

Explaining whether a molecule is polar or not

You need to mention:

1. Whether individual bonds within a molecule are polar or not. This will be due to **electronegativity differences between atoms** in the bond
2. The 3-D arrangement of atoms in a molecule.
Is it
 - **Tetrahedral** (no lone pairs)
 - **Trigonal pyramid** (always has a lone pair)
 - **Triangular planar**
 - **Bent** (always has 1 or 2 lone pairs)
 - **Linear** (can have lone pairs)
3. Whether or not the polar bonds in the molecule are **symmetrical**
 - If it is symmetrical, polar bonds can cancel making molecule non-polar
 - If it is not symmetrical (due to lone pairs of electrons on central atom **or** different atoms bonded to central atom), the effect of polar bonds is not cancelled and molecule is polar

Example: Explain why NF_3 is a polar molecule (Excellence Answer)

There are 3 polar N-F bonds in NF_3 due to **difference in electronegativity** of N and F.

There are 4 regions of negative charge about the central N atom (3 bonding, 1 non-bonding). These regions repel into a tetrahedral arrangement. However, the shape made by the 3 bonds is **trigonal pyramid**.

This **arrangement** of polar bonds **is not symmetrical**. The polar bonds **do not cancel** out, therefore molecule is **polar**.

Task:

Discuss the polarity of H_2S