# The Energy Effect

A Fully-Developed Interdisciplinary Project Using the Power of Technology to Increase Learning for Grades 6 through 8

## Overview

Energy is everywhere, but it can be difficult to understand. You may be able to see what energy does, but you cannot see energy itself. Without energy, plants, animals, and humans would not able to live. The Energy Effect is a multi-disciplinary project with a strong focus on math in the content areas. Each activity has a real-world math component. Students will learn how mathematical skills and concepts are integrated into all subjects. The Energy Effect provides students with multiple opportunities to experiment with energy, its sources, and its uses. As students explore the world from the perspective of energy, previously unrelated topics become intertwined. Students will recognize the connections among natural resources, politics, economics, science, technology, history, and culture. Through the activities in The Energy Effect, students will examine different forms of energy and understand the difference between renewable and nonrenewable energy resources. They will explore the effect the world's current energy use is having on the environment.

The project will culminate with an Energy Extravaganza. This event will be an opportunity for students to present what they have learned and display the products they created to invited guests. This project strives to engage students by appealing to their natural creativity and curiosity, while providing students with a strong foundation in research skills using the Internet, print material, and computer software. Students will use technology to employ a variety of different learning styles and will demonstrate their understanding of the material in multiple formats. The Energy Effect project sets high academic goals and offers students the means to achieve them. The project emphasizes the use of primary source documents and Internet-based research. A distinct component of The Energy Effect project is its adaptability.

## Project Scope

The project includes three distinct, content driven units of study. Each unit builds on the skill and knowledge of the previous unit. Together, the three units provide a holistic view of energy and how it relates to our world and our lives.

Phase One: **Turn On to Energy!** This is an introduction to the forms and uses of energy. Students will begin to see connections between energy use and its impact on the environment. The activities in this unit help students build prior knowledge and math skills they will need to successfully complete the project.

Phase Two: **I've Got the Power!** In this unit, students will examine different forms of energy, how energy use is calculated, and ways we use energy. They will collect and use data to develop an understanding of the relationship between energy consumption and energy production.

Phase Three: **Power Positive!** In this unit, students will evaluate what impact the world's current energy use has on the environment. Students will discover how an understanding of mathematics can be used to solve real-world energy problems.

*For more information contact Thomas J Lapping • tlapping@jdlhorizons.com • (952) 697-0555 • or visit www.jdlhorizons.com*

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## About Project Based Learning

Project-based learning is a comprehensive approach to instruction. As students participate in engaging, multi-faceted investigations, they develop an array of interdisciplinary skills. Project-based learning allows teachers to create tasks whose complexity and openness mimic problems in the real world. Students collaborate with peers to tackle real-world problems.

### Key Components

The key components to project-based learning are clear objectives, student autonomy, investigative activities, and real-world results:

- Teachers clearly define the instructional objectives: The first step to creating your own project is to define your objectives. Knowing where the project is going is more important to reaching the destination than any other single variable.
- Students direct their own work and take control over their own learning: Students work independently as well as participate in flexible cooperative groupings. Rather than divide students by abilities, allow students with similar interests to work cooperatively. As the range of materials and interests of the students develop and expand, so will the need for different kinds of collaborations and group interactions.

- Students conduct multi-faceted investigations: Students use authentic tools (including technology), seek resources, and solve problems in response to an overall challenge. Students learn that knowing how to find information and making connections is more important than memorizing the facts. They use primary source documents, conduct experiments, construct models, and conduct interviews and surveys.
- Students create real-world products: Students make choices about how to demonstrate learning and are accountable for the choices they make. Products can include multimedia presentations, letters, posters, brochures, newsletters, maps, videos, and more.

The Energy Effect is an example of project-based learning with all of the above components. You can use this project as a model to create your own projects based on specific content and curriculum by adapting many of the activities.

**Orientation on Project Based Learning Summary**

- Establish an Essential Question for the group to answer.
- Teacher laptops or desktops used for research on the essential question. How to training is in real time and in context.
- Grouping; 4 to 5 Teacher Students working towards the same essential question.
- Teachers will experience Cooperative Learning using different strengths of colleagues for final product.
- Inquiry Based Learning exercised to reflect research and decisions and answers to the essential question.
- Differentiated Learning; how each student individually shows understanding with final product presentation.
- Engaging thematic activities through collaboration, creativity and decision making.
- Final Activity Product created on the essential question to present at the end of the day.

www.jdlhorizons.com
8201 Norman Center Drive
Bloomington, MN 55437
Tel: (952) 697-0550
Fax: (952) 697-0551

For more detailed Information, contact JDL Horizons
Tom Lapping - (952) 697-0555 - tlapping@jdlhorizons.com