Empirical Formula Research Project

Many of the chemicals that are produced by plants do not have any role in the plant’s biochemistry. The chemical is present to protect the plant from insects that could eat it or other prey that could destroy the plant. The milkweed plant is one such example, but this plant’s chemical defenses only work some of the time. Most insects and birds will not eat the milkweed plant because the sap contains a chemical that is poisonous to them. This sap does not harm the monarch butterfly, though. In fact, the monarch butterfly uses the sap’s chemical as part of its defense from predators. Most birds become violently ill if they eat a monarch butterfly. The bird, therefore, learns to avoid these orange and black butterflies.

A major area of pharmaceutical research searches for medically effective natural products. Flowering plants, fungi, and bacteria have all been found to produce medically useful products. For example, the potent painkiller morphine is found in a species of poppy and the heart stimulant digitalis is found in foxglove, a flowering plant. Because substances like these are usually present only in minute amounts, the cost of extracting them from their natural source is often prohibitive. Consequently, chemists are challenged to discover synthetic pathways for the production of these useful products. The first step for a chemist is to determine the formula of the compound. Using percent composition data obtained in lab analysis, the molecular formula can be determined. Once the formula is known, a chemist can investigate the molecule’s structure and find a likely method to synthesize it.

The pioneers and the Native Americans had to rely on “folk” medicines derived from plants. Check with your family to discover some folk remedies that they may use. What do your family members do to “cure” the hiccups? What do you used when the flu or a fever strikes? During class time, you will have access to computers and you will research a plant or herb that has been used to create modern medicine using biotechnology—manipulating biological components to develop products that may be beneficial to humans.

The directions for all sections of this **100 point** project follow on this sheet. Five points will be deducted for each day that the project (any part) is turned in late.

**Research Paper (50 pts)**
- Title page
- Intro paragraph
- Fact paragraph
- The culture you have chosen to include
- The EF & MF for this compound
- Comparison to OTC product
- Conclusion
- Works Cited page

**Poster (30 pts)**
- Can see all info from three meters
- Title
- Pictures
- Drawing
- Colorful
- Creative
- On a full sheet of poster board

**Presentation (20 pts)**
- In-class presentation of interesting facts
- You may use PowerPoint, overhead sheet, or handouts
- Samples or hands-on objects to pass around **Please check with me if you are planning to bring something in to be shared with classmates and eaten in class**
  - /5 pts interesting facts
  - /5 presentation mode
  - /5 loud & clear
  - /5 planned