

**Optional Friday Workshops**  
**STEM Think Tank and Conference 2017**  
**Friday, July 14, 9:00-12:30**

**Science-integrated Engineering in Early Elementary Grades (K-2)**

**Lunch is included in the workshop price**

**Target audiences:** Teachers of children in grades K-2

**Instructor:** Pamela Lottero-Perdue, Ph.D. (Towson University)

**Workshop Abstract:** In this workshop, participants will learn how to engage K-2 students in engineering design challenges and integrated STEM (iSTEM) units of instruction. These learning experiences support practices and standards within the: Next Generation Science Standards, Common Core State Standards in Mathematics and English Language Arts, and the Standards for Professional Development and Preparation of Teachers of Engineering. Throughout the workshop, participants will engage in classroom-tested hands-on engineering design challenges and 5E science lessons. After these hands-on experiences, participants will reflect upon the engineering practices, design processes and habits of mind they used as they encountered design problems and designed solutions to those problems. Participants will also reflect upon the ways in which engineering challenges meaningfully connect to other STEM subject areas. Workshop presenters will provide tips and strategies for supporting students as they learn to engineer, and for implementing iSTEM units of instruction in their classrooms.

**"Move the World" – Hope, Purpose, and Joy through Transportation STEM Education**

**Lunch is included in the workshop price**

**Target Audiences:** Teachers and informal educators of children in grades K-8, university faculty, graduate students, and staff, members of industry

**Instructors:** Haley Holt (US DOT - GAMTTEP Clearinghouse via Knox County Schools), Brianna Fisher (US DOT - GAMTTEP), Jennifer Richards, Ph.D. (University of TN - Institute of Agriculture)

**Workshop Abstract:** Why and how is transportation important to your daily life? From MASS transit in highly populated cities to the delivery of key supplies to remote villages - we can all agree transportation is hugely important. Yet, how do our students perceive transportation? The field of transportation is ripe with possibilities for curricular ties and student engagement. In this workshop we consider, experience, and engage ways to provide purpose and hope to STEM learning using transportation based themes and topics.

**Harnessing Solar Energy**

**Lunch is included in the workshop price**

**Target Audiences:** Teachers of children in grades 6-12

**Instructor:** Licia Kovach (Laurel School, OH)

**Workshop Abstract:** The purpose of this workshop is to have participants create hands-on lessons that describe ways to harness solar energy. These lessons will have students explore and answer questions such as: What materials are used to make a solar cell? How are these materials processed and used?

How does sunlight convert to electrical energy in a solar cell? Current, voltage, resistance and power will be introduced and explored by building a solar car and designing a solar panel that will energize a fan motor. This workshop is applicable for anyone who wishes to gain insight into developing science and engineering curricula, specifically in the area of alternative energy.

### **The Marvelous Toy**

**Lunch is included in the workshop price**

**Target Audiences:** Teachers and informal educators of children in grades 6-12

**Instructors:** Becky Smith (Harpeth Hall) and Stephanie Zeiger (Harpeth Hall)

**Workshop Abstract:** It went “zip” when it moved and “bop” when it stopped. There is a famous saying that the only thing that stays the same is change . . . and kids playing with toys. Even as they get more advanced, toys and the opportunity to “play” will always intrigue children and adults alike. That is why toys make a great platform for teaching engineering, circuits, and coding all in one comprehensive and tidy project. In this workshop we’ll start by sharing our model for how we transformed a traditional physical science curriculum into a progressive, engineering, problem-solving based course without sacrificing science teaching. Then we’ll let you try for yourself our toy project which allows students to apply their understanding of circuits and even coding to design an interactive toy from household items that meets the expectations of the “client”. Whether you are looking for a way to teach circuits, a seamless coding connection, or how to actually teach the engineering design process, we promise you will walk away with tangible and applicable resources, regardless of grade level or science topic.