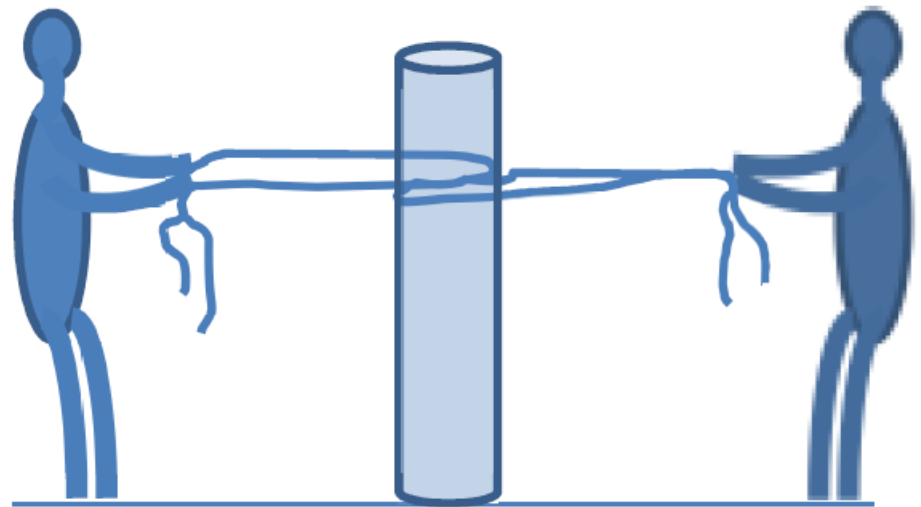


Chapter 7 Part 5

Dr. Turner

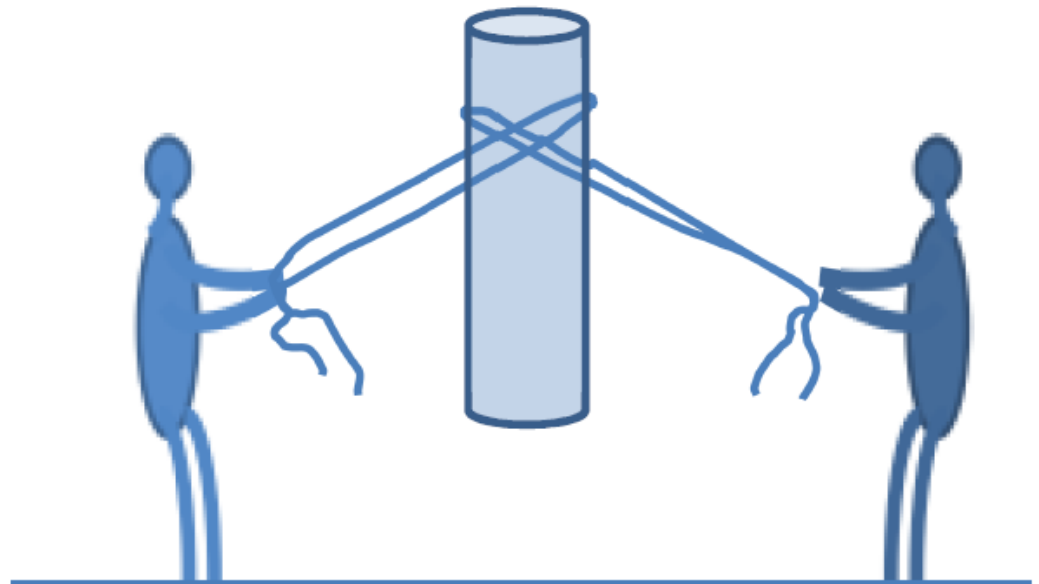
Tug of war

- Imagine two people pulling on a post from opposite sides with equal amounts of force.
- Draw an arrow representing the force each person exerts on the post.
- Does the post move?



Tug of war

- Draw arrows showing the force exerted on the post by each person if they are not standing directly opposite each other.
- Draw an arrow representing which direction the post will move.

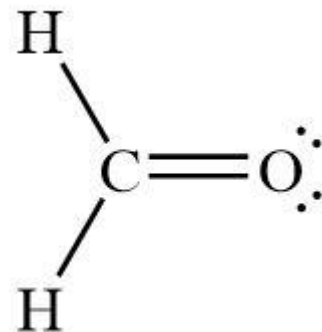
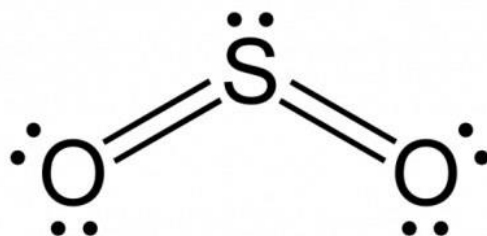
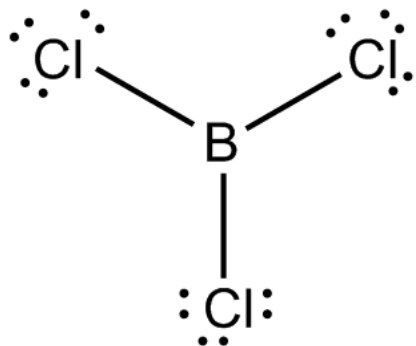


Dipoles: Bond and Molecular

- Electronegative elements pull the electron density in bonds towards themselves causing polar bonds.
- This uneven electron density distribution in bonds can result in an uneven electron density in a molecule. This results in molecular polarity.
- A molecule is said to be polar if the electron density is not spread evenly throughout the molecule.

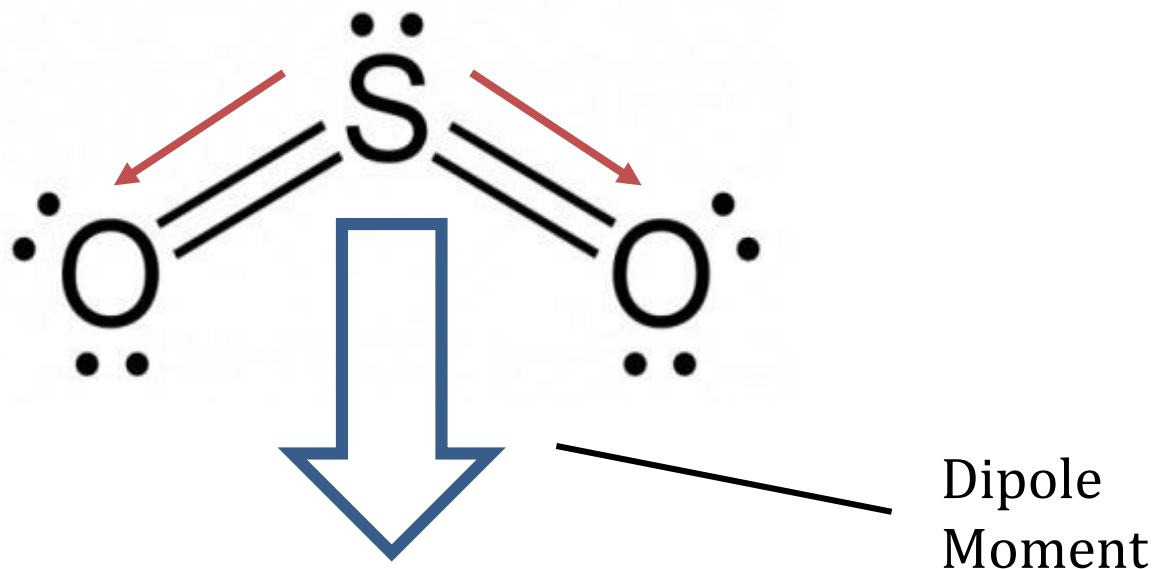
Molecular Polarity

- For the molecules below, draw lined arrows indicating the direction of the electron pull between the central atom and each outer atom. Draw a thick arrow indicating the net electron movement. (Not every drawing will have a thick arrow.)



Dipole Moments

- The large blue arrow indicates the direction of the electron density movement and is called a dipole moment.
- Only polar molecules have dipole moments because only they have an uneven distribution of electron density throughout the molecule.

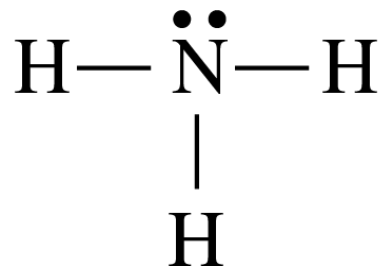


Determining Molecular Polarity

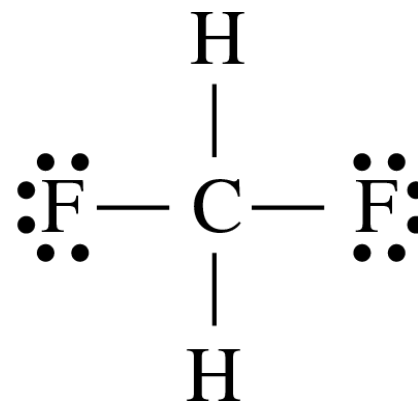
- Determine the molecular geometry in order to get a 3D view of the molecule
- Determine the individual bond polarity pull directions (red arrows)
- Determine the net electron density movement to get the dipole moment (blue arrow)

Do these molecules have dipole moments?

ammonia, NH_3

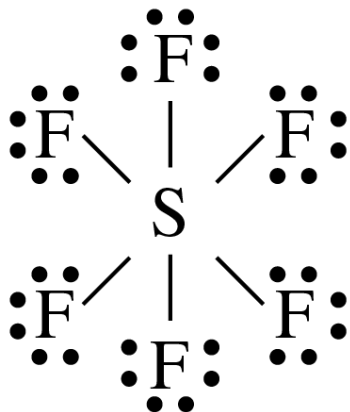


difluoromethane, CH_2F_2

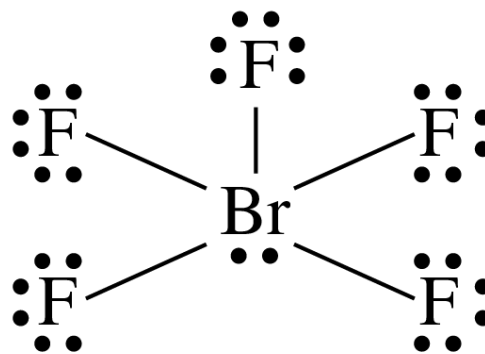


Do these molecules have dipole moments?

sulfur hexafluoride, SF₆



bromine pentafluoride, BrF₅



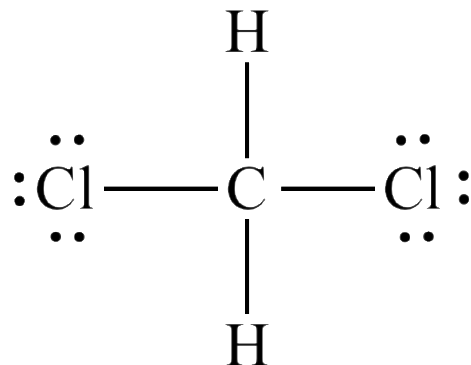
Polarity

Consider a molecule with polar bonds. In which case will this molecule be polar?

- A. always
- B. never
- C. if the number of bonds is odd
- D. if the bonds are arranged symmetrically
- E. if the bonds are arranged asymmetrically

Polarity

Identify the correct statement about the CH_2Cl_2 molecule.



- A. CH_2Cl_2 has polar bonds and is a polar molecule.
- B. CH_2Cl_2 has polar bonds and is a nonpolar molecule.
- C. CH_2Cl_2 has nonpolar bonds and is a polar molecule.
- D. CH_2Cl_2 has nonpolar bonds and is a nonpolar molecule.