CHEMISTRY

MOLECULAR SHAPES

Molecular Shapes

Different molecules have different shapes based on the number of atoms involved and the electrons surrounding the central atom.

Every molecule that has more than two atoms has a central atom that the peripheral atoms rotate around. The outside atoms (and electron pairs) hate bumping in to each other so they will space themselves as far apart as possible.

Examples:

LINEAR

External Atoms = 2

Lone Pairs = 0

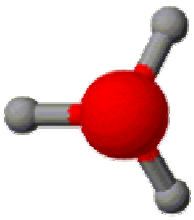
Steric Number = 2

TRIGONAL PLANAR

External Atoms = 3

Lone Pairs = 0

Steric Number = 3



CHEMISTRY

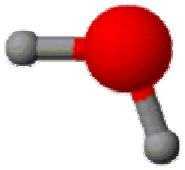
MOLECULAR SHAPES

BENT

External Atoms = 2

Lone Pairs = 1

Steric Number = 3

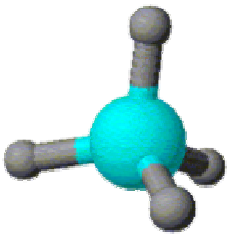


TETRAHEDRAL

External Atoms = 4

Lone Pairs = 0

Steric Number = 4

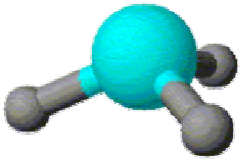


TRIGONAL PYRAMID

External Atoms = 3

Lone Pairs = 1

Steric Number = 4



CHEMISTRY

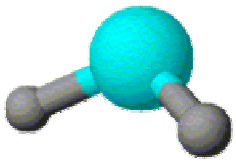
MOLECULAR SHAPES

BENT (REALLY BENT)

External Atoms = 2

Lone Pairs = 2

Steric Number = 4



It is important to know the shape of a molecule in order to determine its symmetry in terms of polarity. As mentioned before, symmetrical molecules will not form poles due to the cancellation of forces. Molecules are symmetrical if they satisfy the following two conditions:

1.

2.

Ex:	CO_2	OCS	H_2O

CHEMISTRY

MOLECULAR SHAPES

SUMMARY

SHAPE	STERIC #	LONE PAIRS	BOND ANGLES	NON-POLAR?
LINEAR	2	0	180	If same Horses
BENT	3	1	120	NEVER
TRIGONAL PLANAR	3	0	120	If same Horses
TETRAHEDRAL	4	0	109	If same Horses
PYRAMID	4	1	109	NEVER
REALLY BENT	4	2	109	NEVER