

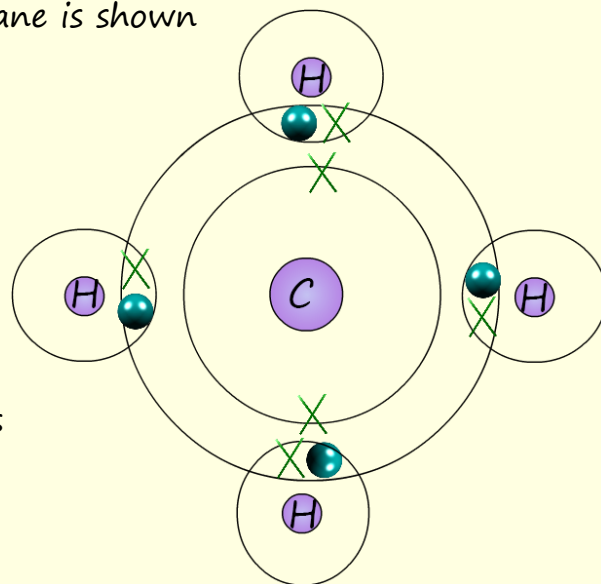
# SHAPES OF MOLECULES USING VSEPR

1. A dot and cross diagram for the molecule methane is shown opposite.

a. What is the formula for this molecule?

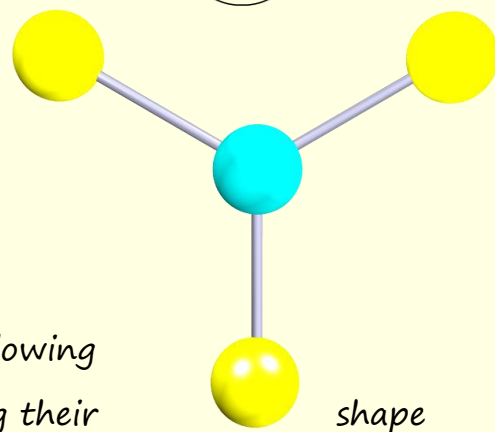
b. What is the central atom in this molecule?

c. Use VSEPR rules to work out the shape of this molecule and then sketch it clearly indicating its 3d shape.



2. The image opposite shows the trigonal planar molecule  $\text{BF}_3$ . Draw a dot and cross diagram for  $\text{BF}_3$ .

Only show the electrons in the valency or last shell.



3. Using VSEPR rules work out the formula for the following molecules then draw the molecules clearly indicating their and bond angles clearly.

a.  $\text{AlCl}_3$

b.  $\text{PH}_3$

c.  $\text{SiCl}_4$

d.  $\text{CHCl}_3$

e.  $\text{PF}_5$

f.  $\text{BeCl}_2$

g.  $\text{SF}_6$

## Answers

1. A dot and cross diagram for the molecule methane is shown opposite.

a. What is the formula for this molecule?  $\text{CH}_4$

b. What is the central atom in this molecule?

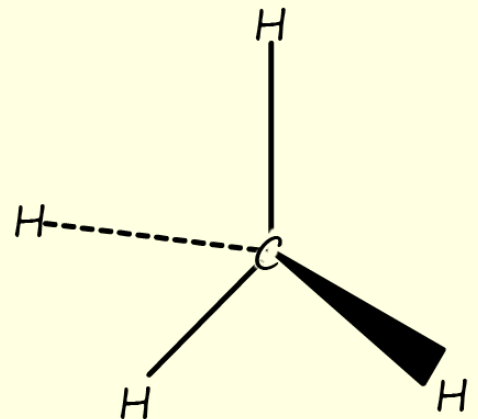
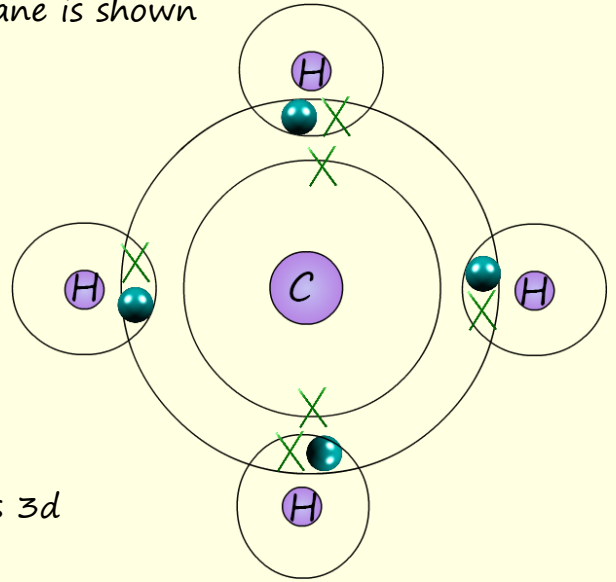
Carbon is the central atom

c. Use VSEPR rules to work out the shape of this molecule and then sketch it clearly indicating its 3d shape.

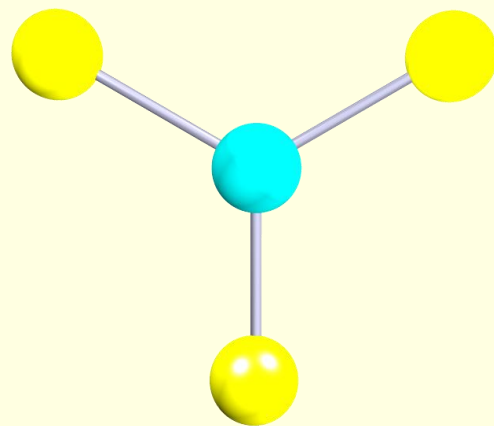
Central atom = C 4 valency electrons

4 bonds to H atoms = 4e

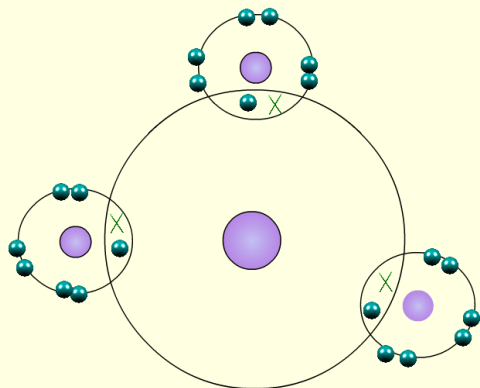
Total electrons = 8e, divide by 2 to get the number of pairs. So we have 4 pairs of electrons around the central atom. This means molecule will be tetrahedral in shape.



2. The image opposite shows the trigonal planar molecule  $\text{BF}_3$ . Draw a dot and cross diagram for  $\text{BF}_3$ .



Only show the electrons in the valency or last shell.



3. Using VSEPR rules work out the formula for the following molecules then draw the molecules clearly indicating their shape and bond angles clearly.

- a.  $\text{AlCl}_3$       b.  $\text{BH}_3$       c.  $\text{SiCl}_4$       d.  $\text{CHCl}_3$   
 e.  $\text{PF}_5$       f.  $\text{BeCl}_2$       g.  $\text{SF}_6$

