Intermolecular Forces Worksheet

1) Using your knowledge of molecular structure, identify the main intermolecular force in the following compounds. You may find it useful to draw Lewis structures to find your answer.

   a) PF_3 _____

   b) H_2CO _____

   c) HF _____

2) Explain how dipole-dipole forces cause molecules to be attracted to one another.

3) Rank the following compounds from lowest to highest boiling point: calcium carbonate, methane, methanol (CH_4O), dimethyl ether (CH_3OCH_3).

4) Explain why nonpolar molecules usually have much lower surface tension than polar ones.

Intermolecular Forces Worksheet Answers

1) Using your knowledge of molecular structure, identify the main intermolecular force in the following compounds. You may find it useful to draw Lewis structures to find your answer.

a) PF_3 **dipole-dipole force**

b) H_2CO **dipole-dipole force**

c) HF **hydrogen bonding**

2) Explain how dipole-dipole forces cause molecules to be attracted to one another.
Polar molecules have partially positive and partially negative sides (which correspond to the side of the molecule which is more or less electronegative). Because opposite charges attract one another, these molecules stick electrostatically.

3) Rank the following compounds from lowest to highest boiling point: calcium carbonate, methane, methanol (CH_4O), dimethyl ether (CH_3OCH_3).
By using intermolecular forces, we can tell that these compounds will rank:
methane (Van der Waals forces), dimethyl ether (dipole-dipole forces), methanol (hydrogen bonding), calcium carbonate (ionic electrostatic forces that are much stronger than intermolecular forces).

4) Explain why nonpolar molecules usually have much lower surface tension than polar ones.
Because the molecules aren't attracted to each other as much as in polar molecules, these molecules are much less likely to have high surface tension.

