**I. Carbon Chemistry- Use the Petroleum/Hydrocarbon Pamphlet and PPT**

1. What is the Lewis Dot structure for carbon? How many valence electrons does it have?
2. What kinds of bonds are found in hydrocarbons?
3. How many bonds form in these families: alkanes, alkenes, alkynes? What are the formulas for determining the # of carbon and hydrogen atoms for each family?
4. Name 5 common products that you would expect to contain carbon based compounds:
5. Describe the reactants and products of a typical hydrocarbon combustion reaction. (In other words….what is produced when a hydrocarbon burns?)
6. Write the molecular formula (showing # of C and H) for each:

|  |  |  |
| --- | --- | --- |
| 3 carbon alkane | 6 carbon alkene | 20 carbon alkyne |
|  |  |  |

1. Draw the structural formula (showing #’s of C and H) for each:

|  |  |  |  |
| --- | --- | --- | --- |
| Butane | Octane | 2-heptene | 3-octyne |
|  |  |  |  |

**II. Polymers**

1. Give examples of the following types of hydrocarbons and be able to recognize diagrams of these: linear, branched, cyclic, polymer
2. What type of polymer is most often used to make plastics?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What are the properties of low density polyethylene? How does it differ in structure and function from high density polyethylene?
4. Sketch a basic diagram of both high density and low density polyethylene.
5. Name three products that are made of high density polyethylene and three products made of low density polyethylene.
6. What is cross linking? What traits do cross linked polymers have?

**III. Polymer Investigation- Be prepared to answer CAPT type short answer questions about an issue concerning polymers.**

Group A carried out the following experiment:

1. Obtain the five types of plastic.
2. Use scissors to cut out a square of each plastic.
3. Use a ball point pen to puncture each plastic and make a judgment on how difficult it is to press the pen through the plastic. If it is easiest rate the plastic as a “1” and if it is the most difficult rate it as a “5”.
4. Make a graph and draw conclusions.

Results:

|  |  |
| --- | --- |
| Plastic Type | Puncture Rating: 1 = easiest to puncture  5 = hardest to puncture |
| Saran Wrap | 1 |
| Grocery bag | 1 |
| White kitchen trash bag | 3 |
| Ziploc Freezer bag | 4 |
| Husky contractor Clean-up bag | 5 |

Answer the following:

1. What is the Problem that the group is trying to solve? Explain your answer fully. Include the IV, DV and a problem statement.
2. Develop a likely hypothesis statement based on the procedure and provide appropriate reasoning as to why this hypothesis was chosen.
3. Identify a control experiment and provide reasoning as to why this control was chosen.
4. What are 3 changes to this procedure that you can make in order to obtain more reliable data on the puncture resistance of the polymer types?