

Module: Catch Your Breath! Exploring Respiratory Function and Asthma



Topics: Respiratory system, scientific method, asthma, lung disease

Overview: This lesson is designed to take place onboard the Seattle Children's Science Adventure Lab, a mobile science laboratory. In this module students learn about the respiratory system and what its role is. Using the same equipment as scientists and physicians, students measure the oxygen saturation level in their blood, their peak flow rate and lung capacity. Students then measure these same parameters after adding slight resistance to breathing to simulate the effects of asthma. Another aspect is to promote understanding and develop empathy for students with conditions such as asthma.

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.

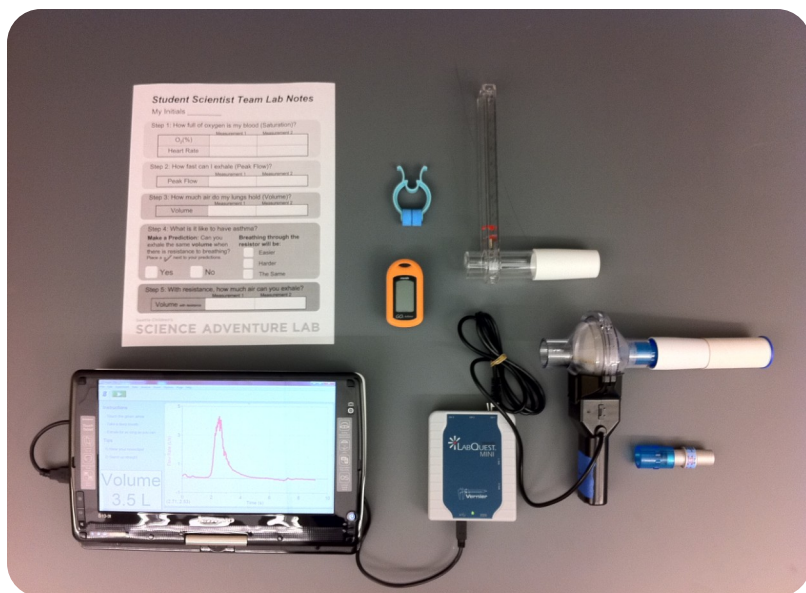
Time Required: Minimum time required to complete this module is 75 minutes.

Lab Equipment Used: Pulse oximeter, respirometer, peak flow meter, biological models of healthy and diseased lungs.

Health Issue: This curriculum module focuses on the respiratory system, how physicians assess how well the system is working and how conditions like asthma affect the system. Almost one in ten children in the United States have asthma, and the disease accounts for over six million missed school days and hundreds of childhood deaths annually. At Seattle Children's, asthma is the most common medical diagnosis among children admitted to our hospital.

Objectives:

- To understand normal respiratory function and how conditions such as asthma affect the respiratory system.
- To expose students to authentic equipment and tools used by scientists and physicians for measuring lung function.
- To develop the laboratory skills and knowledge required to conduct an experiment and test hypotheses.
- 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
6-8	<ul style="list-style-type: none"> EALR 2: Inquiry E - Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations. EALR 4: Life Science F: Lifestyle choices and living environments can damage structures at any level of organization of the human body and can significantly harm the whole organism.

Grade Level	Washington State Health and Fitness Standards
6-8	<ul style="list-style-type: none"> EALR 2: Component 2.2: Understands stages of growth and development. Understands the structure and function of body systems.

Grade Level	Washington State Math Standards
6	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<p>Science Standard A (Science as Inquiry) All students should develop abilities necessary to do scientific inquiry and understanding about scientific inquiry <i>Fundamental concept:</i> Think critically and logically to make the relationships between evidence and explanations.</p> <p>Standard C (Life Science) All students should develop an understanding of structure and function in living systems, and regulation and behavior. <i>Fundamental concept:</i> The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control and coordination, and for protection from disease. These systems interact with one another.</p> <p>Science Standard G (History and Nature of Science) All students should develop an understanding of science as a human endeavor, the nature of science, and the history of science. <i>Fundamental concept:</i> Scientists formulate and test their explanations of nature using observation, experiments and theoretical and mathematical models.</p>