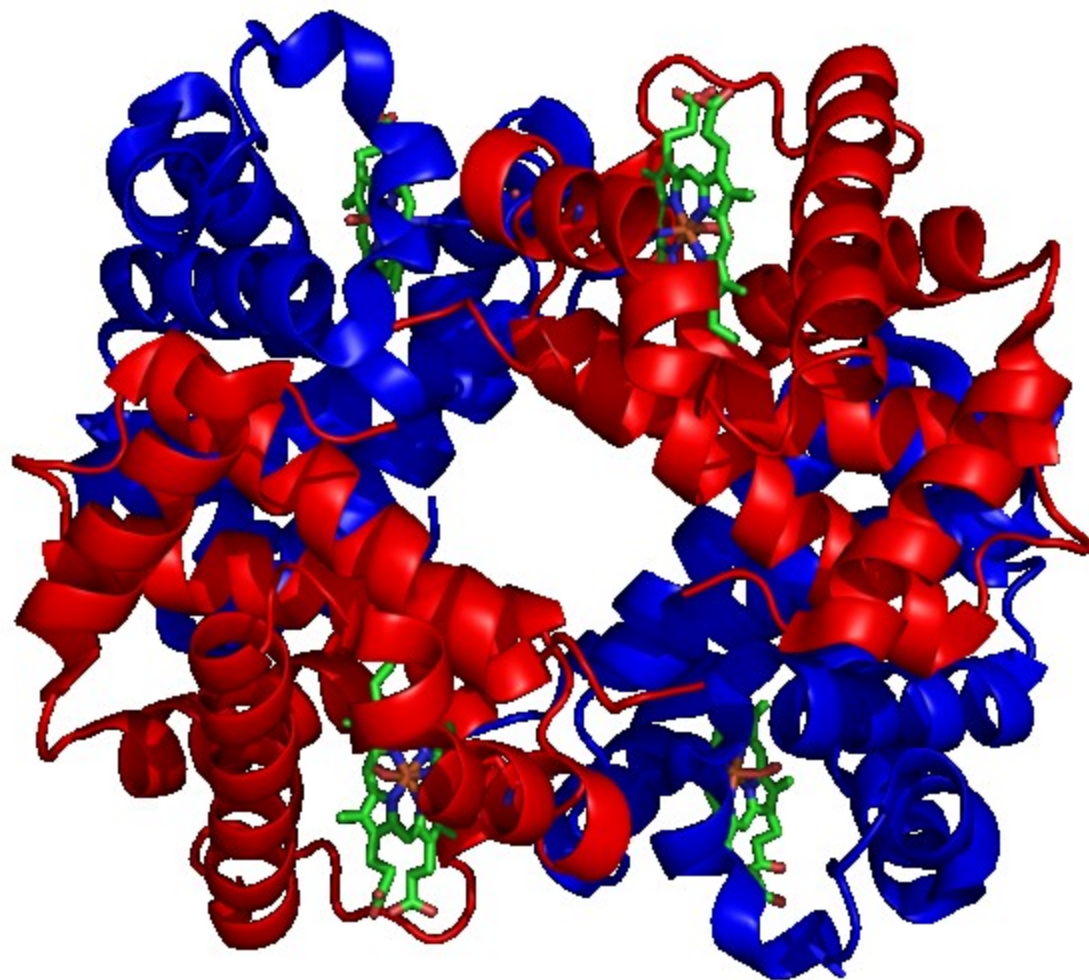


VSEPR  
and  
Molecular  
Geometry



**Hemoglobin**

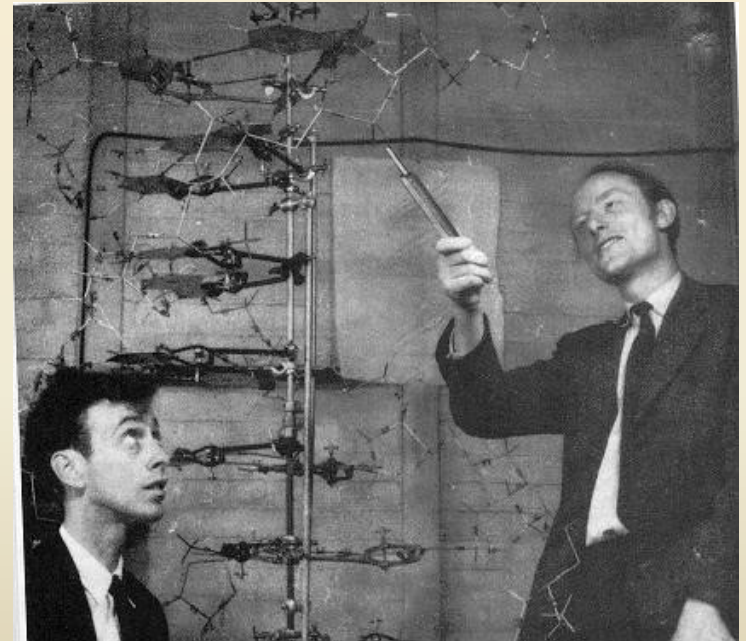
# Models

Models are attempts to explain how nature operates on the microscopic level based on experiences in the macroscopic world.

Models can be **physical** as with this DNA model

Models can be **mathematical**

Models can be **theoretical** or **philosophical**



# Fundamental Properties of Models

- ✦ A model does not equal reality.
- ✦ Models are oversimplifications, and are therefore often wrong.
- ✦ Models become more complicated as they age.
- ✦ We must understand the underlying assumptions in a model so that we don't misuse it.

# VSEPR Model

(Valence Shell Electron Pair Repulsion)

- The structure around a given atom is determined *principally* by minimizing electron pair repulsions.

# Predicting a VSEPR Structure

- Draw Lewis structure.
- Put pairs as far apart as possible.
- Determine positions of atoms from the way electron pairs are shared
- Determine the name of molecular structure from positions of the atoms.



# Steric Number 1

**1** atom bonded to another atom

Steric No.	Basic Geometry 0 lone pair	1 lone pair	2 lone pairs	3 lone pairs	4 lone pairs
<b>1</b>	 linear				

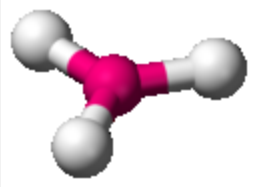
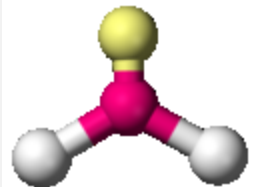
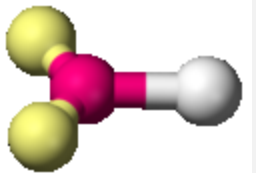
# Steric Number 2

2 atoms, or lone electron pairs, or a combination of the two, bonded to a central atom.

Steric No.	Basic Geometry			
	0 lone pair	1 lone pair	2 lone pairs	3 lone pairs
2	 linear	 linear		

# Steric Number 3

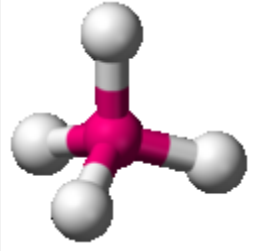
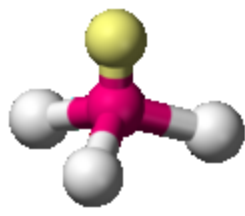
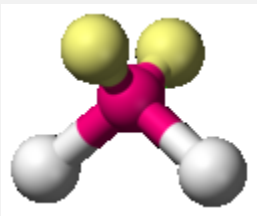
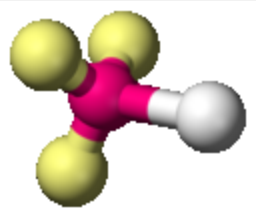
**3** atoms, or lone electron pairs, or a combination of the two, bonded to a central atom.

Steric No.	Basic Geometry			
	0 lone pair	1 lone pair	2 lone pairs	3 lone pairs
<b>3</b>	 trigonal planar	 bent / angular	 linear	



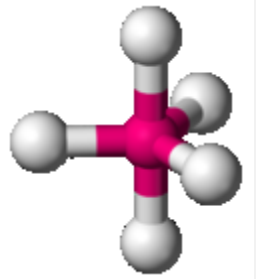
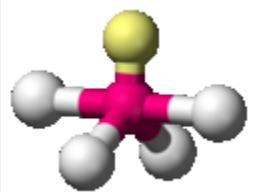
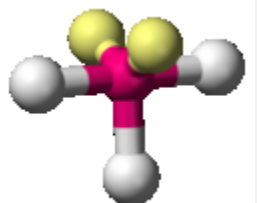
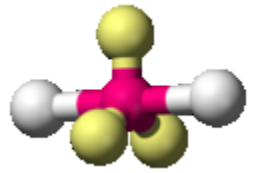
# Steric Number 4

4 atoms, or lone electron pairs, or a combination of the two, bonded to a central atom.

Steric No.	Basic Geometry 0 lone pair	1 lone pair	2 lone pairs	3 lone pairs
4	 tetrahedral	 trigonal pyramid	 bent / angular	 linear

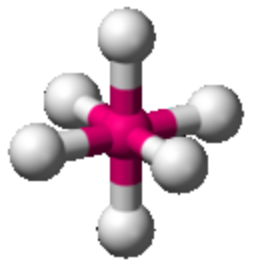
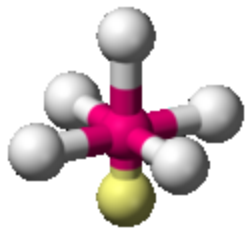

# Steric Number 5

**5** atoms, or lone electron pairs, or a combination of the two, bonded to a central atom.

Steric No.	Basic Geometry 0 lone pair	1 lone pair	2 lone pairs	3 lone pairs
<b>5</b>	 <p>trigonal bipyramid</p>	 <p>sawhorse / seesaw</p>	 <p>t-shape</p>	 <p>linear</p>

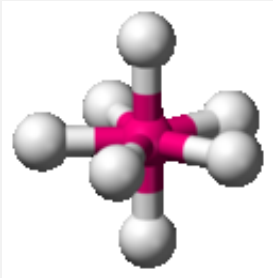
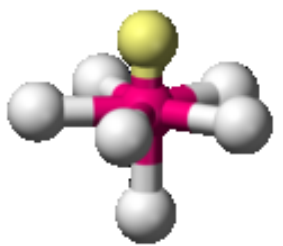
# Steric Number 6

6 atoms, or lone electron pairs, or a combination of the two, bonded to a central atom.

Steric No.	Basic Geometry 0 lone pair	1 lone pair	2 lone pairs	3 lone pairs
6	 Octahedral	 square pyramid	 square planar	

# Steric Number 7

7 atoms, or lone electron pairs, or a combination of the two, bonded to a central atom.

Steric No.	Basic Geometry 0 lone pair	1 lone pair	2 lone pairs	3 lone pairs
7	 pentagonal bipyramidal	 pentagonal pyramidal		