



## **MIDDLE GRADES SCIENCE Training Modules—Year Two**

*Participants will explore lessons from the LTF Middle Grades Life and Earth and Middle Grades Chemistry and Physics guides. Each day will entail some direct content instruction as well as active learning through laboratory explorations. Participants will examine the processes of learning science and engage in meaningful discussions of rigor and pace in the Pre-AP\* middle school classroom. Participants are given passwords to access the protected materials on the LTF website, including diagnostic activities and End-of-Course test materials. Teachers leave every training day with lessons that are classroom-ready and with sufficient preparation to begin using the lessons in their own classrooms.*

### **Day Five Patterns**

This module will explore activities from the Middle Grades Life and Earth and Middle Grades Chemistry and Physics guides that emphasize patterns in science. The topics addressed include taxonomy, genetics, periodic trends, and lunar phases. Participants will perform activities to better visualize and apply these topics in the middle grades classroom.

### **Day Six Properties of Matter and Density**

This module will explore activities from the Middle Grades Chemistry and Physics guide that apply to all middle grades' classes. As matter and density are explored, the topics will be related to life and earth science topics, as well as AP\* biology, chemistry and physics classes.

### **Day Seven Ecology and Energy**

This module will explore activities from the Middle Grades Life and Earth and Middle Grades Chemistry and Physics guides spending the first part of the day focused on predator/prey relationships and genetics and the second part of the day focused on work, power, and energy. Participants will spend the day completing hands on activities that explore real-life topics.

### **Day Eight Environmental Human Impact**

This module will explore activities from the Middle Grades Life and Earth guide that emphasize the impact we have on our environment. Current topics such as global warming and pollution will be discussed and studied. Participants will see how simple changes can affect the impact they have on the world around them.



## **BIOLOGY Training Modules—Year Two**

*Participants will explore lessons from the LTF Biology guide. Each day will entail some direct content instruction as well as active learning through laboratory explorations. Participants will examine the processes of learning science and engage in meaningful discussions of rigor and pace in the Pre-AP Biology classroom. Participants are given passwords to access the protected materials on the LTF website, including diagnostic activities and End-of-Course test materials. Teachers leave every training day with lessons that are classroom-ready and with sufficient preparation to begin using the lessons in their own classrooms.*

### **Day Five Measurement and Statistics**

Pre-AP Biology teachers will discuss and develop student skills related to measurements and statistics in the biology classroom. Lessons will be explored that incorporate microscopes and graphing calculators. Data analysis and its inclusion in laboratory reports will also be addressed.

### **Day Six Chemistry of Life and Cells II**

Pre-AP Biology teachers will investigate the laws of thermodynamics and kinetics as they relate to the biology classrooms. In addition to traditional wet labs, LTF lessons will incorporate probeware and modeling techniques as they explore enzyme catalysis and membrane structure.

### **Day Seven DNA, Genetics and Animals II**

In this second look at DNA, genetics and animals, participants will explore lessons related to endotherms and ectotherms and other animal adaptations. Participants will perform an introductory gel electrophoresis and discuss the implications of DNA fingerprinting.

### **Day Eight Plants, Ecology and Evolution II**

The plant lessons for this module will investigate plant transpiration and pigment chromatography. Participants will also discuss and explore the response and interactions of organisms with their environment as well as perform simulated population studies.



## **CHEMISTRY Training Modules—Year Two**

*Participants will explore lessons from the LTF Chemistry guide. Each day will entail some direct content instruction as well as active learning through laboratory explorations. Participants will examine the processes of learning science and engage in meaningful discussions of rigor and pace in the Pre-AP Chemistry classroom. Participants are given passwords to access the protected materials on the LTF website, including diagnostic activities and End-of-Course test materials. Teachers leave every training day with lessons that are classroom-ready and with sufficient preparation to begin using the lessons in their own classrooms.*

### **Day Five Mathematics and Periodic Table**

Pre-AP Chemistry teachers will discuss mathematical problem solving strategies in chemistry and investigate relationships between elements on the periodic table. Labs will be explored with the intention of solidifying student understanding of periodic trends and their role in chemical behavior. An examination of AP style questions and common student misconceptions will further develop the strategies that can be implemented to facilitate student success.

### **Day Six IMFs and the Condensed Phases**

Pre-AP Chemistry teachers will use a variety of techniques to explore intermolecular forces and the solid and liquid states. Computer simulations, probeware, and traditional lab activities will all be utilized. A discussion of common student misconceptions and strategies to overcome these obstacles will also be developed. Examining Pre-AP assessments will serve to assist participants in better preparing their students for the expectations of AP science.

### **Day Seven Thermodynamics**

Pre-AP Chemistry teachers will review concepts in thermodynamics and apply them to problem solving and laboratory experiments. Investigations using probeware and traditional laboratory equipment will be explored with emphasis on developing the conceptual framework necessary for successful problem solving.

### **Day Eight Assessment and Kinetics**

Pre-AP Chemistry teachers will spend time examining specific assessment strategies that can be implemented in the Pre-AP classroom to prepare students for AP exams. Reading of actual student samples from the 2008 LTF Chemistry End Of Course exam will help participants identify student misconceptions and emphasize the finer points of assessment development. In addition to developing participants' assessment skills, instruction in chemical kinetics and a traditional clock reaction experiment will also be included.