

POLYMER DETECTIVE

DESCRIPTION: The purpose of this event is to develop an awareness of polymers and plastics and how they affect daily living in a modern society. Students will be expected to demonstrate knowledge of common plastics, i.e., properties and uses, key terms, chemical formulas and structure, and scientists known for their work on these materials. No notes of any kind will be allowed.

EVENT PARAMETERS: Students must bring and use OSHA approved splash goggles with indirect vents and chemical aprons. No open toed shoes may be worn.

A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 minutes

THE COMPETITION: This event will consist of three parts:

Part I Students may be given up to 5 unknown fiber samples. Fibers used include cotton, wool, or synthetic fibers. Students will be expected to identify these by the reaction of these fibers with bum tests, and/or by examination with a microscope. Bum tests should be done with a match, lighter or candle.

Part II Students will be expected to characterize samples of the following polymers. The characteristics they will be expected to determine by testing or by observation of density and information about the bum results. If the actual bum tests are done, they **MUST** be done as a demonstration under a hood or in an approved ventilation system by the event supervisor. The student may be provided written information about the bum test results for the polymers. Emphasis in scoring this part of the event is placed on careful and organized observation and identifying the polymers.

Part III The other part of the competition will consist of a written test. Students will be expected to be able to do the following for the polymers:

- A. Demonstrate knowledge of chemical and physical properties of synthetic polymers and natural polymers (silk, rubber, starch and cellulose).
- B. History of the development of polymers, including scientists known for their work on these materials. C. Write structures of the polymers, given the name.
- D. Name the polymer, given the structure.
- E. Sketch a portion of the polymer given the monomer(s).
- F. Write the structure of the monomer(s), given the structure of the polymer.
- G. Identify the method of polymerization: addition (chain-growth) or condensation (step-growth).
- H. Relate characteristics of a polymer to its applications.

SCORING: Part I: 20 points Part II 40 points and Part III 40 points. Ties are broken by using highest score from Part II first, then Part I and if needed predetermined question(s). Time is not a tiebreaker!

RESOURCE: Amer. Plastics Council 1300 Wilson Blvd. Suite 800, Arlington VA 22209. 1-800-2-HELP-90. Website: www.HandsOnPlastics.com