ANSWER KEY.

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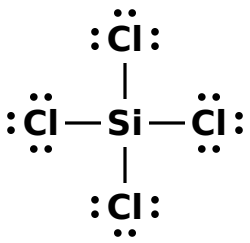
VSEPR

Chemistry | ANSWER KEY

Use a periodic table and the VSEPR chart from the lesson. Draw each Lewis structure. Then give the number of electron groups and lone pairs on the central atom, the shape, and the bond angle. Lewis structures are flat, so the shape comes from the electron groups, not the drawing.

1. silicon tetrachloride, $SiCl_4$

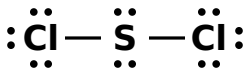
32 valence electrons



4 electron groups, 0 lone pairs. Shape: tetrahedral. Bond angle: 109.5°

2. sulfur dichloride, SCl_2

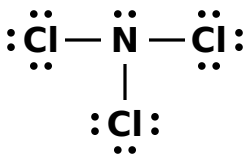
20 valence electrons



4 electron groups, 2 lone pairs. Shape: bent. Bond angle: less than 109.5° (about 104.5° on the chart)

3. nitrogen trichloride, NCl_3

26 valence electrons

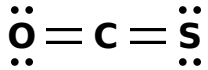


4 electron groups, 1 lone pair. Shape: trigonal pyramidal. Bond angle: less than 109.5° (about 107° on the chart)

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4. carbonyl sulfide, COS (carbon is the central atom)

16 valence electrons

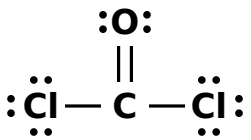


2 electron groups (each double bond counts as 1 group), 0 lone pairs. Shape: linear. Bond angle: 180°

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5. phosgene, $COCl_2$ (carbon is the central atom)

24 valence electrons



3 electron groups (the C=O double bond counts as 1 group), 0 lone pairs. Shape: trigonal planar. Bond angle: 120°

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6. A central atom has 4 electron groups, and 2 of them are lone pairs. A student says the shape is tetrahedral because there are 4 groups. Explain the mistake and give the correct shape and bond angle.

The shape name describes where the atoms are. The 2 lone pairs are still there and push the 2 bonded atoms closer together, but they are not part of the shape name. The shape is bent, with a bond angle less than 109.5° (about 104.5°).

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