Forensic Science – Arson Lab Assignment

Name_________________________________________ Block________

Introduction: In the discussion of understanding some of the different types of liquid accelerants used in arson cases, we need to look at the energy of the compounds.

Background: Several factors can influence the type of accelerants chosen to commit arson. It can be as simple as convenience of having access to the liquid. But those that investigate and consciously choose the volatile liquid to use will include how much energy it has to successfully carry out the crime, to the flash point to allow for easy ignition. As a forensic investigator it will be important to know the type of liquids you will be looking for inside the crime scene.

Objective: To become familiar with an assortment you will carry out the search for physical properties of flashpoint and the heat of combustion (or total internal energy) online. These properties will allow you to rank them by their potential use as accelerants.

Procedure:
1. Write a 2 page paper with the results of your online research about accelerants used in arson case investigations. Include the following:
2. Use your phone or computer to research information on:
   a. Acteone
   b. Diesel fuel.
   c. Gasoline
   d. Propanol
3. You should be answering the following questions:
   a. What is the flashpoint? This is the temperature at which vapors are generated in sufficient quantity to become combustible. The lower the temperature value: the easier it is to get them to burn.
   b. What is the published heat of combustion? If the heat of combustion is not found published, then you can calculate your own with the following steps.
   c. What is the structural formula? You will use this to be able to calculate the amount of energy that will be generated in an exothermal reaction with the material breaking the bonds. Look up the energy of the different types of chemical bonds contained in the molecule. Once you know the values of the individual chemical bonds you simply add them up. This represents the amount of energy produced. This should be a skill covered in a previous chemical course that is a prerequisite for forensic science.
   d. Rank the liquids in step 2 by their energy and their flash point from lowest to highest in the likelihood of being used for committing arson.
   e. Look online and find statics to compare your estimate with real life results from chemical analysis that shows how frequently the fire accelerant is used. Show the results of your calculations and analyze how they compare with real life arson.

Note: due to the hazardous nature of the flammable liquids, you should not collect and burn them to make your prediction choices.

If your having problems locating the vapor point or heat of combustion, you can use the universal chemistry web site: http://www.hbcpnetbase.com/