

Environmental Chemistry

DESCRIPTION:

Event will consist of a series of experiments at stations or a single bench on Environmental Chemistry. Students may bring any calculator and one 8.5" X 11" sheet of paper with handwritten notes.

SAFETY REQUIREMENTS:

Students must wear the following or they will not be allowed to participate: close-toed shoes, OSHA approved chemical splash goggles with indirect vents, pants or skirts that cover the legs to the ankles and a lab coat or apron that reaches below the knees. Gloves are optional. Students who unsafely remove their safety clothing/glasses or are observed handling any of the material or equipment in a hazardous/unsafe manner (e.g., tasting or touching chemicals or flushing solids down a drain and not rinsing them into a designated waste container provided by the supervisor) will be disqualified from the event.

TEAM OF UP TO: 2

APPROXIMATE TIME: 50 minutes

THE COMPETITION:

The competition will consist of a series of experiments and questions on Environmental Chemistry. Students will be expected to use the instruments or chemicals the event supervisor provides to analyze air, water, or soil samples for the assigned cation, anion, or pollutant. On the basis of the analysis, the student will be expected to answer questions on such items as which of several possible sources of pollution is the source of the pollution, what the best course of remediation might be, what the implications to those downwind, downstream, or in the neighborhood might be. Students will be expected to write reversible reactions to show how the recommended remediation will affect the pollutant. For instance students may be asked to determine the amount of nitrogen oxides in a sample container and the amount of volatile organic chemicals and then use that information with a event supervisor provided ozone isopleth graph to determine which of the two pollutants needs to be controlled to reduce the ozone in the area where the air sample was taken from. Or the students may be asked to analyze stream water for ammonia, heavy metals, nitrates, PCB, etc. and then determine if the stream is polluted and if so if the likely source is agricultural or industrial. Or the student may be given a wet soil sample and asked to determine the heavy metal concentration, or other pollutant concentration. Then based on the concentration level and soil type, asked to determine if the pollutant is a threat to others in the neighborhood.

Students will be asked to write a report on the results of their analysis and recommendations.

SCORING:

Points will be awarded for correct answers and/or proper technique. Time may be limited at each station, but time will not be used as a tiebreaker or for scoring. All ties will be broken by the analysis of the environmental situation.