Lesson 2-1: Introduction to Organic Chemistry	
Curriculum Expectations	B2.1 use appropriate terminology related to organic chemistry, including, but not limited to: *organic compound, functional group, saturated hydrocarbon, unsaturated hydrocarbon, structural isomer, stereoisomer,* and *polymer* [C] B3.1 compare the different classes of organic compounds, including hydrocarbons, alcohols, aldehydes, ketones, carboxylic acids, esters, ethers, amines, and amides, by describing the similarities and differences in names and structural formulae of the compounds within each class B3.5 explain the concept of isomerism in organic compounds, and how variations in the properties of isomers relate to their structural and molecular formulae
Learning Goals	**Learning Goals:** By the end of this lesson you will: • Know the different classes of organic compounds • Understand how the different classes of organic compounds differ from each other • Know how to represent organic compounds in various formats from molecular structure to line-angle diagrams • Understand the concept of isomerism
Success Criteria	I know I have achieved the learning goals when I: • Can describe the different classes of organic compounds • Can identify classes of organic compounds based on molecular and structural formulas • Can explain structural and stereoisomerism
Teacher Prep	• Paper for placemat activity • Printouts for Organic formulas gridlock game • Printout for Functional Groups gridlock activity

Minds On
Goal: This activity will introduce the term organic to students as it relates to organic chemistry.

1. **Intro to Organic Chemistry Placemats Activity**

Instructions:

1. Organize students into groups of 3 or 4.
2. Have students draw the placemat organizer on a sheet of paper to be shared.
3. Read the first prompt question together as a class make sure that they understand the question.

   Prompt #1: What does the term organic mean in everyday language?

4. Students will write their own response to the prompt to the space in front of them.
5. The group will discuss their thoughts and come to an agreement on the response to the prompt.
6. Each group will share their agreed upon response with the class.
7. Teacher should lead a discussion based on the responses.
8. Repeat steps 1-7 for the following prompts:

   Prompt #2: What are some examples of everyday products that meet this definition of organic?

   Prompt #3: How does your groups definition relate to "Organic Chemistry"?

Action

****Refer to the Differentiation Resources link for additional practice worksheets, and to enrich your classroom teaching using different tools throughout the lesson. ****

1. **Introduction to Organic Chemistry Worksheet**
   - Have students complete the handout as they work their way through the lesson *or* you can assign the handout as homework to completed after class and taken up in the next session.

2. **2-1A: Introduction to Organic Chemistry**
   - Have students read through the introduction on their own.
   - Discuss the introduction as a class. Reference the previous responses to the placemat activity, noting that for chemistry organic refers to compounds containing carbon.
   - Make sure students take note of the few exceptions of organic compounds.

- Have students practice writing the different types ways to represent organic compounds by giving them molecular formulas for different hydrocarbons.
- Next move on to the cyclic compounds and have students practice writing the different types.
- Finish with a brief discussion about aromatic hydrocarbons.

3. **Organic Formulas Gridlock Activity:** Groups or Whole class. Click on the link for the online version of the gridlocks activity or if in groups or individually, give printouts for the students to complete. This activity will allow students to practice drawing and identifying organic compouds using the different representation types. Explain the rules.

Teacher information:

Gridlock Puzzles are designed to do 3 major things:

1. They give the students a problem solving context for the activity – students like solving problems and there is a sense of satisfaction in completing the gridlock. There can be an aspect of competition as well: who solved the most, who was quickest or who made the least mistakes. In the online versions the students are trying to beat the clock.

2. The students need to engage with the factual information the gridlock is based on. In order to solve the puzzle they need to recall the relationships between the data established in the first part of the activity. For example they need to recall that 3 electron pairs gives trigonal planar geometry or that sulfuric acid forms sulfate salts. Whilst they are solving the gridlocks they should find themselves referring to the initial data repeatedly so much so that they recall a fair bit of it by the end.

3. It develops some important thinking skills. The students have to survey the data given in the gridlock to find which squares can initially be filled in. They cannot simply choose a square at random and fill it in because there may not be enough information yet in the grid to narrow down the options to one possible answer. This thinking skill is sadly missing in the students who, given a titration calculation want to straight multiply a concentration by a volume to give the moles of the reactant asks for despite not having all the relevant information yet. Gridlocks also encourage logical reasoning e.g. 'it has to be x because it can't be w, y or z'.

How they might be used:

Gridlocks are suitable for an episode in a lesson or homework. They are designed to be follow up activities rather than an introduction to a topic. The students should have met at least some of the data the gridlocks are based on. The online gridlocks could be tackled by students working individually or a class using a projector. The paper based gridlocks are easy

to set and readily peer or self assessed. Some gridlocks go beyond specifications and could be used as extension activities.

4. **2-1B: Classes of Organic Compounds:** This activity seeks to introduce the different classes of organic compounds. It will be important for students to be able to identify and draw all of the different classes.
    - For each sections (A-H) have students read through the section on their own, then use the images in the activity as well as other examples to point out the characteristics of each class and how to identify them.
    - At the end of the activity you can play a game by putting up images of different classes of organic compounds and have the students identify the class by name.
    - Alternatively you can play a game where you put up the name of a class of compound and have students describe the defining characteristics of each class.
    - You should spend a good amount of time on this activity as the information is relevant throughout the unit.

5. **Functional Groups Gridlock Activity:** Groups or Whole class. Click on the link for the online version of the gridlocks activity or if in groups or individually, give printouts for the students to complete. This activity will allow students to practice identifying the different classes of organic compounds using the different representation types. Explain the rules. See above (organic formulas gridlock activity) for instructions and teacher information.

6. **2-1C: Isomers**

    - In this activity students will learn about two types of isomers – Structural and stereo- have students read through each section on their own, then use the images from the activity to review together as a class.
    - Have students practice writing different isomers both stereo and structural.
    - It is important to emphasize that isomers, both structural and stereo have different properties, and that slight differences in the placement of atoms within a molecule can have tremendous effects on their properties.

Consolidation

1. **2-1E: Quiz** – To be completed individually, in class or at home. Take up the answers together the following day. Address any misconceptions or questions by reviewing material from the lesson.

2. **Exit Card**

- Print out the following on an exit card and hand to students as they leave to be brought in the following class and discussed.

Exit Card Question:

"Draw as many different structural isomers as you can a hydrocarbon with the molecular formula of C_8H_{20}? When completing your drawings, use different types of representations (line drawings, structural formulas, etc."

****Refer to Differentiation Resources for additional practice worksheets, and to enrich your classroom teaching using different tools. ****