Section: Molecular Shapes

Answer the following items in the space provided.

1. What does VSEPR theory predict?
   
   VSEPR Theory predicts the general shape of a molecule based on its Lewis Structure.

2. Draw the Lewis structure for each of the following molecules, and use the VSEPR theory to predict the shape of each.

   a. CH₄

   ![CH₄ Lewis Structure]

   tetrahedron

   b. CCl₄

   ![CCl₄ Lewis Structure]

   tetrahedron

   c. NO₂

   ![NO₂ Lewis Structure]

   bent

3. How does one unbonded pair of electrons affect the shape of a molecule?

   The electrons in the unbonded pair repel bonding electrons as far away as possible from it.
4. How do multiple unbonded pairs of electrons affect the shape of a molecule?

Multiple unbonded pairs of electrons, as in the oxygen atom of H₂O, can repel each other as well as bonding electrons, and form a bent molecule.

5. What evidence is there to support the idea that opposite polar ends of molecules attract each other?

The energy required to separate polar molecules is greater than that required to separate non-polar molecules.

6. How do polarity and shape of molecules relate to the properties of a substance?

Shape and polarity can affect how a molecule fits into another structure and how it tastes. It can affect how easy the molecule is to separate and its attraction to positively or negatively charged objects.