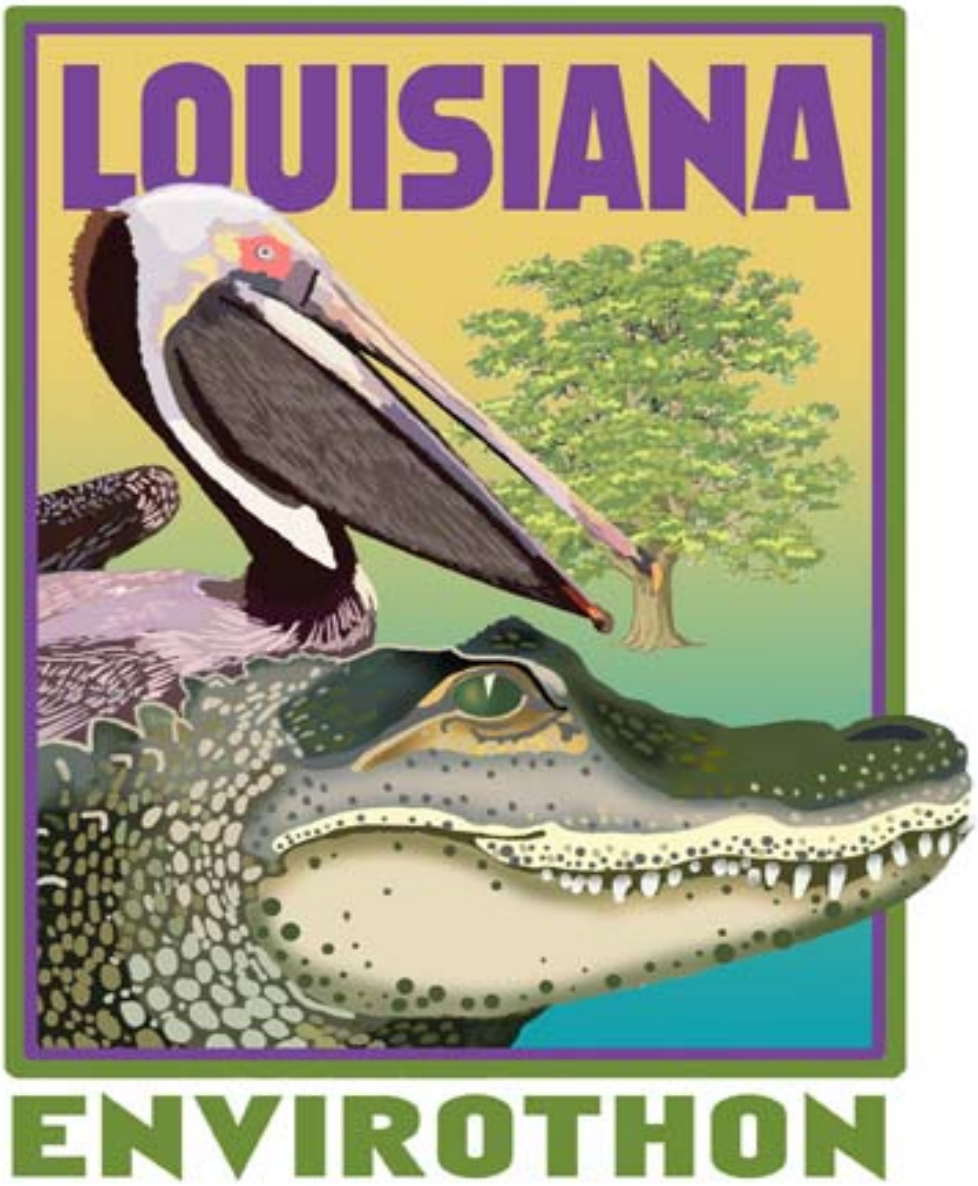

2007 Advisors' Handbook

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Introduction

Envirothon Philosophy

The goal of environmental education is the development of knowledgeable, skilled and dedicated citizens who are willing to work toward achieving and maintaining a natural balance between quality of life and the quality of the environment. ALCOA Foundation, The Louisiana Environmental Education Commission, the Governor's Office of Environmental Education and other partners are promoting environmental education through the Louisiana Envirothon. The Louisiana Envirothon works in partnership with resource management professionals and the general public to promote and strengthen the goal of environmental education.

The Louisiana Envirothon

The Louisiana Envirothon is a multidisciplinary, environmental problem-solving competition for students in grades 6 through 12. Teams will be comprised of students from the same school or associated with an organized group (i.e. FFA, 4-H, home-school groups, conservation districts, etc.). Participating teams (five students) train and compete in five natural resource areas: soils, aquatic resources, forestry, wildlife, and a current environmental issue. There is also an oral presentation component of the competition, in which teams present a solution to an environmental problem related to the current issue. Throughout the competition students learn in a real-life context the complexities of solving environmental problems while working as a team and having fun.

The Louisiana Envirothon will be held at the Model Sustainable Agriculture Center (MSAC) of the University of Louisiana at Lafayette on May 5, 2007. The MSAC is located at the Cade Farm facility on 1234 W. J. Bernard Road in St. Martinville, Louisiana.

The team of 9th -12th grade students with the highest overall score will travel to the Canon Envirothon competition this summer to represent Louisiana. The Environmental Education Commission will pay the team's expenses to the Canon Envirothon Competition. Information on the Canon Envirothon Competition can be found at www.envirothon.org.

Advisors

Volunteer Advisors are responsible for directing local Envirothon groups/teams. Their duties include promoting the Envirothon program, recruiting students to participate, and arranging/providing the learning activities, curricula, and anything else necessary to prepare his/her group for competition.

Many resources are available to assist an advisor with his/her responsibilities and can be obtained from the Louisiana Envirothon Committee.

Goals and Objectives

Goal 1:

To promote a desire to learn more about the natural environment and equip students with the knowledge and skills needed to apply the basic principles and practices of resource management and ecology to complex environmental issues.

a. Students should be able to demonstrate a basic knowledge of concepts in natural resource management and ecology, especially in the areas of soils/land use, aquatic ecology, forestry, wildlife, and current environmental issues.

b. Students should be able to analyze soil, aquatic, forestry, wildlife, and current environmental issues in problem-solving activities involving resource issues.

Goal 2:

To promote stewardship of natural resources and to encourage the development of the critical thinking, cooperative problem-solving, and decision-making skills required to achieve and maintain a natural balance between the quality of life and the quality of the environment**.***

a. Students should be able to identify environmental issues in a given situation and the various interests involved, while taking into consideration ecological, social, and economic factors.

b. Students should be able to investigate issues using both primary and secondary sources of information and synthesize the data gathered. Additionally, students should demonstrate the ability to:

- Listen with comprehension;
- Collect, organize, and analyze information;
- Frame appropriate questions to guide their investigation;
- Use a range of resources and technologies in addressing questions; and
- Critically examine information from a variety of sources.

c. Students should be able to assess the nature of information and materials from a variety of different viewpoints and evaluate their implications.

d. Students should be able to identify alternative solutions for various issues and their associated value perspectives. They should be able evaluate alternative solutions with respect to their ecological and cultural implications. Additionally, the alternative solutions generated should attempt to take into consideration the variety of interests involved, while maintaining a healthy environment.

e. Students should be able to identify and evaluate their own position on environmental issues and their associated solutions. These positions should be based on balanced information, critical analysis, and careful synthesis. Moreover, students should be able to test their position against new information, personal experiences and beliefs.

f. Students should be able to evaluate the interaction of the proposed solution with other ecological and social factors and anticipate having to plan ahead when evaluating the long and short-term implications of possible solutions to environmental problems.

Goal 3:

To provide students with experience in environmentally-oriented activities, enabling them to become environmentally-aware, action-oriented citizens.*****

a. Students should have knowledge of a wide range of action strategies involved in seeking solutions to environmental problems.

b. Students should have a knowledge of agencies and organizations that can be used as resources to seek solutions to environmental problems.

c. Students should be able to evaluate the impact of their own actions affecting a particular environmental problem and devise alternative actions to work towards improving environmental conditions.

d. Students should be able to work independently and/or collaboratively to solve environmental problems.

*Adapted from the draft National Standards for Environmental Education (NAAEE), August 1995 draft.

The Training

Teams that have notified organizers of their interest by registering or emailing a request for inclusion, will be notified of training opportunities offered by the organizing committee and their partners.

Team members and advisors are encouraged to seek training opportunities on their own.

The Oral Presentation

Advisors will receive by email notification of the oral presentation scenario approximately three weeks before the Louisiana competition. Teams should begin immediately formulating their oral presentations for presentation during the competition. Oral presentation preparation time will not be provided the day of the competition.

Oral presentations will be 10-15 minutes in duration and each team member must share equally in the presentation. Visual aids must be prepared by team members using only materials from the list provided by the Envirothon Committee.

Team members are encouraged to hone oral presentation skills prior to receipt of the scenario.

The Competition

Overview

Students, competing as team members, rotate through a series of stations managed by natural resource specialists. For example, a forester may conduct the forestry station, and a soil scientist can be expected to coordinate the activities at the soils station. Team members will be given a written test (which involves hands-on field activities) to complete. Each test is taken as a team with each team member participating in answering the questions. Test questions may be asked in a variety of ways. For example, test questions may be, but are not limited to multiple choice, true/false, essay or fill-in-the-blank.

Each team will also be presented with an environmental problem that is based on the "current environmental issue." The hypothetical environmental problem situation (and presentation materials) will be given to each team before the competition. Each team will be asked to develop and present a management plan for the hypothetical problem. All team members must verbally participate in the oral presentation.

The top scoring team at the state competition may represent Louisiana at the Canon Envirothon.

Competition Scoring

1. There will be a first-place winner in each of the following areas of the competition: Aquatic Resources, Forestry, Soils, Wildlife, Current Issue and Oral Presentation.

2. The winner of each testing station — Aquatics, Forestry, Soils, Wildlife and Current Issue, will be the team with the highest test score (100 points possible). The Oral Presentation is judged by a panel of experts. The Oral Presentation score will be the average of all the judges' scores (200 points each).

3. There will be one overall winner. The overall winner is determined by the cumulative total (700 points possible) of the five station test scores (100 points each) plus the final oral presentation score (200 points). This team with the highest score and meeting the committee's

achievement requirements will represent Louisiana at the Canon Envirothon.

4. If needed, the tiebreaker shall be in the following order: Oral Presentation Score, Current Issue score, Aquatic resources score, Forestry score, Soils score, Wildlife score.

Rules and Regulations

The Louisiana Envirothon shall be conducted under the following rules and regulations:

1. Only students enrolled in grades 6 through 12 or equivalent home school ranking in the current school year are eligible to compete in the Louisiana Envirothon. Teams may be composed of 6th- 8th grade students, 9th – 12th grade students or a combination of the two. Only teams composed of 9th -12th grade students will qualify to represent Louisiana at the Canon Envirothon.

2. A school may send multiple teams to the Louisiana Envirothon. Each team will compete independently.

3. Each team must consist of five students from the same school and/or organization. Only the five team members will be allowed at the testing stations. Team members may be substituted by submitting written notification to the Office of Environmental Education prior to April 5.

4. Teams must be accompanied to Cade Farm by an adult advisor. Advisors are required and will be responsible to assure that the team members display proper conduct.

5. There will be no access given to the testing stations for advisors or teams before the competition or during breaks.

6. No advisor, sponsor, teacher, alternate, or parent may communicate with team members once the competition begins. When messages between competing team members and others are necessary they shall be delivered by members of the Envirothon Committee.

7. During testing, breaks, and lunch, the advisors may not rotate or join their respective teams. No contact between advisors and their team shall be made until after all testing and oral presentations are

completed. Each team will be assigned a team buddy who will accompany them throughout the competition.

8. Weapons, tobacco, illegal drugs, and alcohol are not permitted during any part of the competition. No backpacks will be allowed on the testing circuit.

9. Only content keys, reference materials, and equipment provided by the Louisiana Envirothon Committee will be allowed for use at the event. No electronic, battery-operated or solar-powered equipment including cell phones may be used by teams during any portion of the competition.

10. Judges' decisions are final on all events.

11. Noncompliance with any of the aforementioned rules will be grounds for disqualification.

Competition fees are non-refundable.

Oral Presentation Rules

1. Oral presentations must be 10-15 minutes in duration.–
2. Each team member must have an equal part in the oral presentation.
3. There will be a question period by judges.
4. Visual aids must be prepared by team members using only materials from the list provided by the Envirothon Committee. No computer generated materials may be used. No photographs or printed material may be used. Prepared presentation materials will be turned in at competition registration and returned to teams just prior to their presentations.

Visual Aids Material List

2 sheets of newsprint, not to exceed 27"x 33"
8 waterbase markers
4 sheets of 8.5" x11" construction paper (blue, green, red, yellow)
Glue stick
Ruler
No. 2 Pencil
10 note cards 3" x 5"
Black ballpoint pen
Standard office scissors

The Rules and Regulations of the Louisiana Envirothon are subject to change. All changes to the Envirothon rules will go into effect on January 1 and will be in effect through that year's competition.

Current Environmental Issue

ALTERNATIVE/RENEWABLE ENERGY

Decisions about the production and use of energy are critical issues of environmental, economic and social policies and of individual choice. Decisions about sources and uses of energy are made not only in the halls of national and local governments, and in corporate boardrooms, but in private homes and individual minds. The environmental, economic and social outcomes of these choices will shape the future of our nation and our planet.

Efficient use of energy generated from traditional sources and the development of renewable energy resources are two aspects of energy policy currently the focus of extensive research by state and federal government agencies, academic institutions and private companies. The fund of knowledge is great, continues to grow, and offers a wealth of resources for an Envirothon competition.

The present generation of high school students will be asked to make difficult decisions about energy both in matters of public environmental and economic policy and in matters of personal choices. Providing a structure and materials for intensive investigation into energy resources and alternatives would be a service to those students and their schools.

Sustainable, renewable energy is a crucial and intrinsic element of sustainable development. Until energy needs are met by affordable, environmentally sound means, sustainable development efforts will be greatly hampered.

Cleaner energy sources are of prime concern to the majority of Louisiana citizens as they are impacted by ground level ozone. Louisiana offers access to sites demonstrating a wide variety of energy resources and uses. Nuclear, gas and coal-fired power plants are within the State's boundary. Natural gas production can be observed, as can methane recovery from landfills. Off shore sites have been targeted for intensive development of wind-source generation of electricity.

State Competition Preparation Checklist

Maintain close contact with the Governor's Office of Environmental Education prior to the competition. Ensure the following checklist is completed:

- Your team is registered and the registration fee has been paid.
- Transportation has been arranged to the competition location.
- Team members are familiar with the rules of the competition.
- Team members are trained in each of the five test areas: soils, aquatic resources, forestry, wildlife and the current environmental issue. Study guides are available on the Louiaiana Envirothon web site www.deq.louisiana.gov/envirothon Canon Envirothon web site www.envirothon.org .
- Team members are developing oral skills presentation.

Learning Objectives

Aquatic Resources

Students should be able to:

1. Describe the processes of the hydrologic cycle including transpiration and aquifer recharge.
2. Describe water in its three states of matter, the structure of the water molecule and relate it to water's ability to dissolve substances, cohesion and capillary action.
3. Discuss what causes nitrate contamination of well water; where in the U.S. you would most likely find it, what can happen if you drink nitrate contaminated water and what can be done to reduce it. Understand basic well construction and the importance of well grouting. Know what wellhead protection is and what constitutes a wellhead protection program.
4. Discuss what ground water and the processes that cause it to become stored and replenished mean. Understand recharge and how it occurs. Learn the processes of ground water contamination and what can be done to clean contaminated ground water. Discuss how an on-site waste disposal system works.
5. Explain how drinking water is monitored using the Safe Water Drinking Act. Be able to discuss the importance of the Clean Water Act.
6. Discuss coliform bacteria and explain why they are used as indicator organisms in drinking water.
7. Know what water conservation is and steps that can be taken at both the individual and government levels. Understand some of the basics of water resource management.
8. Discuss what causes lead contamination in drinking water and what can be done to decrease it.
9. Understand what is meant by non point source pollution and be able to give some examples, including plant nutrients, sediment and toxic chemicals.
10. Explain some basic water quality parameters such as pH and toxic chemicals. Be able to identify the equipment used by scientists who monitor water. Know how to use a pH meter, a thermometer and a dissolved oxygen meter.

11. Describe a wetland. Discuss why wetlands are important and what steps might be taken to preserve them. Know the difference between several types of wetlands such as marshes and estuaries.
12. Describe a simple aquatic food web, including producers and consumers, herbivores, omnivores, carnivores and detritivores.
13. Describe a watershed. How could you use a topographic map to outline a watershed?
14. Describe and identify simple aquatic insects, especially those which can be used to indicate clean or polluted water.
15. Explain the water treatment processes used to produce clean drinking water or to treat sewage.

Forestry

Students should be able to:

1. Identify common trees without a key.
2. Understand the uses of different trees for pulp, lumber, wildlife, etc.
3. Identify specific or unusual species of trees or shrubs through the use of a key.
4. Understand tree anatomy and physiology.
5. Understand how wildlife habitat relates to: forest communities, forest species, forest age structure, snags and den trees, availability of food and cover and riparian zones.
6. Understand basic forest management techniques and the purpose for their use- harvesting regulations, intermediate cutting and TSI (timber stand improvements) protection.
7. Be familiar with the use of a Biltmore Stick and other forestry tools.
8. Understand the value of trees in urban/suburban/rural settings and the factors affecting their health and survival.
9. Understand the multiple use concept in the management of forests.
10. Be familiar with forest history, forest inventory and what is meant by sustainable forestry.

Soils

Students should be able to:

1. Know the characteristics of soil horizons and the features of a soil profile.
2. Identify and understand soil properties (including color, texture, structure, porosity, etc.) and their relation to soil characteristics, uses and limitations.
3. Know the characteristics of soil constituents (clays, organic matter, sand and silt).
4. Understand soil drainage classes and know how wetlands are defined.
5. Know how to use and understand a soil survey.
6. Know how soil can be used as a filter for pollutants.
7. Be aware of the effects of land uses on soils.
8. Identify the factors affecting soil erosion by wind and water.
9. Understand the origin of soil parent materials and be familiar with glacial geology.
10. Understand the nature of plant nutrients and how they are held by soil material.
11. Understanding of soil water, its movement, storage and uptake by plants.
12. Know how to measure soil slope.

Wildlife

Students should be able to:

1. Identify common wildlife species (game animals, furbearers, endangered species, etc.) and be able to identify biofacts (hair, fur, feathers, gnaw marks, etc.) wildlife signs. Keys will be used for more extensive identification.
2. Identify basic wildlife habitat and survival needs (food, water, shelter/cover, space).
3. Describe specific adaptations of wildlife to their environment and their role in the ecosystem.
4. Describe predator - prey relationships and give examples.
5. Describe food chains and food webs and cite examples.

6. Evaluate a given habitat for its suitability for a designated species, given a description of the habitat needs of the species.
7. Describe ways that habitat can be improved for specific species by knowing their habitat requirements.
8. Describe factors that limit or enhance population growth. Discuss the concept of carrying capacity and limiting factors.
9. Discuss various ways the public and wildlife managers can help in the protection, conservation, management and enhancement of wildlife populations.
10. Describe the potential impact of the introduction of non-native species.
11. Describe major factors affecting threatened and endangered species and methods used to improve the populations of these species.
12. Identify species from given natural history information.
13. Understand the roles of wildlife in an ecosystem.
14. Understand some key wildlife laws and the reasons behind many regulations. (i.e. regulations designed to protect the resource and spread it out among would-be users).
15. Understand some of the basic "tools" of wildlife managers (hunting, habitat manipulation, population census techniques, people management, etc.)

Current Environmental Issue

Students will comprehend long term and short term environmental, social, and economic considerations of energy production and usage.
ACTIVITIES:

 Students will research, compare and contrast traditional and emerging energy production resources and applications; focusing on the environmental implications of such production.

 Students will relate energy systems to corresponding natural resources.

 Students will identify the organizations (and their roles) and the processes involved in making energy decisions in Louisiana and globally.

 Students will describe the interactions among society, technology, and use of energy sources.

 Students will identify technologies created as a result of society's concern for dwindling non-renewable energy resources (e.g., electric cars, biodiesel).

OUTCOMES:
Students will be able to evaluate appropriate energy resource choices for a specific application.
UNDERSTANDINGS AND TOPICS OF INVESTIGATION: TASKS
I Traditional energy uses and production
1. Identify and understand the traditional sources of energy generation of:
A. Electricity
1. hydropower
2. fossil fuel
3. nuclear energy
B. Natural gas
C. Fossil fuels (vehicles)
2. Assess environmental impacts of the above
A. Consumption of resources
B. By- products (emissions/ waste)
C. Impacts on ecosystems
3. Assess social and economic factors and implications:
A. Infrastructure
B. Environmental justice
C. Conservation practices
D. Organizations and agencies active in energy policy decision making
E. Design of energy distribution systems
II Emerging energy technologies
1. Identify and understand sources and applications of renewable energy
A. Solar
B. Wind generation
C. Biomass
D. Geothermal
E. Hydrogen
F. Ocean (Tidal) generation
G Ethanol/Methanol/methane
2. Assess the environmental impacts of the above.
A. Consumption of resources
B. By- products (emissions/ waste)
C. Impacts on surrounding ecosystems
3. Assess social and economic factors and implications of the above:
A. Infrastructure
B. Environmental justice
C. Conservation practices
D. Organizations and agencies active in energy policy decision making
E. Design of energy distribution systems
III Energy Issues Related to other Canon Envirothon Study Areas:
1. Soils:
A. Identify and understand issues of traditional and innovative energy sources related to
1. agricultural and forested lands

2. soil erosion control

2. Aquatics:

A. Identify and understand issues of traditional and innovative energy sources related to:

1. fish habitat and reproduction
2. changes in flow rates and water levels
3. biodiversity
4. groundwater/aquifer resources

3. Forestry:

A. Identify and understand issues of traditional and innovative energy sources related to:

1. biofuels
2. species diversity – plant and animal
3. pests and pesticides
4. forest management practices

4. Wildlife:

A. Identify and understand issues of traditional and innovative energy sources to:

1. migratory bird flyways
2. habitat loss/degradation

Partners

The Louisiana Envirothon is made possible by the cooperative efforts of the following organizations:

Sponsored by
ALCOA Foundation
Governor's Office of Environmental Education
Louisiana Environmental Education Commission

In Cooperation with
Louisiana Cooperative Extension Service
Louisiana Department of Agriculture and Forestry
Louisiana Department of Culture, Recreation & Tourism
Louisiana Department of Environmental Quality
Louisiana Department of Natural Resources
Louisiana Department of Wildlife and Fisheries
University of Louisiana at Lafayette

With Support from
Louisiana Environmental Education Commission
Louisiana Association of Conservation Districts
Louisiana Environmental Health Association
Borden Milk Products
McDonald's of Acadiana

Resources

Sample Test Questions

Sample tests are available on the Canon Envirothon website at www.envirothon.org .

Oral Presentation Judges' Scoring Sheets

The Louisiana Envirothon will use the Canon Envirothon Judges' Scoring sheets for the state Envirothon competition. The Canon Envirothon Judges' Scoring sheets are available at the Canon Envirothon website at www.envirothon.org .

Resource Organizations

Publications and reference materials for all disciplines can be obtained from local, state, and federal agencies listed below.

Environmental Protection Agency www.epa.gov
Farm Service Agency www.fsa.usda.gov
Geological Survey www.usgs.gov
National Park Service www.nps.gov
Nature Conservancy www.nature.org
USDA Forest Service www.fs.fed.us
USDA Natural Resources Conservation Service (NRCS)
www.nrcs.usda.gov
U.S. Fish and Wildlife Service www.fws.gov
World Wildlife Fund www.wwf.org

U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy
www.eere.energy.gov
Clean Cities program
www.eere.energy.gov/cleancities/
The Alternative Energy Institute
www.altenergy.org
U.S. Environmental Protection Agency, Green Communities website and links to many other websites: www.epa.gov/greenkit/q5_energ.htm
U.S. Energy Information Administration, website: www.eia.doe.gov
National Renewable Energy Laboratory
www.nrel.gov
New York state energy Research and Development Authority
www.nypa.gov/es.htm
Business Council for Sustainable Energy

www.bcse.org
Canadian Association for Sustainable Energy
www.newenergy.org

Solar Power:

U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy – Solar Energy
www.eere.energy.gov/RE/solar.html
Kyocera Solar, Inc., solar systems manufacturer, www.trianglesystems.com 126 Ideaho Avenue, Plattsburge, NY 12930
International Solar Energy Society
www.ises.org
American Solar Energy Society
www.ases.org

Wind Power:

New York State Energy Research and Development Authority, Community Resources for Wind Development
www.powernaturally.com/programs/Wind/toolkit.asp
U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy Wind power www.eere.energy.gov/RE/wind.html
Green Power Network
www.eere.energy.gov/greenpower
American Wind Energy Association
www.awea.org
Canadian Wind Energy Association
www.canwea.ca
Patel, Mukund. Wind and Solar Power Systems. CRC Press, 1999

Biofuels: National Biodiesel Board

www.biodiesel.org
United States Department of Energy Biomass Program
www.eere.energy.gov/biomass
Commoner, Barry. The Poverty of Power. Bantum Books, July 1980.

Geothermal Energy:

U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy – Geothermal Energy www.eere.energy.gov/RE/geothermal.html

Hydropower:

U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy – Hydropower
www.eere.energy.gov/RE/hydropower.html

Hydrogen power, Fuel Cells:

U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy – Hydrogen power www.eere.energy.gov/RE/hydrogen.html

Oceans:

U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy – ocean energy www.eere.energy.gov/RE/ocean.html

Biomass Energy:

U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy-

BioPower Program www.eere.energy.gov/RE/biomass.html

Alternative Fuel Vehicles:

Advanced Transportation Technology Institute
www.etvi.org
Alternative Fuels Data Center
www.afdc.doe.gov
Electric Auto Association
www.eaaev.org
Natural Gas Vehicle Association
www.ngvc.org
Society of Automotive Engineers. Alternative Fuels: Technology & Developments. 1997

- relevant links and other useful info

http://www.sciencedaily.com/directory/Science/Agriculture/Soils
http://soils.usda.gov/sqi/
http://www.sarep.ucdavis.edu/soil/websites.htm
http://www.cwp.org Center for watershed protection - lots of related info and links
http://www.ctic.purdue.edu Conservation technology and information center
http://www.epa.gov/region6/water/npdes/sw/ms4/index.htm (see "Storm Water Hot Topics)
http://www.iwla.org Izaac Walton League - great aquatics info
http://www.nacdnet.org National Association of Conservation Districts
http://www.la.nrcs.usda.gov USDA Natural Resources Conservation Service - soils and related educational info
http://www.projectwet.org Project WET (Water Education for Teachers) water ed info and links
http://www.agry.purdue.edu/courses/agry255/brochure/brochure.html soils info
http://www.swcs.org/ natural resource educational info
http://www.usgs.gov/education U.S. Geological Survey - Natural resource educational links and info
http://cfpub.epa.gov/npdes/home.cfm?program_id=6 Urban and residential stormwater management info
http://www.cyber-sierra.com/area9/p-soils.html Soils Info
http://www.attra.org/soils.html Soils info
http://www.forestsoils.org/S-7/ Soils info
http://www.des.ucdavis.edu/iad217/soilsites.html Soils Info
http://iaswww.com/ODP/Science/Agriculture/Soils Soils Info