

ENERGY

IN THE CLASSROOM

Correlation of NEED Materials
to the
Grade Level Expectations
of the
Illinois Learning Standards
for
Math & Science

NEED

25th
Anniversary
2005

Putting Energy into Education

TABLE OF CONTENTS

Section 1	Correlations to Illinois Learning Standards	
	Early Elementary	3
	Late Elementary	6
	Middle/Junior High	9
	Early High School	12
	Late High School	14
Section 2	Description of NEED Materials	15

To join the NEED Network
and receive the materials and training you need to
conduct an innovative energy unit in your classroom
contact:

The NEED Project
PO Box 10101
Manassas, VA 20108
TEL 1-800-875-5029
FAX 1-800-847-1820
Email info@need.org

Check out our website at www.need.org

The NEED Project is a 501(c)(3) nonprofit education association dedicated to providing objective, comprehensive, innovative materials for teachers to use to teach students about energy. Materials are available for students in grades K–12.

EARLY ELEMENTARY SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 6-A: Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings.

- 6.A.1b Identify and model fractions using concrete materials and pictorial representations.

STANDARD 6-B: Investigate, represent and solve problems using number facts, operations and their properties, algorithms and relationships.

- 6.B.1 Solve one- and two-step problems with whole numbers using addition, subtraction, multiplication and division.

STANDARD 6-C: Compute and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.

- 6.C.1a Select and perform computational procedures to solve problems with whole numbers.

- 6.C.1b Show evidence that whole number computational results are correct and/or that estimates are reasonable.

STANDARD 6-D: Solve problems using comparison of quantities, ratios, proportions and percents.

- 6.D.1 Compare the numbers of objects in groups.

STANDARD 7-A: Measure and compare quantities using appropriate units, instruments and methods.

- 7.A.1a Measure length, volume and weight/mass using rulers, scales and other appropriate measuring instruments in the customary and metric systems.

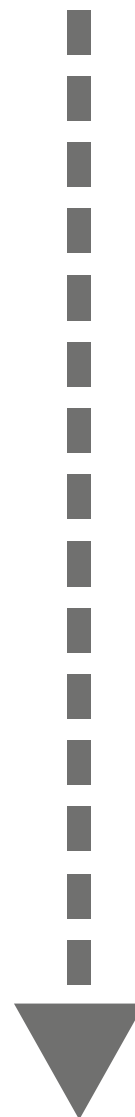
- 7.A.1d Read temperatures to the nearest degree from Celsius and Fahrenheit thermometers.

STANDARD 7-B: Estimate measurements and determine acceptable levels of accuracy.

- 7.B.1a Given a problem, describe possible methods for estimating a given measure.

- 7.B.1b Compare estimated measures to actual measures taken with appropriate measuring instruments.

Primary Science of Energy Kit
Exploring Magnets Kit
The Sun and Its Energy Kit
Building Buddies Kit
Today in Energy
Primary Stories and More
Primary Energy Carnival
Trash Flip Book
Energy Math Challenge



EARLY ELEMENTARY SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 10-A: Organize, describe and make predictions from existing data.

- 10.A.1a Organize and display data using pictures, tallies, tables, charts or bar graphs.
- 10.A.1b Answer questions and make predictions based on given data.

STANDARD 10-B: Formulate questions, design data collection methods, gather and analyze data and communicate findings.

- 10.B.1a Formulate questions of interest and design surveys or experiments to gather data.
- 10.B.1b Collect, organize and describe data using pictures, tallies, tables, charts or bar graphs.
- 10.B.1c Analyze data, draw conclusions and communicate the results.

STANDARD 10-C: Determine, describe and apply the probabilities of events.

- 10.C.1a Describe the concept of probability in relationship to likelihood and chance.
- 10.C.1b Systematically list all possible outcomes of a simple one-stage experiment.

STANDARD 11-A: Know and apply the concepts, principles and processes of scientific inquiry.

- 11.A.1a Describe an observed event.
- 11.A.1b Develop questions on scientific topics.
- 11.A.1c Collect data for investigations using measuring instruments and technologies.
- 11.A.1d Record and store data using available technologies.
- 11.A.1e Arrange data into logical patterns and describe the patterns.
- 11.A.1f Compare observations of individual and group results.

Energy Fair
Primary Science of Energy Kit
Exploring Magnets Kit
The Sun and Its Energy Kit
Building Buddies Kit
Trash Flip Book
Energy Math Challenge



Primary Science of Energy Kit
Exploring Magnets Kit
The Sun and Its Energy Kit
Building Buddies Kit
Energy Fair

EARLY ELEMENTARY SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 12-C: Know and apply concepts that describe properties of matter and energy and the interactions between them.

- 12.C.1a Identify and compare sources of energy.
- 12.C.1b Compare large scale physical properties of matter.

Primary Energy Flip Book
Primary Science of Energy Kit
Primary Energy Stories and More
Exploring Magnets Kit
The Sun and Its Energy Kit
Ethanol
Biodiesel

STANDARD 12-D: Know and apply concepts that describe force and motion and the principles that explain them.

- 12.D.1a Identify examples of motion.
- 12.D.1b Identify observable forces in nature.

Primary Science of Energy Kit
Exploring Magnets Kit

STANDARD 12-E: Know and apply concepts that describe the features and processes of the Earth and its resources.

- 12.E.1c Identify renewable and nonrenewable natural resources.

Primary Energy Flip Book
Primary Energy Stories and More
Ethanol
Biodiesel

STANDARD 13-A: Know and apply the accepted practices of science.

- 13.A.1a Use basic safety practices.
- 13.A.1b Explain why similar results are expected when procedures are done the same way.
- 13.A.1c Explain how knowledge can be gained from careful observation.

Primary Science of Energy Kit
Building Buddies Kit
Primary Energy Stories and More
Energy Fair
Exploring Magnets Kit
The Sun and Its Energy Kit

STANDARD 13-B: Know and apply concepts that describe the interaction between science, technology and society.

- 13.B.1a Explain the uses of common scientific instruments.
- 13.B.1b Explain how using measuring tools improves the accuracy of estimates.
- 13.B.1c Describe contributions men and women have made to science and technology.
- 13.B.1d Identify and describe ways that science and technology affect people's everyday lives.
- 13.B.1e Demonstrate ways to reduce, reuse and recycle materials.

Primary Energy Flip Book
Building Buddies Kit
Primary Science of Energy Kit
Exploring Magnets Kit
The Sun and Its Energy Kit
Primary Energy Stories and More
Today in Energy

Trash Flip Book

LATE ELEMENTARY SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 6-A: Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings.

- 6.A.2 Compare and order whole numbers, fractions and decimals using concrete materials, drawings and mathematical symbols.

STANDARD 6-B: Investigate, represent and solve problems using number facts, operations and their properties, algorithms and relationships.

- 6.B.2 Solve one- and two-step problems involving whole numbers, fractions and decimals using addition, subtraction, multiplication and division.

STANDARD 6-C: Compute and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.

- 6.C.2a Select and perform computational procedures to solve problems with whole numbers, fractions and decimals.
- 6.C.2b Show evidence that computational results using whole numbers, fractions and decimals are correct and/or that estimates are reasonable.

STANDARD 6-D: Solve problems using comparison of quantities, ratios, proportions and percents.

- 6.D.2 Describe the relationship between two sets of data using ratios and appropriate notations.

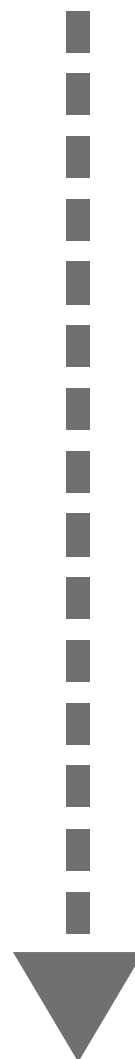
STANDARD 7-A: Measure and compare quantities using appropriate units, instruments and methods.

- 7.A.2a Calculate, compare and convert length, perimeter, area, weight/mass and volume within the customary and metric systems.

STANDARD 7-B: Estimate measurements and determine acceptable levels of accuracy.

- 7.B.2a Determine and communicate possible methods for estimating a given measure, selecting proper units in both customary and metric systems.
- 7.B.2b Estimate conversions between measures within the customary and metric systems.

EnergyWorks Kit
ElectroWorks Kit
Monitoring/Mentoring Kit
Energy From the Sun Kit
Elementary Science of Energy Kit
Energy Math Challenge
Energy in the Balance
Energy Carnival
Ethanol
Biodiesel



LATE ELEMENTARY SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 10-A: Organize, describe and make predictions from existing data.

- 10.A.2a Organize and display data using pictures, tallies, tables, charts, bar graphs, line graphs, line plots and stem-and-leaf graphs.
- 10.A.2c Make predictions and decisions based on data and communicate their reasoning.

STANDARD 10-B: Formulate questions, design data collection methods, gather and analyze data and communicate findings.

- 10.B.2a Formulate questions of interest and select methods to systematically collect data.
- 10.B.2b Collect, organize and display data using tables, charts, bar graphs, line graphs, circle graphs, line plots and stem-and-leaf graphs.
- 10.B.2d Interpret results or make relevant decisions based on the data gathered.

STANDARD 10-C: Determine, describe and apply the probabilities of events.

- 10.C.2a Calculate the probability of a simple event.

STANDARD 11-A: Know and apply the concepts, principles and processes of scientific inquiry.

- 11.A.2a Formulate questions on a specific science topic and choose the steps needed to answer the questions.
- 11.A.2b Collect data for investigations using scientific process skills including observing, estimating and measuring.
- 11.A.2c Construct charts and visualizations to display data.
- 11.A.2d Use data to produce reasonable explanations.
- 11.A.2e Report and display the results of individual and group investigations.

EnergyWorks Kit
ElectroWorks Kit
Monitoring & Mentoring Kit
Energy From the Sun Kit
Elementary Science of Energy Kit
Energy Math Challenge
Energy in the Balance
Energy Carnival
Energy Flows
Ethanol
Biodiesel



Energy Fair
EnergyWorks Kit
Elementary Science of Energy Kit
Monitoring & Mentoring Kit
Exploring Energy
ElectroWorks Kit
Energy From the Sun Kit
Energy Flows
Ethanol
Biodiesel

LATE ELEMENTARY SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 12-C: Know and apply concepts that describe properties of matter and energy and the interactions between them.

- 12.C.2a Describe and compare types of energy including light, heat, sound, electrical and mechanical.
- 12.C.2b Describe and explain the properties of solids, liquids and gases.

Elementary Science of Energy Kit
EnergyWorks Kit
ElectroWorks

STANDARD 12-D: Know and apply concepts that describe force and motion and the principles that explain them.

- 12.D.2a Explain constant, variable and periodic motions.
- 12.D.2b Demonstrate and explain ways that forces cause actions and reactions.

EnergyWorks Kit
Exploring Energy
Elementary Science of Energy Kit
Exploring Magnets Kit

STANDARD 12-E: Know and apply concepts that describe the features and processes of the Earth and its resources.

- 12.E.2a Identify and explain natural cycles of Earth's land, water and atmospheric systems.
- 12.E.2c Identify and classify recyclable materials.

Elementary Energy Infobook
Exploring Energy
EnergyWorks Kit
Trash Talk

STANDARD 13-A: Know and apply the accepted practices of science.

- 13.A.2a Demonstrate ways to avoid injury when conducting science activities.
- 13.A.2b Explain why similar investigations may not produce similar results.
- 13.A.2c Explain why keeping accurate and detailed records is important.

EnergyWorks Kit
ElectroWorks Kit
Elementary Science of Energy Kit
Monitoring & Mentoring Kit
Energy From the Sun Kit

STANDARD 13-B: Know and apply concepts that describe the interaction between science, technology and society.

- 13.B.2a Explain how technology is used in science for a variety of purposes.
- 13.B.2b Describe the effects on society of scientific and technological innovations.
- 13.B.2d Compare the effectiveness of reducing, reusing and recycling in actual situations.
- 13.B.2e Identify and explain ways that technology changes ecosystems.
- 13.B.2f Analyze how specific personal and societal choices that humans make affect local, regional and global ecosystems.

Elementary Energy Infobook
Energy in the Balance
Monitoring and Mentoring Kit
EnergyWorks Kit
Energy From the Sun Kit
Exploring Energy
Trash Talk
Energy Around the World
Great Energy Debate Game
What Car Will You Drive?
Ethanol
Biodiesel

MIDDLE/JUNIOR HIGH SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 6-A: Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings.

- 6.A.3 Represent fractions, decimals, percentages, exponents and scientific notation in equivalent forms.

STANDARD 6-B: Investigate, represent and solve problems using number facts, operations and their properties, algorithms and relationships.

- 6.B3a Solve practical computation problems involving whole numbers, integers and rational numbers.

STANDARD 6-C: Compute and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.

- 6.C.3a Select computational procedures and solve problems with whole numbers, fractions, decimals, percents and proportions.

- 6.C.3b Show evidence that computational results using whole numbers, fractions, decimals, percents and proportions are correct and/or that estimates are reasonable.

STANDARD 6-D: Solve problems using comparison of quantities, ratios, proportions and percents.

- 6.D.3 Apply ratios and proportions to solve practical problems.

STANDARD 7-A: Measure and compare quantities using appropriate units, instruments and methods.

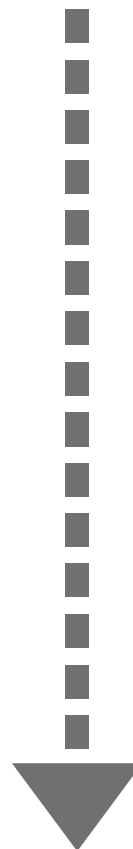
- 7.A.3a Measure length, capacity, weight/mass and angles using sophisticated instruments.

- 7.A.3b Apply the concepts and attributes of length, capacity, weight/mass, perimeter, area, volume, time, temperature and angle measures in practical situations.

STANDARD 7-B: Estimate measurements and determine acceptable levels of accuracy.

- 7.B.3 Select and apply instruments including rulers and protractors and units of measure to the degree of accuracy required.

EnergyWorks Kit
ElectroWorks Kit
Monitoring & Mentoring Kit
Learning & Conserving Kit
Exploring Solar Energy Kit
Secondary Science of Energy Kit
Exploring Solar Energy Kit
Energy Math Challenge
Mission Possible
Energy Carnival
Energy Analysis
Ethanol
Biodiesel



MIDDLE/JUNIOR HIGH SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 10-A: Organize, describe and make predictions from existing data.

- 10.A.3a Construct, read and interpret tables, graphs and charts to organize and represent data.
- 10.A.3c Test the reasonableness of an argument based on data and communicate their findings.

Monitoring & Mentoring Kit
Learning and Conserving Kit
Secondary Science of Energy Kit
Exploring Solar Energy Kit
ElectroWorks Kit
Mission Possible
Alternative Transportation Fuels
Great Energy Debate Game
ThermoDynamics
Ethanol
Biodiesel

STANDARD 10-B: Formulate questions, design data collection methods, gather and analyze data and communicate findings.

- 10.B.3 Formulate questions, devise and conduct experiments or simulations, gather data, draw conclusions and communicate results to an audience using traditional methods and contemporary technologies.

STANDARD 10-C: Determine, describe and apply the probabilities of events.

- 10.C.3b Analyze problem situations and make predictions about results.

STANDARD 11-A: Know and apply the concepts, principles and processes of scientific inquiry.

- 11.A.3c Collect and record data accurately using consistent measuring and recording techniques and media.
- 11.A.3e Use data manipulation tools and quantitative and representational methods to analyze measurements.
- 11.A.3f Interpret and represent results of analysis to produce findings.
- 11.A.3g Report and display the process and results of a scientific investigation.

EnergyWorks Kit
Monitoring & Mentoring Kit
Learning and Conserving Kit
Secondary Science of Energy Kit
Exploring Solar Energy Kit
ElectroWorks Kit
ThermoDynamics

STANDARD 12-C: Know and apply concepts that describe properties of matter and energy and the interactions between them.

- 12.C.3a Explain interactions of energy with matter including changes of state and conservation of mass and energy.
- 12.C.3b Model and describe the chemical and physical characteristics of matter.

EnergyWorks Kit
ThermoDynamics
Intermediate/Secondary Infobooks

MIDDLE/JUNIOR HIGH SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 12-E: Know and apply concepts that describe the features and processes of the Earth and its resources.

- 12.E.3c Evaluate the biodegradability of renewable and nonrenewable natural resources.

**Intermediate/Secondary Infobooks
Museum of Solid Waste and Energy**

STANDARD 13-B: Know and apply concepts that describe the interaction between science, technology and society.

- 13.B.3a Identify and explain ways that scientific knowledge and economics drive technological development.

- 13.B.3d Analyze the interaction of resource acquisition, technological development and ecosystem impact.

- 13.B.3e Identify advantages and disadvantages of natural resource conservation and management programs.

**Intermediate/Secondary Infobooks
Monitoring & Mentoring Kit
Learning & Conserving Kit
Great Energy Debate Game
Mission Possible
Energy Around the World
Alternative Transportation Fuels
Museum of Solid Waste and Energy
Ethanol
Biodiesel**

EARLY HIGH SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 7-A: Measure and compare quantities using appropriate units, instruments and methods.

- 7.A.4a Apply units and scales to describe and compare numerical data and physical objects.
- 7.A.4b Apply formulas in a wide variety of theoretical and practical real-world measurement applications involving perimeter, area, volume, time, temperature, mass, speed, distance, density and monetary values.

STANDARD 7-B: Estimate measurements and determine acceptable levels of accuracy.

- 7.B.4 Estimate and measure the magnitude and directions of physical quantities using rulers, protractors and other scientific instruments including timers, calculators and computers.

STANDARD 10-A: Organize, describe and make predictions from existing data.

- 10.A.4a Represent and organize data by creating lists, charts, tables, frequency distributions, graphs, scatterplots and box-plots.
- 10.A.4c Predict from data using interpolation, extrapolation and trend lines, with and without the use of technology.

STANDARD 10-B: Formulate questions, design data collection methods, gather and analyze data and communicate findings.

- 10.B.4 Design and execute surveys or experiments, gather data to answer relevant questions, and communicate results and conclusions to an audience using traditional methods and contemporary technology.

STANDARD 11-A: Know and apply the concepts, principles and processes of scientific inquiry.

- 11.A.4b Conduct controlled experiments or simulations to test hypotheses.
- 11.A.4c Collect, organize and analyze data accurately and precisely.
- 11.A.4f Using available technology, report, display and defend to an audience conclusions drawn from investigations.

Learning & Conserving Kit
Secondary Science of Energy Kit
Energy Math Challenge
Mission Possible
ThermoDynamics
The Future is Today
Energy Analysis
Ethanol
Biodiesel



Learning and Conserving Kit
ThermoDynamics
Secondary Science of Energy Kit
Photovoltaics Kit
Mission Possible
The Future is Today
Energy Analysis

EARLY HIGH SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 12-C: Know and apply concepts that describe properties of matter and energy and the interactions between them.

- 12.C.4a Use kinetic theory, wave theory, quantum theory and the laws of thermodynamics to explain energy transformations.
- 12.C.4b Analyze and explain the atomic and nuclear structure of matter.

ThermoDynamics

Photovoltaics Kit

STANDARD 12-E: Know and apply concepts that describe the features and processes of the Earth and its resources.

- 12.E.4a Explain how external and internal energy sources drive Earth processes.

**Secondary Energy Infobooks
Marine Energy
Photovoltaics Kit**

STANDARD 13-B: Know and apply concepts that describe the interaction between science, technology and society.

- 13.B.4c Analyze ways that resource management and technology can be used to accommodate population trends.
- 13.B.4d Analyze local examples of resource use, technology use or conservation programs; document findings; and make recommendations for improvements.

**Learning and Conserving Kit
Mission Possible
The Future is Today
Ethanol
Biodiesel**

LATE HIGH SCHOOL CORRELATIONS

LEARNING STANDARD

MATERIALS TO MEET OBJECTIVES

(See detailed description of materials)

STANDARD 13-B: Know and apply concepts that describe the interaction between science, technology and society.

- 13.B.5c Design and conduct an environmental impact study, analyze findings and justify recommendations.
- 13.B.5d Analyze the costs, benefits and effects of scientific and technological policies at the local, state, national and global levels.

Learning and Conserving Kit
Mission Possible
Marine Energy
The Future is Today
Ethanol
Biodiesel
Energy Analysis

NEED PROJECT MATERIALS

The NEED Project is a nonprofit organization dedicated to educating students, teachers, and the community about energy. Below is a description of NEED materials available to teachers listed in alphabetical order:

Biodiesel (Grades 4-12)—Students explore biodiesel as a transportation fuel with backgrounders on three reading levels and suggested activities.

Blueprint for Success (Grades K-12)—This booklet is designed to help teachers develop an effective energy education program for their grade level and special needs using NEED materials. Pre- and post surveys at four reading levels and an energy unit exam are also included.

Building Buddies (Grades 1-3)—This primary program introduces students to basic concepts of energy use and conservation, beginning with activities focused on home energy use and extending to school energy use and conservation measures. Students monitor weather conditions, record indoor and outdoor temperatures, and evaluate their energy use behaviors daily. Individual students and classrooms are recognized for energy-saving habits and being good Building Buddies. Teacher and student guides are included. The Building Buddies Kit includes an indoor/outdoor thermometer, immersion thermometer, flicker checker, and Building Buddies pouches, buttons, stickers, and certificates.

Current Energy Affair (Grades 7-12)—Students act as TV correspondents to report on electric power generation. They explore how electricity is generated and transported, what energy sources are used to make it, the history of electricity, efficiency and conservation, and the future of electricity generation.

ElectroWorks (Grades 4-7)—This hands-on unit introduces students to the mysteries of electricity with five centers—static electricity, batteries, magnets, electromagnetism, and circuits. This unit includes a Teacher Guide and Student Guide with a backgrounder, worksheets, and experiments. An ElectroWorks Kit with the materials needed to conduct the experiments and a class set of Student Guides is also available.

Energy Analysis (Grades 7-12)—Students research and analyze information in graphic formats to discern energy trends.

Energy Around The World (Grades 5-12)—Students work in groups to research and make presentations on energy use in one of 60 countries around the world.

Energy Carnivals (Grades K-12)—NEED's popular carnival games are an excellent way to get students and adults thinking about energy. The Energy Carnival for Grades 4-12 contains complete instructions for ten carnival games including Energy Pictionary, The Wheel of Energy, Top Five, Energy Knockdown, and Energy Taboo. An excellent activity for elementary or middle school energy fair or Earth Day celebration. The Primary Energy Carnival contains nine games appropriate for students in Grades K-3, including games such as Energy Bingo, Energy Math, Memory, Match Game, and Energy Pursuit.

Energy Conservation Contract (Grades 4-12)—Students ask their families and neighbors to sign contracts in which they agree to save energy at home and on the road. Teacher and student guides are included.

Energy Enigma (Grades 7-12)—Students put on their detective hats to uncover the mysteries of the energy sources.

Energy Fair (Grades 2-6)—This unit is a guide to teaching the experimental design model with an emphasis on energy. Classroom projects, suggested energy fair projects, and a student guide are included.

Energy Flows (Grades 5-12)—This hands-on activity explains forms of energy and energy transformations.

Energy From The Sun (Grades 3-4)—This elementary solar energy kit teaches the basics of solar energy and photovoltaics with hands-on explorations.

Energy House (Grades 4-12)—In this activity, students insulate a cardboard-box house with a variety of insulating materials that they purchase with energy bucks, learning about energy conservation and savings. Teacher and student guides are included.

Energy Infobooks (Grades K–12)—NEED’s energy infobooks are available in primary (grades K-2), elementary (3-4), intermediate (grades 5-8), and secondary (grades 7-12) versions. The booklets provide information on the sources of energy, electricity, consumption, as well as general energy information. The booklets are revised each year to provide the most complete, up-to-date information. Class sets of infobooks can be ordered.

Energy Infobook Activities (Grades K–12)—NEED’s energy infobook activities are companion workbooks to the infobooks and are available in primary (grades K-2), elementary (3-4), intermediate (grades 5-8), and secondary (grades 7-12) versions.

Energy In The Balance (Grades 4–6)—This unit introduces students to the advantages and disadvantages of the major energy sources through a series of critical thinking, charting, and graphing activities.

Energy Jeopardy (Grades 4-12)—Students enjoy learning about energy using this game show format.

Energy Math Challenge (Grades 3–12)—These activities strengthen students’ math skills while increasing their knowledge of energy. Students work individually and in teams to solve energy math problems. Elementary, intermediate and secondary skill levels are included.

Energy On Public Lands (Grades 5-8)—Students learn and teach others about how energy on public lands is managed with background information and hands-on activities.

Energy On Stage (Grades 4–12)—NEED’s own versions of cartoon characters, classic TV characters, blockbuster movies, and children’s stories—all with an energy story to tell.

Energy Source Expo (Grades 3-12)—Students work in groups to develop exhibits and make presentations on the major energy sources as they develop an expo to teach others. Teacher and student instructions and background resources are included.

EnergyWorks—(Grades 4–8) This is a hands-on unit that introduces students to the things energy does—heat, light, motion, sound, growth, and powering technology. This unit includes a Teacher Guide and Student Guide with backgrounders, worksheets, and hands-on experiments. Separate heat, light, motion, and sound units are available. An EnergyWorks Kit with the materials needed to conduct the experiments and a class set of Student Guides is also available.

Ethanol (Grades 4-12)—Students explore ethanol as a transportation fuel with backgrounders on three reading levels and suggested activities.

Exploring Energy (Grades 4–6)—This booklet contains short articles and hands-on explorations on a variety on energy-related topics, such as composting, solar cooking, heat, refrigeration, microwaves, how cars work, and the greenhouse effect.

Exploring Magnets (Grades 1–4)—The Exploring Magnets unit teaches the fundamentals of magnetism using a hands-on kit.

Exploring Solar Energy (Grades 5–8)—The intermediate solar energy kit teaches students the applications of solar energy and photovoltaics using hands-on materials.

Future is Today (Grades 7–12)—Students learn about conventional and alternative fuels with comprehensive background information and suggested activities.

Games & Icebreakers (Grades K–12)—Fun and educational activities and games, including Bumper Stumpers, Energy Bingo, Electric Connections, Energy Chants, and America’s Most Wanted Energy Wasters.

Global Trading Game (Grades 4–12)—This activity, developed by the Ohio Energy Project, allows students to become economic advisors, geologists and miners as they work in teams to learn about their assigned country’s resources and needs, then trade with other countries.

Great Energy Debate Game (Grades 5–12)—Students work cooperatively to devise strategies for the Great Energy Debate Game. Students represent different energy sources and develop arguments on the merits of their energy source over the others. A good critical thinking game.

Great Energy Rock Performances (Grades 3–12)—Recommended for grades 3-12. Student rock bands sing about their energy sources in this rousing contest. You'll learn more from these energy rock stars as they tell their stories to interviewers out to get the latest energy scoop. Teacher and student instructions included, along with sample songs and interviews.

H2 Educate (Grades 6-12)—This intermediate/secondary unit introduces students to hydrogen as an important energy carrier for the future, both as a fuel for distributed generation and as a transportation fuel. A hands-on kit explores electrolysis, atomic structure, and hydrogen fuel cells, and includes a hydrogen fuel cell car.

Learning & Conserving (Grades 7–12)—Secondary students learn about energy consumption and conservation by reading utility meters and utility bills, comparing EnergyGuide labels, and exploring electric nameplates. Students conduct comprehensive surveys of the school building and school energy consumption—gathering, recording and analyzing data, and monitoring energy usage. Students develop a comprehensive energy management plan for the school that includes suggestions for retrofits, systems management and conservation practices. The Learning and Conserving Kit includes indoor/outdoor thermometer/ immersion thermometer, hygrometer, light meter, and measuring tape.

Marine Energy (Grades 7–12)—Students construct a topographical map of the United States, including the outer continental shelf and the Exclusive Economic Zone, that shows the major land and underwater formations. Students also conduct a community hearing on the development of energy resources and/or minerals in these areas.

Mission Possible: Energy Trade-offs (Grades 7–12)—This is an activity in which students are challenged to develop an energy plan for a fictitious, growing country. Students consider the advantages and disadvantages of the energy sources available in the country so that they can increase electricity production while maintaining environmental quality.

Monitoring & Mentoring (Grades 4–6)—The elementary program introduces students to methods of measuring energy usage, determining costs, and quantifying environmental effects through a series of activities that include reading electric and natural gas meters, EnergyGuide labels, and electric nameplates. Students conduct surveys of the school building and school energy consumption—gathering, recording and analyzing data, and monitoring energy usage. Students are encouraged to buddy with primary students to learn by teaching others. The Monitoring & Mentoring Kit includes indoor/outdoor thermometer, immersion thermometer, hygrometer, and light meter.

Museum of Solid Waste and Energy (Grades 6–12)—Students create museum stations on eight solid waste and energy topics, such as reusing, recycling paper, metals, and plastics, reducing, and landfilling.

Mystery World Tour (Grades 4–8)—This activity allows students to create 12 murals depicting energy sources and terms, while learning about different countries.

Ocean Energy (Grades 6–8)—Intermediate students learn about all of the energy sources available in, under and over the ocean, with background information and hands-on activities.

Photovoltaics (Grades 8-12)—This secondary solar energy kit provides comprehensive information on solar energy and photovoltaics with hands-on explorations.

Primary Energy Stories & More (Grades K–4)—This booklet contains a series of stories and hands-on activities for primary teachers to use to introduce basic energy concepts and the major energy sources.

Primary Science of Energy (Grades 1–4)—The Primary Science of Energy, for students in Grades K-4, teaches the fundamentals of motion, heat, sound and light through a series of hands-on activities that introduce simple measurement tools such as thermometers, balances, rulers, beakers, and graduated cylinders. Primary students learn to observe, measure, record results, compare and contrast, categorize, make predictions, analyze and graph results, and draw conclusions.

Projects & Activities (Grades K–12) This booklet includes workplan and suggestions for energy outreach activities to other classes, schools, families, and communities, as well as the **Youth Awards Guide** and application form.

Science of Energy—Elementary & Secondary (Grades 4–12)—The Elementary Science of Energy, for students in Grades 4-8, teaches about the forms of energy and how one form is converted into other forms. It is designed to take five class sessions of 45 minutes. The kit includes teacher demonstrations and six experiment stations with complete student instructions and worksheets that incorporate the scientific method. The Secondary Science of Energy (Grades 8-12) teaches the same concepts with more detailed scientific explanations.

Sun and Its Energy (Grades K–2)—This primary solar energy kit teaches the fundamentals of solar energy and photovoltaics with hands-on explorations.

Talking Trash (Grades 4–6)—Students create exhibits of eight trash topics, including reusing, recycling paper, metals, and plastics, reducing, and landfilling.

This Mine Of Mine (Grades 2-6)—Students explore the formation, geology, recovery, and uses of coal, as well as the reclamation of mine sites, by building a plot of land, mining the coal, and reclaiming the land.

Today In Energy (Grades K-4)—Students are introduced to the concepts of energy choice, trade-offs, and costs using math and critical thinking skills to get them through the day with a limited supply of energy bucks.

Transparent Energy (Grades 5–12)—In this activity, students prepare and make presentations on the ten energy sources using transparencies. Included are teacher and student instructions, a sample energy presentation on energy consumption, sample presentation scripts, and transparency masters for the energy sources.

Transportation Fuels Debate Game (Grades 5-12)—Students evaluate the advantages and disadvantages of conventional and alternative transportation fuels.

Transportation Fuels Expo (Grades 5-12)—Students work in groups to develop exhibits and make presentations on conventional and alternative transportation fuels in a debate game format.

Transportation Fuels Rock Performances (Grades 4-12)—Students rock bands write songs and sing about alternative fuels in this entertaining activity. Teacher and student instructions are included, along with sample songs and interviews.

Trash FlipBook (Grades K–2)—Primary students are introduced to trash, recycling, and landfills using a flipbook with simple words and bold graphics, with comprehensive teacher information and suggested hands-on activities.

ThermoDynamics (Grades 7–12)—A guide to hands-on experiments that explore concepts of thermodynamics, including molecular structure, conduction, convection, radiation, specific heat, heat of fusion, and heat of vaporization.

This Mine of Mine (Grades 2–6)—Students build a plot of land with coal deposits in it; mine the coal using tools, then reclaim the land and investigate the uses of coal to produce energy.

Today in Energy (Grades K–4)—This primary activity introduces students to the concepts of choice, trade-offs and economics. Students use math and critical thinking skills to get them through the day with a limited supply of money.

U.S. Energy Geography (Grades 4-12)—This resource includes maps of all ten major energy sources, energy production, energy consumption, and more. The maps can be used as transparency masters.

What Car Will You Drive? (Grades 5–6)—Students are introduced to conventional and alternative fuels with background information and suggested activities.

Yesterday In Energy (Grades 4–12)—The booklet informs students about how life has changed in the United States in the last 100 years, especially in terms of energy sources and usage. Students work in small groups to prepare a museum exhibit and short presentation of one facet of the life of yesterday and today, such as transportation, heating, lighting, and jobs.