Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**sciencemusicvideos: Carbon and Functional Groups**

**Getting to the tutorials.**

* Go to [www.sciencemusicvideos.com](http://www.sciencemusicvideos.com); Use the College Bio, AP Bio, or Learning Guide Menus to find “Carbon and Functional Groups”
* *Start with “1. Carbon the Central Element”*

*Note from Mr. W: The video in this tutorial incorrectly uses the term “orbitals” to describe “electron energy levels” (also known as “shells” or “orbits.”). So when you hear “orbital,” think “energy level” or “shell.”*

**Tutorial 1. Carbon, the Central Element**

**1. Why the molecules of life are built around carbon**

1.1. Draw structural and electron distribution models of methane to demonstrate how carbon atoms can form \_\_\_\_\_\_\_ covalent bonds

|  |  |
| --- | --- |
| Methane, Electron Distribution Model | Methane, Structural Formula |
|  |  |

1.2. Carbon’s bonding ability allows it to form \_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules.

1.3. Find the coolest looking molecule on this page, and draw it in the space below.

1.4. Speculate: there’s an episode of the old *Star Trek* series (“Devil in the Dark)” where the crew of the Enterprise has to confront a silicon based form of life. Silicon was a good choice for an alternative basis for life. Why?

2. Take the “Checking Understanding…” Quiz. ☐

*Proceed to the next tutorial, “Functional Groups.”*

**Tutorial 2: Functional Groups**

1. What are isomers?

2. What are hydrocarbons?

3. Write a general definition for a “functional group.”

4. As you read, complete the table below:

|  |  |  |
| --- | --- | --- |
| Name | Structure | Function |
| Hydroxyl |  |  |
|  | glennSSD:GlennBook_data_6-17-11:Glenn:artist:sciencemusicvideos:www.sciencemusicvideos.com:Tutorial image files:module 05_functional groups:02_carbonyl.png |  |
|  |  | Makes a molecule acidic (because it can donate \_\_\_\_\_ to a solution) |
|  | glennSSD:GlennBook_data_6-17-11:Glenn:artist:sciencemusicvideos:www.sciencemusicvideos.com:Tutorial image files:module 05_functional groups:04_amino.png |  |
| Sulfhydryl |  |  |
|  |  | Important in energy transfer |
| Methyl |  |  |
|  | Macintosh HD:GlennBook_data_6-17-11:Glenn:artist:sciencemusicvideos:www.sciencemusicvideos.com:Tutorial image files:module 05_carbon and functional groups:00_functional groups:08_Acetyl_group (BIG).png |  |

2. Take the quiz “Identifying Functional Groups”

☐

3. Read about “Ionized Functional Groups” and study the table

☐

(continues on opposite side)

4. Read “More about isomers.” Describe each of the three kinds of isomers:

a) Structural Isomers

b) cis-trans isomers

c) enantiomers

5. Take “Another Quiz: Functional groups and isomers”

☐

**Carbon and Functional Groups Crossword Puzzle**



|  |  |
| --- | --- |
| **Across:** | **Down:** |
| 2 - This carbon containing functional group makes a molecule weakly acidic.4 - This configuration has molecular pieces on the same side of a double bond.5 - A functional group important in energy transfer.9 - two shared pairs of electrons makes for a \_\_\_\_\_\_\_\_ bond11 - same chemical formula but a different arrangement of atoms12 - energy-rich substances, many of which are fossil fuels15 - This sulfur containing functional group is responsible for the disulfide bridges that are important in protein structure16 - These groups of atoms act as a unit18 - one carbon bonded to four hydrogens19 - Mirror image isomers | 1 - the number of valence electrons in carbon3 - This nitrogen containing functional group makes a molecule basic.6 - A functional groups that's like a water molecule that's missing one hydrogen7 - This functional group has an oxygen double bonded to a carbon atom, and creating a polar region.8 - Attaching this functional group can make a molecule non-polar10 - the number of protons in a carbon nucleus13 - the central element of life is14 - When methyl groups are attached to \_\_\_\_\_\_, genes can become deactivated17 - This configuration has molecular pieces on opposing sides of a double bond. |

**Possible Answers:** DNA, amino, carbon, carbonyl, carboxyl, cis, double, enantiomers, four, functional, hydrocarbons, hydroxyl, isomer, methane, methyl, phosphate, six, sulfhydryl, trans