

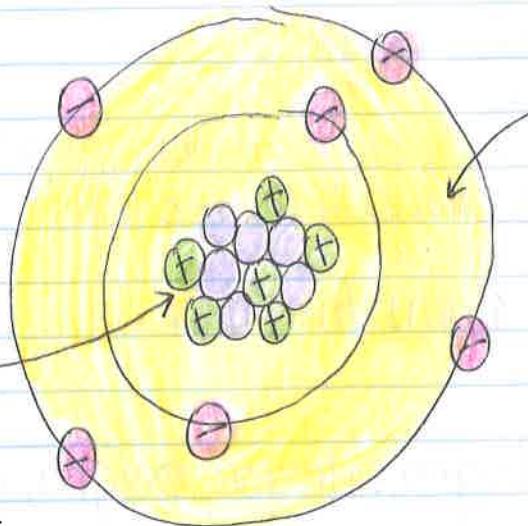
34

Carbon-12 Atom

 # p = 6
 # n = 6
 # e = 6

Carbon creates four bonds to achieve stability.

nucleus of atom:
contains protons + neutrons



electron cloud:
contains electrons

First Orbital or Energy Level: holds up to $2e^-$
(2 electrons)

Second Orbital + beyond: the atom is stable when these orbitals hold $8e^-$ (8 electrons)

- ✳ When atoms have full energy levels, they are non-reactive.

Noble gases (inert gases) have full orbitals or shells, so they are non-reactive.

The Nature of Matter

Atoms are the basic units of matter.

Atoms consist of 3 subatomic particles:

Particle	amu	charge
protons	1	+ 1
neutrons	1	Ø
electrons	Ø ($\approx \frac{1}{2000}$ mass of p)	- 1

In a neutral atom, the # of protons is = # of electrons.

The only thing that defines an element is the # of protons.

An element consists of only one type of atom.

Isotopes are elements that have the same number of protons, but a different # of neutrons.

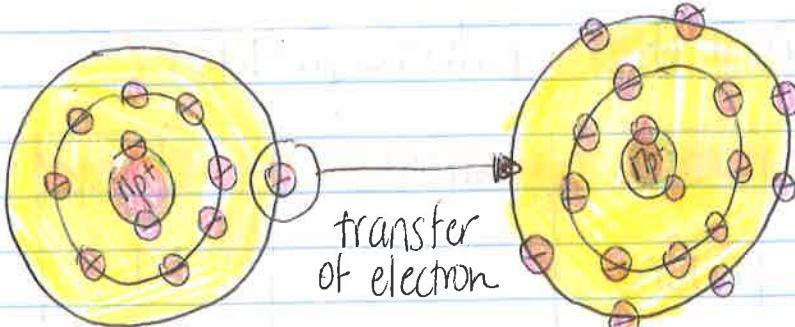
Isotope	# of pt	# of e ⁻	# of n
carbon-12	6	6	6
carbon-13	6	6	7
carbon-14 (radioactive)	6	6	8

of protons + # of neutrons

36



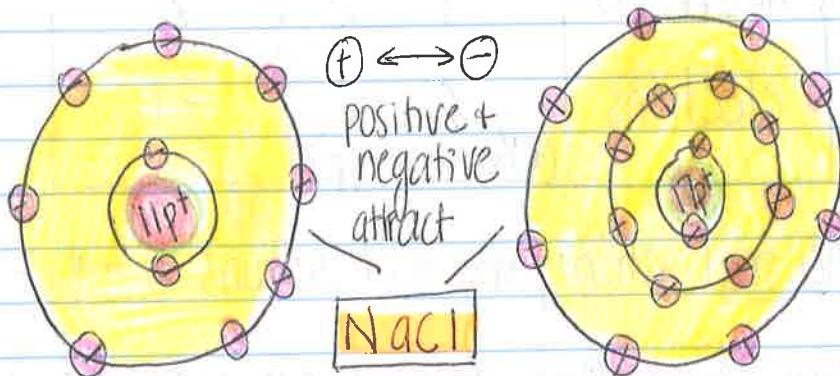
Na
 $\frac{11\text{p}^+}{11\text{e}^-}$
 $\cancel{\text{charge}}$



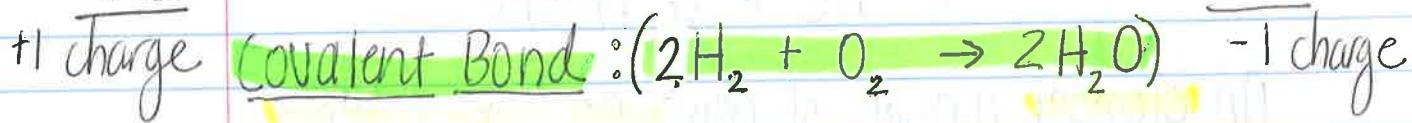
Cl

$\frac{17\text{p}^+}{17\text{e}^-}$
 $\cancel{\text{charge}}$

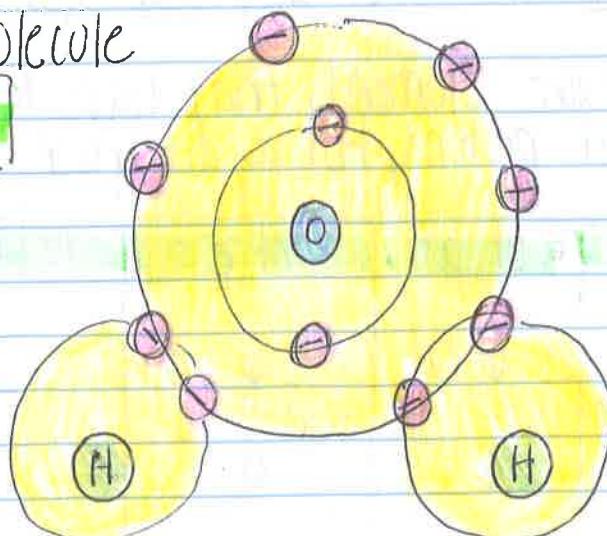
Na^+
 $\frac{11\text{p}^+}{10\text{e}^-}$
 $+1 \text{ charge}$

 Cl^-

$\frac{17\text{p}^+}{18\text{e}^-}$
 -1 charge

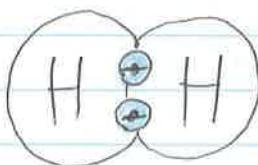


Water Molecule

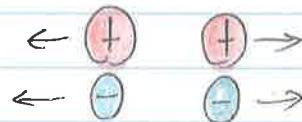
 $\boxed{\text{H}_2\text{O}}$ 

All atoms bond to achieve stability.

H₂ or hydrogen gas



In a covalent bond, electrons are shared.



like species. opposites attract.

In an ionic bond, electrons are transferred and the resulting ions (atoms that are positively charged or negatively charged) attract each other.

The two main types of bonds are ionic + covalent.

that are chemically bonded.

A compound is 2 or more different elements

Some isotopes are radioactive. Their nuclei are unstable + break down at a constant rate over time. Radioactive isotopes can be used to determine the age of rocks or fossils. They are also used in the medical field to detect cancer or track movements in the body.