

3. PCl_3 and AsCl_3 are similar substances with similar geometries and bonding modes. Give a brief explanation with your answers to the following: a) Which of the two substances would you expect to be more volatile at room temperature? b) Which substance would you expect to have the higher boiling point? c) Which substance would have the greater average kinetic energy at $40\text{ }^\circ\text{C}$? d) In which substance would you expect the intermolecular forces to be larger?
4. The planet Jupiter has a mass 318 times that of Earth, and its surface temperature is 140 K. Mercury has a mass 0.05 that of Earth, and its surface temperature is between 600 K and 700K. On which planet is the atmosphere more likely to obey the ideal-gas law? Explain.
5. a) When you exercise vigorously you sweat. How does this help your body cool? b) A flask of water is connected to a vacuum pump. A few moments after the pump is turned on the water begins to boil. After a few minutes the water begins to freeze. Explain why these processes occur.