*Log onto MOODLE and find the SLIDE SHOW for Organics / Carbon Chemistry. Complete the worksheet based on the slide show*.

1. Naturally occurring organic molecules are found in **\_\_\_\_\_\_\_\_**, \_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_ fuels.

2. **\_\_\_\_\_\_\_** take \_\_\_\_\_\_ dioxide from the atmosphere to produce most of the chemicals and molecules that comprise life: \_\_\_\_\_\_\_\_\_\_\_, proteins, \_\_\_\_\_, oils, nucleic acids, fatty acids, vitamins.

3. \_\_\_\_\_\_\_\_ are composed of organic molecules (carbon based life forms) … mainly \_\_\_\_\_\_\_\_.

4. \_\_\_\_\_\_\_ \_\_\_\_\_\_ include \_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_ (oil, diesel, etc.). Plants and animals die and are buried for many years under high \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_, produces fossil fuels. Fossil fuels are burned in \_\_\_\_\_\_\_\_\_\_\_\_ reactions. What are the two products of a combustion reaction: \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_.

5. Carbon usually forms **\_\_\_\_\_\_** strong covalent bonds, with other elements.

6. Organic molecules can be classified in two main groups. The largest group of Organic Molecules are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The second largest group contain \_\_\_\_\_\_\_\_\_\_.

7. \_\_\_\_\_\_\_\_\_\_\_\_\_ consist entirely and ONLY of \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_.

8. **\_\_\_\_\_\_\_\_\_\_** contain only carbon-hydrogen and carbon-carbon **\_\_\_\_\_\_\_\_** covalent bonds.

**\_\_\_\_\_\_\_\_\_\_**  contain at least one carbon-carbon **\_\_\_\_\_\_\_\_** covalent bond.

**\_\_\_\_\_\_\_\_\_\_**  contain a least one carbon-carbon **\_\_\_\_\_\_\_\_** covalent bond.

\_\_\_\_\_\_\_\_\_\_ contain \_\_\_\_\_\_\_ of \_\_\_\_ carbon atoms that can be drawn with alternating single and double bonds.

9. Fill in the chart to show how many carbons each latin prefix indicates:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Meth- | Eth- | Prop- | But- | Pent- | Hex- | Hept- | Oct- | Non- | Dec- |
|  |  |  |  |  |  |  |  |  |  |

10. Define an “R” group (alkyl group):

11. Functional groups are parts of organic molecules that result in \_\_\_\_\_\_\_\_\_\_\_\_ features.

Properties such as **\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, **\_\_\_\_\_\_\_\_\_\_\_\_\_**, **\_\_\_\_\_\_\_\_\_\_\_\_** change.

12. Fill in the chart to show the different Functional Groups and their Carbon arrangement:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name |  |  |  |  |  |  |
| Carbon Arrangement | O  ║  –C–C–O–C | O  ║  –C–OH | O  ║  –C–C–C– | O  ║  –C–H | –C–O–C– | –C–OH |

13. List 2 organic molecules containing a hydroxyl group? \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14. List 4 organic molecules contain a carbonyl group? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. Which organic molecule contains a carboxyl group? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. What are the three isomers of C6H12O6 called? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

17. \_\_\_\_\_\_\_\_\_\_\_\_ may have the same formula, but have very different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

18. Draw the two isomers of C4H10 and name them based on the slide show:

|  |  |
| --- | --- |
|  |  |

19. Draw the three isomers of C5H12 and name them based on the slide show:

|  |  |  |
| --- | --- | --- |
|  |  |  |

20. Make a sketch of hexane’s isomers (use stick figures as the first one shown):



ANSWER KEY

*Log onto MOODLE and find the SLIDE SHOW for Organics / Carbon Chemistry. Complete the worksheet based on the slide show*.

1. Naturally occurring organic molecules are found in **plants, animals**, and **fossil** fuels.

2. **Plants** take **carbon** dioxide from the atmosphere to produce most of the chemicals and molecules that comprise life: **carbohydrates** proteins, **fats** oils, nucleic acids, fatty acids, vitamins.

3. **Animals** are composed of organic molecules (carbon based life forms) … mainly **proteins**.

4. **Fossil Fuels** include **coal**, **natural gas**, **petroleum** (oil, diesel, etc.). Plants and animals die and are buried for many years under high **temperature** and **pressure**, produces fossil fuels. Fossil fuels are burned in **combustion** reactions. What are the two products of a combustion reaction: **carbon dioxide** + **water**.

5. Carbon usually forms **four** strong covalent bonds, with other elements.

6. Organic molecules can be classified in two main groups. The largest group of Organic Molecules are the **hydrocarbons**. The second largest group contain **oxygen**.

7. **Hydrocarbons** consist entirely and ONLY of **carbon** and **hydrogen**.

8. **Alkanes** contain only carbon-hydrogen and carbon-carbon **single** covalent bonds.

**Alkenes** contain at least one carbon-carbon **double** covalent bond.

**Alkynes** contain a least one carbon-carbon **triple** covalent bond.

**Aromatics** contain **rings** of **six** carbon atoms that can be drawn with alternating single and double bonds.

9. Fill in the chart to show how many carbons each latin prefix indicates:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Meth- | Eth- | Prop- | But- | Pent- | Hex- | Hept- | Oct- | Non- | Dec- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

10. Define an “R” group (alkyl group):

**R is an alkyl group of any other C atom or arrangement of C atoms for the rest of the organic molecule**

11. Functional groups are parts of organic molecules that result in **characteristic** features.

Properties such as **melting point,** **boiling point**, **solubility** change.

12. Fill in the chart to show the different Functional Groups and their Carbon arrangement:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name | **Esters** | **Carboxylic acids** | **Ketones** | **Aldehydes** | **Ethers** | **Alcohols** |
| Carbon Arrangement | O  ║  –C–C–O–C | O  ║  –C–OH | O  ║  –C–C–C– | O  ║  –C–H | –C–O–C– | –C–OH |

13. List 2 organic molecules containing a hydroxyl group? **Alcohols,** **Carboxylic acids**

14. List 4 organic molecules contain a carbonyl group? **Esters,** **Carboxylic acids,** **Ketones,** **Aldehydes**

15. Which organic molecule contains a carboxyl group? **Carboxylic acids**

16. What are the three isomers of C6H12O6 called? **Glucose**, **fructose**, **galactose**

17. **Isomers** may have the same formula, but have very different **structures**

18. Draw the two isomers of C4H10 and name them based on the slide show:

|  |  |
| --- | --- |
|  |  |

19. Draw the three isomers of C5H12 and name them based on the slide show:

|  |  |  |
| --- | --- | --- |
|  |  |  |

20. Make a sketch of hexane’s isomers (use stick figures as the first one shown):

    