Chirality and its importance.

Chirality is another form of isomerism. Chiral isomers are non-superimposable (meaning that they can put them on top of each with each atom overlapping correctly) images of each other. So, they are the same molecules with one of them being like looking in a mirror at yourself.

There are two types of isomerism with one being structural, meaning they are two of the same molecules with the same molecular formula but with different structural formula but atoms would be are joined together differently. The other type of isomerism is called stereo isomerism which is when a molecule has the same structural formula and molecular formula, but the atoms are arranged differently in a space. There are two types of stereoisomerism: geometrical which is having groups arranged differently about a double bond or ring having the same structural formula. The other type of stereoisomerism is optical which is just a non-superimposable mirrored image with the same structural formula. Geometrical isomerism is found when there is restricted rotation around a chemical bond and optical isomerism occurs when substances have the same molecular formula and structural formula but cannot be super imposed on each other. The optical rotation is the angle through which the plane of polarisation is rotated when polarized light passes through a layer of liquid. Optical rotation is the effect in which is determined by the concentration of chiral molecules in their molecular structure in a substance.

In a double bond between atoms there are two different types of bonds. The sigma bond and the pi bond. The sigma bond is type of covalent bond that is formed by head on positive overlap in the inter-nuclear axis (a straight line connecting the centre of two atoms in a bond). Sigma bonds are the strongest covalent bonds owing to the direct overlapping of the two participating orbitals. Sigma bonds are usually formed by s-s bonds which means two molecules overlap along the inter nuclear axis. The pi bond is formed by the sideways positive overlap of atomic particles perpendicular to the inter-nuclear axis. Pi bonding is weaker than sigma bonding as there is a significantly less degree of overlapping. double bonds usually contain one sigma and one pi bond, and the triple is usually made by two pi bonds and one sigma bond. The difference between the two types of bonds is that the sigma bonds overlap head on whereas pi bonds rather overlap side on. Sigma bonds can exist by themselves whereas pi bonds have to coexist with a sigma bond in a double bond. Sigma particles also have an impact on the shape of the particles whereas pi molecules have no role in determining the shape of the molecule.

Chirality molecules can be classed as enantiomers which means they have similar chemical properties and physical properties and are indistinguishable other than the fact of the rotation of the plane polarized light (referring to how the waves oscillate in a specific plane at a certain intensity) one enantiomer rotates polarized light to the left whereas one of the rotates the to the right. The chiral molecule that rotated the light to the right is known as dextrorotatory and its chemical sign Is followed by a positive sign. Its enantiomer that rotates

it to the left is named levorotatory and then the minus sign is used for it. this property is known as optical isomerism.

In my opinion once being discovered by a scientist called Jean-Baptiste Biot in 1812 it's been a key part in drug research and also biochemistry as once discovered it was a great importance in the sugar industry, analytical chemistry and also pharmaceuticals like drugs and painkillers. The term *chirality* was later named by *Lord kelvin* in 1894. In modern day around half of all drugs are made of chiral compounds which is massive for pharmaceutical research.

One thing isomers are quite important in is air pollution research as even slightly different structures can provoke massive differences in chemical and physical properties. So isomers may exhibit different chemo dynamic (the study of dynamics In chemical reactions) and different toxicities.