

Textbook p51 Kinetic theory of Matter

13. Nitrogen is relatively inert. But air contains oxygen which reacts with food.
15. These are known as contrails. At high altitude, temperature is lower because with a thinner atmosphere, less molecules are there to contain the heat. The moisture produced by the combustion of jet fuel freezes and forms tiny crystals that appear as a tail.
22. The gas contains H₂O which forms form the combustion of gasoline. When encountering cold air, the water vapour molecules slow down ; the attractions cuase them to condense into tiny liquid droplets .



p62 Kinetic theory of Matter

10. B
11. a) There's a lot of empty space between translating molecules. Liquid molecules are bunched up.
- b) Solid molecules are also bunched up, which means that compared to widely spaced gas molecules, there are more solid ones per unit volume, increasing their density.
- c) Gas molecules translate as far as the walls of their container.
- d) Rotations don't carry liquid molecules as far as gas molecules.
- e) Kinetic energy is the product of 0.5, mass and the square of velocity. But if at the same temperature, molecules have the same average kinetic energy, then the smaller ones have to be moving faster to compensate for their smaller mass.

p68 no.8 Law of Effusion

$$a) \frac{v_u}{v_{CO_2}} = \sqrt{\frac{M_{CO_2}}{M_u}}$$

$$b) \frac{43.0}{32.0} = \sqrt{\frac{44.0}{M_u}}$$

$$\left(\frac{43}{32}\right)^2 = \left(\frac{44}{M_u}\right)$$

$$M_u = 44 \div \left(\frac{43}{32}\right)^2 = 24.3 \text{ g.mole}$$

