

ENERGY

SOURCE EXPO

Students work in groups to create hands-on exhibits about the energy sources that power the nation, then use these exhibits to teach others.



ENERGY
SOURCES

GRADE LEVEL

3-12

SUBJECT AREAS

Science

Social Studies

Language Arts

Technology



NEED

2008-2009

Putting Energy into Education

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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 Vision Statement

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

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Correlations to National Science Content Standards

(Bolded standards are emphasized in the unit.)

PRIMARY (K-4) CONTENT STANDARD–F: SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

3. Types of Resources

- a. Resources are things that we get from the living and nonliving environment to meet the needs and wants of a population.
- b. 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.
- c. The supply of many resources is limited. If used, resources can be extended through recycling and decreased use.

4. Changes in Environments

- b. Changes in environments can be natural or influenced by humans. Some changes are good, some are bad, and some are neither good nor bad.**
- c. Pollution is a change in the environment that can influence the health, survival, or activities of organisms, including humans.**

INTERMEDIATE (5-8) CONTENT STANDARD–B: PHYSICAL SCIENCE

3. Transfer of Energy

- a. Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical.
- b. Energy is transferred in many ways.**
- e. Electrical circuits provide a means of transferring electrical energy.**
- f. In most chemical and nuclear reactions, energy is transferred into or out of a system. Heat, light, mechanical motion, or electricity might all be involved in such transfers.**
- g. The sun is the 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 earth, transferring energy from the sun to the earth. The sun's energy arrives as light with a range of wavelengths.

INTERMEDIATE (5-8) CONTENT STANDARD–D: EARTH AND SPACE SCIENCE

1. Structure of the Earth System

- a. The solid earth is layered with a lithosphere; hot, convecting mantle; and dense, metallic core.**
- b. Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the water cycle.**

3. Earth in the Solar System

- a. Gravity governs the motion in the solar system. Gravity explains the phenomenon of the tides.**
- b. The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle.

INTERMEDIATE (5-8) CONTENT STANDARD–E: SCIENCE AND TECHNOLOGY

2. Understandings about Science and Technology

- c. Technological solutions are temporary and have side effects. Technologies cost, carry risks, and have benefits.**
- d. Many different people in different cultures have made and continue to make contributions to science and technology.**

- f. **Perfectly designed solutions do not exist. All technological solutions have trade-offs, such as safety, cost, efficiency, and appearance. Risk is part of living in a highly technological world. Reducing risk often results in new technology.**

INTERMEDIATE (5-8) CONTENT STANDARD-F: SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

3. Natural Hazards

- b. **Human activities can induce hazards through resource acquisition, urban growth, land-use decisions, and waste disposal.**

SECONDARY (9-12) CONTENT STANDARD-B: PHYSICAL SCIENCE

1. Structure of Atoms

- f. **Fission is the splitting of a large nucleus into smaller pieces.**

SECONDARY (9-12) CONTENT STANDARD-D: EARTH AND SPACE SCIENCE

1. Energy in the Earth System

- a. **Earth systems have internal and external sources of energy, both of which create heat. The sun is the major external source of energy. Two primary sources of internal energy are the decay of radioactive isotopes and the gravitational energy from the earth's original formation.**
- b. **The outward transfer of earth's internal heat drives convection circulation in the mantle.**
- c. **Heating of earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents.**
- d. **Global climate is determined by energy transfer from the sun at and near the earth's surface.**

SECONDARY (9-12) CONTENT STANDARD-F: SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES

3. Natural Resources

- a. **Human populations use resources in the environment to maintain and improve their existence.**
- b. **The earth does not have infinite resources; increasing human consumption places severe stress on the natural processes that renew some resources, and depletes those resources that cannot be renewed.**
- c. **Humans use many 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.**

4. Environmental Quality

- a. **Natural ecosystems provide an array of basic processes that affect humans. Those processes include maintenance of the quality of the atmosphere, generation of soils, control of the hydrologic cycle, disposal of wastes, and recycling of nutrients. Humans are changing many of these basic processes, and the changes may be detrimental to humans.**

Introduction

INCLUDED IN THIS BOOKLET

- Correlations to the National Science Education Content Standards
- Teacher Guide with Resource List
- Student Guides for each Exhibit

OBJECTIVES

Students will work in groups to create and present exhibits on the major energy sources.

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

TECHNOLOGY CONNECTION

In addition to, or instead of having students work in groups to make exhibits, have the groups use the exhibit guides to make computer-generated multimedia slide shows on their topics.

EXHIBIT TOPICS

Exhibit 1—Introduction to the Energy Sources

Exhibit 2—Petroleum

Exhibit 3—Natural Gas

Exhibit 4—Coal

Exhibit 5—Propane

Exhibit 6—Uranium

Exhibit 7—Hydropower

Exhibit 8—Biomass

Exhibit 9—Solar

Exhibit 10—Wind

Exhibit 11—Geothermal

GRADE LEVEL

This activity is designed for students in grades 3–12.

TIME NEEDED

Students can complete this activity in four-five days (one 45-minute period per day for four/five days.)

MATERIALS NEEDED

Class set of Energy Infobooks—Elementary (2–4), Intermediate (5–8), or Secondary (7–12), depending on the reading level of students.

Other resources and materials for creating the exhibits.

Teacher Guide

ASSIGN STUDENTS TO GROUPS

Divide students into eleven groups. (This allows two/three students per group. If you would like more students per group, divide the students into six groups and have one group do the introduction and the five other groups do one renewable and one nonrenewable source. Or involve another class in preparing half of the exhibits.) Assign the groups topics listed on page 6.

MAKE EXHIBIT FOLDERS

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 Infobooks (one copy per student)
- Student Exhibit Guides (one copy per student in the group)
- Any special materials and/or resources you have on the topic/source

COLLECT SUPPLIES AND OTHER MATERIALS

- one exhibit board for each group (optional)
- construction paper and posterboard
- colored markers, crayons, paints

LESSON PLAN FOR 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.

Teacher Guide

LESSON PLAN FOR 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).

LESSON PLAN FOR 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.

LESSON PLAN FOR 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.

RESOURCES & LANGUAGE ARTS CONNECTIONS

For graphics and other materials to use as resources for this activity, look on NEED's website (www.NEED.org) and in the following NEED booklets: *Transparent Energy*, *Primary Stories and More*, and *Exploring Energy*.

The NEED website has links to many different energy organizations, including the ones listed on the next page. 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.

Resource List

National Energy Information Center, EI-30
Energy Information Administration
1000 Independence Avenue, S. W.
Washington, DC 20585
(202) 586-8800
E-Mail: infoctr@eia.doe.gov
Web: www.eia.doe.gov
Web: www.eia.doe.gov/kids

American Coal Foundation
1130 17th Street, N.W., Suite 220
Washington, DC 20036-4604
(202) 466-8630
Fax: (202) 466-8632
E-Mail: acf-coal@mindspring.com
Web: www.teachcoal.org

American Electric Power
Corporate Communications Programs
1 Riverside Plaza
Columbus, OH 43215
(614) 223-1653
Fax: (614) 223-1682
E-Mail: blschumann@aep.com
Web: www.aep.com

American Geological Institute (AGI)
4220 King Street
Alexandria, VA 22302-1502
(703) 379-2480
Fax: (703) 379-7563
E-Mail: ehr@agiweb.org
Web: www.agiweb.org

American Solar Energy Society
2400 Central Avenue, Suite G-1
Boulder, CO 80301
(303) 443-3130
Fax: (303) 443-3212
E-Mail: ases@ases.org
Web: www.ases.org/solar

American Wind Energy Association
122 C Street, NW, Suite 380
Washington, DC 20001
(202) 383-2500
Fax: (202) 383-2505
E-Mail: windmail@awea.org
Web: www.awea.org

BP
Community Relations
28100 Torch Parkway
Warrenville, IL 60555
(630) 420-5111
Web: www.bpamoco.com

California Energy Commission
1516 9th Street, MS-29
Sacramento, CA 95814
(916) 654-4989
Fax: (916) 654-4420
E-Mail: cecetec@energy.ca.gov
Web: www.energy.ca.gov/education (Energy Quest)

Center for Energy and Economic Development
1800 Diagonal Road, Suite 370
Alexandria, VA 22314
(703) 684-6292
Fax: (703) 684-6297
E-Mail: info@ceednet.org
Web: www.ceednet.org

Florida Solar Energy Center (FSEC)
1679 Clearlake Road
Cocoa, FL 32922-5703
(407) 638-1000
Fax: (407) 638-1010
Web: <http://fsec.ucf.edu>

Geothermal Education Office
664 Hilary Drive
Tiburon, CA 94920
1-(800) 866-4436
(415) 435-4574
Fax: (415) 435-7737
E-Mail: geo@marin.org
Web: <http://geothermal.marin.org>

Independent Petroleum Association of America
Information Services Department
1101 16th Street, N.W.
Washington, DC 20036
(202) 857-4722
Fax: (202) 857-4799
E-Mail: treardon@ipaa.org
Web: www.ipaa.org

Mineral Information Institute (MII)
475 17th Street, Suite 510
Denver, CO 80202
(303) 297-3226
Fax: (303) 295-6463
Web: www.mii.org

National Hydropower Association
One Massachusetts Avenue, NW, Suite 850
Washington, DC 20001
(202) 642-1700
Fax: (202) 682-9478
E-Mail: hydroinfo@hydro.org
Web: www.hydro.org

Nuclear Energy Institute
1776 I Street, NW, Suite 400
Washington, DC 20006-3708
(202) 739-8000
Fax: (202) 785-4019
E-Mail: publications@nei.org
Web: www.nei.org

Renewable Fuels Association
One Massachusetts Avenue, NW, Suite 820
Washington, DC 20001
(202) 289-3835
Fax: (202) 289-7519
E-Mail: etohrfa@erols.com
Web: www.ethanolrfa.org

Shell Oil Company
Corporate Communications
P.O. Box 2463
Houston, TX 77252-2463
(713) 241-6161
Fax: (713) 241-6988
Web: www.countonshell.com

U.S. Department of Energy
National Renewable Energy Laboratory
Education Programs
1617 Cole Boulevard, MS 1713
Golden, CO 80401
(303) 275-3044
Fax: (303) 275-3076
Web: www.nrel.gov
Web: www.nrel.gov/business/education.html

U.S. Department of the Interior
Minerals Management Service (MMS)
Office of Communications
1849 C Street, NW
Washington, DC 20240
(202) 208-3985
Fax: (202) 208-3968 or (202) 208-3918
Web: www.mms.gov
Web: www.mms.gov/mmskids

National Ocean Industries Association
1120 G Street, Suite 900, NW
Washington, DC. 20005
(202) 347-6900
E-mail: laura@noia.org
Web: www.noia.org

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 1—Introduction to Energy

STEP 1—LEARN ABOUT ENERGY.

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

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

- [1-5 pts] 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.
- Who will write the script?
 - Who will make the displays?
 - Who will collect the materials we need?
 - Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 2—Petroleum

STEP 1—LEARN ABOUT PETROLEUM.

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

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

- [1-5 pts] 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.
- Who will write the script?
Who will make the displays?
Who will collect the materials we need?
Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 3—Natural Gas

STEP 1—LEARN ABOUT NATURAL GAS.

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

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

- [1-5 pts] 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.
- Who will write the script?
 - Who will make the displays?
 - Who will collect the materials we need?
 - Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 4—Coal

STEP 1—LEARN ABOUT COAL.

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

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

- [1-5 pts] 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.
- Who will write the script?
 - Who will make the displays?
 - Who will collect the materials we need?
 - Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 5—Propane

STEP 1—LEARN ABOUT PROPANE.

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

- [1-5 pts] As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions:
- 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 gas.
Make a list of ways to use propane safely.

STEP 3—USE YOUR TALENT.

- [1-5 pts] 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.
- Who will write the script?
Who will make the displays?
Who will collect the materials we need?
Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 6—Uranium

STEP 1—LEARN ABOUT URANIUM.

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

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

- [1-5 pts] 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.
- Who will write the script?
Who will make the displays?
Who will collect the materials we need?
Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 7—Hydropower

STEP 1—LEARN ABOUT HYDROPOWER.

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

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

- [1-5 pts] 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.
- Who will write the script?
 - Who will make the displays?
 - Who will collect the materials we need?
 - Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 8—Biomass

STEP 1—LEARN ABOUT BIOMASS.

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

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

- [1-5 pts] 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.
- Who will write the script?
Who will make the displays?
Who will collect the materials we need?
Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 9—Solar

STEP 1—LEARN ABOUT SOLAR ENERGY.

- [1-5 pts] 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 pts] As a group, make a list of the facts you want to teach others. Make sure you answer these questions:
- How is solar energy made?
 - Is solar energy renewable or nonrenewable?
 - How do we harness solar energy?
 - How do we use solar energy?
 - What other energy sources depend on solar energy?
 - How does using solar energy affect the environment?

STEP 2—PLAN YOUR EXHIBIT.

- [1-5 pts] As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions:
- Display a solar cell or a solar calculator.
 - Make a colorful graph of solar energy uses.
 - Make a simple solar oven to show how you can cook with solar energy.

STEP 3—USE YOUR TALENT.

- [1-5 pts] 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.
- Who will write the script?
 - Who will make the displays?
 - Who will collect the materials we need?
 - Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 10—Wind

STEP 1—LEARN ABOUT WIND.

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

- [1-5 pts] As a group, make a list of the displays you can use to make your exhibit interesting. Here are some suggestions:
- Display pictures of wind mills.
 - Make a colorful diagram of how wind is made.
 - Make a pin wheel to show how wind energy works.

STEP 3—USE YOUR TALENT.

- [1-5 pts] 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.
- Who will write the script?
 - Who will make the displays?
 - Who will collect the materials we need?
 - Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING AN ENERGY EXHIBIT

Exhibit 11—Geothermal

STEP 1—LEARN ABOUT GEOTHERMAL ENERGY.

- [1-5 pts] Read about geothermal in your infobook and in your other materials. Underline the main ideas. Put a star (*) by the most important facts.
- [1-5 pts] As a group, make a list of the facts you want to teach others. Make sure you answer these questions:
- 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.

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

- [1-5 pts] 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.
- Who will write the script?
Who will make the displays?
Who will collect the materials we need?
Who will learn the script and teach the others?

STEP 4—CREATE YOUR EXHIBIT AND WRITE YOUR SCRIPT.

- [1-5 pts] Write a two minute script using the list of important facts.
- [1-5 pts] Create an interesting display with posters and hands-on materials. Make sure the display and the script cover the same information.
- [1-5 pts] Practice the script so that you don't have to read it. Use notecards with the important facts listed on them.

STEP 5—TEACH OTHERS!

- [1-5 pts] Give a presentation of your exhibit to others.

Total Points _____

STUDENT GUIDE TO CREATING A MULTIMEDIA PRESENTATION

STEP 1—LEARN ABOUT YOUR TOPIC.

- [1-5 pts] 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 pts] As a group, make a list of the facts you want to include in your presentation.

STEP 2—PLAN YOUR PRESENTATION.

- [1-10 pts] As a group, look at your facts and group them into five related categories, such as:
- Introduction & Formation
 - Exploration & Development
 - Distribution
 - Uses
 - Economic & Environmental Impacts

STEP 3—USE YOUR TALENT AND ORGANIZATIONAL SKILLS.

- [1-10 pts] 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.
- Who will write the text?
 - Who will find/make the graphics?
 - Who will design the presentation?
 - Who will edit and revise the presentation?
 - Who will make the presentation to the class?

STEP 4—CREATE YOUR PRESENTATION.

- [1-15 pts] Create five slides with original and creative use of:
- | | |
|----------|-----------------------------------|
| Headings | Bullets with details and examples |
| Font | Color |
| Buttons | Sound |
| Graphics | Animation |

STEP 5—EDIT AND REVISE YOUR PRESENTATION.

- [1-10 pts] Check all of the facts for accuracy. Make sure you included all of the important facts.
- [1-5 pts] Check grammar and spelling.
- [1-5 pts] Practice your presentation.

STEP 6—TEACH OTHERS.

- [1-10 pts] Make your presentation to the class.

Total Points _____

MULTIMEDIA PROJECT RUBRIC

CATEGORY	4	3	2	1
<p>CONTENT [20 points]</p>	<p>Presentation covers the topic in-depth with many details and examples. Subject knowledge is excellent.</p>	<p>Presentation includes essential information about the topic. Subject knowledge appears to be good.</p>	<p>Presentation includes essential information about the topic, but there are 1-2 factual errors.</p>	<p>Presentation includes minimal information about the topic, or there are several factual errors.</p>
<p>REQUIREMENTS [20 points]</p>	<p>All requirements are met and exceeded. Five slides with graphics, buttons, animation, and sound.</p>	<p>All requirements are met. Five slides with graphics and buttons.</p>	<p>One requirement was not completely met.</p>	<p>More than one requirement was not completely met.</p>
<p>ORGANIZATION [15 points]</p>	<p>Content is very well organized using headings or bulleted lists of related information.</p>	<p>Content includes headings or bulleted lists, but the overall organization of information is flawed.</p>	<p>Content is logically organized for the most part.</p>	<p>There is no clear or logical organizational structure, just a compilation of facts.</p>
<p>ATTRACTIVENESS [5 points]</p>	<p>Presentation makes excellent use of fonts, color, graphics, and special effects.</p>	<p>Presentation makes good use of fonts, color, graphics, and special effects.</p>	<p>Presentation makes some use of fonts, color, graphics, and special effects.</p>	<p>Presentation makes use of fonts, color, and graphics, but they detract from product.</p>
<p>ORIGINALITY [5 points]</p>	<p>Presentation shows much original thought. Ideas are creative and inventive.</p>	<p>Presentation shows some original thought. Work shows new ideas and insights.</p>	<p>Presentation uses ideas of others with credit, but there is little evidence of original thinking.</p>	<p>Presentation uses other people's ideas, but does not give them credit.</p>
<p>WORKLOAD [10 points]</p>	<p>The workload is divided and shared equally by all team members.</p>	<p>The workload is divided and shared fairly equally by all team members, though workloads may vary.</p>	<p>The workload is divided, but one person in the group is viewed as not doing fair share of the work.</p>	<p>The workload is not divided, or several in the group are viewed as not doing fair share of the work.</p>

ENERGY EXPO

Evaluation Form

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

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

How would you rate the activity overall (excellent, good, fair, poor)?

How would your students rate the activity overall (excellent, good, fair, poor)?

What would make the activity more useful to you?

Other Comments:

Please fax or mail to:
NEED Project
PO Box 10101
Manassas, VA 20108
FAX: 1-800-847-1820

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Energy Training Solutions		
Equitable Resources		
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