

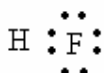
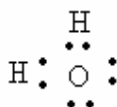
Molecular Shape

How can you determine the shape of a molecule?

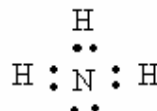
Information: Bonding and Non-Bonding Electrons



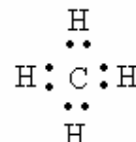
Neon

Hydrofluoric
Acid

Water



Ammonia



Methane

Neon has four lone pairs.

Hydrofluoric acid has three lone pairs and one pair of bonding electrons.

Water has two lone pairs and two bonding pairs.

Ammonia has one lone pair and three bonding pairs.

Methane has zero lone pairs and four bonding pairs.

Exploring Questions

1. How many lone pairs does neon have?
2. How many bonding pairs/ lone pairs does water have?
3. How many bonding pairs/ lone pairs does ammonia have?
4. How many bonding pairs/ lone pairs does methane have?
5. What is the bond angle between H O H in water?
6. What is the bond angle between H N H in ammonia?
7. What is the bond angle between H C H in methane?

Critical Thinking Questions

1. How many lone pairs does Ar have?
2. How many bonding pairs/ lone pairs does Hydrogen sulfide have?
3. Using the information above, what is a lone pair of electrons?
4. Using the information above, what is a bonding pair of electrons?
5. Based on the methane figure above and your answer to question seven in the exploration questions. What do you think the bond angle between H C H is? The actual experimental value of this angle is 109.5 degrees. What could cause those angles to expand?
6. Take a look at the figure above representing water. You can also use your answer to question five from the exploration questions. You may think the bond angle between H O H is 90 degree, but the actual experimental value of this angle is 103.5 degrees. Why are the angles in this figure not consistent with the actual values?
7. Are the bond angles in the given structure below correct? Why and why not?

