1) Build hand-held molecular models of CH4, NH3 and H2O, and SF4. If you can’t find the correct color for a given atom, don’t worry. It is more important to use the correct shape than color because you can always add a label that indicates what atom you would like it to represent. Note: you won’t have time to build the models at the start of lab, so be sure to have them prepared in advance. Note for #2-4: Do not tear out any copy pages of your notebook because during the experiment, you will fill in each table with the information the computer provides.

2) Prepare table for CH4, NH3, and H2O.

a) Make a full-page table in your notebook (landscape format) with these headings: Chemical Formula, Lewis Structure, Sample Drawing of Various Computer Models, 3-D Drawing of Model with Arrow Showing Dipole, Bond Angle, Magnitude of Dipole Moment, Electrostatic potential (elpot) Map. Make the table cells big so you’ll have plenty of space for drawing the models.

b) In the “Chemical Formula” column, write the formulas of the molecules we’ll be viewing in Parts I and II of this experiment: CH4, NH3, and H2O.

c) In the “Lewis structures” column, draw the Lewis structures of CH4, NH3, and H2O.

3) Prepare table for H2, HF, and LiH. a) On a second page, make a table with these headings: Chemical Formula, Lewis structure with Arrow for Direction of Dipole, Electrostatic Potential Map, Magnitude of Dipole Moment. (Note for when you are working on the computers: “dipole moment” is the term used to quantitate the strength of a dipole and is measured in units of Debye, D.)

b) In the Chemical Formula column, write these chemical formulas: H2, HF, and LiH.

c) In the Lewis structure column, draw their Lewis structures.

Prepare table for SF4.

a) On a third page, make a table with these headings: Lewis structure of SF4, 3-D structure of SF4 with lone pair shown in equatorial position, SF4 energy if lone pair is equatorial, 3-D structure of SF4 with lone pair shown in axial position, SF4 energy if lone pair is axial.

b) Draw the Lewis and 3-D structures in the corresponding columns.

5) Prepare table for miscellaneous molecules.

a) On a fourth page, make a table in landscape format with these headings: Chemical formula, Lewis structure, 3-D structure, Orbital (or Electron Group) Geometry, Molecular geometry, Bond Angles, Hybridization, Polar or Non-polar.

b) Leave space in your table for five molecules; during lab, you’ll build models of and complete the table for five assigned molecules.