

**Fall 2019 TSAAPT WORKSHOPS**  
**Texas Tech University – Lubbock, TX**  
**October 25 - 26, 2019**

**FRIDAY AM**

- W1 “Video Analysis: Energy of Toys”**, presented by Stephanie Ingle, Lee College, Baytown, TX  
Investigate energy with video analysis software. Come play with spring loaded toys and poppers. Make a video, then use it to create energy graphs, analyze the conservation of energy, calculate the energy stored in the spring or popper. There will be a quick introduction to the software and then participants will address the challenge. Fun for all! AND you get to keep the toy!  
**Limited to 18 participants – 2 hours – Cost \$2.00**

**FRIDAY PM**

- W2 “Making Astronomy a Lab Based Science”**, presented by Kenric Davies, PTR, Liberty High School, Frisco, TX.  
Astronomy is quickly becoming a hook for students entering the field of physics which is reflected in institutions changing their departmental names to “Physics & Astronomy”. In high schools, the Astronomy course has been gaining popularity since its creation during the era of the “4 x 4” graduation plan. This session introduces ways that Astronomy courses can be taught as a Lab Based Science course complete with inquiry, data logging, and physical/ virtual experimentation.  
**Limited to 20 participants – 1.5 hours – Cost \$5.00**

**SATURDAY AM**

- W3 “Fire in the Bottle: Making Multiple Concept Connections Through a Single Demonstration”**, presented by Keith West, Texas Tech University, Lubbock, TX.  
Fire in the Bottle is a demonstration in which alcohol fumes are ignited in a large water cooler bottle. Depending on the method of ignition, the way the fumes burn will vary. Close observation before and after the ignition will highlight concepts such as air pressure, surface tension, sound, combustion by-products, and convection currents. These observations can be used to springboard discussion about these concepts and where they apply.  
**Limited to 30 participants – 2.0 hours – Cost \$2.00**

**SATURDAY PM**

- W4 “How Astronomers Detect Black Holes”** presented by Tom Maccarone, Texas Tech University, Lubbock, TX  
Black holes are one of the most fascinating classes of objects in space. Astronomers use a variety of methods to detect them. While understanding the relativistic effects that govern the behavior of black holes close to their event horizons, the process of finding black holes involves classical physics that is accessible to students in introductory classes. I will discuss the processes used to search for black holes and how astronomers have made use of them over the years.  
**Limited to 20 participants – 2 hours – Cost \$2.00**