# Exercise 9.1
# Molecular Polarity

*Be aware that there are two common conventions for drawing dipole arrows.*

- *In the convention approved by IUPAC (used in this answer key), the arrow points from the negative end of the bond/molecule to the positive end; you can imagine that it has a – sign buried in its tail to remind you that that is the negative end of the dipole.*
- *In a convention commonly used by chemists (that it is very likely you will encounter at some point during your education/career), the arrow points from the positive end of the bond/molecule to the negative end; this type of arrow has a + sign on its tail to remind you that that is the positive end of the dipole.*

*When reading a dipole, if you're not sure which convention is being used, check the tail! (Silberberg mixed up the two conventions in the first edition. We have pointed this out and hope it will be fixed in the second edition.)*

*In CHEM 1000 and 2000, unless your instructor explicitly states otherwise, assume that you are to use the IUPAC convention. All course materials use this convention.*

1. For each of the molecules listed below:
   - Draw the bond dipoles on a diagram of the molecule showing its geometry.
   - Draw the net dipole (if there is one) or write "no net dipole".
   - Identify whether the molecule is polar or nonpolar.

   *These are the same molecules as on Exercise 8.5. You may wish to add to those answers.*

   *Electronegativity values are provided for the elements in $BBr_3$. For the other molecules (except those containing Xe), use periodic trends to predict which atom in each bond is more electronegative.*

   *For molecules containing Xe (which, as a noble gas, does not appear on electronegativity tables), do not show dipoles. Just identify whether the molecule is polar or nonpolar. The Xe-O and Xe-F bonds are polar (with Xe as the positive end of each bond dipole).*

(a) $SO_2$ (b) $BeCl_2$

(c) $OF_2$ (d) $XeF_2$

(e) $BBr_3$ $\chi(B) = 2.0$ $\chi(Br) = 2.8$ (f) $XeO_3$

(g) $ClF_3$ (h) $SF_4$

(i) $XeF_4$ (j) $XeO_4$

(k) $ClF_5$ (l) $PCl_5$

(m) $SCl_6$