

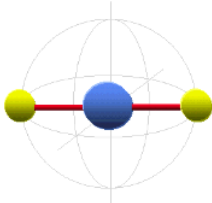
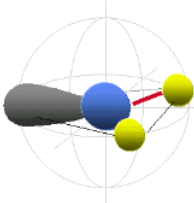
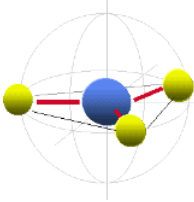
2. What is the meaning of VSEPR?
The corresponding concept is a good tool for ...
and was established by...?

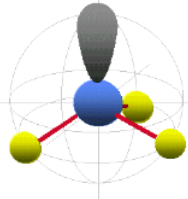
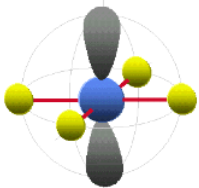
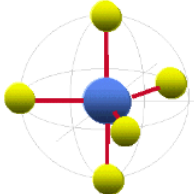
Valence Shell Electron Pair Repulsion Concept
→ Predicting the shape/structure of molecules

It was established by Gillespie and Nyholm in the year 1957.

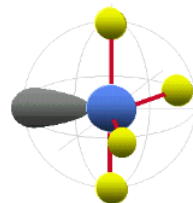
3. Give the shape, the type, and the psi-polyhedron/
geometry of CO_2 , NO_2^- , NO_3^- , SO_3^{2-} , XeF_4 ,
 $\text{PCl}_5(\text{g})$, SF_4 .

For a molecule AX_mE_n (A = central atom, X = ligand atom, E = free electron pair), X and E tend to minimize repulsion i.e., are arranged on the surface of a sphere around A forming simple polyhedra/geometric figures (E needs more space than X).

| Molecule | Type | Ψ -Geometry | Geometry |
|-----------------|-----------------------|--|-----------|
| CO_2 | AX_2 | linear  | linear |
| NO_2^- | AX_2E | trig. pl.  | bent |
| NO_3^- | AX_3 | trig. pl.  | trig. pl. |

| Molecule | Type | Ψ -Geometry | Geometry |
|--------------------|-------------------------|--|------------|
| SO_3^{2-} | AX_3E | tetr.  | trig. py. |
| XeF_4 | AX_4E_2 | oct.  | quad. pl. |
| PCl_5 (g) | AX_5 | trig. bipy.  | trig. bipy |

| Molecule | Type | Ψ -Geometry | Geometry |
|---------------|-----------------------|------------------|--------------|
| SF_4 | AX_4E | trig. bipy. | disphenoidal |



For further information see www.shef.ac.uk/chemistry/vsepr