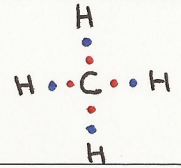
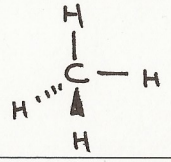
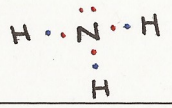
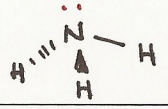
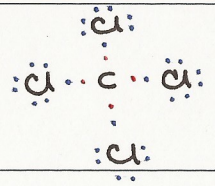
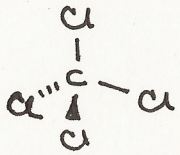
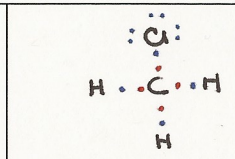
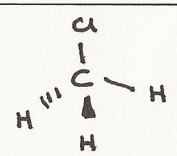
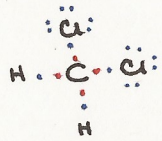
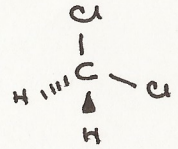
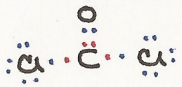
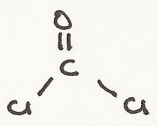
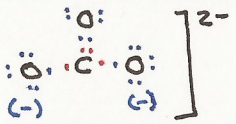
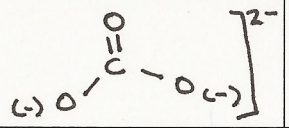
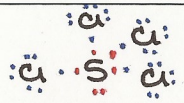
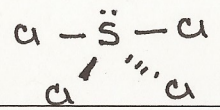
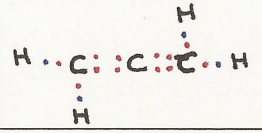
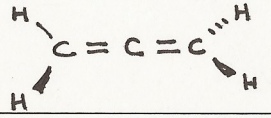
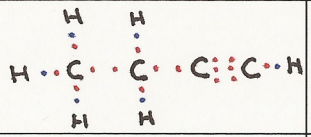
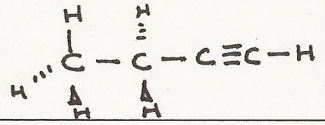
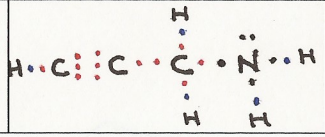
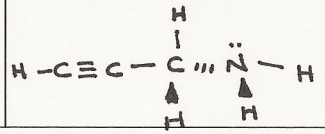
We can predict bonding using our Lewis dot structure model. From these dot structures and VSEPR theory, we can predict the electronic geometry – organization of electron domains – and the shape of the molecule, where the atoms are in relation to each other. From these predicted shapes and our understanding of electronegativity, we can predict whether or not a molecule will be polar and have a net dipole moment. As we will see in upcoming topics, this polarity helps us understand certain properties of the substance.

What you should do:

1. Put away your books, notes, etc. Keep out just your pencil, this sheet, clay and toothpicks, and iclicker. Remember, your goal is to fully understand each topic prior to the next class, so you should now understand shape well enough to not need your notes. Use today's activity as a low-stakes assessment of your ability – can you correctly identify the geometries of these molecules?
2. For each molecule, complete the chart and build the molecule with clay and toothpicks, using different colored clay balls for different elements in the compound. Compare your structure with neighbors. Have one of our undergraduate learning assistants check it for you if you have any questions! For larger molecules, combine resources (clay and toothpicks) to build the entire structure, piecing it together from your knowledge of the geometry around each central atom.

| Formula | Dot Structure | 3-D Picture/Description | Electronic Geometry | Molecular Geometry | Polar? Why or Why Not? |
|---|---|---|---|---|---|
| $CH_4$ |  |  | Tetrahedron | Tetrahedron | NP |
| $NH_3$ |  |  | Tetrahedron | Trigonal Pyramid | P |
| $H_2O$ |  |  | Tetrahedron | Bent | P |
| $CCl_4$ |  |  | Tetrahedron | Tetrahedron | NP |

| | | | | | |
|---|---|---|---|---|---|
| $CHCl_3$ |  |  | Tetrahedron | Tetrahedron | P |
| $CH_2Cl_2$ |  |  | Tetrahedron | Tetrahedron | P |
| $COCl_2$ |  |  | Trigonal Planar | Trigonal Planar | P |
| Carbonate ion |  |  | Trigonal Planar | Trigonal Planar | NP |
| $SCl_4$ |  |  | Trigonal Bipyramidal | See-saw | P |
| $CH_2CCH_2$ |  |  | Linear | Linear | NP |
| $CH_3CH_2CCH$ |  |  | | | NP |
| $CHCCH_2NH_2$ |  |  | | | P |