

## FOOD SCIENCE-B

- 1 **DESCRIPTION:** Students will answer questions and perform developmentally appropriate experiments pertaining to food chemistry.

**A TEAM OF:** up to 2

**APPROXIMATE TIME:** 50 minutes

- 2 **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) would be disqualified from the event.

- 3 **EVENT PARAMETERS:** The students must supply a pencil. The event supervisors will supply all other necessary materials, equipment, and reagents. Absolutely no reference materials, scientific instruments, or other resource materials will be admitted.

- 4 **THE COMPETITION:** Foods are made up of at least three major food groups or classes of compounds: carbohydrates, proteins, and lipids. In this event students will be expected to perform laboratory tasks identifying carbohydrates, lipids, and proteins in foods. Students should be able to measure mass, volume, temperature and pH as well as perform simple chemical/physical tests such as density, moisture content, and percent composition. Detection tests for proteins, lipids and various carbohydrates may be performed using appropriate methods such as Biurets test, Benedicts test, iodine reagent test, and presence tests using brown paper to test food product for lipids. Questions and activities may also cover topics such as leavening agents, food additives, vitamins and minerals, and caloric value. The event may consist of stations and will be 75% laboratory activities and 25% questions. At the regional level, it is recommended that students work together to complete all tasks. At the state and national levels students may need to work somewhat independently to complete all task within the recommended time limit.

- 5 **SAMPLE TASKS AND LABORATORY EXPERIMENTS:**

- When given several food samples, students will be expected to distinguish between lipids, carbohydrates and proteins with supplied tests and solutions.
- When given samples of carbohydrates, students will properly characterize them as either starches or sugars.
- Given a food sample, students will use a calorimeter to determine the caloric value of the foodstuff when given experimental procedure.
- Determine the amount of iron in breakfast cereals when given experimental procedure.
- Differentiate baking soda and baking powder based on simple chemical reactions.
- Determine melting points of different fats when given experimental procedure.
- Rank Vitamin C content in various foods using an indicator solution (Prepare indicator solution by mixing 15mL of cornstarch into water to make a paste. Add 250mL water and boil for 5 minutes, cool. Add 10 drops of this starch solution to 75mL water and then add enough iodine to produce a dark-purple color). Students will be given experimental procedure.
- When provided with a food sample such as popping corn, students will determine the amount of moisture in a known sample.
  - Determine the density of a food sample.
  - Determine the percentage of carbohydrate or protein in a sample such as skim milk, when given experimental procedure.
  - Answer questions concerning food labels/labeling, e.g. number of calories per serving, amount of lipids (fats) in the total package.



- 6 **SCORING:** The laboratory part of the activity will count at least 75% of the total points. Points will be awarded for correct answers and/or proper techniques. The remaining 25% will be based on the questions, which will be at some of the stations. Cleanup must occur after all laboratories are completed and failure to do this will result in a penalty. All measurements and calculations must be recorded in the correct significant figures and units. All ties will be broken by selected questions chosen by the supervisors. These questions will not be identified to the students.