**Isomers**

Isomers are molecules that have the same molecular formula but different structural formula.

You need to know about 2 types which are **1)** Constitutional and **2)** Geometric

**1) Constitutional aka Structural**

|  |  |  |
| --- | --- | --- |
| **chain isomerism** | **positional isomerism** | **functional group isomerism** |
| butane | 1-bromopropane | propanoic acid  acid |
| 2 methyl propane | 2-bromopropane | methyl ethanoate *(an ester Level 3 only!)* |
| *pentane C5 H12 has 3 isomers*  *make, draw & name them* | *make & draw butan-1-ol and butan-2-ol* | *C2H6O has 2 isomers*  *methoxy methane*  *(an ether, not required for NCEA Level 2 or 3)*    *and*  *try to draw the second isomer of C2H6O* |

**2) Stereoisomers**

|  |  |
| --- | --- |
| **Geometric cis or trans isomers** | **Enantiomers (for Level 3 Chemistry)** |
| |  |  | | --- | --- | |  |  | | cis-1,2-dichloroethene | trans-1,2-dichloroethene |   • restricted rotation about a C=C  • 2 different groups on the left hand side  and 2 different groups on the right hand side |  |
| *make & draw cis-but-2-ene*  *and*  *trans-but-2-ene* |  |
| **additional interesting information *(for Level 3 Chemistry)***   |  |  |  | | --- | --- | --- | |  | **mp (‘C)** | **bp (‘C)** | | **cis** | **-80** | **60** | | **trans** | **-50** | **48** |   *why is the bp of cis higher?*  cis is polar trans is non-polar with  permanent dipole forces as well as temporary dipole forces  so  more energy is required to boil the cis isomer so bp is higher  *why is the melting point of cis lower?*  in a solid state the molecules must pack together efficiently, however the U shape of the cis isomer will not pack as well as the straight shape of the trans isomer  so  less energy is needed to melt the cis isomer so the mp is lower |  |

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