Year 12 Science: Lewis structures, shapes and polarity

Name: _____ Date: _____

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

Practice

1. How many valence electrons are shown in the Lewis structure of HCN?

2. Give the shape and bond angle of methanal, H2CO (C in the middle, double bonded to O).

3. What is the bond angle in silane, SiH4?

4. Name the shape of oxygen difluoride, OF2.

5. Is dichloromethane, CH2Cl2, polar or non-polar?

Exam-style question: BCl3 and PCl3

Boron trichloride, BCl3, and phosphorus trichloride, PCl3, are both used to make other chemicals in industry. Each has three Cl atoms bonded to a central atom.

6. Give the total number of valence electrons in the Lewis structure of each molecule.

7. Name the shape of each molecule and give its bond angle.

8. Explain why the two molecules have different shapes.

9. Both molecules contain polar bonds. Discuss why BCl3 is non-polar but PCl3 is polar.

Fix the mistake

10. Correct this statement: "CO2 is bent like water, because it has three atoms."

11. Correct this statement: "A double bond counts as two regions of electron density."

12. Correct this statement: "CCl4 has polar bonds, so it must be a polar molecule."

13. Correct this statement: "In a Lewis structure of PCl3 only the bonds and the P lone pair need drawing."