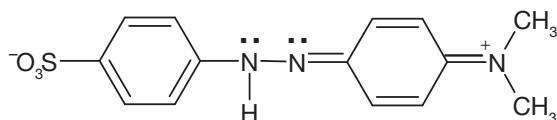


Post-Laboratory Review Questions

1. Hydrocarbons are nonpolar compounds containing carbon and hydrogen atoms. The properties of three hydrocarbons are summarized below.

Methane	Octane	Eicosane
CH ₄	C ₈ H ₁₈	CH ₃ (CH ₂) ₁₈ CH ₃
Natural gas	Gasoline	Lubricant (grease)
Gas, bp -161 °C	Liquid, bp 126 °C	Solid, mp 37 °C

- a. How do the attractive forces between molecules change in the transition from the gas to the liquid to the solid state?
- b. Based on its properties, which compound has the strongest attractive forces? The weakest attractive forces?
- c. Write a general statement describing how the size of a molecule influences the strength of London dispersion forces between molecules.
2. Dyes are organic compounds that can be used to impart bright, permanent colors to fabrics. The affinity of a dye for a fabric depends on the chemical structures of the dye and fabric molecules and also on the interactions between them. Three common fabrics are wool, cotton and nylon. Wool is a protein, a naturally occurring polymer made up of amino acids with ionized (charged) side chains. Cotton is a naturally occurring polymer made up of glucose units with hydrophilic groups surrounding each glucose unit. Nylon is a synthetic polymer made of hydrocarbon repeating chains joined together by highly polar amide (-CONH-) functional groups.
- a. The chemical structure of methyl orange is drawn below. Identify the groups in the dye that will bind to ionic and polar sites in a fabric.



- b. Complete the following “If/then” hypothesis to explain how the structure of a fabric will influence the relative color intensity produced by methyl orange.
- “If a fabric contains more ionic and polar groups in its structure, then the intensity of the dye color due to methyl orange should (increase/decrease), because _____.”
- c. Using this hypothesis, predict the relative color intensity that would be produced by methyl orange on cotton, nylon and wool. Rank the fabrics from 1 = lightest color to 3 = darkest color.