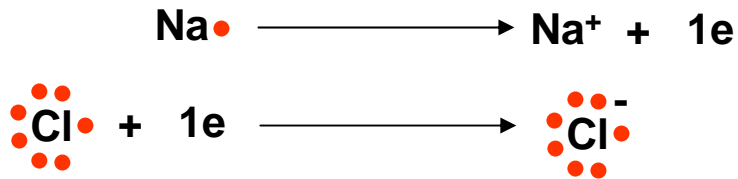
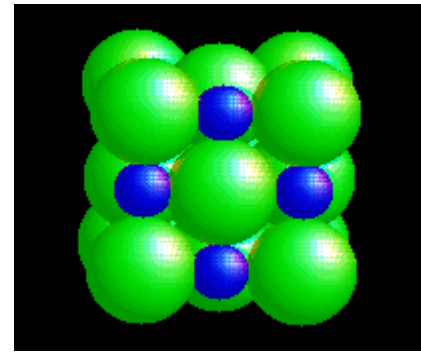
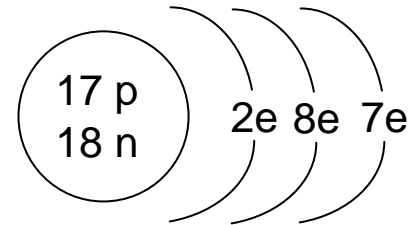
ELEKTRON VALENSI



DOT

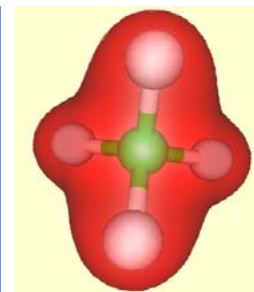
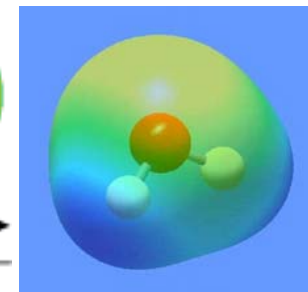
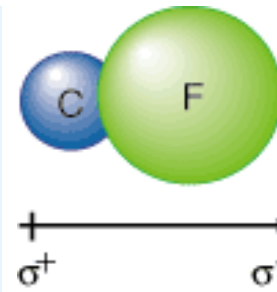
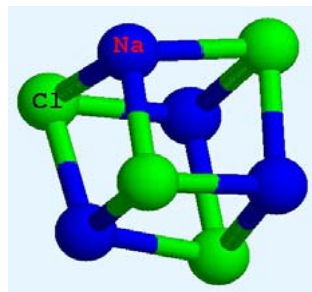
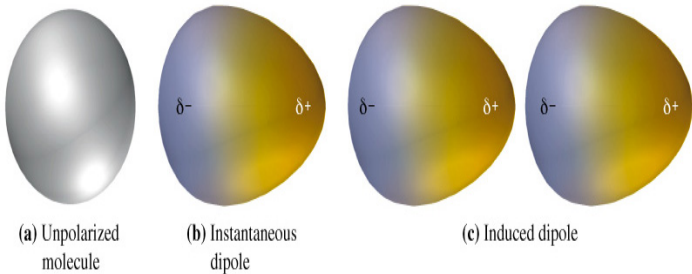


Na•



GOLONGAN UTAMA

IA	IIA	IIIA	IVA	VA	VIA	VIIA	GAS MULIA
H •							
Li •	• Be •	• B •	• C •	• N •	• O •	• F •	• Ne •
Na •	• Mg •	• Al •	• Si •	• P •	• S •	• Cl •	• Ar •
K •	• Ca •						



NATRIUM BEREAKSI DENGAN KLOR

FAKTA

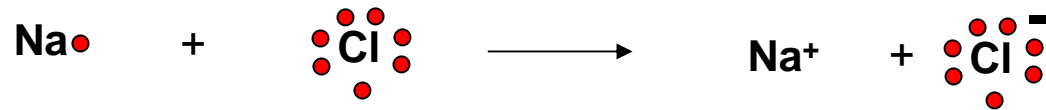


LOGAM MENKILAT
KEPERAKAN

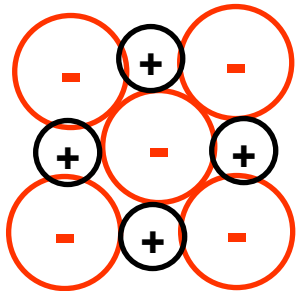
GAS
KUNING
KEHIJAUAN

PADATAN
PUTIH

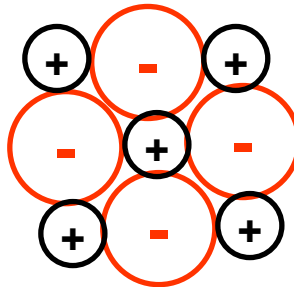
TEORI



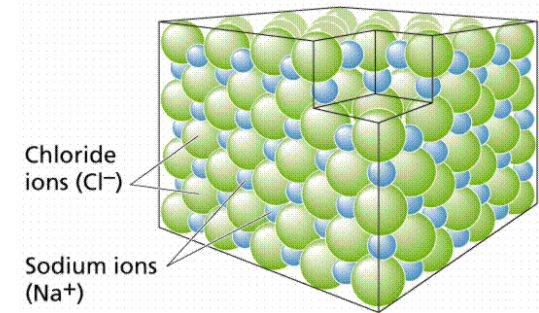
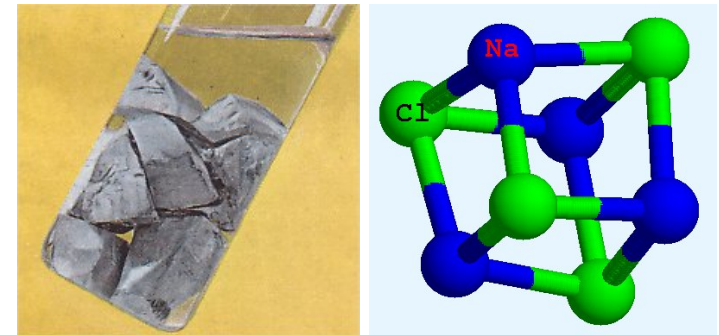
KRISTAL NaCl:



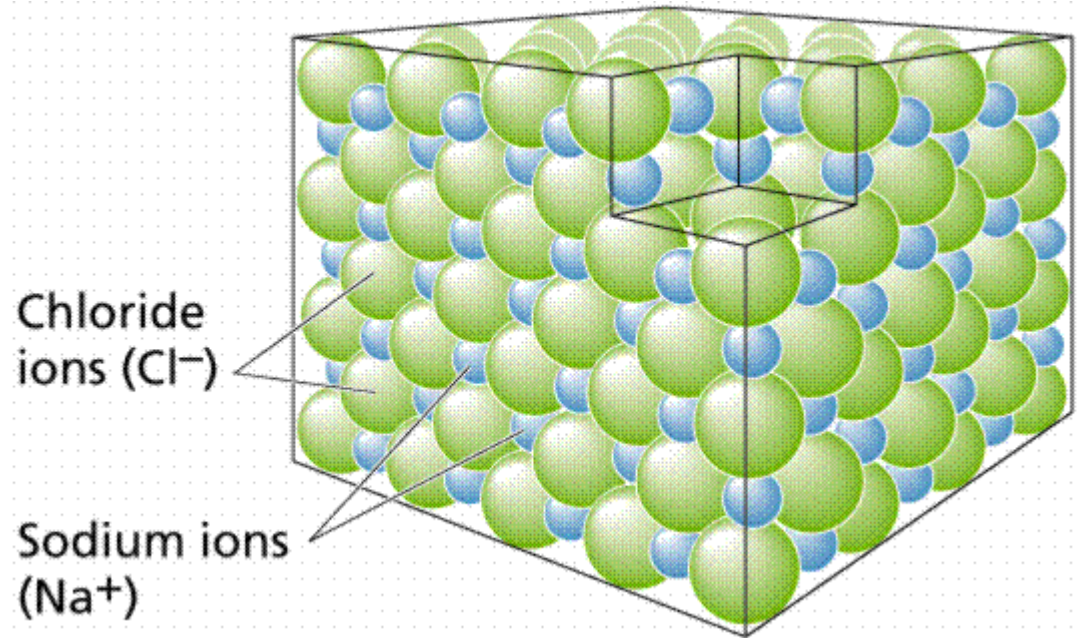
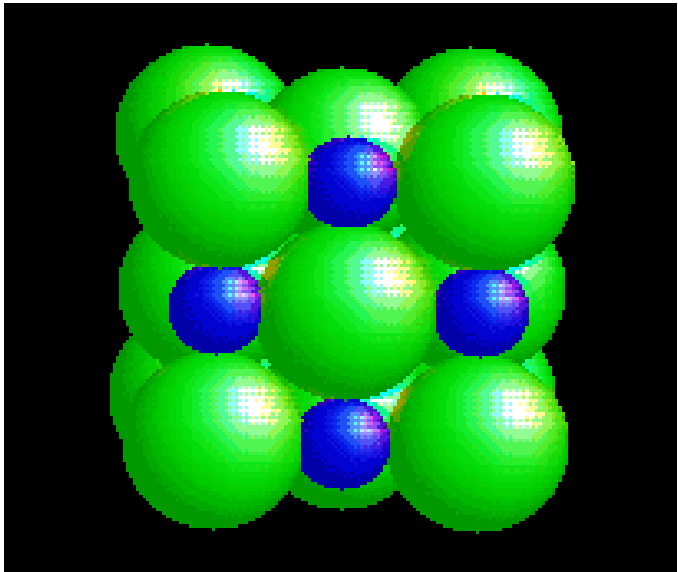
LAPISAN PERTAMA



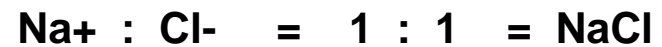
LAPISAN KEDUA



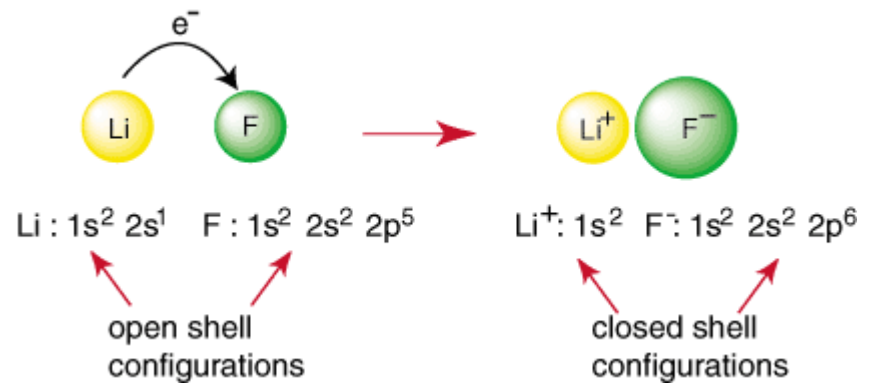
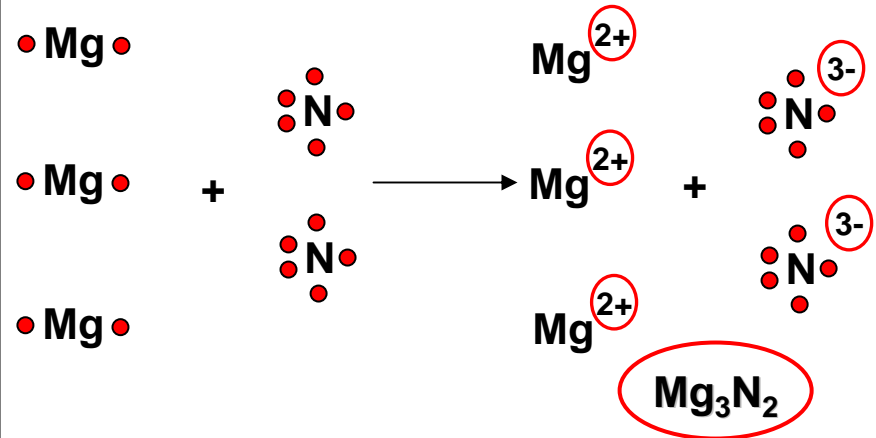
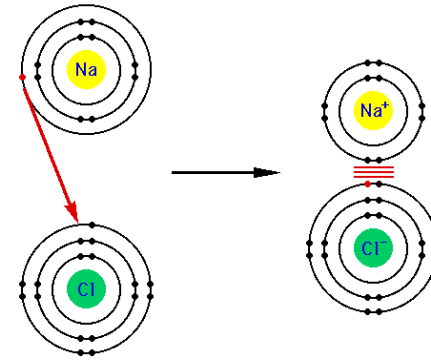
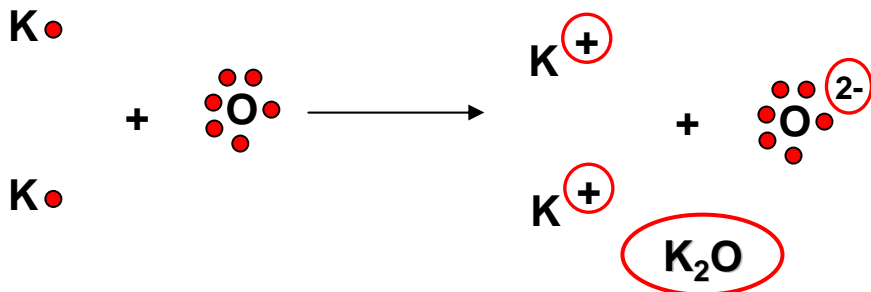
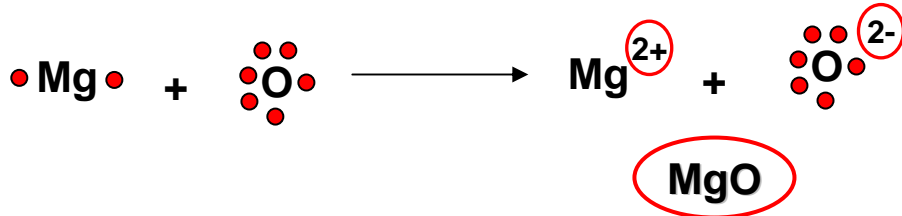
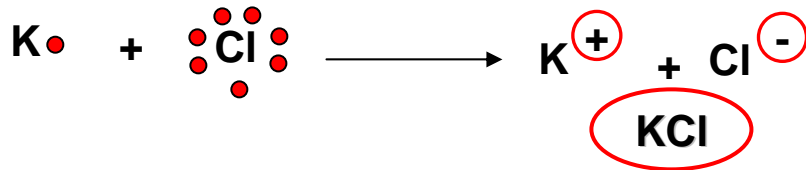
MODEL BOLA DAN TONGKAT KRISTAL NaCl



SETIAP ION Na⁺ MENARIK 6 ION Cl⁻
SETIAP ION Cl⁻ MENARIK 6 ION Na⁺

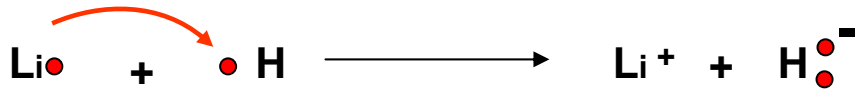


IKATAN IONIK



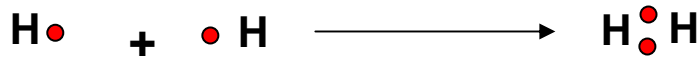
IKATAN KOVALEN

IKATAN IONIK

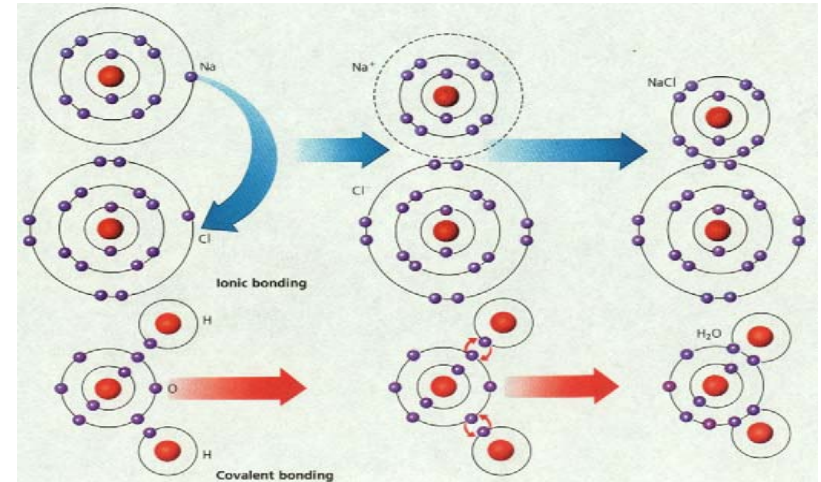


TRANSFER
ELEKTRON

JIKA HANYA TERDAPAT ATOM HIDROGEN



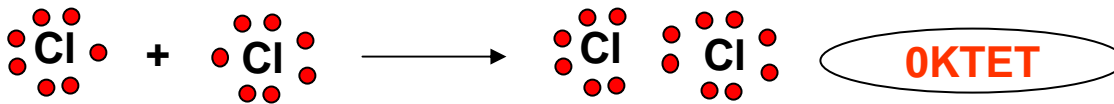
PEMAKAIAN BERSAMA SEPASANG ELEKTRON



IKATAN KOVALEN



ATOM KLOR DAPAT MENERIMA SATU ELEKTRON

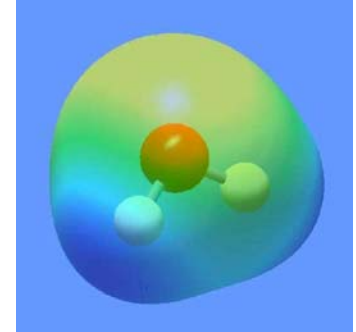


OKTET

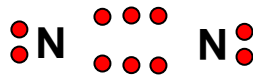
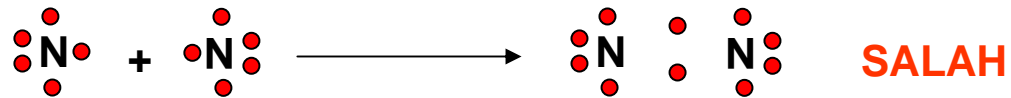


ATURAN OKTET

- SUSUNAN YANG MENGELILINGI SUATU ATOM DENGAN 8 ELEKTRON
- KONFIGURASI ELEKTRON = GAS MULIA



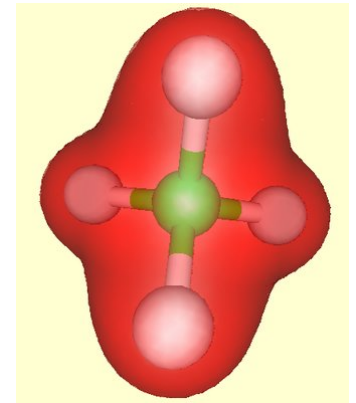
CONTOH LAIN



PASANGAN ELEKTRON
TIDAK DIPAKAI BERSAMA

TIGA PASANGAN ELEKTRON

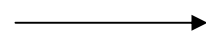
IKATAN GANDA TIGA



IKATAN KOVALEN POLAR

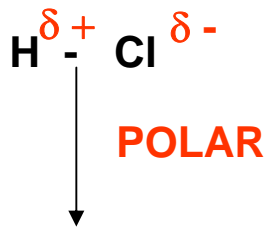
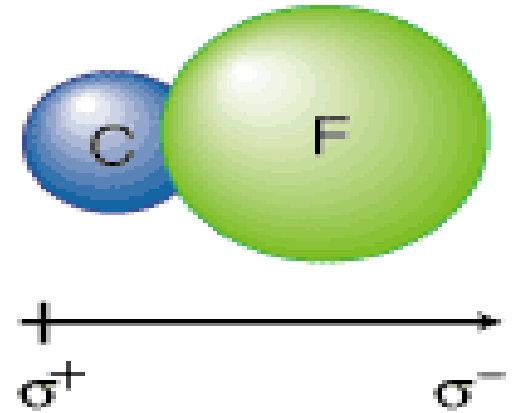
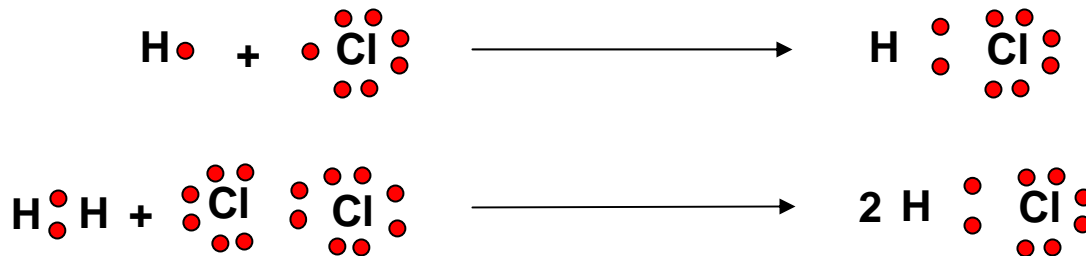
PEMAKAIAN BERSAMA ELEKTRON PADA IKATAN KOVALEN TIDAK MERATA

HIDROGEN + KLORIDA

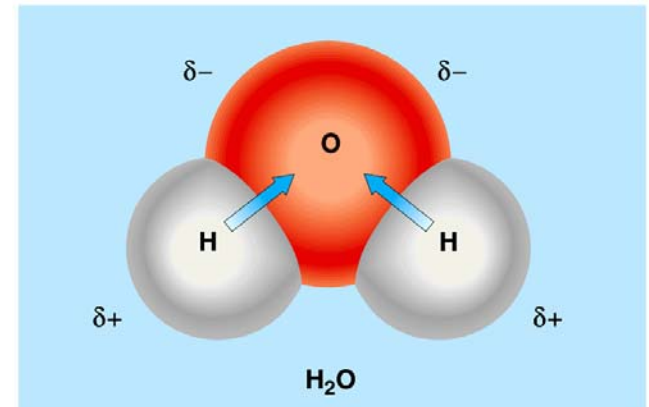
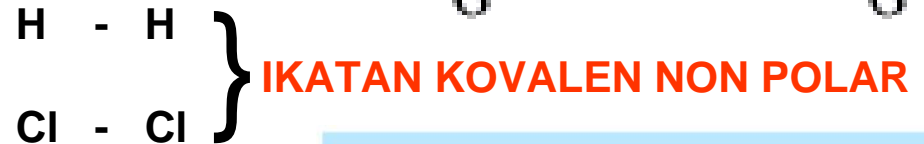


HIDROGEN KLORIDA

GAS BERACUN TIDAK BERWARNA

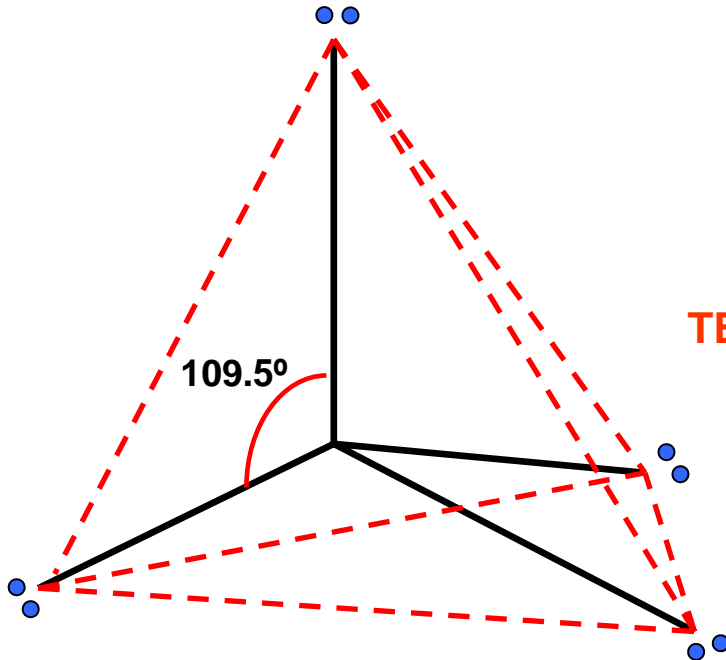
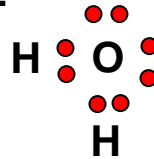


**IKATAN KOVALEN POLAR
(BUKAN IKATAN IONIK)**

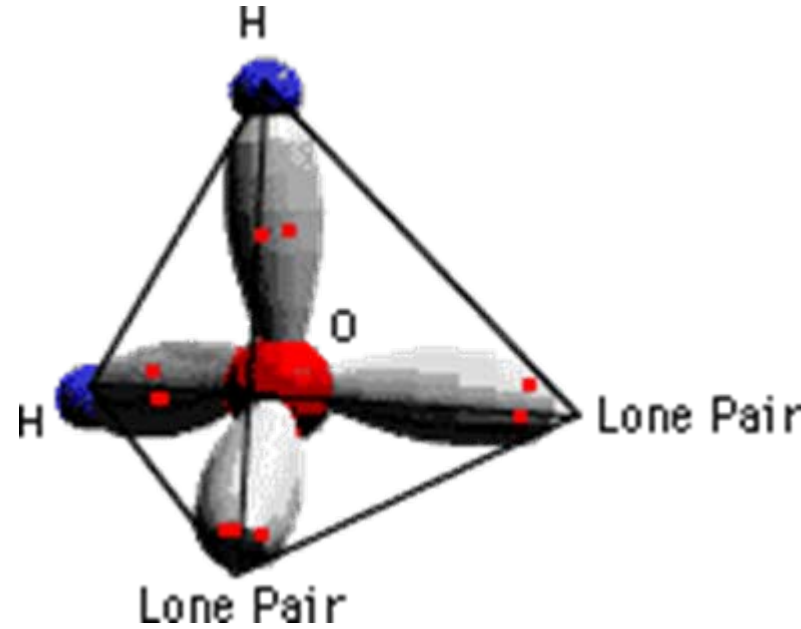


TEORI VSEPR

- TEORI TOLAKAN PASANGAN ELEKTRON KULIT VALENSI
- MENENTUKAN BENTUK MOLEKUL



TETRAHEDRAL



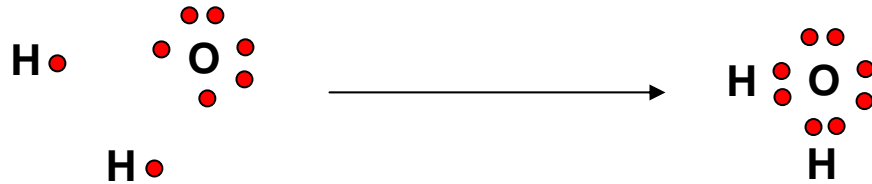
H_2O → 2 PASANG ELEKTRON YANG TIDAK BERIKATAN

SUDUT IKATAN : 104.5°

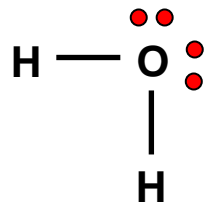
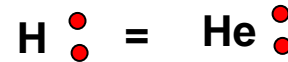
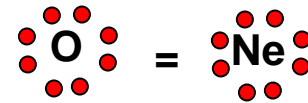
BENTUK MOLEKUL : V

AIR - H₂O

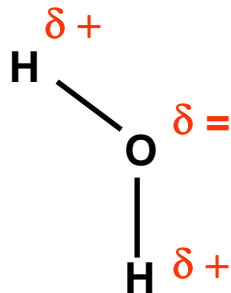
MOLEKUL KOVALEN POLAR YANG PALING PENTING DIBUMI



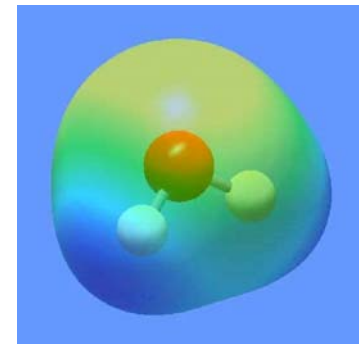
KONFIGURASI ELEKTRON



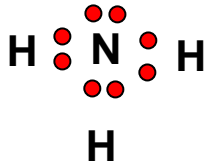
POLAR



CONTOH:
GAMBARKAN STRUKTUR DOT ELEKTRON UNTUK H₂S



NH_3 - AMONIA



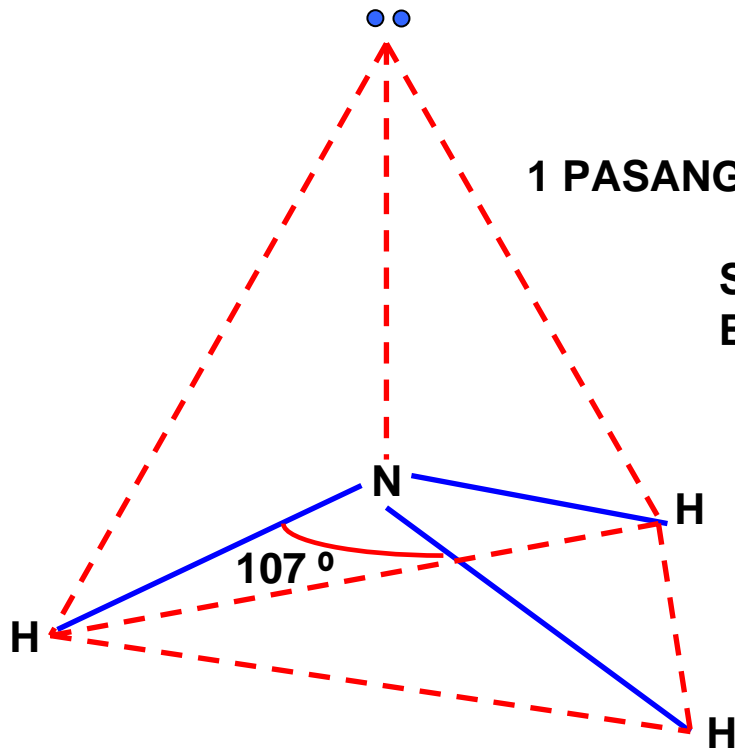
- IKATAN N - H (POLAR)
- MOLEKUL NH_3 (POLAR)



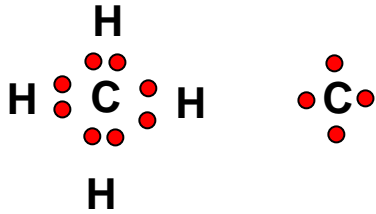
1 PASANGAN ELEKTRON YANG TAK BERIKATAN

SUDUT IKATAN = 107°

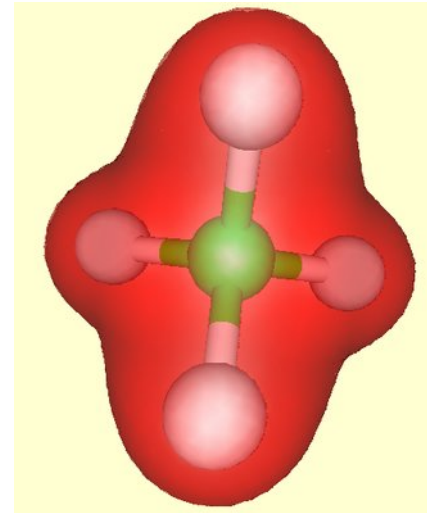
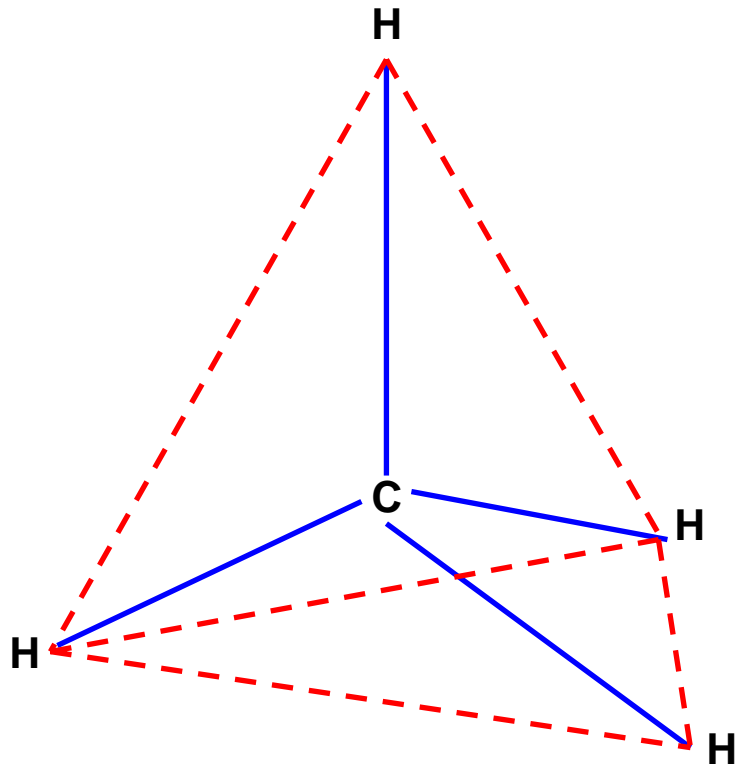
BENTUK MOLEKUL = PIRAMIDA SEGITIGA



CH₄ - METANA



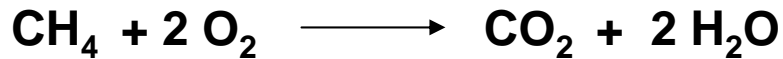
- IKATAN C - H (POLAR)
- MOLEKUL CH₄ (POLAR)



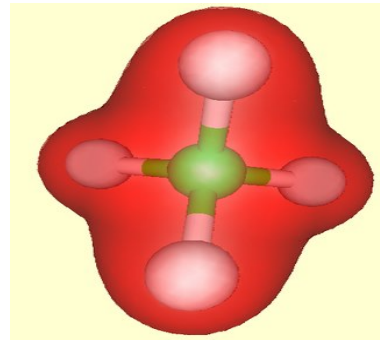
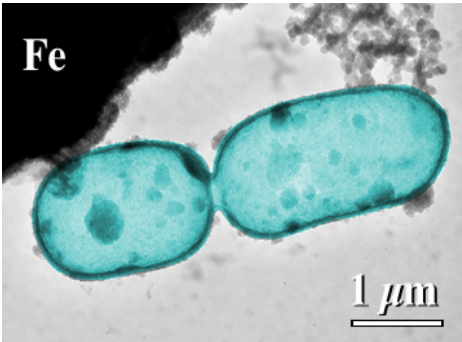
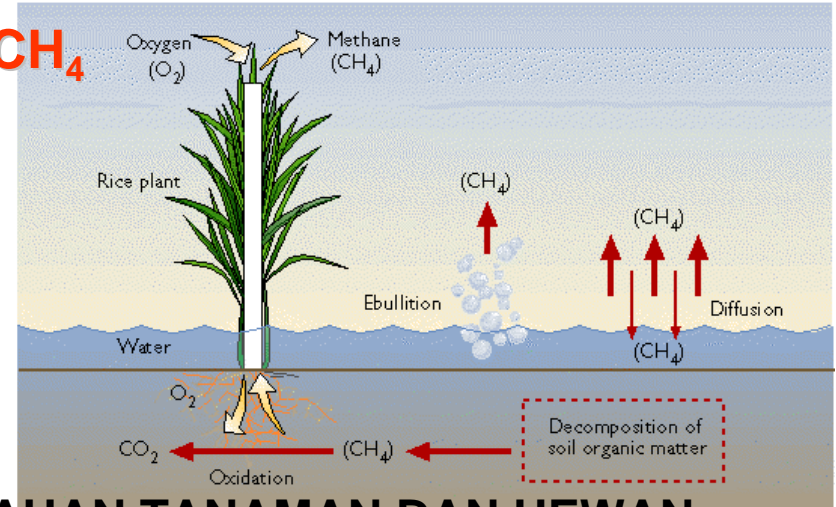
SUDUT IKATAN = 109.5 °
BENTUK MOLEKUL = TETRAHEDRAL

METANA - CH₄

- KOMPONEN DASAR GAS ALAM
- PEMBAKARAN GAS METANA

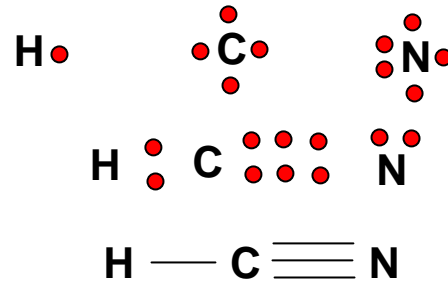


- DIHASILKAN DARI PEMBUSUKAN BAHAN TANAMAN DAN HEWAN
- METABOLISME BAKTERI DALAM USUS
- SAWAH TERGENANG AIR \longrightarrow CH₄ (PRODUKSI PADI MENURUN)



CONTOH 1:

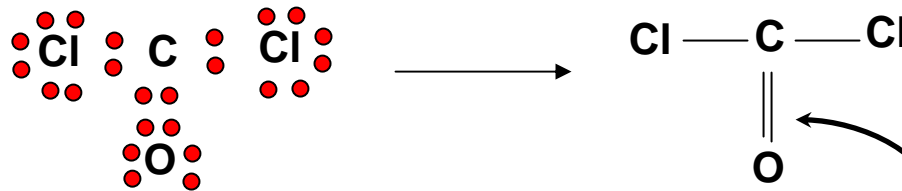
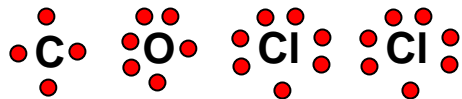
TULIS STRUKTUR DOT ELEKTRON SENYAWA HIDROGEN SIANIDA



IKATAN GANDA TIGA

CONTOH 2:

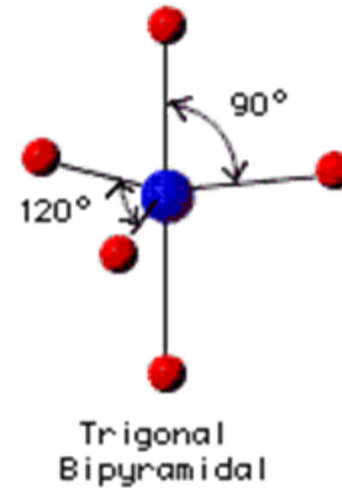
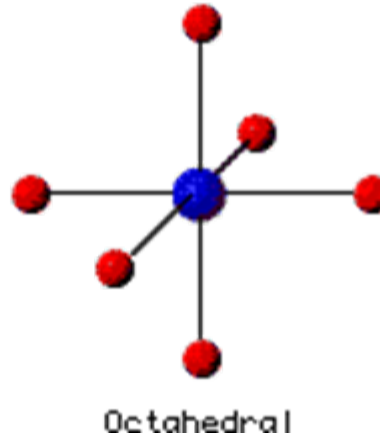
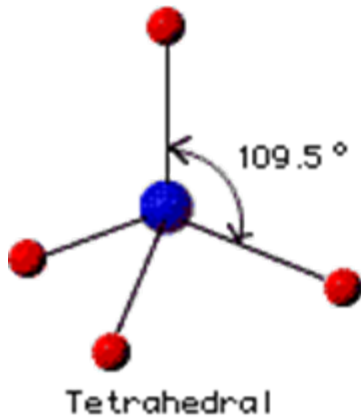
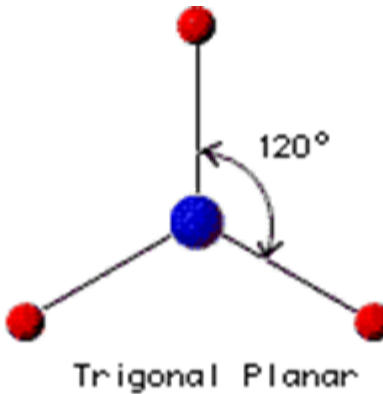
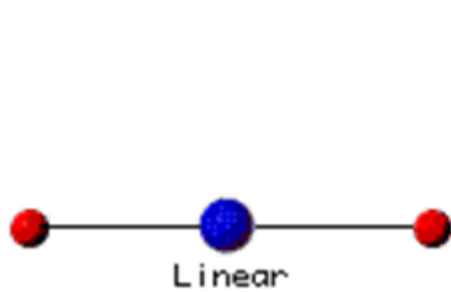
BAGAIMANA STRUKTUR SENYAWA FOSGEN, COCl₂





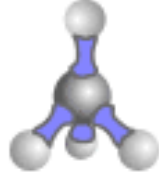
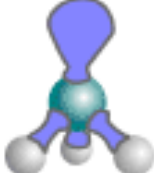

IKATAN GANDA DUA

IKATAN DAN BENTUK MOLEKUL

A = ATOM PUSAT
X = JUMLAH IKATAN
E = JUMLAH PASANGAN ELEKTRON TIDAK BERIKATAN



IKATAN DAN BENTUK MOLEKUL

Formula	BeCl ₂	BCl ₃	CH ₄	NH ₃	H ₂ O
	Beryllium chloride	Boron trichloride	Methane	Ammonia	Water
Bonding Pairs	2	3	4	3	2
Valence Electrons	2	3	4	5	6
Lone Pairs	0	0	0	1	2
Angles between bonding pairs	180°	120°	109.5°	107°	105°
Name of shape	Linear	Trigonal Planar	Tetrahedral	Trigonal Pyramid	Bent
					

IKATAN DAN BENTUK MOLEKUL

Formula	NH_4^+	PCl_5	SF_6	XeF_4	ICl_3
Bonding Pairs	4	5	6	4	3
Valence Electrons	5	5	6	8	7
Rule 2a	$5 - 1 = 4$				
Lone Pairs	0	0	0	2	2
Angles between bonding pairs	109.5°	90° & 120°	90°	90°	90°
Name of shape	Tetrahedral	Trigonal Bipyrimid	Octahedron	Square	T shape
	