Work hard. Be nice.

Name: _____ Period: _____ Date: _____

KIPP NYC College Prep General Chemistry

UNIT 6: Organic Chemistry

Lesson 1: Hydrocarbons

By the end of today, you will have an answer to:

What are the properties of Carbon?

Do Now:

Let's review a little bonding

1. How many valence electrons does Carbon have?

2. What type of bond does a compound with carbon usually contain?

--Explain your reasoning:

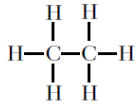
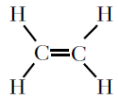
3. In the box to the right draw the Lewis-dot structure for CF_4

4. What is the IUPAC name for CF_4?

CF_4

CATALYST:

Table Q
Homologous Series of Hydrocarbons

Name	General Formula	Examples	
		Name	Structural Formula
alkanes	C_nH_{2n+2}	ethane	
alkenes	C_nH_{2n}	ethene	
alkynes	C_nH_{2n-2}	ethyne	

Note: n = number of carbon atoms

1. According to Table Q, compare the number of bonds between the carbon atoms in an alkane, alkene, and alkyne?

2. According to Table Q, how do the names of the compounds differ between an alkane, alkene, and alkyne?

Hydrocarbons are organic compounds that contain only atoms of hydrogen and carbon.

There are three **Homologous Series** of hydrocarbons **(Found on Table Q)**

1) **alkanes** 2) **alkenes** 3) **alkynes**

Molecular and Structural Formulas: Alkanes (saturated hydrocarbon)

# of carbons	Name	Molecular formula (C_nH_{2n+2})	Structural formula
1			
2			
3			

Alkenes (unsaturated hydrocarbon)

# of carbons	Alkenes	Molecular formula (C_nH_{2n})	Structural formula
2			
3			
4			

Alkynes (unsaturated hydrocarbon)

# of carbons	Name	Molecular formula (C_nH_{2n-2})	Structural formula
2			
3			
5			

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CW 6.1—Hydrocarbons **10 points**

	Homologous Series	**Name**	**Structural formula**
C_3H_8			
C_4H_8			
C_2H_2			
C_5H_8			
C_6H_{14}			
C_7H_{14}			

	Homologous Series	**Molecular Formula**	**Structural formula**
Hexene			
Nonane			
Butyne			
Pentene			
Ethyne			

1. What is the atomic number of the element whose atoms bond to each other in chains, rings, and networks?

(1) 10 (3) 6

(2) 8 (4) 4

2. How many pairs of electrons are shared between two adjacent carbon atoms in a saturated hydrocarbon?

(1) 1 (3) 3

(2) 2 (4) 4

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General Chemistry

HW 6.1 Hydrocarbons
20 points

1. A molecule of an organic compound contains at least one atom of
   (1) carbon (3) nitrogen
   (2) chlorine (4) oxygen

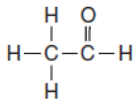
2. Which formula represents an unsaturated hydrocarbon?
   (1) CH_4 (3) C_3H_8
   (2) C_2H_4 (4) C_4H_{10}

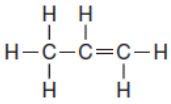
3. A carbon-carbon triple bond is found in a molecule of
   (1) butane (3) butane
   (2) butanone (4) butyne

4. A molecule of an unsaturated hydrocarbon must have
   (1) at least one single carbon-carbon bond
   (2) at least one multiple carbon-carbon bond
   (3) two or more single carbon-carbon bonds
   (4) two or more multiple carbon-carbon bonds

5. Which compound is a member of the same homologous series as C_3H_8?
   (1) CH_4 (3) C_5H_8
   (2) C_4H_8 (4) C_5H_{10}

6. Which formula represents an unsaturated hydrocarbon?


(1)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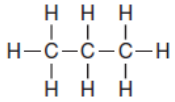
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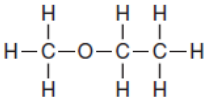
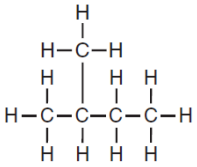

(4)

Answer questions to 7 and 8 on the information below.

The formula below represents a hydrocarbon.

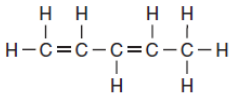


7. Identify the homologous series to which this hydrocarbon belongs. [1]

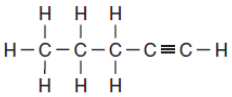
8. Explain, in terms of carbon-carbon bonds, why this hydrocarbon is saturated. [1]

Two hydrocarbons that are isomers of each other are represented by the structural formulas and molecular formulas below.

Hydrocarbon 1


C_5H_8

Hydrocarbon 2


C_5H_8

9. Explain, in terms of bonds, why these hydrocarbons are unsaturated. [1]

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Exit Ticket 6.1 Hydrocarbons **3 points**

Consider the hydrocarbon, **propene.**

1. To which **homologous series** does it belong? _____

2. Is this molecule considered **saturated** or **unsaturated**? _____

3. In the box on the right draw the **structural formula** for this molecule:

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Exit Ticket 6.1 Hydrocarbons **3 points**

Consider the hydrocarbon, **propene.**

1. To which **homologous series** does it belong? _____

2. Is this molecule considered **saturated** or **unsaturated**? _____

3. In the box on the right draw the **structural formula** for this molecule:

EXTRA:

PRE-READING: Read pages 704-706 in your textbook and answer the following questions.

1. How can there be two entirely different molecules with a formula of C_4H_{10}?

2. Explain why butane and 2-methylpropane are considered isomers?

3. Describe the structural difference between *trans*-2-pentene and *cis*-2-pentene.