

The Energy Lab

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Summary

The National Guard has developed The Energy Lab to provide a unique hands-on science, technology, engineering and math (STEM) experience for 11th- and 12th-grade students in underserved communities and for the children of Soldiers at local armories. The Energy Lab exposes students to these concepts through the platform of power creation, energy efficiency and alternative power sources. The Energy Lab boasts cutting-edge technology, a 24-seat on-board theater, and four interactive and engaging experiences, represented by the elements of Earth, Water, Wind and Fire that engage students and teach them about energy resources.



The Primary Goals of the Energy Lab are to:

- Provide students with a unique hands on experience in STEM related subjects, and increase tools and information for educators to assist students with career guidance in STEM areas in participating schools
- Increase the presence, positive image and awareness of the National Guard's role as an organization that adds value back to its communities
- Increase graduation rate of schools visited and inspire academic interest in STEM career fields

- Develop partnerships to optimize program reach and success and leverage available resources to sustain and expand program operations
- Increase school attendance, academic performance and graduation rates in participating schools

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Frequently Asked Questions

Q. What is the schedule for The Energy Lab?

A. The schedule can be found on [The Energy Lab Website](#).

Q. As a parent, how does The Energy Lab benefit my child?

A. The Energy Lab, created by the National Guard, wants your child to experience science, technology, engineering and math (STEM) through hands-on interactions. Their experience will be memorable, educational and most of all, fun! We want The Energy Lab to spark your child's interest in these subjects and show them opportunities that exist within these and related fields.

The Energy Lab is designed to teach your child about the creation of power through natural resources and demonstrate the career opportunities that exist in science-related fields.

While in The Energy Lab, children will interact with experiences based on one of four elements: [Earth](#), [Water](#), [Wind](#), and [Fire](#). Each element represents an energy source that can be harnessed to create electricity. Students will work to create energy with resources that can be easily replaced (renewable), and some that cannot be replaced (non-renewable). Teams will compete to see who can create the most power with the least amount of waste.

The Elements



Interaction with the Earth station gives students the experience of controlling the planet's fossil fuel resources for the next 40 years

Students place their water buoy in an ocean of their choice; they are challenged to generate waves and measure the electrical output of their buoy.



Students use simulated solar panels to capture solar energy and convert it into electricity to power as many homes as possible.

Students choose between different types of wind turbines, then place them where they will be most effective at maximizing electricity output.



Q. As a teacher, what will my students learn from The Energy Lab?

A. The National Guard developed The Energy Lab with student education in mind. We worked with nationally recognized math and science educators to develop concepts relevant to high school upperclassmen. The Energy Lab presents to students, in an interactive and engaging manner through the platform of energy and the environment, the following educational concepts that are central to most math and science curricula:

- Endothermic & Exothermic Heat
- Wavelengths
- Unit Conversion
- Energy Transfer
- Energy Efficiency
- Renewable and Non-Renewable Energy
- Basic Trigonometry and the Graphical Representation of Waves
- Fraction and Proportions
- Dimensional Analysis
- Coordinate Planes and Graphing a Set of Data
- Quadratic Equations
- Frequency Distribution of Data

Q. What sort of pre-learning documents are there?

A. We strongly recommend introducing your students to the concept of energy before The Energy Lab arrives at your school. The Energy Lab Pre-Learning Document outlines the math and science concepts your students will be exposed to during the

experience. This document provides pre-learning activities based on the four elements, pre-learning discussion questions, and additional resources. The Energy Lab Pre-Learning Document can be downloaded by clicking [here](#).

To assist you in tying the experiences on The Energy Lab to the previously identified math and science concepts, 30 Facilitator's Guides have been created. These guides outline general lesson goals, objectives, assessment tools, adaptations, extensions and resources, and provide you with resources to extend Energy Lab lessons into the classroom. Each concept has a guide for a basic (Level I/II) and advanced (Level III) level of learning.

To download the Facilitator's Guides, click the grade and subject you are teaching below:

- [Grade 11: Math](#)
- [Grade 11: Science](#)
- [Grade 12: Math](#)
- [Grade 12: Science](#)

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Links

- [The Energy Lab](#)
The Energy Lab website provides Students, Families, and Partners information regarding the learning experience, touring schedule, and science/math careers.

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References

Documents and Forms

- [Press Release: National Guard's Nationwide Tour to Improve Performance of America's Students in Science and Math](#)
- [The Energy Lab: Educator Resources](#)

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