HOW TO USE THIS MODULE

The AMBIENT curriculum air module is comprised of a number of segments. Some of these segments can be taught independently and others are meant to be used together in a certain order. The segments are presented roughly in order of planned presentation although it is noted when a segment can be skipped or used out of order. Each segment begins with a cover sheet for teachers describing its:

- Purpose
- Time required
- Required skills
- Key concepts
- Materials needed
- Assessment techniques

The following is a description of the segments and instructions on how teachers can use them to best suit their interests and the time they have allotted to the module.

Some of the key concepts in this module on air and asthma include:
- Human-made pollutants, natural processes, and air quality
- Vulnerability of young people and other sensitive subpopulations
- Asthma and respiratory ailments
- How to determine the extent of a problem (such as an outbreak of asthma) in a community
- How to choose an appropriate response to the problem
- Interpretation of mapping data
- Simulation and measurement of asthma and air pollution
- Creative reading and writing uses breath as a healing intervention and as a metaphor
- Critical reading and role playing of the different international viewpoints on the impact of air pollution and the value of a human life

NOTE: It is recommended that teachers alternate lecture format lessons with the lab-oriented segments to maintain student interest.

“Ethics Enigma”

The AMBIENT curriculum features “Ethics Boxes” in some of its exercises, which highlight for teachers ethical issues. These topics come in two forms:

1) A “Classroom Concern” – These are practical issues teachers may face when doing a given lesson. The ethics box points out pitfalls to avoid when carrying out an exercise.
2) A “Big Idea” – These highlight the larger ethical questions that face society as a whole, or particular segments of society as part of dealing with given environmental health issues. These include concepts of responsibility, harm, fairness and compensation. These boxes can serve as discussion starters during the work of the exercise.
Student Segments

Scenario -- This is the core of the unit and is comprised of several exercises that develop the concept of the class as an environmental consulting firm hired by their school district to present information on asthma and other respiratory ailments, investigate the prevalence of these problems within the community and their school, and design an appropriate intervention in response to their findings.

#1) Scenario -- This introduces the role-play in a short paragraph and prompts an inquiry-based learning model discussion, either in four groups, or as a class. This exercise helps students identify the problem in their own words, establish what they know and what they need to know to fulfill their "Contract" with the School Board (which is provided).

#2) Research and Presentation - The students take responsibility for making a research and action plan generated by their discussion of the scenario. Students will form four teams to research given topics, becoming "experts" in their area. Each team will present its findings to the rest of the class and will be supervised by the "Project Supervisor", i.e. the instructor. Websites may form the core of the students' research.

#3) "Our Community" Data Quiz -- This segment provides current facts about the community asthma situation. Students take the "quiz" and check their answers against the provided key in a discussion led by the teacher. This can also be done by students independently of the scenario.

#4) School Respiratory Health Survey and Analysis -- Students either design a simple survey or use the provided school survey to determine the prevalence of asthma and related respiratory ailments in their class or school. Students use data to describe and quantify the problem then transform the data to test simple hypotheses. Concepts of confidentiality, sample size, and use of data are covered.

#5) Final Report -- This asks the students to coherently present the problem of asthma in their school and, based on their research, make recommendations for addressing the problem. Students must fulfill the specific requirements of the "Contract" and may invite visitors such as parents, other teachers and school staff or actual School Board members to view their Final Report presentation. This is the alternate Culminating Experience for classes not participating in the Debate.

Environmental Air Quality Risk Survey: Micro to Macro -- This is an individual assignment for each student (or member of the firm). Each student is expected to identify (based on the group's research) risk factors and protective factors for asthma and respiratory problems in their home and daily life (including the school environment), factors for their community, their country and the Earth using the provided handout. This exercise is intended to help students think about their own "microclimate" and the "macroclimate" of the Earth. The exercise also raises the issue of who has responsibility
for air quality at each level. A key is provided to make sure students cover all major sources of air pollution in their discussion.

**Asthma "Outbreak" Exercise** - This fictional case study of an outbreak of acute asthma in AMBIENT High School is based on an actual epidemic that occurred in Barcelona, Spain. Students explore basic concepts of Epidemiology by making a case definition and a series of hypotheses about the source of the outbreak. An Appendix includes an additional Case Study of a Fog in London with mortality and morbidity for more advanced students.

**Mapping Case Study: Wildfires in Mexico** -- This is a classroom exercise in which spatial data from an actual atmospheric event is used to demonstrate how air pollutants can move on a global scale. Students are expected to analyze the visual data and to make predictions about where cases of asthma might occur and how public health officials could use available geographic data to protect public health.

**Air Quality Labs** -- The labs (both the general concept and the specific air-related labs) can be inserted as desired to emphasize scientific concepts such as measurement, experimentation, and sampling. In keeping with the role-play, the teams most familiar with each topic could lead the labs with the teacher (i.e. appropriate teams are indicated for each lab).

- a. Plants/CO₂ Lab (Atmosphere Team, Outdoor Air Team)
- b. Temperature Inversion Lab (Atmosphere Team, Outdoor Air Team)
- c. Particulate Observation Lab (Indoor Air Team)
- d. Indoor Air Pollutant Sensing (2) (Indoor Air Team)
  1. "A Canary in a Coal Mine?" Carbon Monoxide Lab Lead-in
  2. Peppermint Diffusion Lab
- e. Straw Breathing Exercise (Human Health Team)
- f. Peak Flow Meter Study (Human Health Team)

**Creative Writing** --

- a. *Breath as Metaphor* -- This creative writing exercise asks the students to read a variety of works from famous authors and poets who use breath and/or air as a metaphor in their work. Students can analyze the given literature or use it as a starting point to generate new works from their own perspective.
- b. *Writing for Healing* -- This short essay assignment introduces the students to the use of writing as a documented means of reducing symptoms of stress-related illness including asthma.

**Critical Reading: Asthma and Air Pollution** -- Students read two articles which present starkly different points of view on the role of air pollution in causing asthma. Students are asked to define terms, identify facts, and contrast the articles' main ideas.

**Debate: "Indoor Air Pollution vs. Outdoor Air Pollution: Which is the More Serious Threat to Public Health?"** -- This debate incorporates international issues relevant to the asthma problem as presented in several excerpted articles from the World Bank. This is the alternate Culminating Experience for classes not participating in the role-play scenario.