

## Chapter 2 Objectives

### I. Ways to Represent Organic Compounds

1. Describe what molecular formulas, Lewis structures, condensed structures, line structures, and names tell you about an organic compound, including their strengths and weaknesses.
2. If given a line structure, provide a molecular formula, Lewis structure, or condensed structure.
3. If given a Lewis structure, provide a condensed structure or a line structure.
4. Interpret hybridization, geometry, and polar bonds in lines structures.

### II. Classification of Organic Molecules

#### General Terms

1. Describe what kinds of molecules can be described by the terms "hydrocarbon," "aromatic," "aliphatic," "unsaturated," and "saturated."
2. Classify molecules using the terms above.

#### Hydrocarbon functional groups, Functional groups containing only oxygen, Functional groups containing nitrogen, Functional groups containing halogens

1. Explain what a functional group is, and why compounds are classified this way.
2. Give the names and descriptions of the functional groups.
3. Determine what functional groups a compound contains by looking at the line structure of the compound.
4. Determine what functional groups a compound may contain by looking at the name of the compound.
5. Draw a line structure for a compound with a specific molecular formula, containing a given functional group.

### III. Physical Properties of Organic Molecules

1. List the physical properties of organic molecules which are of most common concern to organic chemistry.

#### Intermolecular forces

1. Explain the difference between chemical bonds and intermolecular forces.

2. Describe the three intermolecular forces, including what causes them, what types of molecules will experience them, and what factors affect them.
3. Identify the most important intermolecular force for any organic molecule.

#### States of matter and the transitions between them

1. Describe the behavior of molecules in a solid, liquid, or gas in terms of organization, space between molecules, amount of movement, and amount of energy.
2. Explain what happens to the molecules of a compound during a phase change from solid to liquid and from liquid to gas (and vice versa).
3. Determine what state of matter a substance is in at a given temperature using the melting point and boiling point.
4. Explain how and why mass and intermolecular forces affect melting and boiling points.
5. Determine which of two compounds will have a higher boiling or melting point, and why.
6. Explain why atmospheric pressure affects boiling points, but not melting points.

#### Solubility

1. Explain why some substances are soluble in water, while others are not.
2. Predict which of two molecules will be more likely to dissolve in water.
3. Predict whether a molecule will be more likely to dissolve in water or an organic compound.