# Year 13 Science: Shapes, polarity and intermolecular forces

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

## Practice

1. $XeF_2$ has 2 bonding regions and 3 lone pairs on xenon. What is its shape?

2. What is the shape and bond angle of $SiCl_4$?

3. What is the shape of $BrF_5$?

4. Is $PCl_5$ polar or non-polar?

5. Which attractions act between $CH_3Cl$ molecules?

6. Draw the Lewis structure of the $ICl_4^-$ ion and name its shape.

7. Explain why the bond angle in $NH_3$ is about 107°, while in $BF_3$ it is 120°.

8. $ClF_3$ is polar but $PCl_5$ is non-polar. Explain why.

9. Ethanol, $CH_3CH_2OH$ (46 g $mol^{-1}$), boils at 78 °C, methoxymethane, $CH_3OCH_3$ (46 g $mol^{-1}$), at −24 °C, and propane, $C_3H_8$ (44 g $mol^{-1}$), at −42 °C. Justify the order of boiling points.

## Fix the mistake

10. Correct this statement: "$XeF_4$ has six regions, so its shape is octahedral."

11. Correct this statement: "When water boils, the O–H bonds break."

12. Correct this statement: "$CH_3Cl$ contains a hydrogen atom and a chlorine atom, so it has hydrogen bonding."

13. Correct this statement: "$XeF_4$ has polar bonds, so it is a polar molecule."