i-STEAM with CSATS

PennState College of Education

CSATS Bridging Research & Education in STEM Center for Science and the Schools

i-STEAM TRACE Workshop

Teaching Radiation Application and Cycles in our Environment

Presented by

Candace Davison
Assistant Director for Education and Outreach at the Penn State Radiation Science & Engineering Center
and
Gabriel Knowles
Center for Science and the Schools (CSATS)

Thursday, March 28, 2019
9:00 a.m. – 3:30 p.m.

101 Breazeale Nuclear Reactor
The Pennsylvania State University
University Park, PA 16802

Target audience: teachers in grades 5 - 9

This workshop is FREE to all educators with ACT 48.

Have you ever wondered how scientists use radiation in their research to make discoveries in archeology, botany, energy, medicine, and paleontology? Explore how scientists use the process of radioactive decay in a variety of careers to make new discoveries as well as help medical experts make diagnoses and treatments that impacts that lives of people everyday. The activities in this workshop are based on the NGSS scientific and engineering practices and can be easily replicated in your classroom. Learn more about the Breazeale Nuclear Reactor, which is celebrating over 60 years of research and training in continuing to find peaceful applications for the energy that atoms create.

All i-STEAM Workshops are aligned to PA State Standards, Next Generation Science Standards and Common Core. A continental breakfast and lunch are provided by the Center for Science and the Schools (CSATS). Maximum enrollment is 24; please register online now to reserve a spot.

Sponsored by
The Penn State College of Education
Center for Science and the Schools
182 Chambers Building, University Park, PA 16802

To register visit: http://csats.psu.edu
For more information, email Gabe Knowles at glk54@psu.edu or call 814-865-1713.

NGSS Scientific and Engineering Practices

Asking questions (for science) and defining problems (for engineering)

A basic practice of the ***scientist*** is the ability to formulate empirically answerable questions about phenomena to establish what is already known, and to determine what questions have yet to be satisfactorily answered.

Engineering begins with a problem that needs to be solved, such as "How can we reduce the nation's dependence on fossil fuels?" or "What can be done to reduce a particular disease?" or "How can we improve the fuel efficiency of automobiles?"

Developing and using models

Science often involves the construction and use of models and simulations to help develop explanations about natural phenomena.

Engineering makes use of models and simulations to analyze systems to identify flaw that might occur or to test possible solutions to a new problem.

Planning and carrying out investigations

A major practice of ***scientists*** is planning and carrying out systematic scientific investigations that require identifying variables and clarifying what counts as data.

Engineering investigations are conducted to gain data essential for specifying criteria or parameters and to test proposed designs.

Analyzing and interpreting data

Scientific investigations produce data that must be analyzed to derive meaning. ***Scientists*** use a range of tools to identify significant features and patterns in the data.

Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria.

Using mathematics and computational thinking

In ***science***, mathematics and computation are fundamental tools for representing physical variables and their relationships.

In ***engineering***, mathematical and computational representations of established relationships and principles are an integral part of the design process.

Constructing explanations (for science) and designing solutions (for engineering)

The goal of ***science*** is the construction of theories that provide explanatory accounts of the material world.

The goal of ***engineering*** design is a systematic approach to solving engineering problems that is based on scientific knowledge and models of the material world.

Engaging in argument from evidence

In ***science***, reasoning and argument are essential for clarifying strengths and weaknesses of a line of evidence and for identifying the best expl nation for a natural phenomenon.

In ***engineering***, reasoning and arguments are essential for finding the best solution to a problem. Engineers collaborate with their peers throughout the design process.

Obtaining, evaluating, and communicating information

Science cannot advance if scientists are unable to communicate their findings clearly and persuasively or learn about the findings of others.

Engineering cannot produce new or improved technologies if the advantages of their designs are not communicated clearly and persuasively.