

# ***Making Science Meaningful***

## **Teacher's Packet**

A KET professional development workshop for educators approved for Professional Development Training by the Kentucky Department of Education.

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This four-part series for middle school science teachers explores the learning cycle. Rooted in constructivism, this model provides the environment and structure for students to develop deep conceptual understanding and process skills. Hosted by Kentucky Department of Education Sciences Branch Manager Carol Hanley, programs 1-3 take an in-depth look at the learning cycle in a sixth-grade classroom where Kelly Taylor is introducing his students to a unit on sound. The final program in the series features Kelly Taylor and Carol Hanley discussing how to modify a traditional lesson into a lesson using the learning cycle.

Teacher Standards addressed in the series include the following:

**Standard 3:** The teacher designs/plans instruction that develops student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

**Standard 4:** The teacher creates a learning climate that supports the development of student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

**Standard 5:** The teacher introduces/implements/manages instruction that develops student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

## **Viewer Participation**

Following each program in the four-part series, teachers are encouraged to discuss the strengths of the modeled instruction and the challenges (resources, space, management routines, etc.) that they would face in implementing similar instructional activities in their classrooms. After viewing Program 4, teachers could work in small groups to modify a science unit so it better fits the learning cycle model presented.

## **About This Packet**

The materials in this packet include biographies of host and presenter and summaries of the content of the four programs.

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### **Professional Development Credit**

**Stage of Participant Development:** Practice/Application

**The Kentucky Department of Education has approved all KET Star Channels Seminars for professional development credit if schools or districts choose to include them in their professional development plans. Districts or schools may choose to include preparation and/or follow-up time as part of professional development. For example, if a teacher participates in one 90-minute program and spends an additional 30 minutes in related activities, he or she could be awarded a total of two hours professional development credit.**

**Individual teachers who wish to use these videotapes for professional development credit should check with their school professional development chair or with their district professional development coordinator.**

**Professional development can also be used to satisfy requirements for the fifth year program. Contact your local university or the Division of Teacher Education and Certification at 502-564-4606 for more information.**

## About the Host and Presenter

Host **Carol Hanley** is the Sciences Branch Manager at the Kentucky Department of Education.

Presenter **Kelly Taylor**, who teaches science at Tates Creek Middle School in Lexington, has 21 years of classroom experience, 10 teaching ninth-grade physical science and 11 teaching middle school integrated science. Kelly is chair of the science department at Tates Creek and has served on district-wide writing committees and on the Kentucky Science Teachers Association Board of Directors. A PRISM Science Specialist, Kelly has led a number of professional development workshops for teachers. He has a B.A. in telecommunications and an M.S. in secondary education, both from the University of Kentucky.

# Program Summaries

## Program 1

Viewers see how Kelly Taylor sets the stage for learning by engaging students in a lively discussion about pleasant and unpleasant sounds. The students are then turned loose during the exploration phase of the lesson to discover how a variety of objects can be used to make sounds. During the subsequent discussion, the students share their discoveries about how sounds are caused by vibrations.

## Program 2

This seminar is a continuation of the lesson begun in the first program with the students becoming involved in a more structured exploration. By using plastic cups and rubber bands of varying sizes, they gain hands-on experience with creating different pitches. To check his students' understanding and to provide them with a chance to apply their new knowledge, Kelly has the students complete a fun and engaging activity in which they try to play *Mary Had a Little Lamb* on a set of steel pipes. Kelly wraps up the day's lesson by having his students state a conceptual understanding of the relationship between pitch and vibration.

## Program 3

Viewers get a close-up look at masterful direct instruction. Kelly uses a variety of technologies including lasers, graphing calculators, and laser disc players to help his students understand frequency and how it relates to pitch. Through concept mapping and a reading activity, the students begin to formalize their understanding of sound.

## Program 4

Kelly Taylor and Carol Hanley lead teachers through a framework for modifying a traditional science lesson into one that is modeled after the learning cycle. They explore the differences in learning cycle-based instruction and traditional instruction and demonstrate how to shift instruction toward the constructivist model.

## **Acknowledgments**

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Carol Hanley  
Kentucky Department of Education  
Frankfort, Kentucky

Kelly Taylor  
Tates Creek Middle School  
Lexington, Kentucky

## **KET Production Staff**

Sharon Bennett  
Producer/Director

Mary Duncan  
Writer

Darlene Carl  
Office Manager

Treg Ward  
Videographer