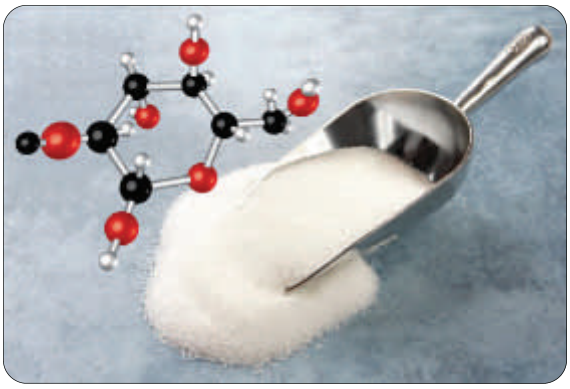
Module: **Seeking the Sugar Solution: Nutrition and Chemistry Curriculum**

Topics: **Chemistry, scientific method, controls, standards, reagents, nutrition, obesity.**

Seattle Children's SCIENCE ADVENTURE LAB

Overview: This lesson is designed to take place onboard the Seattle Children's Science Adventure Lab, a mobile science laboratory. In this module students conduct an experiment to determine how much sugar is in a simulated "mystery beverage" using a chemical reagent (Benedict's reagent), which produces a visible red precipitate when it reacts with sugar. Students determine the amount of sugar in the beverage by comparing the color change to that of standards containing a known concentration of glucose. In the process, they learn the importance of controls and standards in conducting scientific experimentation. Students review nutritional labels on known beverages and make predictions about which standard the "mystery beverage" and known beverages will resemble. After performing the experiment, students complete a nutritional information label for the "mystery beverage". They also see a visual representation of just how much sugar is in a standard serving of common drinks, reflect on their own sugar consumption and learn nutrition and health facts that support making healthy decisions about the beverages they consume. Throughout the lesson, as part of the 5E Instructional Model, Science Adventure Lab instructors and classroom teachers serve as "facilitators" and "coaches," guiding students through the inquiry process.



Grade Levels: This module is appropriate for students in Grades 6-8.

Time Required: Minimum time required to complete this module is 75 minutes.

Lab Equipment Used: Micropipettes, vortex mixers, heat blocks, Benedict's reagent

Health Issue: This module uses a chemistry experiment to encourage students to think about the connection between nutrition and health and to make healthy decisions about what drinks children and teens should consume. Obesity is considered the largest health problem facing children in the United States. More than 30% of American children are overweight and more than 15% are obese, increasing their risk of developing many health problems.

Objectives:

- To conduct an experiment to measure the relative concentration of sugar in various beverages by comparison to standards of known glucose concentration.
- To increase awareness about the amount of sugar in common beverages.
- To develop the laboratory skills and knowledge required to conduct an experiment and test hypotheses.
- To expose students to authentic equipment and tools used by scientists.
- To empower students with the confidence that they can be successful in science and encourage them to pursue careers in science and healthcare.

Selected State and National Academic Standards

Grade Level	*Washington State Science Standards*
6	• EALR 2: Inquiry A - Scientific inquiry involves asking and answering questions and comparing the answer with what scientists already know about the world. • EALR 4: Life Science 1A – All organisms are composed of cells, which carry on the many functions needed to sustain life. • EALR 4: Life Science 3B - Every organism contains a set of genetic information (instructions) to specify its traits. This information is contained within genes in the chromosomes in the nucleus of each cell.

Grade Level	*Washington State Health and Fitness Standards*
6-8	• EALR 2: Component 2.2: Understands stages of growth and development. Understands hereditary factors that affect growth, development, and health.

Grade Level	*Washington State Math Standards*
6	• 6.3.A Identify and write ratios as comparisons of part-to-part and part-to-whole relationships. • 6.6.H Make and test conjectures based on data (or information) collected from explorations and experiments.
7	• 7.2.A Mentally add, subtract, multiply , and divide simple fractions, decimals and percents. • 7.6.H Make and test conjectures based on data (or information) collected from explorations and experiments.
8	• 8.5.H Make and test conjectures based on data (or information) collected from explorations and experiments.

Grade Level	*National Science Education Standards*
6-8	Science Standard A (Science as Inquiry) All students should develop abilities necessary to do scientific inquiry and understanding about scientific inquiry *Fundamental concept:* Use mathematics in all aspects of scientific inquiry. Standard B (Physical Science) All students should develop an understanding of properties and changes of properties in matter. *Fundamental concept:* Substances react chemically in characteristic ways with other substances to form new substances with different characteristic properties. Science Standard F (Science in Personal and Social Perspectives) All students should develop an understanding of the characteristics of personal health. *Fundamental concept:* Food provides energy and nutrients for growth and development. Nutrition requirements vary with body weight, age, sex, activity and body functioning.