

Unit 3, Section C: Petroleum: A Building Material Source

Why are carbon-based molecules so versatile as chemical building blocks?

Objectives:

- Define and distinguish between a *monomer* and *polymer*.
- Explain how molecular structure affects physical properties of a polymer.
- Compare saturated and unsaturated hydrocarbons in terms of structure and properties.
- Identify the functional groups in alcohols, ethers, carboxylic acids and esters.
- Give examples of how functional groups impart characteristic properties to organic compounds.
- Identify and describe two major classes of ring compounds.
- Identify and describe the roles of addition and condensation reactions in polymerization.

Vocabulary/Terms Introduced: *Define and draw a visual representation of each term as assigned*

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|------------------------|-------------------------|---------------------------|-------------------------|
| • petrochemical | • linear polymer | • unsaturated hydrocarbon | • alcohol |
| • polymer | • coiled polymer | • substituted alkene | • functional groups |
| • monomers | • branched polymer | • alkyne | • carboxylic acid |
| • covalent bond | • side chain | • dimer | • ester |
| • double covalent bond | • cross linking | • cycloalkane | • condensation reaction |
| • addition reaction | • saturated hydrocarbon | • aromatic compound | • condensation polymer |
| • addition polymer | • alkene | • benzene | • PET |

Reference or Worksheets: Organic Functional Groups

Labs/Lab Activities: C-4—**The Builders** pp. 267-270, C.8—**Condensation** (Esters Lab) p 275-277

Student Assessments: Vocabulary Quiz, Basic functional groups, 3C Exam.

Reading Notes, Terms, Labs and Questions Assigned:

- **C.1-C.2—Creating New Options: Petrochemicals** Complete Reading Notes pp. 261-266. Define: petrochemical, polymer, monomer, covalent bond, double covalent bond, addition reaction, additional polymer, linear polymer, coiled polymer, branched polymer, side chain, cross linking. Answer questions #1-6 p. 266 and Do Summary Questions #1-5 p. 279.
- *In Class* **C.3—Beyond Alkanes** and **C-4—The Builders**. Complete activity answering Questions #1-19, pp 267-270. HW: Define: saturated hydrocarbon, alkenes, unsaturated hydrocarbon, substituted alkenes, alkynes, dimer, Do Summary Questions #6-15 p. 279.
- **C.5—More Builder Molecules** and **C.6—Builder Molecules Containing Oxygen**. Define: cycloalkane, aromatic compound, benzene, alcohols, functional groups, carboxylic acid, and ester. Do Summary Questions #16-23, p. 280.
- **C.7—Condensation Polymers**. p. 274. Define: condensation reaction, condensation polymer and PET. Do Summary Questions 24-26 p.280. Read through C.8 pp. 275-277. Write the title, purpose, safety considerations and summary of procedure in preparation for Lab.
- *In Class* **C.8—Condensation** (Esters Lab) p. 275-277. Carefully follow procedure and safety for this lab. Complete Questions #1-5 p. 276. HW: Complete Summary Questions #24-26 p.280.
- *In Class* **C.8—Builder Molecules in Transportation** pp. 277-278. Read and complete Questions 1-4. **HW:** Review vocabulary, lab and summary questions to study for Unit 3C Exam.