Energy Expos

2012-2013

Students work in groups to create hands-on exhibits about the energy sources that power the nation, ways to save energy at home and school, and conventional and alternative transportation fuels. Students use these exhibits to teach others.

ENERGY SOURCES

TRANSPORTATION

EFFICIENCY CONSERVATION

Grade Levels:

- Elementary
- Intermediate
- Secondary

Subject Areas:

- Science
- Social Studies
- Language Arts
- Technology

NEED

National Energy Education Development Project

Teacher Advisory Board

Shelly Baumann
Rockford, MI

Constance Beatty
Kankakee, IL

Sara Brownell
Canyon Country, CA

Loree Burroughs
Merced, CA

Amy Constant
Raleigh, NC

Joanne Coons
Clifton Park, NY

Nina Corley
Galveston, TX

Regina Donour
Whitesburg, KY

Linda Fonner
New Martinsville, WV

Samantha Forbes
Vienna, VA

Viola Henry
Thaxton, VA

Robert Hodash
Bakersfield, CA

DaNel Hogan
Kuna, ID

Greg Holman
Paradise, CA

Linda Hutton
Kitty Hawk, NC

Michelle Lamb
Buffalo Grove, IL

Barbara Lazar
Albuquerque, NM

Robert Lazar
Albuquerque, NM

Leslie Lively
Reader, WV

Mollie Mukhamedov
Port St. Lucie, FL

Don Pruett
Sumner, WA

Josh Rubin
Palo Alto, CA

Joanne Spaziano
Cranston, RI

Gina Spencer
Virginia Beach, VA

Tom Spencer
Chesapeake, VA

Joanne Trombley
West Chester, PA

Jim Wilkie
Long Beach, CA

Carolyn Wuest
Pensacola, FL

Wayne Yonkelowitz
Fayetteville, WV

NEED Mission Statement

The mission of The NEED Project is to promote an energy conscious and educated society by creating effective networks of students, educators, business, government and community leaders to design and deliver objective, multi-sided energy education programs.

Teacher Advisory Board Statement

In support of NEED, the national Teacher Advisory Board (TAB) is dedicated to developing and promoting standards-based energy curriculum and training.

Permission to Copy

NEED materials may be reproduced for non-commercial educational purposes.

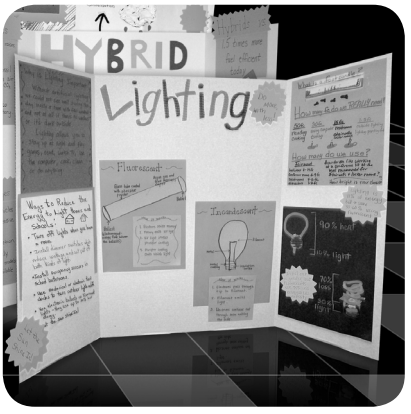
Energy Data Used in NEED Materials

NEED believes in providing the most recently reported energy data available to our teachers and students. Most statistics and data are derived from the U.S. Energy Information Administration's Annual Energy Review that is published in June of each year. Working in partnership with EIA, NEED includes easy to understand data in our curriculum materials. To do further research, visit the EIA web site at www.eia.gov. EIA's Energy Kids site has great lessons and activities for students at www.eia.gov/kids.

NEED
National Energy Education Development

1.800.875.5029
www.NEED.org

Printed on Recycled Paper



Energy Expos

Table of Contents

- Correlations to National Science Education Standards 4
- Teacher Guide 6
- Internet Resources 9
- Student Guides
  - Energy Source Exhibits 11
  - Saving Energy Exhibits 22
  - Transportation Fuels Exhibits 30
- Evaluation Form 39

Correlations to National Science Education Standards

Content Standard | B *PHYSICAL SCIENCE*

- **Light, Heat, Electricity, and Magnetism (K-4)**
  - Light travels in a straight line until it strikes an object. Light can be reflected by a mirror, refracted by a lens, or absorbed by the object.
  - Heat can be produced in many ways, such as burning, rubbing, or mixing one substance with another. Heat can move from one object to another by conduction.
  - Electricity in circuits can produce light, heat, sound, and magnetic effects. Electrical circuits require a complete loop through which an electrical current can pass.

- **Transfer of Energy (5-8)**
  - Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways.
  - Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.
  - The sun is a major source of energy for changes on the earth's surface. The sun loses energy by emitting light. A tiny fraction of that light reaches the earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.

- **Structure of Atoms (9-12)**
  - The atom's nucleus is composed of protons and neutrons, which are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called different isotopes of the element.
  - The nuclear forces that hold the nucleus of an atom together, at nuclear distances, are usually stronger than the electric forces that would make it fly apart. Nuclear reactions convert a fraction of the mass of interacting particles into energy, and they can release much greater amounts of energy than atomic interactions. Fission is the splitting of a large nucleus into smaller pieces. Fusion is the joining of two nuclei at extremely high temperature and pressure, and is the process responsible for the energy of the sun and other stars.

- **Structure and Properties of Matter (9-12)**
  - Carbon atoms can bond to one another in chains, rings, and branching networks to form a variety of structures, including synthetic polymers, oils, and the large molecules essential to life.

- **Motions and Forces (9-12)**
  - Electricity and magnetism are two aspects of a single electromagnetic force. Moving electric charges produce magnetic forces, and moving magnets produce electric forces. These effects help students to understand electric motors and generators.

- **Conservation of Energy and the Increase in Disorder (9-12)**
  - The total energy of the universe is constant. Energy can be transferred by collisions in chemical and nuclear reactions, by light waves and other radiations, and in many other ways. However, it can never be destroyed. As these transfers occur, the matter involved becomes steadily less ordered.
  - All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.

Content Standard D | *EARTH AND SPACE SCIENCE*

- **Properties of Earth Materials (K-4)**
  - Earth materials are solid rocks and soils, water, and the gases of the atmosphere. The varied materials have different physical and chemical properties, which make them useful in different ways, for example, as building materials, as sources of fuel, or for growing the plants we use as food. Earth materials provide many of the resources that humans use.

- **Structure of the Earth System (5-8)**
  - The solid earth is layered with a lithosphere; hot, convecting mantle; and dense, metallic core.
  - Lithospheric plates on the scales of continents and oceans constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from these plate motions.
  - Water, which covers the majority of earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle." Water evaporates from the earth's surface, rises and cools as it moves to higher elevations, condenses as rain or snow, and falls to the surface where it collects in lakes, oceans, soil, and in rocks underground.

- **Energy in the Earth System (9-12)**
  - Heating of earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents.

Correlations to National Science Education Standards

Content Standard E | *SCIENCE AND TECHNOLOGY*

- **Understanding about Science and Technology (K-4)**
  - People have always had questions about their world. Science is one way of answering questions and explaining the natural world.
  - People have always had problems and invented tools and techniques (ways of doing something) to solve problems. Trying to determine the effects of solutions helps people avoid some new problems.

- **Understandings about Science and Technology (5-8)**
  - Perfectly designed solutions do not exist. All technological solutions have trade-offs, such as safety, cost, efficiency, and appearance. Engineers often build in back-up systems to provide safety. Risk is part of living in a highly technological world. Reducing risk often results in new technology.

- **Understandings about Science and Technology (9-12)**
  - Science often advances with the introduction of new technologies. Solving technological problems often results in new scientific knowledge. New technologies often extend the current levels of scientific understanding and introduce new areas of research.
  - Creativity, imagination, and a good knowledge base are all required in the work of science and engineering.

Content Standard F | *SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES*

- **Types of Resources (K-4)**
  - Resources are things that we get from the living and nonliving environment to meet the needs and wants of a population.
  - Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are nonmaterial, such as quiet places, beauty, security, and safety.
  - The supply of many resources is limited. If used, resources can be extended through recycling and decreased use.

- **Science and Technology in Local Challenges (K-4)**
  - People continue inventing new ways of doing things, solving problems, and getting work done. New ideas and inventions often affect other people; sometimes the effects are good and sometimes they are bad. It is helpful to try to determine in advance how ideas and inventions will affect other people.
  - Science and technology have greatly improved food quality and quantity, transportation, health, sanitation, and communication. These benefits of science and technology are not available to all of the people in the world.

- **Science and Technology in Society (5-8)**
  - Science influences society through its knowledge and world view. Scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment. The effect of science on society is neither entirely beneficial nor entirely detrimental.
  - Societal challenges often inspire questions for scientific research, and social priorities often influence research priorities through the availability of funding for research.

- **Natural Resources (9-12)**
  - Human populations use resources in the environment in order to maintain and improve their existence. Natural resources have been and will continue to be used to maintain human populations.
  - The earth does not have infinite resources; increasing human consumption places severe stress on the natural processes that renew some resources, and it depletes those resources that cannot be renewed.
  - Humans use natural systems as resources. Natural systems have the capacity to reuse waste, but that capacity is limited. Natural systems can change to an extent that exceeds the limits of organisms to adapt naturally or humans to adapt technologically.

- **Science and Technology in Local, National, and Global Challenges (9-12)**
  - Science and technology are essential social enterprises, but alone they can only indicate what can happen, not what should happen. The latter involves human decisions about the use of knowledge.
  - Progress in science and technology can be affected by social issues and challenges. Funding priorities for specific health problems serve as examples of ways that social issues influence science and technology.

Teacher Guide

Background

Energy Expos is a cooperative learning activity designed to complement The National Energy Education Development (NEED) Project's existing curricula, *Energy Infobooks, Transportation Fuels Infobooks, Monitoring and Mentoring,* and *Learning and Conservin*g. Using information from these resources, students will create exhibits to teach others about their energy topic.

Objectives

Students will work in groups to create and present exhibits on energy sources, saving energy, or transportation fuels.

Students will enhance reading, writing, researching, public speaking, art, technology, and critical thinking skills.

Grade Level

This activity is designed for students in grades 4-12.

Time

4-5 days

Exhibit Topics

Energy Expos are divided into three topics: Energy Sources, Saving Energy, and Transportation Fuels. Use the guide below to determine which exhibits you would like your students to create.

ENERGY SOURCE EXHIBIT	SAVING ENERGY EXHIBIT	TRANSPORTATION FUELS EXHIBIT
Introduction to Energy, page 11	Energy Consumption in the U.S., page 22	Petroleum Fuels—Gasoline and Diesel, page 30
Petroleum, page 12	Why Saving Energy is Important, page 23	Biodiesel, page 31
Natural Gas, page 13	Heating, page 24	Ethanol, page 32
Coal, page 14	Cooling, page 25	Hydrogen, page 33
Propane, page 15	Lighting, page 26	Electricity, page 34
Uranium, page 16	Water Heating, page 27	Hybrid Electric, page 35
Hydropower, page 17	Electrical Devices and Appliances, page 28	Propane, page 36
Biomass, page 18	Taking Care of Trash, page 29	CNG/LNG, page 37
Solar, page 19		
Wind , page 20		
Geothermal, page 21		

Preparation

1. Divide students into groups of 2-4. Assign students to groups based on the energy topics you are focusing on as listed on page 6.
2. Make an informational packet for each exhibit. Put all the materials in a folder and label it with the exhibit's topic. Each folder should include:

	ENERGY SOURCES	SAVING ENERGY	TRANSPORTATION FUELS
Grades 4-5 (one copy per student)	Elementary Energy Infobook	Elementary Energy Infobook Monitoring and Mentoring	Transportation Fuel Factsheet from Elementary Transportation Fuels Infobook
Grades 6-8 (one copy per student)	Intermediate Energy Infobook	Intermediate Energy Infobook Monitoring and Mentoring	Transportation Fuel Factsheet from Transportation Fuels Infobook
Grades 9-12 (one copy per student)	Secondary Energy Infobook	Secondary Energy Infobook Learning and Conserving	Transportation Fuel Factsheet from Transportation Fuels Infobook
All Grades	Student Guides (one copy per student in the group) Any special materials and/or resources you have on the topic/source		

3. Collect supplies and other materials, including the following:
   - one exhibit board for each group (optional);
   - construction paper and posterboard; and
   - colored markers, crayons, paints.

Technology Integration

In addition to, or instead of, having students produce physical exhibits, have students create multimedia presentations using the technology available in your school.

For electronic images from NEED's materials, visit www.NEED.org.

Language Arts Extension

The NEED web site has links to many different energy organizations, including the ones listed on the following pages. These organizations can provide supplemental resource materials on energy or a specific energy source. As a language arts activity, consider having your students write to these organizations for additional information a few weeks before you begin the activity.

Day 1

1. Introduce the activity to the students. Topics to cover in your introduction include:
   - A general overview of the role of energy in our lives and the importance of using many energy sources to meet our energy needs.
   - The concept that all energy sources have advantages and disadvantages.
   - A review of how students should work together in small groups and a timetable for working on the exhibits.
2. Divide the students into their groups and assign their topics. Hand out the folders.
3. Review the Student Guide format and the information in the folders with the students.

   Explain the grading rubric with a total of 40 possible points as follows:

5 = Excellent	Total points 36-40 Excellent (A)
4 = Very Good	Total points 31-35 Very Good (B)
3 = Satisfactory	Total points 24-30 Satisfactory (C)
2 = Fair	Total points 20-23 Fair (D)
1 = Poor	Total points < 20 Poor (F)

4. Have students begin working on their assignments. Have the groups get your approval of the lists and scripts they are to write before they proceed to the next step.

Day 2

1. Monitor group work. Students should complete Steps 2 and 3 and begin working on Step 4 of the Student Guide.
2. Check work product. At the end of the assigned time, check each group's script.
3. Take a few minutes to review the schedule of presentations for Day 4 (or Day 5, if you determine that the students need more time).

Day 3

1. Monitor group work. Students complete Step 4.
2. Check work product. Make sure that students are ready to make presentations on Day 4.

Day 4 (and 5 if necessary)

1. Set up exhibits.
2. Student presentations.
3. Evaluate student performance using the rubric.

Extension/Outreach

1. Invite other classes in to visit your expo or take your expo to other schools.
2. Put on a presentation for the PTA.

Internet Resources

Alliance to Save Energy
www.ase.org

Alternative Fuels Data Center of Department of Energy
www.afdc.energy.gov

American Coal Foundation
www.teachcoal.org

American Electric Power
www.aep.com

American Geological Institute (AGI)
www.agiweb.org

American Solar Energy Society
www.ases.org

American Wind Energy Association
www.awea.org

BP
www.bp.com

Bureau of Ocean Energy Management
http://www.boem.gov

California Energy Commission
Energy Quest
www.energy.ca.gov/index.html

California Energy Commission
www.energy.ca.gov

Columbia Par Car
www.parcar.com

DaimlerChrysler
www.fleet.chrysler.com

Department of Energy
Clean Cities Program
www.energy.gov/clean-cities

Department of Energy
Energy Information Administration
www.eia.gov

Department of Energy
Energy Information Administration, Energy Kids
www.eia.gov/kids

Department of Energy
Hydrogen Fuel Cell Program
www1.eere.energy.gov/hydrogenandfuelcells

Department of Energy
National Renewable Energy Laboratory
www.nrel.gov

Diesel Technology Forum
www.dieselforum.org

Electric Drive Transportation Association
www.electricdrive.org

Energy Efficiency and Renewable Energy
www.eere.energy.gov/

Energy Savers
www.energysavers.gov

ENERGY STAR
www.energystar.gov

Florida Solar Energy Center (FSEC)
http://fsec.ucf.edu

Ford
www.fleet.ford.com

General Motors
www.gmaltfuel.com

Geothermal Education Office
http://geothermal.marin.org

Governors' Biofuels Coalition
www.governorsbiofuelscoalition.org

Griffin Industries
www.biog3000.com

Honda
www.honda.com

Independent Petroleum Association of America
www.ipaa.org

International Research Center for Energy and Economic Development
www.iceed.org

Jefferson County Air Pollution Control District
www.apcd.org

Kentucky Clean Fuels Coalition
www.kentuckycleanfuels.org

Kentucky Division of Energy
www.energy.ky.gov

Kentucky Propane Council
www.kypropane.org

Kentucky Soybean Council
www.kysoy.org

Kentucky Transportation Cabinet
www.transportation.ky.gov

Mineral Information Institute (MII)
www.mii.org

National Biodiesel Board
www.biodiesel.org

National Hydropower Association
www.hydro.org

National Ocean Industries Association
www.noia.org

Northeast Sustainable Energy Association
www.NESEA.org

Nuclear Energy Institute
www.nei.org

Regional Ozone Coalition
www.doyourshare.org

Renewable Fuels Association
www.ethanolrfa.org

Shell Oil Company
www.countonshell.com

Suburban Propane
www.suburbanpropane.com

Toyota
www.toyota.com

Transit Authority of River City
www.ridetarc.org

U.S. Department of Energy
www.doe.gov

U.S. Department of Energy and Environmental Protection Agency Fuel Economy
www.fueleconomy.gov

U.S. Environmental Protection Agency
www.epa.gov

Introduction to Energy
Energy Source Exhibit 1

Step 1: Learn About Energy

1. Read about your topic in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is energy?
- What does energy do?
- What do we use energy for in the United States?
- What energy sources do we use in the United States?
- What do renewable and nonrenewable mean?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display items or pictures that show what energy does—a toy car, a flashlight, a small plant, a calculator, a radio, etc.
- Pour water back and forth between two cups to show renewable energy and have small crackers to eat to show nonrenewable.
- Make posters of the ways we use energy and the energy sources we use.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

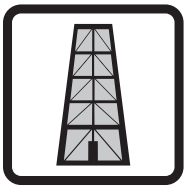
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____



STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Petroleum
Energy Source Exhibit 2

Step 1: Learn About Petroleum

1. Read about petroleum in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How was petroleum formed? Where do we find it?
- Is petroleum renewable or nonrenewable?
- How do we get petroleum? How do we move it?
- How do we use petroleum?
- How does using petroleum affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display things, or pictures of things, that are made with petroleum—plastics, clothes, medicines, etc.
- Make a colorful graph of petroleum uses.
- Make a diagram or model of a drilling rig.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Natural Gas
Energy Source Exhibit 3

Step 1: Learn About Natural Gas

1. Read about natural gas in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How was natural gas formed? Where do we find it?
- Is natural gas renewable or nonrenewable?
- How do we get natural gas? How do we move it?
- How do we use natural gas?
- How does using natural gas affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display pictures of things that use natural gas—stove, furnace, water heater, etc.
- Make a colorful graph of natural gas uses.
- Make a map of where natural gas is found in the United States.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Coal
Energy Source Exhibit 4

Step 1: Learn About Coal

1. Read about coal in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How was coal formed? Where do we find it?
- Is coal renewable or nonrenewable?
- How do we get coal? How do we move it?
- How do we use coal?
- How does using coal affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display pieces of different kinds of coal.
- Make diagrams of underground and surface mines.
- Display pictures of coal miners and machines.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Propane
Energy Source Exhibit 5

Step 1: Learn About Propane

1. Read about propane in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How was propane formed? Where do we find it?
- Is propane renewable or nonrenewable?
- How do we get propane? How do we move it?
- How do we use propane?
- How does using propane affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display pictures of things that use propane—grill, hot air balloon, farm, etc.
- Make two containers that show the volume of propane as a liquid and as a gas.
- Make a list of ways to use propane safely.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Uranium
Energy Source Exhibit 6

Step 1: Learn About Uranium

1. Read about uranium in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is uranium? Where do we find it?
- Is uranium renewable or nonrenewable?
- How do we use uranium?
- What is radiation? How can it help and hurt us?
- How does using uranium in a power plant affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a model of an atom showing protons, neutrons, and electrons.
- Make a diagram showing how we use uranium.
- Take a survey of the parents in the class to see how many think nuclear power is a good way to make the electricity we need. Display a graph of the results.
- Make a map showing where the nuclear power plants are in the U.S. or in your state.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Hydropower
Energy Source Exhibit 7

Step 1: Learn About Hydropower

1. Read about hydropower in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is the water cycle?
- Is hydropower renewable or nonrenewable?
- How do we capture the power in moving water?
- How do we use hydropower?
- How does using hydropower affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a water wheel to show the power in water.
- Make a colorful diagram of the water cycle.
- Make a diagram or model of how a hydropower dam works.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Biomass
Energy Source Exhibit 8

Step 1: Learn About Biomass

1. Read about biomass in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is biomass?
- Is biomass renewable or nonrenewable?
- How do we make biomass?
- How do we use biomass?
- How does using biomass affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display different kinds of biomass—paper, wood, garbage, etc.
- Make a colorful graph of biomass uses.
- Mix some juice and yeast in a ziplock bag to show how biomass can produce a gas.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Solar
Energy Source Exhibit 9

Step 1: Learn About Solar Energy

1. Read about solar energy in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How is solar energy made?
- Is solar energy renewable or nonrenewable?
- How do we harness solar energy?
- What other energy sources depend on solar energy?
- How does using solar energy affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display a solar cell or a solar calculator.
- Make a colorful poster of solar energy uses.
- Make a simple solar oven to show how you can cook with solar energy.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

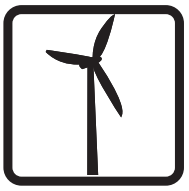
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____



Wind
Energy Source Exhibit 10

Step 1: Learn About Wind Energy

1. Read about wind energy in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How is wind formed?
- Is wind energy renewable or nonrenewable?
- How do we capture the energy in wind?
- How do we use wind energy?
- How does using wind affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display pictures of windmills and wind turbines.
- Make a colorful diagram of how wind is made.
- Make a pinwheel to show how wind energy works.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Geothermal
Energy Source Exhibit 11

Step 1: Learn About Geothermal Energy

1. Read about geothermal energy in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How is geothermal energy made? Where do we find it?
- Is geothermal energy renewable or nonrenewable?
- How do we get geothermal energy?
- How do we use geothermal energy?
- How does using geothermal energy affect the environment?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display pictures of things that show geothermal energy—volcano, Old Faithful, hot springs, etc.
- Make a display of the Earth out of clay, showing the Earth's layers.
- Make a diagram of how a geothermal power plant or heat pump works.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Energy Consumption in the U.S.
Saving Energy Exhibit 1

Step 1: Learn About Energy Consumption

1. Read about energy consumption in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How much energy do we use in the U.S.?
- How does energy consumption in the U.S. compare to that of other countries?
- What are the sectors of the economy and how much energy do they use?
- What are the main tasks for which we use energy?
- What are the advantages of U.S. energy consumption?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make graphs of U.S. population and U.S. energy consumption.
- Make a poster explaining the sectors of the economy and how they use energy.
- Display objects that use energy even when they are turned off.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Why Saving Energy is Important
Saving Energy Exhibit 2

Step 1: Learn About Saving Energy

1. Read about saving energy in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How much of each energy source does the U.S. use?
- What is the percentage of renewable and nonrenewable energy use?
- What are the environmental impacts of U.S. energy consumption?
- What are the economic impacts of U.S. energy consumption?
- Why is it important for the U.S. to conserve energy?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a diagram of how much of each energy source we use.
- Display utility bills for electricity and natural gas.
- Draw a map showing possible impacts of global warming on low lying areas.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

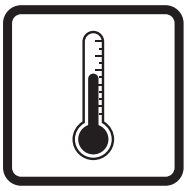
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____



Heating
Saving Energy Exhibit 3

Step 1: Learn About Heating

1. Read about heating in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- Why do we heat buildings and to what temperatures should we heat them?
- What devices do we use to heat buildings and what fuels do they use?
- How much energy does heating buildings consume?
- How is energy wasted when heating buildings?
- How can we conserve energy when heating buildings?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display different types of insulation.
- Display caulking and weatherstripping.
- Make a poster showing where heat escapes in the typical house.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

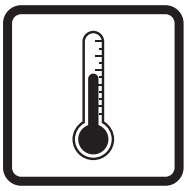
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____



Cooling
Saving Energy Exhibit 4

Step 1: Learn About Cooling

1. Read about cooling in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- Why do we cool buildings and to what temperatures should we cool them?
- What devices do we use to cool buildings and how are they powered?
- How much energy does cooling buildings consume?
- How is energy wasted when cooling buildings?
- How can we conserve energy when cooling buildings?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display a programmable thermostat and explain how it can save energy.
- Demonstrate how a fan can make people feel cooler.
- Display pictures of other alternatives to air conditioners.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Lighting
Saving Energy Exhibit 5

Step 1: Learn About Lighting

1. Read about lighting in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- Why is lighting important?
- What types of lighting are used in homes and schools?
- What is the energy consumption of different lights?
- How much light is needed for different tasks—reading, television, security?
- How can we reduce the energy used to light homes and schools?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Compare life cycle costs of incandescent and fluorescent and LED lights.
- Display the optimum light levels for different tasks.
- Demonstrate the use of daylight to reduce artificial lighting use.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Water Heating
Saving Energy Exhibit 6

Step 1: Learn About Water Heating

1. Read about water heating in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- Why is hot water important?
- What methods and energy sources do we use to heat water?
- How hot should water be to perform different tasks?
- How do we waste hot water?
- How can we save energy when heating water?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing important uses of hot water.
- Make a chart showing the optimum temperature for different tasks that need hot water.
- Make a hot water DO and DON'T chart.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

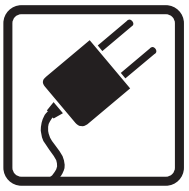
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____



STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Electrical Devices and Appliances

Saving Energy Exhibit 7

Step 1: Learn About Electrical Devices and Appliances

1. Read about electrical devices and appliances in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What energy sources generate electricity in the U.S.?
- Why is electricity important to the U.S. economy and individuals?
- How is electricity measured and how much does it cost?
- How do electrical devices and appliances waste energy?
- How can we save energy when using electrical devices and appliances?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a diagram showing how electricity is generated.
- Display devices that use energy even when they are turned off.
- Make a display showing how to read EnergyGuide Labels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Take Care of Trash
Saving Energy Exhibit 8

Step 1: Learn About Trash and Energy

1. Read about trash and energy in your *Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- How is trash part of the energy picture?
- How much trash does the typical American generate compared to people in other countries?
- How do we dispose of our trash in the U.S.?
- How is energy wasted in trash disposal?
- How can we save energy when disposing of our trash?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Display different kinds of trash and explain it's energy content.
- Make a poster showing how reducing, reusing, repairing, and recycling can save energy.
- Show how landfills can produce methane gas for energy use.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

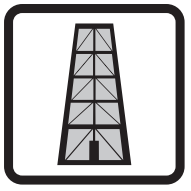
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____



STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Petroleum Fuels—Gasoline and Diesel

Transportation Fuels Exhibit 1

Step 1: Learn About Petroleum Fuels

1. Read about petroleum fuels in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What are gasoline and diesel?
- How are gasoline and diesel produced and distributed?
- What are some vehicles that use gasoline and diesel?
- What are the environmental impacts of gasoline and diesel?
- What is the economic impact of gasoline and diesel?
- What challenges are there when considering the use of other fuels?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing how petroleum fuels are produced.
- Display a chart showing advantages and disadvantages of gasoline and diesel.
- Show pictures/models of vehicles that use gasoline and diesel.
- Draw a diagram comparing petroleum fuels to other fuels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Biodiesel
Transportation Fuels Exhibit 2

Step 1: Learn About Biodiesel

1. Read about biodiesel in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is biodiesel?
- How is biodiesel produced and distributed?
- What are some vehicles that use biodiesel?
- What is the environmental impact of biodiesel?
- What is the economic impact of biodiesel?
- What are the challenges to widespread use?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing how biodiesel is produced.
- Display a chart showing advantages and disadvantages biodiesel.
- Show pictures/models of vehicles that use biodiesel.
- Draw a diagram comparing biodiesel to other fuels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Ethanol
Transportation Fuels Exhibit 3

Step 1: Learn About Ethanol

1. Read about ethanol in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is ethanol?
- How is ethanol produced and distributed? What is the difference between E10 and E85?
- What vehicles use ethanol (E85)?
- What are the environmental impacts of ethanol?
- What are the economic impacts of ethanol?
- What are the challenges to widespread use?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing how ethanol is produced.
- Display a chart showing the advantages and disadvantages of using ethanol.
- Show pictures/models of vehicles that use ethanol (E85).
- Draw a diagram comparing ethanol to other fuels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Hydrogen
Transportation Fuels Exhibit 4

Step 1: Learn About Hydrogen

1. Read about hydrogen in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is hydrogen?
- How is hydrogen produced and distributed?
- What vehicles use hydrogen?
- What are the environmental impacts of hydrogen?
- What is the economic impact of hydrogen?
- What are the challenges to widespread use?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing how hydrogen is produced.
- Display a chart showing the advantages and disadvantages of using hydrogen.
- Show pictures/models of vehicles that use hydrogen.
- Draw a diagram comparing hydrogen to other fuels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

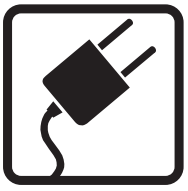
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____



Electricity
Transportation Fuels Exhibit 5

Step 1: Learn About Electricity

1. Read about electric vehicles in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is electricity?
- How is electricity produced and distributed?
- What vehicles use electricity?
- What are the environmental impacts of electricity fueled vehicles?
- What is the economic impact of electricity fueled vehicles?
- What are challenges to widespread use?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing how electricity is produced.
- Display a chart showing advantages and disadvantages of electricity fueled vehicles.
- Find pictures/models of vehicles that use electricity.
- Draw a diagram comparing electricity to other fuels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Hybrid Electric
Transportation Fuels Exhibit 6

Step 1: Learn About Hybrid Electric Vehicles

1. Read about hybrid electric vehicles in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*
2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*
   - What are hybrid electric vehicles?
   - How is fuel produced and distributed?
   - What vehicles are hybrid electric?
   - What are the environmental impacts of hybrid electric vehicles?
   - What is the economic impact of hybrid electric fuels?
   - What are challenges to widespread use?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*
   - Make a poster showing how hybrid electric vehicles use both gasoline and electricity.
   - Display a chart showing the advantages and disadvantages of hybrid electric vehicles.
   - Find pictures/models of hybrid electric vehicles.
   - Draw a graph comparing the number of hybrid electric vehicles on the road to other vehicles.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*
   - Who will write the script?
   - Who will make the displays?
   - Who will collect the materials we need?
   - Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*
2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*
3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Propane
Transportation Fuels Exhibit 7

Step 1: Learn About Propane

1. Read about propane in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What is propane?
- How is propane produced and distributed?
- What vehicles use propane?
- What are the environmental impacts of propane?
- What is the economic impact of propane?
- What are challenges to widespread use?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing how propane is produced.
- Display a chart showing advantages and disadvantages of using propane.
- Find pictures/models of vehicles that use propane.
- Draw a diagram comparing propane to other fuels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Compressed and Liquefied Natural Gas
Transportation Fuels Exhibit 8

Step 1: Learn About Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG)

1. Read about CNG and LNG in your *Transportation Fuels Infobook* and in your other materials. Underline the main ideas. Put a star (*) by the most important facts. *1-5 points*

2. As a group, make a list of the facts you want to teach others. Make sure you answer these questions: *1-5 points*

- What are CNG and LNG?
- How are CNG and LNG produced and distributed?
- What vehicles use CNG and LNG?
- What are the environmental impacts of CNG and LNG?
- What is the economic impact of CNG and LNG?
- What are challenges to widespread use?

Step 2: Plan Your Exhibit

1. As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions: *1-5 points*

- Make a poster showing how CNG and LNG are produced.
- Display a chart showing advantages and disadvantages of CNG and LNG.
- Find pictures/models of vehicles that use CNG and LNG.
- Draw a diagram comparing CNG and LNG to other fuels.

Step 3: Use Your Talent

1. As a group, decide who will do which jobs. Write down the name of each person in the group. Next to each name, write the person's jobs. You can have more than one person helping on each job. *1-5 points*

- Who will write the script?
- Who will make the displays?
- Who will collect the materials we need?
- Who will learn the script and teach others?

Step 4: Create Your Exhibit and Write Your Script

1. Write a two minute script using the list of important facts. *1-5 points*

2. Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information. *1-5 points*

3. Practice the script so that you do not have to read it. Use note cards with the important facts listed on them. *1-5 points*

Step 5: Teach Others

1. Give a presentation of your exhibit to others. *1-5 points*

Total Points: _____

Energy Expos
Evaluation Form

State: _____ **Grade Level:** _____ **Number of Students:** _____

1. Did you conduct the entire unit?	❑ Yes	❑ No
2. Were the instructions clear and easy to follow?	❑ Yes	❑ No
3. Did the activities meet your academic objectives?	❑ Yes	❑ No
4. Were the activities age appropriate?	❑ Yes	❑ No
5. Were the allotted times sufficient to conduct the activities?	❑ Yes	❑ No
6. Were the activities easy to use?	❑ Yes	❑ No
7. Was the preparation required acceptable for the activities?	❑ Yes	❑ No
8. Were the students interested and motivated?	❑ Yes	❑ No
9. Was the energy knowledge content age appropriate?	❑ Yes	❑ No
10. Would you teach this unit again?	❑ Yes	❑ No

Please explain any 'no' statement below

How would you rate the unit overall?	❑ excellent	❑ good	❑ fair	❑ poor
How would your students rate the unit overall?	❑ excellent	❑ good	❑ fair	❑ poor

What would make the unit more useful to you?

Other Comments:

Please fax or mail to: **The NEED Project**
P.O. Box 10101
Manassas, VA 20108
FAX: 1-800-847-1820

NEED National Sponsors and Partners

American Association of Blacks in Energy
American Chemistry Council
American Electric Power
American Electric Power Foundation
American Solar Energy Society
American Wind Energy Association
Appalachian Regional Commission
Areva
Arkansas Energy Office
Armstrong Energy Corporation
Association of Desk & Derrick Clubs
Robert L. Bayless, Producer, LLC
BP
BP Alaska
C&E Operators
Cape and Islands Self Reliance
Cape Cod Cooperative Extension
Cape Light Compact–Massachusetts
L.J. and Wilma Carr
Central Virginia Community College
Chevron
Chevron Energy Solutions
ComEd
ConEdison Solutions
ConocoPhillips
Council on Foreign Relations
CPS Energy
Dart Foundation
David Petroleum Corporation
Desk and Derrick of Roswell, NM
Dominion
Dominion Foundation
DTE Energy Foundation
Duke Energy
East Kentucky Power
El Paso Foundation
E.M.G. Oil Properties
Encana
Encana Cares Foundation
Energy Education for Michigan
Energy Training Solutions
Energy Solutions Foundation
Entergy
Equitable Resources
First Roswell Company
Foundation for Environmental Education
FPL
The Franklin Institute
GenOn Energy–California
Georgia Environmental Facilities Authority
Government of Thailand–Energy Ministry
Guam Energy Office
Gulf Power
Halliburton Foundation
Hawaii Energy
Gerald Harrington, Geologist
Houston Museum of Natural Science
Hydro Research Foundation
Idaho Department of Education
Idaho National Laboratory
Illinois Clean Energy Community Foundation
Independent Petroleum Association of America
Independent Petroleum Association of New Mexico
Indiana Michigan Power
Interstate Renewable Energy Council
iStem–Idaho STEM Education
Kansas City Power and Light
KBR
Kentucky Clean Fuels Coalition
Kentucky Department of Education
Kentucky Department of Energy Development and Independence
Kentucky Oil and Gas Association
Kentucky Propane Education and Research Council
Kentucky River Properties LLC
Kentucky Utilities Company
Lenfest Foundation
Littler Mendelson
Llano Land and Exploration
Los Alamos National Laboratory
Louisville Gas and Electric Company
Maine Energy Education Project
Maine Public Service Company
Marianas Islands Energy Office
Massachusetts Division of Energy Resources
Lee Matherne Family Foundation
Michigan Oil and Gas Producers Education Foundation
Midwest Energy Cooperative
Mississippi Development Authority–Energy Division
Montana Energy Education Council
The Mosaic Company
NADA Scientific
NASA
National Association of State Energy Officials
National Fuel
National Grid
National Hydropower Association
National Ocean Industries Association
National Renewable Energy Laboratory
Nebraska Public Power District
New Mexico Oil Corporation
New Mexico Landman's Association
New Orleans Solar Schools Initiative
New York Power Authority
NSTAR
OCI Enterprises
Offshore Energy Center
Offshore Technology Conference
Ohio Energy Project
Pacific Gas and Electric Company
PECO
Petroleum Equipment Suppliers Association
Phillips 66
PNM
Puerto Rico Energy Affairs Administration
Puget Sound Energy
Rhode Island Office of Energy Resources
RiverWorks Discovery
Roswell Climate Change Committee
Roswell Geological Society
Sacramento Municipal Utility District
Saudi Aramco
Schneider Electric
Science Museum of Virginia
C.T. Seaver Trust
Shell
Snohomish County Public Utility District–WA
Society of Petroleum Engineers
SolarWorld USA
David Sorenson
Southern Company
Southern LNG
Southwest Gas
Space Sciences Laboratory–University of California Berkeley
Tennessee Department of Economic and Community Development–Energy Division
Tennessee Valley Authority
Toyota
TXU Energy
United States Energy Association
University of Nevada–Las Vegas, NV
U.S. Department of Energy
U.S. Department of Energy–Hydrogen Program
U.S. Department of Energy–Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy–Office of Fossil Energy
U.S. Department of Energy–Wind for Schools
U.S. Department of Energy–Wind Powering America
U.S. Department of the Interior–Bureau of Land Management
U.S. Department of the Interior–Bureau of Ocean Energy Management, Regulation and Enforcement
U.S. Energy Information Administration
U.S. Environmental Protection Agency
Van Ness Feldman
Virgin Islands Energy Office
Virginia Department of Education
Virginia Department of Mines, Minerals and Energy
Walmart Foundation
Washington and Lee University
Western Kentucky Science Alliance
W. Plack Carr Company
Yates Petroleum Corporation