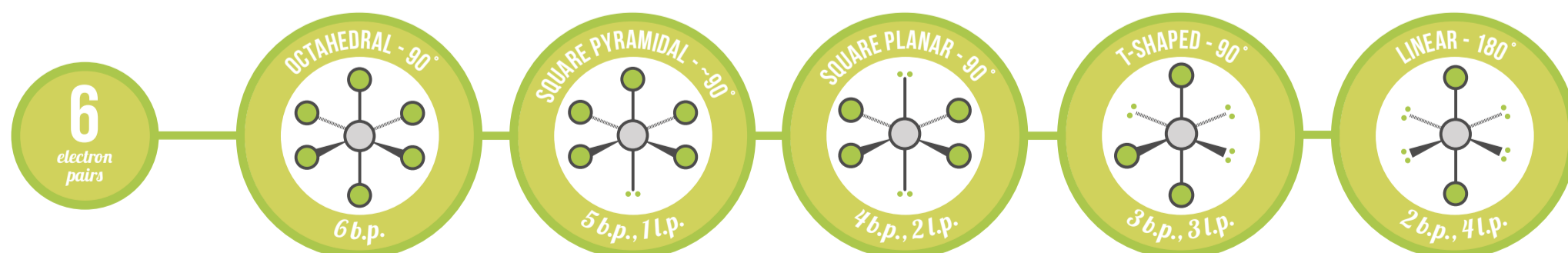
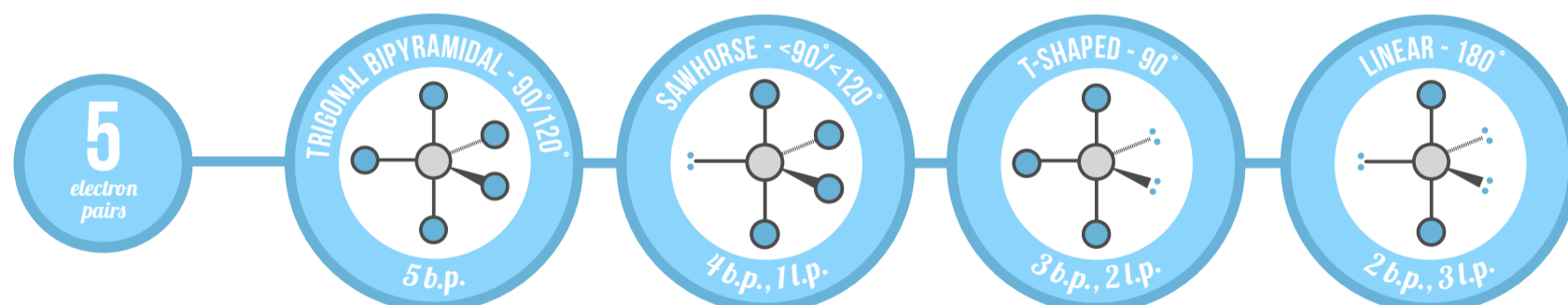
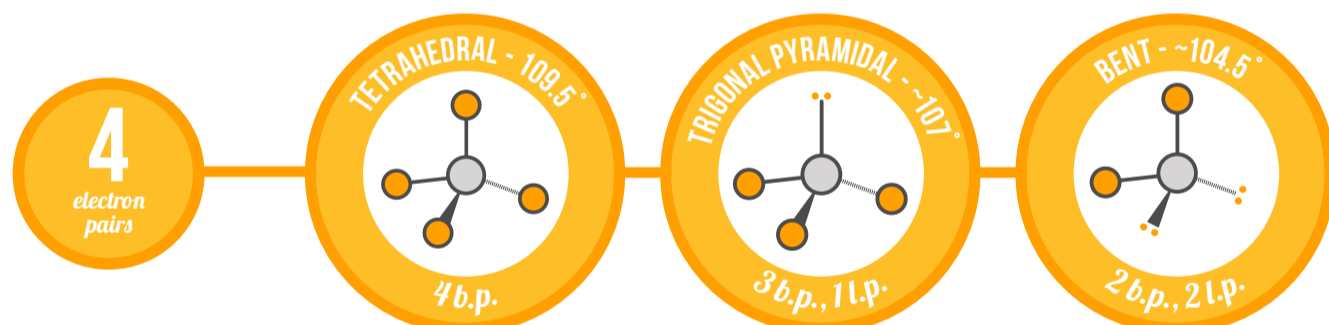
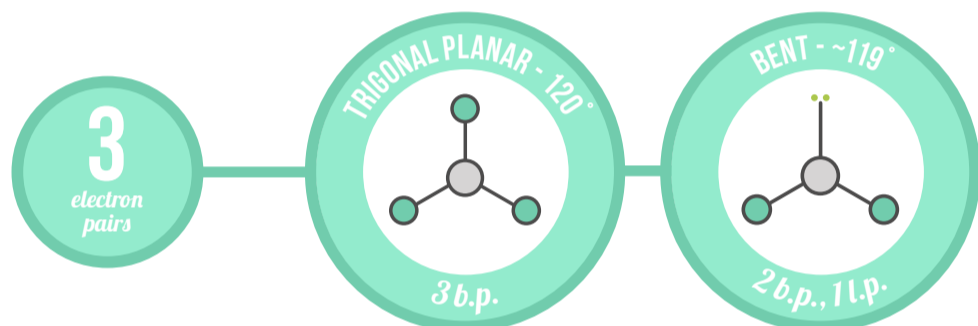
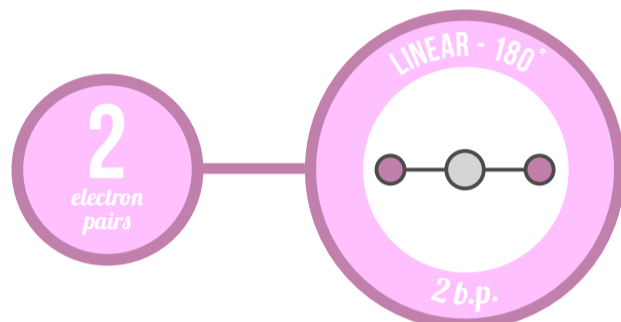
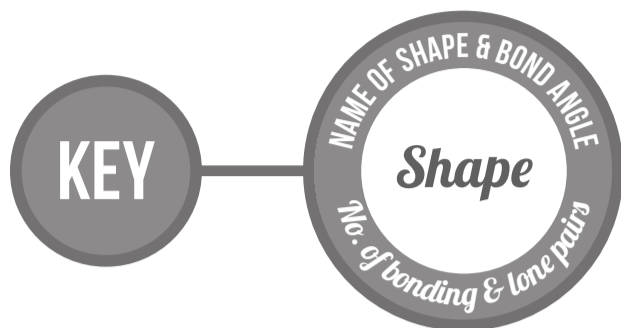


VSEPR & THE SHAPES OF MOLECULES

A SUMMARY OF THE MOLECULE SHAPES PREDICTED BY VALENCE SHELL ELECTRON PAIR REPULSION THEORY



Using Valence Shell Electron Pair Repulsion Theory

VSEPR is a model used to predict shapes of molecules. Electron pairs repel each other, and adopt an arrangement that minimises repulsion. To find the shape, a Lewis structure can be drawn, or use the following method (assumes single bonds only):

- 1 Find the number of electrons the central atom normally has in its valence shell.
- 2 Add one electron for every atom that the central atom is bonded to.
- 3 Add or subtract electrons to account for charges if the molecule is charged.
- 4 Divide the number arrived at by two to find the number of electron pairs.
- 5 Subtract no. of atoms bonded to the central atom to find no. of lone pairs.
- 6 Arrange electron pairs in the correct shape.

Bonding Pairs & Lone Pairs

Lone pairs lie closer to the central atom, and hence repel more than a bonded pair. The order of strengths of repulsion is:

LONE PAIR/LONE PAIR > BONDED PAIR/ LONE PAIR > BONDED PAIR/BONDED PAIR

Lone Pair Repulsion

Each lone pair reduces the bond angle by **APPROXIMATELY 2.5 DEGREES**

(if there are 4+ electron pairs arranged around the central atom, ignore repulsions at >90° angles)

FAILS FOR:

Isoelectronic species

Transition metal compounds