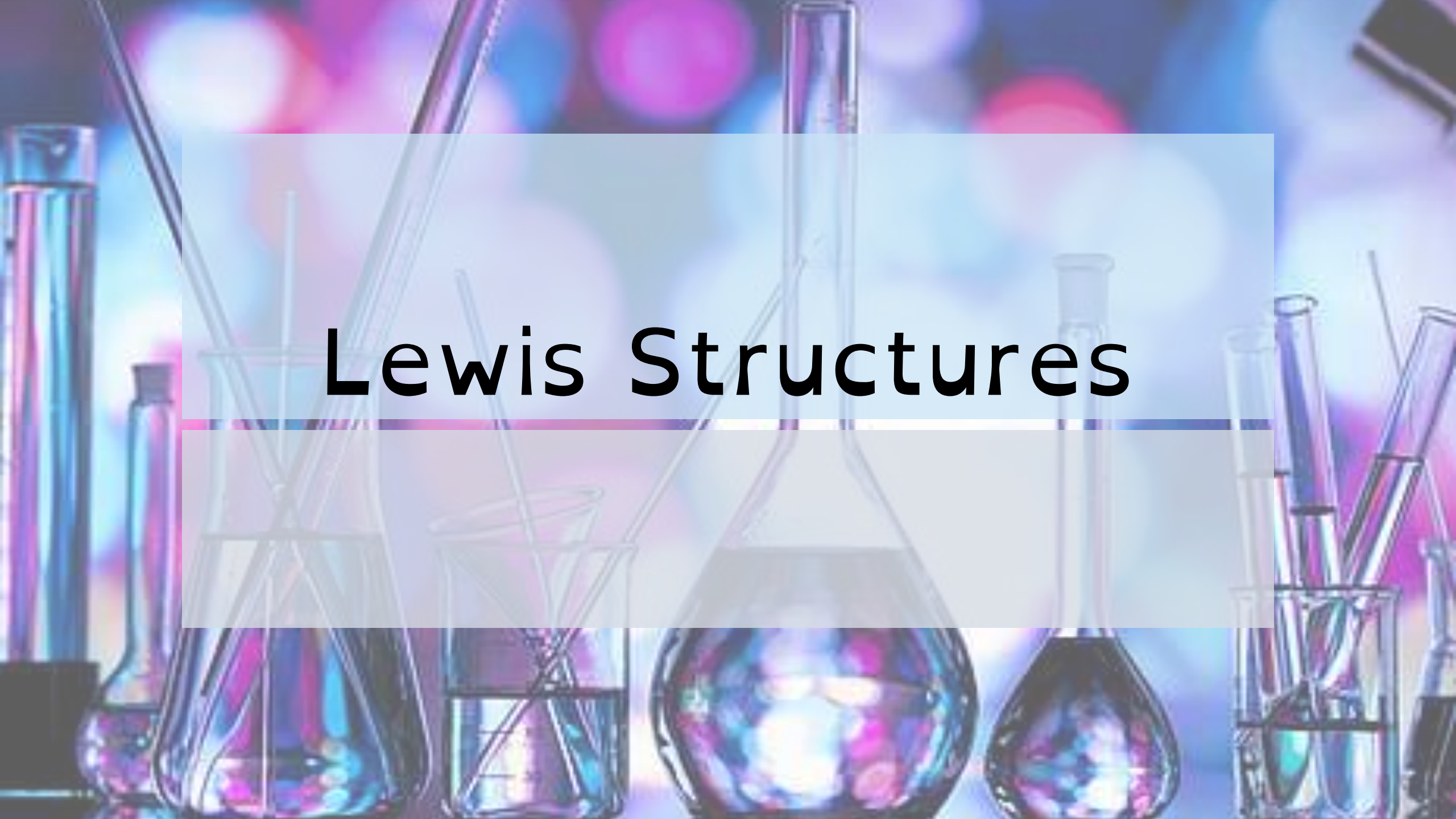


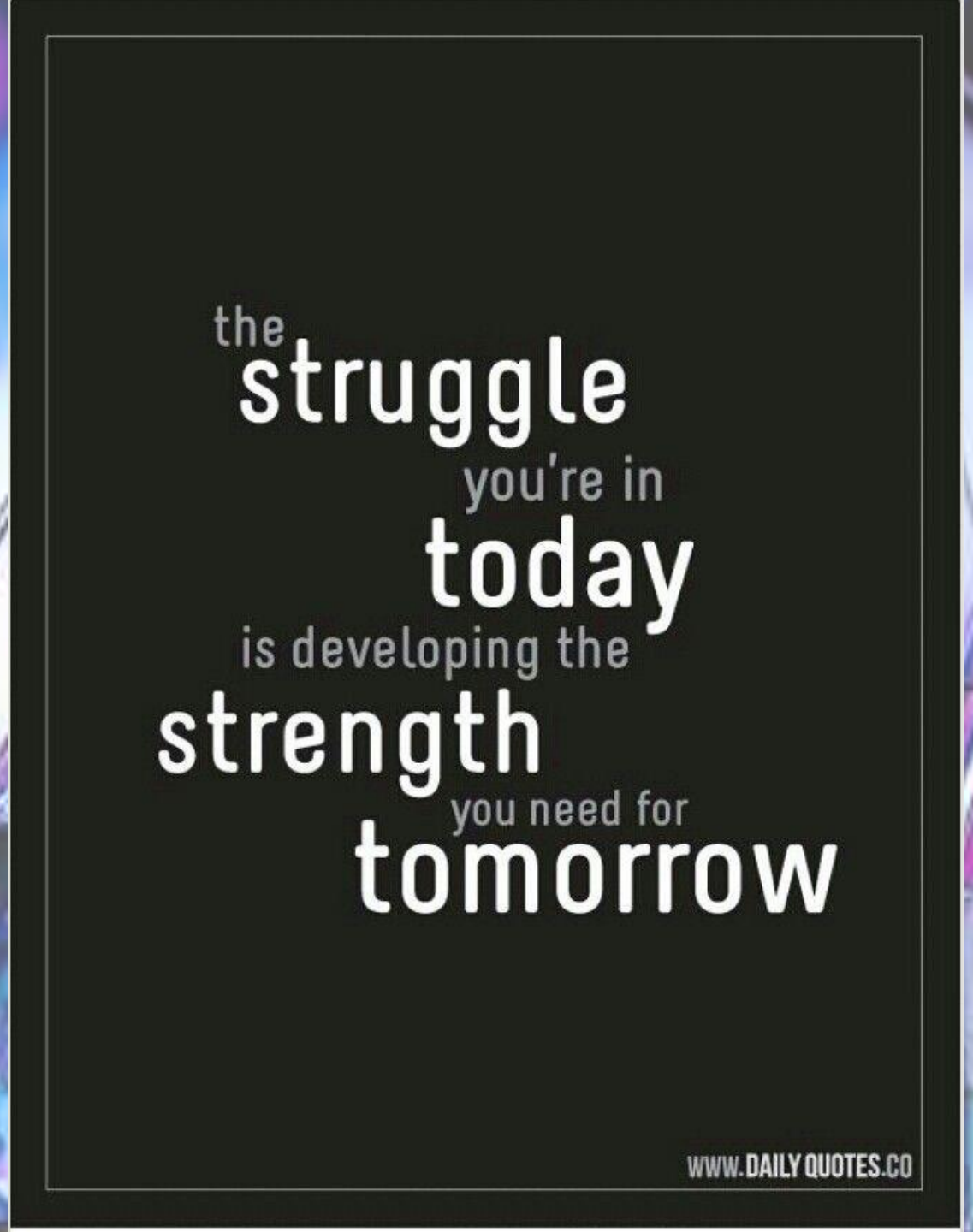
Lewis Structures

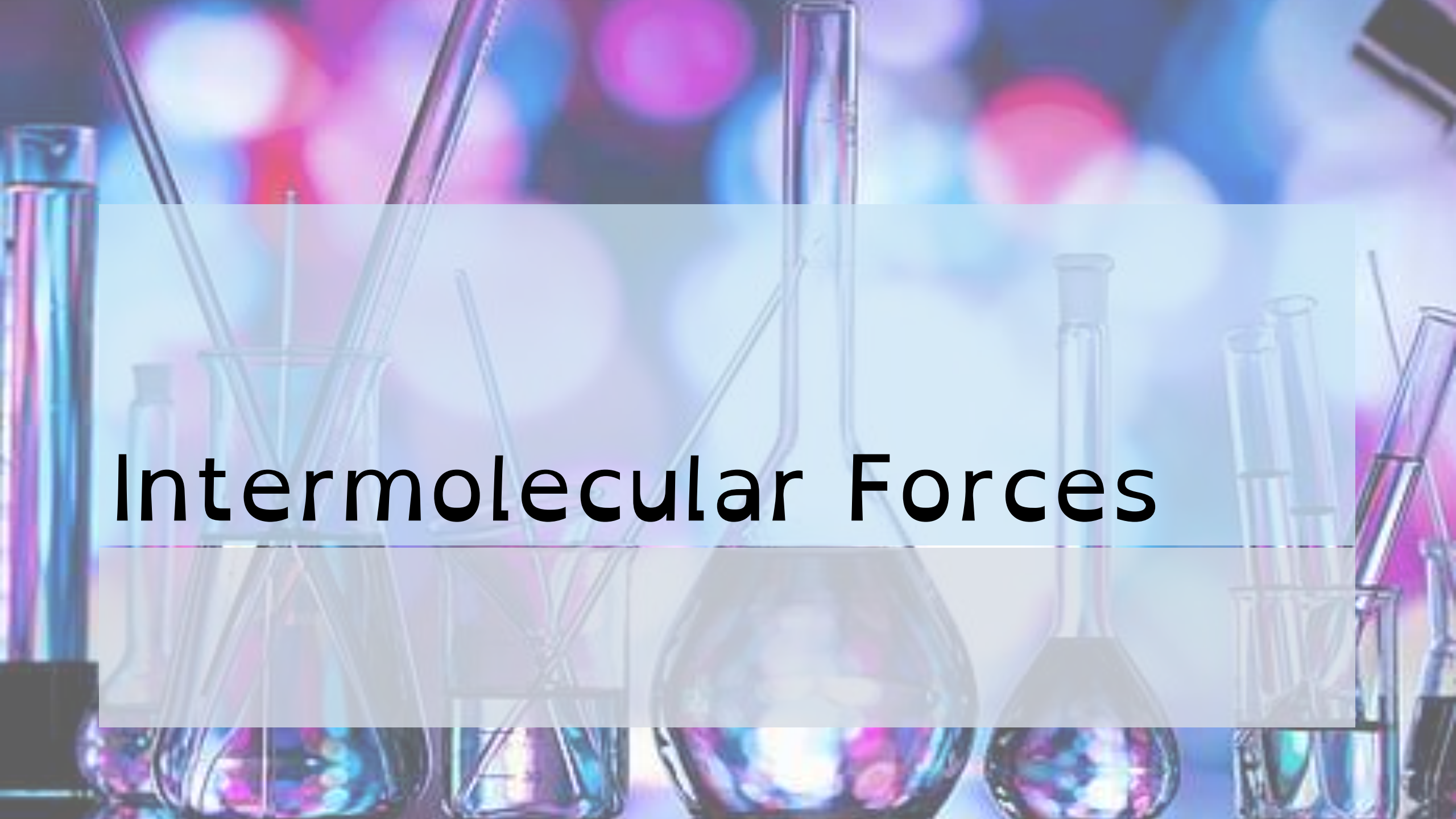
Today's 'Inspiration for All' Submission

Here is our first submission from our 'Inspiration for All'

Today's word is OVERCOME.

Thank you for these inspirational words...





Intermolecular Forces

Intermolecular Forces

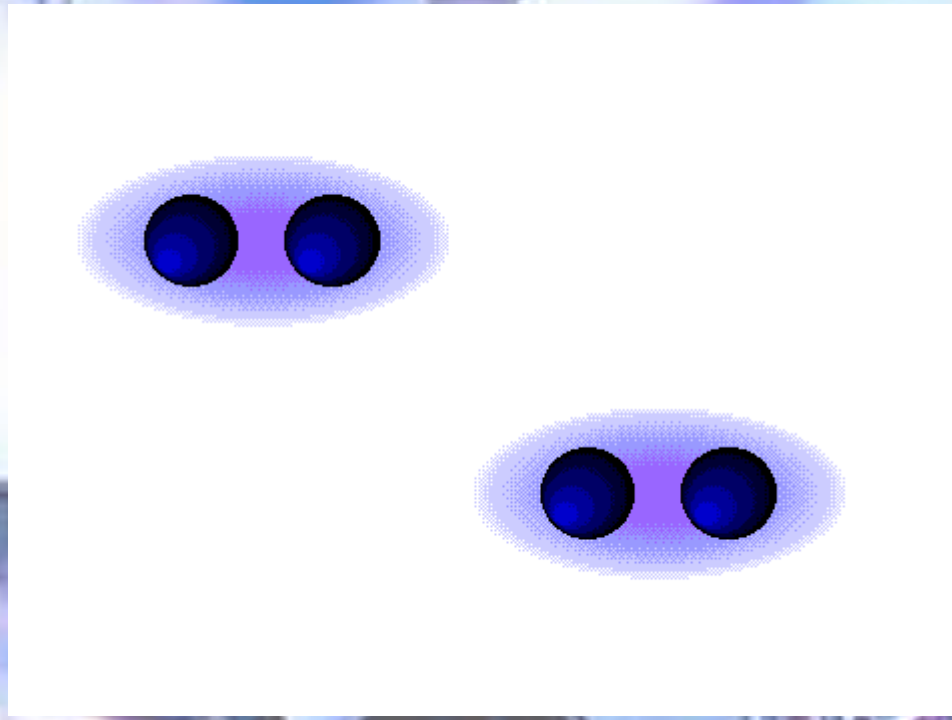
- Intermolecular attractions are attractions between one molecule and a neighbouring molecule.
- All intermolecular attractions are known collectively as Van der Waals forces.
- The various different types of forces were first explained by different people at different times.
- Dispersion forces, for example, were described by Fritz London in 1930; dipole-dipole interactions by Keesom in 1912.

In Ionic Compounds and Metals

- Electrostatic forces occur between charged species and are responsible for the extremely high melting and boiling points of ionic compounds and metals.

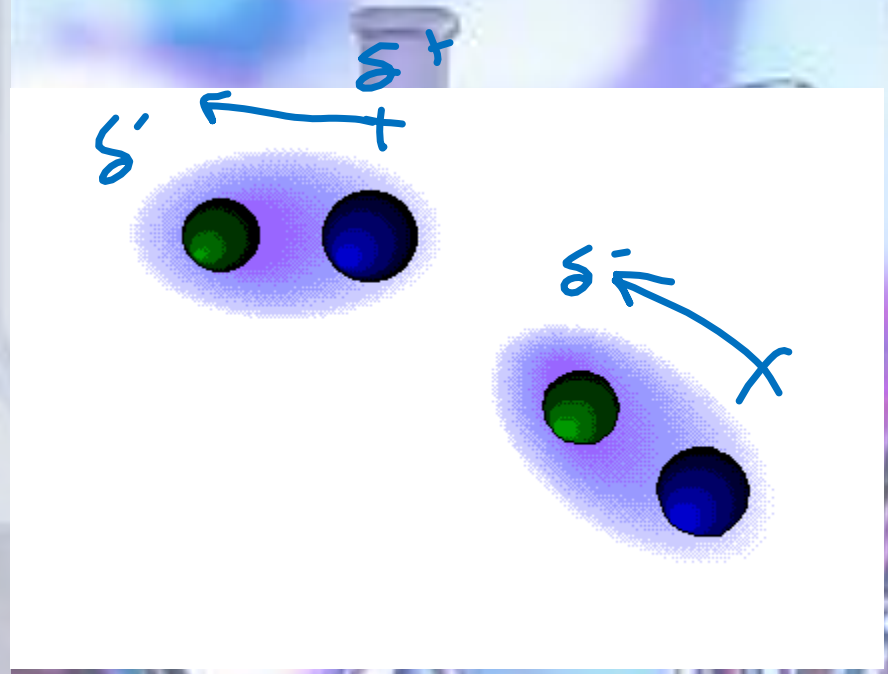
In Covalent Compounds

- All molecules have the capability to form London forces (also known as dispersion forces).
- They result from the movement of the electrons in the molecule which generates temporary positive and negative regions in the molecule.
- These are the only types of forces that non-polar covalent molecules can form.

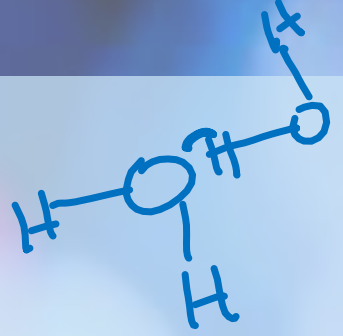


In Covalent Compounds

- Dipole-dipole forces are caused by positive and negative ends of a molecule which attract each other like little magnets.
- Only polar covalent molecules have the ability to form dipole-dipole attractions between molecules.

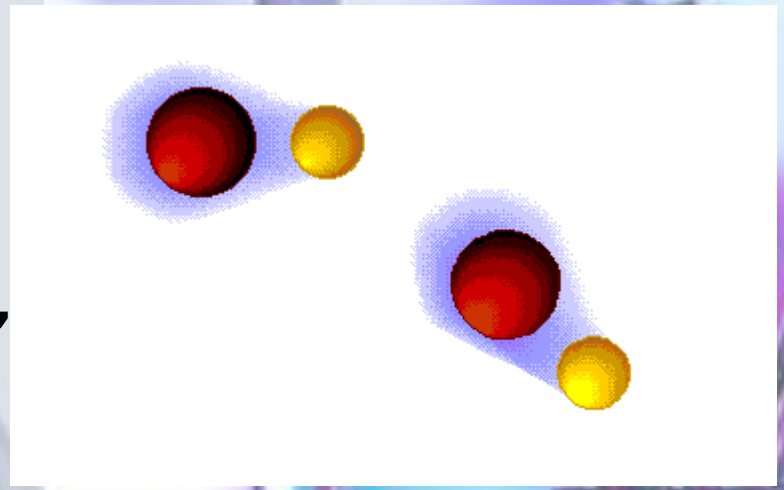


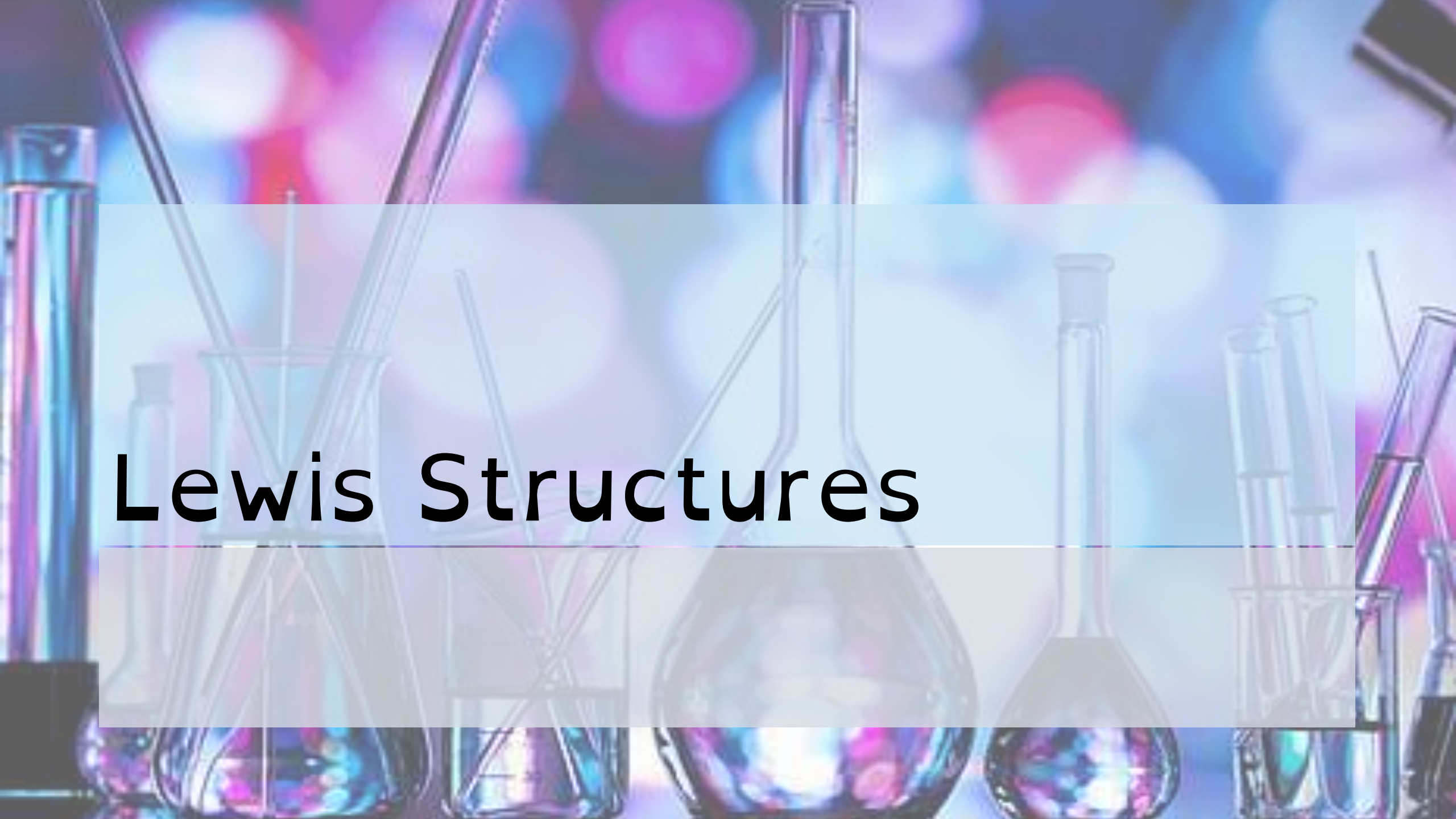
In Covalent Compounds



- Hydrogen bonding occurs between polar covalent molecules that possess hydrogen bonded to an extremely electronegative element, specifically nitrogen, oxygen and fluorine.
- These often occur in organic molecules.
- It is much weaker than a covalent bond, but in large molecules with many hydrogen bond interactions, the sum of the interactions can be an important determinant in retaining the shape and structure of a molecule, such as protein and DNA structure.

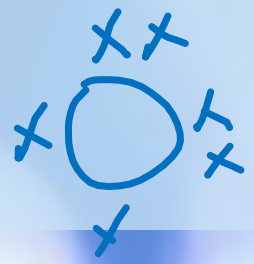
CHON





Lewis Structures

Lewis Structures



- In order to represent the bonds between atoms in a molecule, visual aids are needed.
- To draw three-dimensional structures in two-dimensions, Lewis structures are used.
- A Lewis structure is a symbol in which an atom's valence electrons are represented by dots placed around the element's symbol.

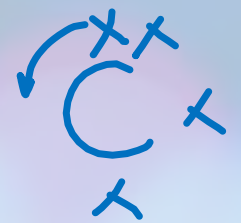
Hydrogen has 1 valence electron. Its Lewis structure is: H·

Oxygen has 6 valence electrons. Its Lewis structure is: ·O·

Chlorine has 7 valence electrons. Its Lewis structure is: :Cl·

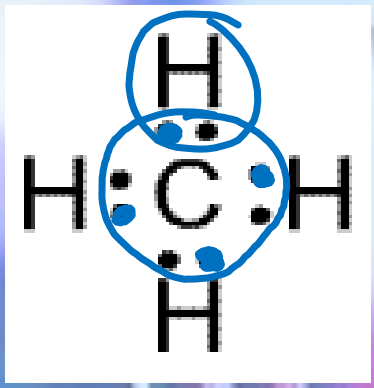
A chlorine ion, Cl-, has 8 valence electrons. Its Lewis structure is: :Cl:⁻

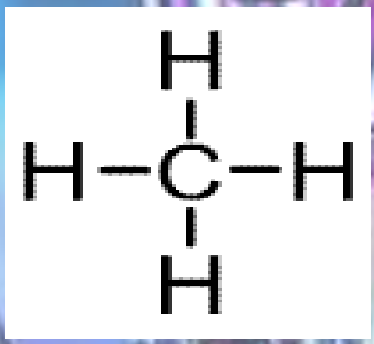
Lewis Structures



- The Lewis structure of a compound shows how the valence electrons are arranged among the atoms in the molecule to show the connectivity of the atoms.

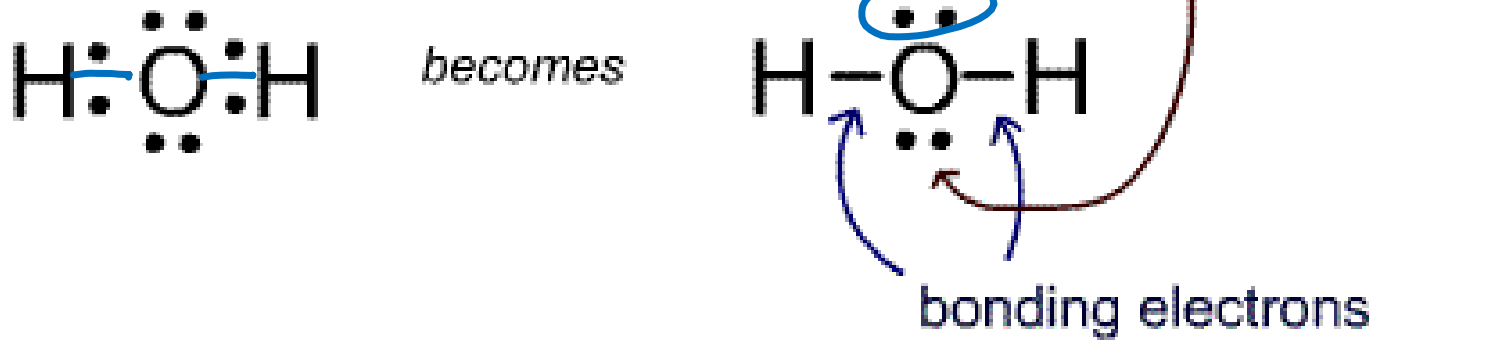
- Instead of using two dots to indicate the two electrons that comprise the covalent bond, a line is substituted for the two dots that represent the two electrons.

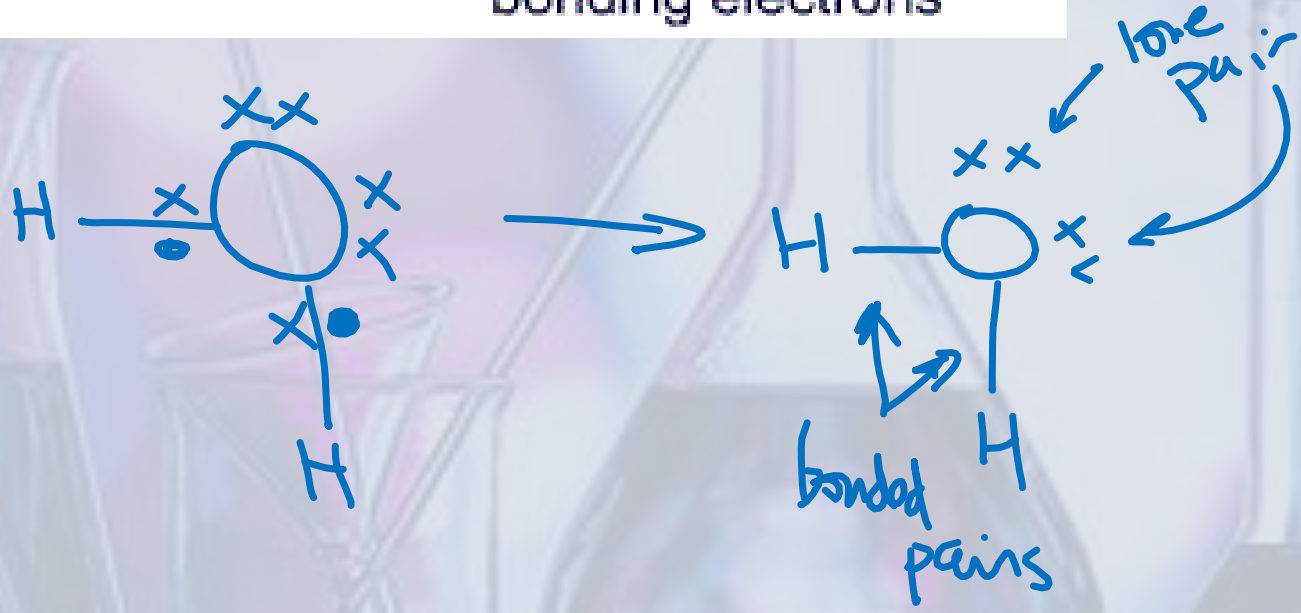




Lewis Structure of Water

- Two hydrogen atoms are each covalently bonded to the central oxygen atom.
- The bonding electrons are indicated by the dashes between the O and each H.
- The other two pairs of electrons that constitute oxygen's octet are called non-bonding (lone pair) electrons as they are not involved in a covalent bond.

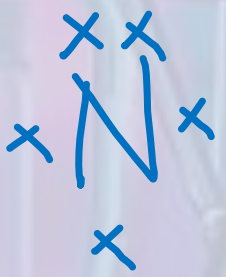

non-bonding electrons
becomes
bonding electrons

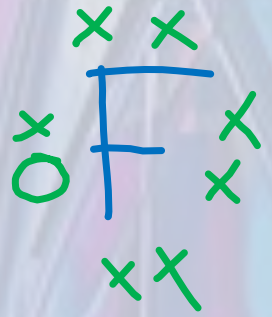

lone pair
bonded pairs

Rules to Draw Lewis Structure

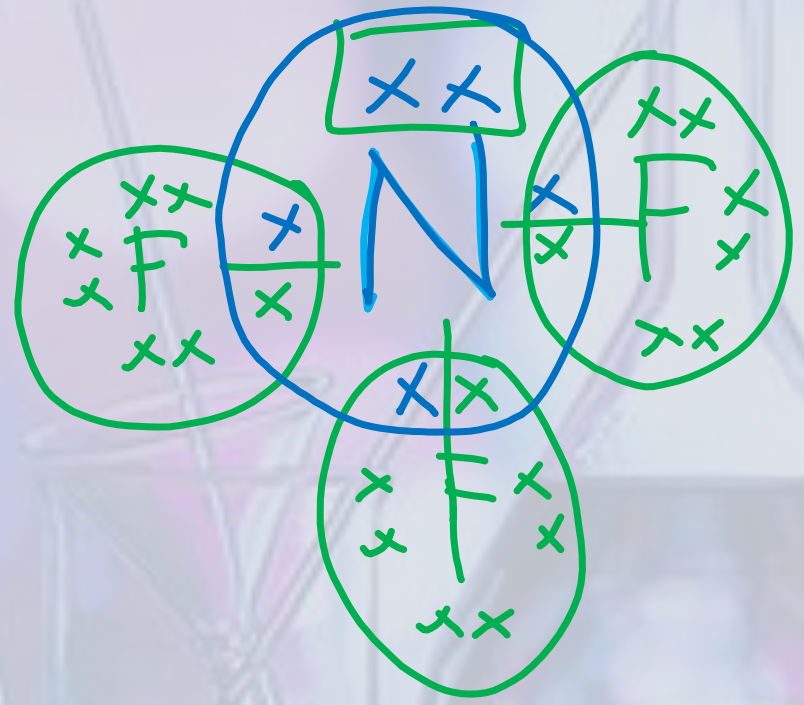
- Draw out the Lewis diagram for each type of atom in the compound
- Look for lone pairs on atoms... no bond can work there – helps to define the molecules shape
- Put lines to represent bonds where electrons are needed to get to a full octet
- 'Smoosh' atoms around the main atom (usually most valence electrons or a carbon backbone/chain)

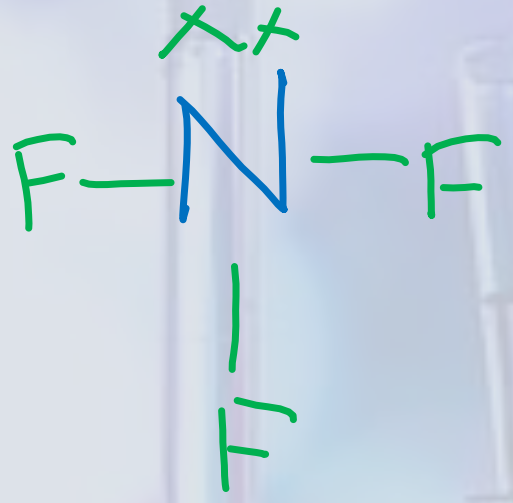
NF_3

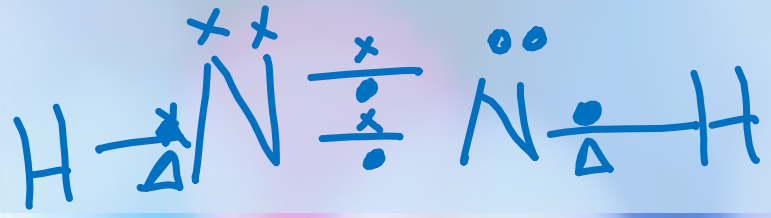




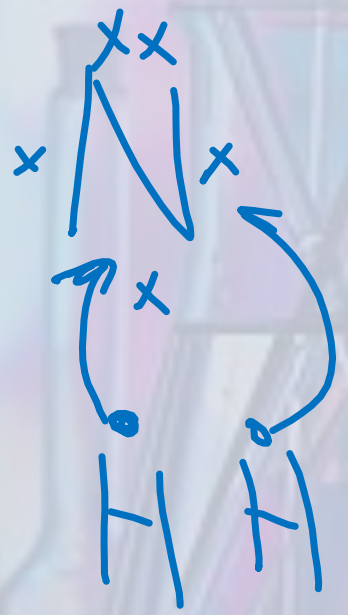
Full octet

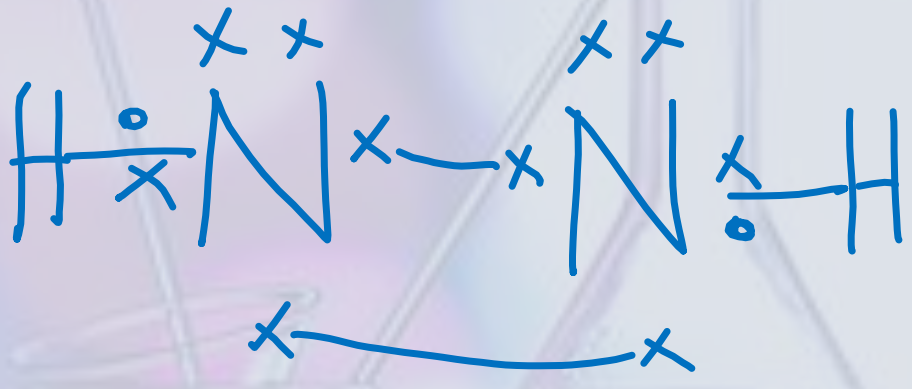






N_2H_2





Compound Shape Naming