

- 1) ↑ Polarity \implies ↑ IMF \implies ↑ Boiling Point
- 2) ↓ Polarity \implies ↓ IMF \implies ↓ Boiling Point
- 3) ↓ Polarity \implies ↓ IMF \implies ↓ Boiling Point
- 4) ↑ Polarity \implies ↑ IMF \implies ↑ Boiling Point
- 5) ↑ Polarity \implies ↑ IMF \implies ↑ Boiling Point
- 6) ↑ Polarity \implies ↑ IMF \implies ↓ Volatility
- 7) ↑ Polarity \implies ↑ IMF \implies ↓ Volatility
- 8) ↓ Polarity \implies ↓ IMF \implies ↑ Volatility
- 9) ↓ Polarity \implies ↓ IMF \implies ↑ Volatility
- 10) ↓ Polarity \implies ↓ IMF \implies ↑ Volatility

11) ↓ Polarity \implies ↓ IMF \implies Ⓣ Cohesive Forces

12) ↑ Polarity \implies Ⓢ IMF \implies ↑ Cohesive Forces

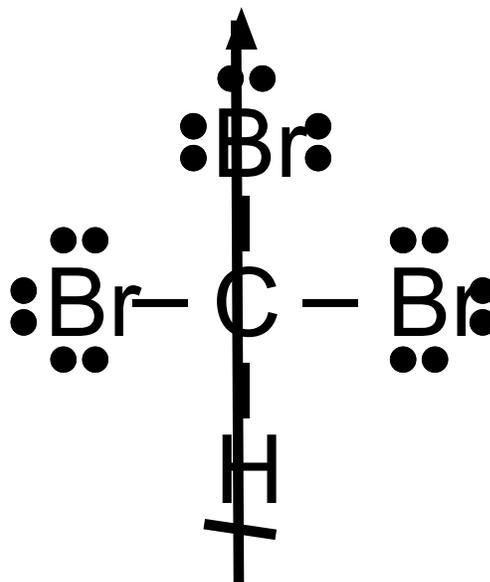
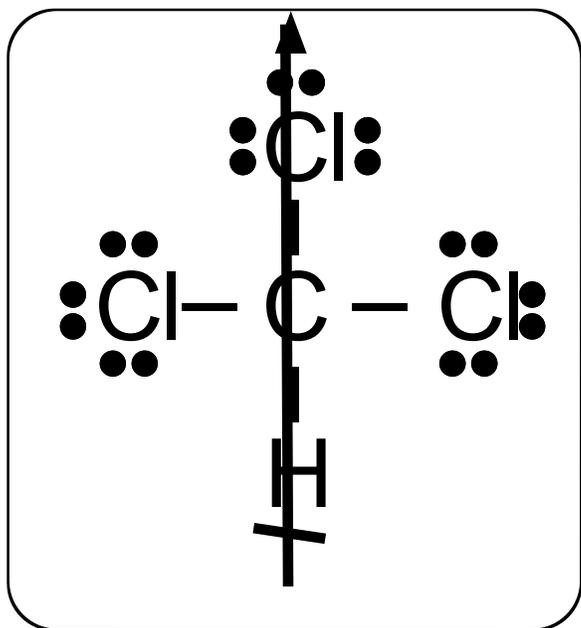
13) ↑ Polarity \implies ↑ IMF \implies Ⓢ Cohesive Forces

14) ↓ Polarity \implies Ⓣ IMF \implies ↓ Cohesive Forces

15) Ⓢ Polarity \implies ↑ IMF \implies ↑ Cohesive Forces

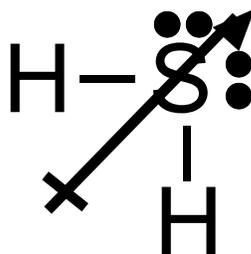
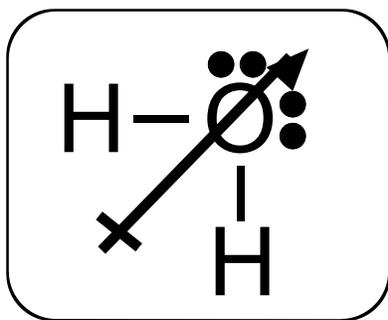
1) Methyl chloride (CHCl_3) or methyl bromide (CHBr_3)

Methyl chloride is more polar because the Cl-C bond is more polar than the Br-C bond.



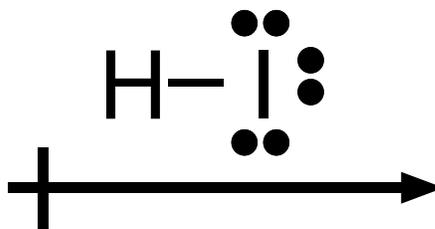
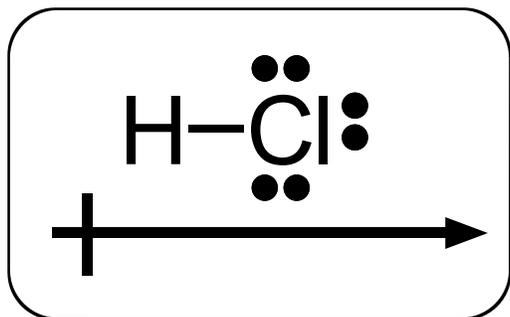
2) Water or hydrogen sulfide (H_2S)

Water is more polar because the O-H bond is more polar than the H-S bond



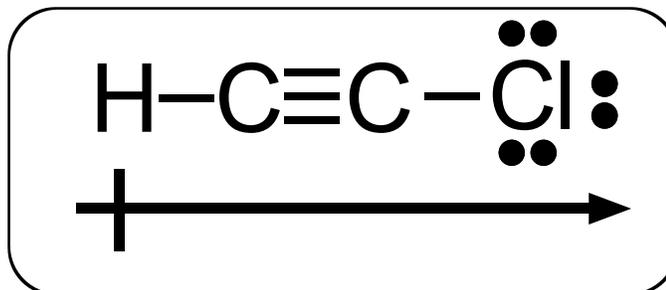
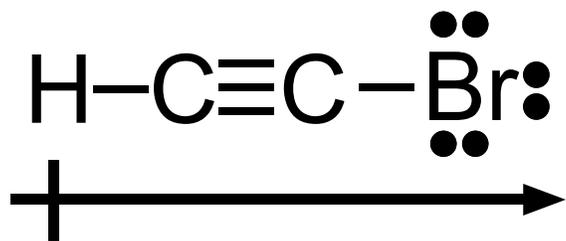
3) Hydrochloric acid (HCl) or hydroiodic acid (HI)

Hydrochloric acid is more polar because the H-Cl bond is more polar than the H-I bond.



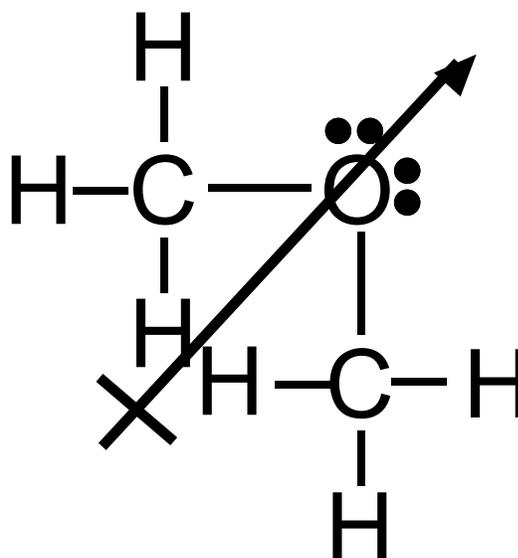
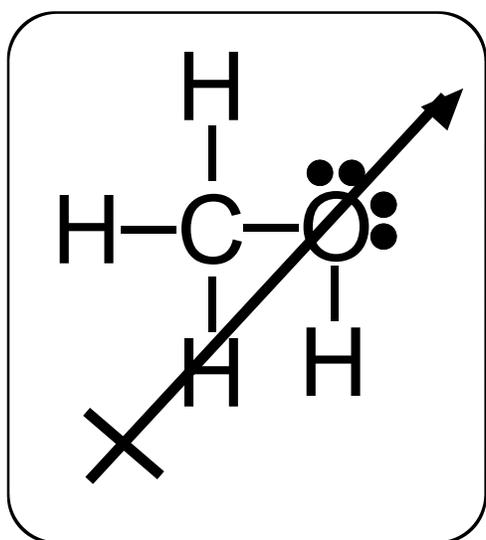
4) Bromoacetylene (C_2HBr) or chloroacetylene (C_2HCl)

Chloroacetylene is more polar because the chlorine is more electronegative than bromine.



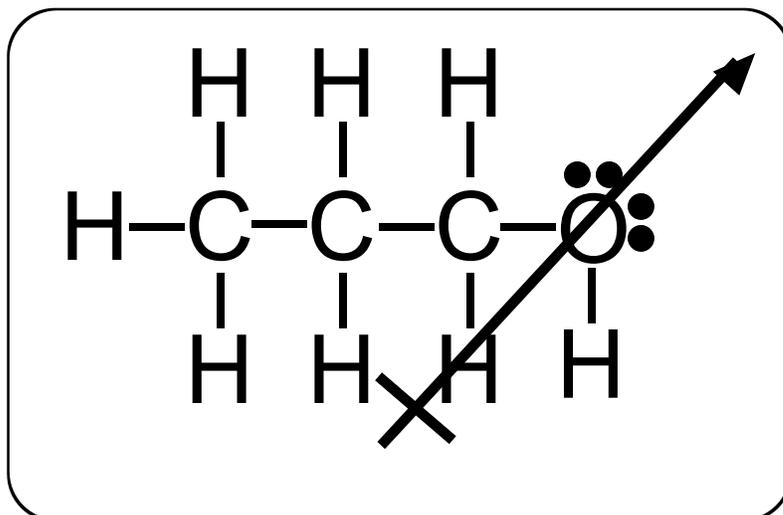
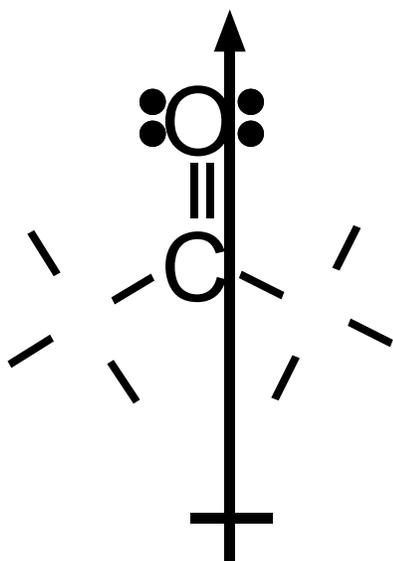
5) Methanol (CH_3OH) or diethyl ether $[(CH_3)_2O]$

Methanol is more polar because the O-H bond is more polar than the O-C bond and because methanol is smaller, making it more non-symmetrical overall.



6) Acetone $[(CH_3)_2CO]$ or propanol (C_3H_8O)

Propanol is more polar because the O-H bond is more polar than the O-C bond and because propanol is more non-symmetrical overall.



Regarding the molecules you just drew, answer the following questions, including a brief description of your reasoning.

1) Regarding set 1, which will exhibit stronger cohesive forces?

CHCl_3 ↑ Cohesive \therefore ↑ IMF's \therefore ↑ Polarity

2) Regarding set 2, which will evaporate more readily?

H_2S ↑ Volatility \therefore ↓ IMF's \therefore ↓ Polarity

3) Regarding set 6, which will boil at a lower temperature?

Acetone ↓ BP \therefore ↓ IMF's \therefore ↓ Polarity

4) Regarding set 5, which will have stronger intermolecular forces?

Methanol ↑ IMF's \therefore ↑ Polarity

5) Regarding set 5, which will least likely evaporate and therefore be a liquid?

Methanol ↓ Volatility \therefore ↑ IMF's \therefore ↑ Polarity

6) Regarding set 4, which will be more volatile?

Bromoacetylene ↑ Volatility \therefore ↓ IMF's \therefore ↓ Polarity

7) Regarding set 3, which will have a higher boiling point?

HCl ↑ BP \therefore ↑ IMF's \therefore ↑ Polarity

8) Regarding set 2, which will boil at a lower temperature?

H_2S ↓ BP \therefore ↓ IMF's \therefore ↓ Polarity

9) Regarding set 6, which will be less volatile?

Propanol ↓ Volatility \therefore ↑ IMF's \therefore ↑ Polarity

10) Regarding set 2, which will exhibit weaker cohesive forces

H_2S ↓ Cohesive \therefore ↓ IMF's \therefore ↓ Polarity