Intermolecular Forces

Molecular Substance with Phase at Room Temperature	Number of electrons	boiling point (°C)	Types of Intermolecular Forces		
			Van der Walls		hydrogen bonding
			dipole - dipole	London dispersion	
e.g. $F_{2(g)}$	18	-188		✓	
$Cl_{2(g)}$		-35			
$Br_{2(l)}$		59			
$I_{2(s)}$		184			
$ClF_{(g)}$		-101			
$BrF_{(g)}$		-20			
$BrCl_{(s)}$		5			
$ICl_{(s)}$		97			
$IBr_{(s)}$		116			
$CH_{4(g)}$		-162			
$C_2H_{6(g)}$		-87			
$C_3H_{8(g)}$		-45			
$C_4H_{10(g)}$		-0.50			
$C_5H_{12(l)}$		36			
$CF_{4(g)}$		-129			
$CCl_{4(l)}$		77			
$CBr_{4(s)}$		189			
$CH_3F_{(g)}$		-78			
$CH_3Cl_{(g)}$		-24			
$CH_3Br_{(g)}$		3.6			
$CH_3I_{(l)}$		43			
$CH_3OH_{(l)}$		65			
$C_2H_5F_{(g)}$		-38			
$C_2H_5Cl_{(g)}$		13			
$C_2H_5Br_{(l)}$		38			
$C_2H_5I_{(l)}$		72			
$C_2H_5OH_{(l)}$		78			

Refer to the table relating boiling point vs #'s of electrons and intermolecular forces as you answer the following questions.

1 Compare the boiling points of $BrF_{(g)}$ and $C_3H_{8(g)}$. Account for the difference in boiling points.

2 Methanol, CH_3OH, and ethanol, C_2H_5OH, each have the fewest electrons but the highest boiling points of their respective series. Account for this.

3 Explain the difference in boiling point between C_2H_6 and CH_3F

4 Explain the difference in boiling point between Cl_2 and C_4H_{10}