

Constructing Molecular Models

Part	Molecule	Sketch the Molecule & Name the Shape	Lewis Structure	Bond Type	Molecule Type
A	H ₂				
	Cl ₂				
	Br ₂				
	HCl				
	HBr				
B	CH ₄				
	CCl ₄				
C	NH ₃				
D	H ₂ O				
	Cl ₂ O				
E	O ₂				
	CO ₂				
	C ₂ H ₄				
F	N ₂				
	HCN				
	C ₂ H ₂				

Constructing Molecular Models

Molecules have three-dimensional shapes which depend on the ways in which the atoms in the molecules are bonded together. Many molecular model kits use coloured balls and connectors to represent atoms and bonds. A structure formed by joining these balls and connectors will approximate the actual shape of a molecule.

The "atoms" in a molecular model kit are colour coded:

H = yellow

O = red

Cl = green

I = purple

C = black

N = blue

Br = orange

In a molecular model, if two balls are joined together by a connector (stick), the connector represents a covalent bond composed of two electrons. If two balls are joined together by two connectors (springs), a double covalent bond composed of two electron pairs (four electrons) is indicated. Three connectors joining two balls represent a triple covalent bond composed of three electron pairs (six electrons).

Instructions

Construct molecular models of each of the compounds listed in the data table. Sketch a diagram of what the molecular model looks like and name the shape of the molecule. Draw the Lewis structure and determine the bond and molecule type (polar or nonpolar).

Questions

1. What type of bond is involved in the models you constructed in parts A, B, C, and D?
2. What type of bond is common to the three models you constructed in part E?
3. What type of bond is common to the three models you constructed in part F?
4. Which of the models that you constructed represent diatomic molecules?
5. On the basis of your results, what bond combinations must be present in order for a triatomic molecule to be linear?
6. Why do you think you were instructed to use as many connectors as possible to join atoms in each model?