Ohio Energy Project

Student Leader Guidebook

Ohio Energy Project
Student Leader Timeline

Opening Session

- Welcome students hand out trinkets/buttons
- Introduce members and their Energy Source
- World Mystery Tour
- Go over answers
- Separate students into their groups according to their trinket/button
- Pre-test

- **You choose which of the following activities are most applicable to your teacher's curriculum.**

Energy Commercials/chant

- Each group creates and performs a commercial based on an energy source (team building activity)

Energy Source presentation

- Use the back side of the World Mystery Tour posters to describe the energy sources

Global Trading Game

- Follow the outline

Energy Bike Demonstration

- Follow the outline

Energy Carnival

- Follow the outline

Electroworks Stations

- Follow the outline

Summary

- Review the activities of the day and their primary objectives
- Thank everyone for their effort and enthusiasm
- Post-test
- Create a page for the scrapbook and fill out the evaluation form

NEED YOUTH AWARDS PROGRAM FOR ENERGY ACHIEVEMENT

PROJECT REPORTING FORM

(make one copy for each goal)

STATE ____ SCHOOL NAME _____ FORM ____ OF____

GOAL # _____

ENERGY CONTENT ACTIVITIES:

STUDENT LEADERSHIP:

RESOURCES:

EVALUATION:

GLOBAL TRADING GAME
STUDENT LEADER OUTLINE

INTRODUCTION:

People: **Students in one big group in the center of the room**
Time: **3-5 minutes**

An Ohio Energy Project Staff person will be giving an introduction and overview of the game to the entire group.

- Sit with your student team and helping them to stay focused on the instructions.
- Listen closely for cues such as "break into teams" and get your team where they should be.

GET TO KNOW YOUR COUNTRY:

People: **Students in ten country teams**
Props: **COUNTRY PACKETS**
Time: **10 minutes**

Each team will be working together to read the Country Profiles and Country Comparison Charts. They will use this information to identify 3 advantages and 3 disadvantages of their country, which will be written in their Leadership Guide.

- Assist student team in finding 3 advantages and 3 disadvantages to the country.
- Different students may have different opinions about which facts are advantages and/or disadvantages. Accept all suggestions and ask students to explain their point of view.
- Encourage students to use the Country Comparison Charts to learn how they compare to other students in the game.

GET A JOB:

People: ***Student teams together in one big group, with folders***
Time: **3-5 minutes**

Students will get an overview of the four job descriptions and will choose a job to perform within their country.

- Help get your students back into one big group. Make sure they have their folders pencils
- Sit with students and help to keep them focused and listening.
- Listen for cues to return to team space and set up game boards.
- There will be two students per job (2 miners, 2 geologists, etc.) Refrain from singling out one job as the best–all the jobs are important to the success of the team.

DETAILED JOB DESCRIPTIONS:

People: **Miners & Geologists in a group together, then**
Advisors & Traders in a group together
Time: **5-8 minutes**

Students will get more specific information about their jobs. First the Geologists and Miners meet with the OEP staff person to get details about their jobs. At this time, the Traders and Advisors will help you to set up the game boards in your team space. The Geologists and Miners will return with their country bin, and then the Traders and Advisors will meet with the OEP staff person to get their details.

- Listen to the cues of the OEP staff person to learn where people should be.
- When setting up the game board, get all the cards and money out of the game pieces box and arrange them on the game board in the blank spaces.
- When the Geologists and Miners return with their plot of land, remind them to first draw a

- When the Geologists and Miners return with their plot of land, remind them to first draw a map, then begin to investigate and mine.
- The following are brief details about each job:

Geologists: They first sketch a map of the land, then probe the soil carefully with straws to find and mark all of the energy sources. The straws are left in the sand to mark the sources.

Miners: They surface mine by removing each layer of earth. They remove each layer of earth until the layer with the energy sources is exposed. Each layer stays IN THE BIN, but is piled separately so the land can be reclaimed later. After the sources are found, the OEP staff will give a signal for the students to come up to them to get cards for each source.

Geologists and the Miners will then work together to reclaim the land. This means that they use the map they drew to put the land back exactly as it was. They also re-bury the energy sources. This wouldn't happen in real life, but we're doing it now for the sake of setting up the game.

Economic Advisors come up with a plan to help the team reach the goals of ending up with 5 of each card. They also decide how much they want the traders to buy or sell, how much money can be spent on each item, etc.

International Traders: They go to the Trade Center during trading rounds and use the Advisors' strategy to buy, sell and trade with other teams. They must be assertive and persuasive!

PLANNING, RECLAIMING & TRADING:

People: **Students are in country teams**
Props: **STUDENTS WORK WITH GAME PIECES**
Time: **10-12 minutes**

Teams have 2 minutes to come up with a plan, then compete in three trading rounds. ONLY International Traders may come up to the trade center.

- Do not mention impacts to students until the third trading round
- Help the team to develop a strategy, but try not to give away what you already know about the game.

TRADING ROUND 1:	Try to get 5 of each card
REGROUP WITH TEAM:	1 minute
TRADING ROUND 2:	Try to get 5 of each card
REGROUP WITH TEAM:	Discussion led by OEP staff about impacts
TRADING ROUND 3:	Students try to get 5 of each card and 13 or fewer impacts

WRAP UP:

People: **Students begin in teams, then in one big group**
Props: **WORLD MAP, COUNTRY SUMMARIES, FLAGS**
Time: **8-10 minutes**

Help students clean up the game components. Guide students to center of a room for the OEP staff person to do a wrap up.

Please draw your country map below:

NORTH

WEST **EAST**

SOUTH

THE GLOBAL TRADING GAME

WHAT ARE THREE ADVANTAGES TO YOUR COUNTRY?

1. _____

_____

2. _____

_____

3. _____

_____

WHAT ARE THREE DISADVANTAGES TO YOUR COUNTRY?

1. _____

_____

2. _____

_____

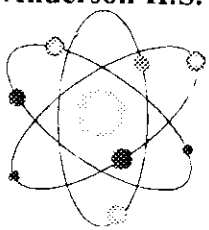
3. _____

_____

Name_____

ABMOD_____

NEED Workshop
Date_____
Anderson H.S.



NEED Carnival Score sheet

Team Name and Members_____

Game	**Score (1-5)**
Energy Pictionary	_____
Energy Knockdown	_____
Energy Sleuth	_____
Energy Taboo	_____
Energy Pursuit	_____
Top Five	_____
Wheel of Energy	_____
Energy Jumble	_____
Energy Equations	_____
Source Separation	_____
Total Points	_____

The Energy Carnival Guide

ENERGY CARNIVAL TEAM PLAY

Welcome to the **Energy Carnival**: ten games in which students combine their academic skills and energy knowledge with their ability to toss and throw—learning while playing. Each game comes with complete instructions and practical advice and can be played independently.

The carnival can be played by a single class or by several classes at the same time. Student teams spend five minutes at up to ten stations and win energy bucks by answering questions and solving problems. The instructions are geared for a ten station carnival program with six students on a team. For smaller groups, use fewer carnival games or reduce the number of students on each team. For larger audiences, organize additional carnival circles.

This **Energy Carnival Guide** will assist you with all the details before and during the carnival. However, if you do have a question, just call the NEED Hotline at (800) 875-5029 and ask for help. The NEED Project is also interested in any games that you invent, as well as any modifications to the existing games.

GET READY

1. Complete one or more sets of the **Energy Carnival** games you've chosen to play.

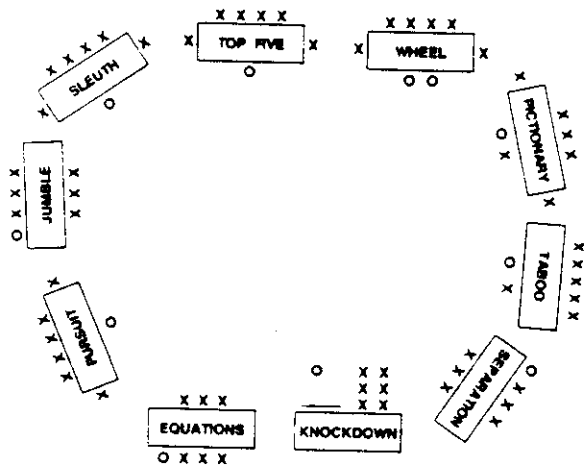
2. Secure a room large enough to accommodate one or more carnival circles of ten rectangular 3' x 8' tables.

3. Familiarize each carnival game leader with the rules and operation of his/her game. The success of your carnival depends upon the ability of your leaders to be in command of their tasks.

4. Duplicate (on colored paper) and distribute ten $1 energy bucks and five $5 energy bucks to each carnival game leader. Masters of the energy bucks are on pages 8 and 9 of this guide.

5. Secure prizes for the winning teams. Prizes can be energy-related—such as food, solar calculators, yo-yos, flying discs, NEED T-shirts, and other NEED items.

6. Select one or two individuals to be carnival ringmasters. They will be responsible for giving directions to the whole group. Detailed instructions for the carnival ringmasters follow later in this guide.



7. To make the environment more fun, purchase or make outfits for each carnival game leader and the carnival ringmasters—vests, skimmer hats, arm-garter belts.

8. Decorate the room with balloons, streamers, and table skirting.

GET SET

1. For a carnival circle with ten games, set up ten tables in a circular pattern. Set the chairs and tables according to the diagram on page 4 (X = students and O = carnival leaders). Adjust the circle if you'll be playing fewer than ten games.

2. Organize students into ten teams of no more than six students per team and assign each team to a carnival game table. Have each team select a team spokesperson and a treasurer. The spokesperson will give the team's answer to the carnival game leader. The treasurer will be responsible for handling the energy bucks won at each station.

3. Have students choose an energy name for their group such as the *Atomic Splits, The Turbines,* or the *Geothermal Gems.*

4. Choose a timekeeper to help the ringmaster keep track of the timing of the sessions.

5. When choosing the questions for each game, try to pick questions dealing with material that you have covered in class. Students won't enjoy playing the carnival games if they don't know the answers to the questions. Go through the carnival before you begin your energy unit. Choose questions for each game, and make sure the material you cover during your energy unit answers the questions you have chosen for the carnival.

GO!

The carnival ringmaster should call everyone to attention and give the following instructions:

1. Welcome to **The Energy Carnival**. During the next 60 minutes, you and your team will use your academic skills, knowledge of energy and carnival game skills to win energy bucks that can be redeemed for prizes.

2. Your team will have five minutes at each of **The Energy Carnival** stations. At each station, you can win a maximum of five energy bucks by playing the game and answering questions. Answers will only be accepted from your spokesperson. Each team should now select a spokesperson. *(Allow 30 seconds for teams to choose spokesperson.)*

3. At the completion of each round, the carnival game leader will award the energy bucks you earned to the treasurer of your team. Each team should now select a treasurer. *(Allow 30 seconds for choosing a treasurer.)*

4. Do not move from station to station until you receive my signal. If you leave your station before my signal, your team will be penalized five energy bucks.

5. When you get to each station, your carnival game leader will give you instructions on how the game is played. The game will not start until each of the game leaders has his or her hand raised, signaling me that each team understands the instructions and is ready to play. No one starts until all teams are ready.

6. Carnival leaders, please explain the instructions for your game now. When ready, raise your hand. When all hands are raised, I will give the signal to start. You will then have five minutes to play. To help you pace your time, you will get two-minute and one-minute warnings. Any questions? Remember, don't move to the next station before my signal.

After all the games have been played, the treasurer of each team and the carnival game leader at the last game will count the energy bucks the team has won. Each carnival game leader will then give the team's name to the ringmaster and report the number of energy bucks won. The ringmaster will announce the third, second, and first place teams and award prizes to the winning teams.

The Energy Carnival Guide

ENERGY CARNIVAL INDIVIDUAL PLAY

In some cases, you might find that team play of the **Energy Carnival** games does not work well. This is particularly true when you have parents and visitors arriving at various times to attend your NEED Program. In this case, you will want to use the Individual Play instructions for the **Energy Carnival** games.

Each of the ten carnival games includes instructions for individual play. For individual play, duplicate the coupon sheet and give each participant a strip as he/she arrives. Each strip has one coupon for each game. The coupon master is on page 7.

In addition to the coupon distribution, you will need to set up a redemption table at which people can redeem their energy bucks for prizes. Try to obtain prize contributions from different organizations for use at the redemption table or buy prizes from NEED Headquarters.

Make sure the game leaders consider the level of difficulty of the participants who are playing the games. For example, in the game **Energy Equations**, the game leader would give an elementary school student a simple problem and a high school student a more advanced problem.

In addition, be sure to time the duration of the games carefully in order to keep things running smoothly. Each game leader should have a watch to facilitate play.

Try to be creative and add exhibits and shows that will reinforce your theme of an **Energy Carnival**. For example, a school from Dinwiddie, Virginia, constructed an *Energy Jail*. Students dressed in convict uniforms told passersby of their energy crimes: running the dishwasher when it was only half full or leaving the lights on. If you develop new games or sideshows, please let us know so that we can share them with other schools.

Energy Cycle Presentation
Basic Workshop Script

Introduction

Welcome to the Energy Cycle Station! Here we will use this bicycle, connected to a generator, to learn how much energy different light bulbs and appliances use. First, we need to know what energy is and where it comes from. To figure this out, I need one volunteer to pedal the bike.

[*Invite one student up to pedal the bike and light one incandescent bulb.*]

Energy Forms

What did you have for breakfast this morning?
(Get answers: cereal, pop tarts, eggs, etc.)

"Where did the (cereal, pop tarts, eggs) get its energy?"
[*Trace energy back to the nuclear reaction occurring in the sun.*]
(The cereal got its energy from the grain/plant it is made from. The plant got its energy from sun, the sun gets its energy from a nuclear reaction occurring in the sun.)

[*Go through the forms of energy as you place the word pieces on the poster.*]
Nuclear energy is caused by energy released through the fusion of atoms in the nucleus of the sun. Nuclear energy is transformed into radiant energy in the form of heat and light falling to earth. Radiant energy is transformed into chemical energy as plants use photosynthesis to transform radiant energy into chemical energy, food for the plants. This form of chemical energy is transformed into chemical energy, again, as we eat plants or eat animals that ate plants, through the process of digestion where our bodies break down the carbohydrates in the food. Chemical energy is transformed into mechanical energy as we pedal the bike. Mechanical energy is transformed into electrical energy as we pedal the bike and the wheel turns the generator, rotating a wire and magnet. Electrical energy is transformed into radiant and thermal energy as the electricity allows us to turn on a light bulb and the energy is transformed into light and heat. Energy can also be transformed into sound energy, which we can hear when we turn on a hair dryer, fan or radio.

Energy Definitions

We know that the light bulb lights up because it gets energy from us when we ride the bike. You will learn that it is not always easy to ride the bike and light bulbs. Some bulbs or appliances are easier to turn on than others are. Why do you think this is? [Get answers, they will vary.] ***(Because they use more energy.)***

To figure out why, we will need to know some energy definitions.

What is electricity? ***(Electricity Is the flow of electrons from one atom to another.)***
What are volts? ***(Volts measure the electrical pressure that pushes electrons.)***
What are amps? ***(Amps measure the amount of electrical current.)***
What are watts? ***(Watts measure electrical power.)***
What is the Law of Conservation? ***(Energy cannot be created or destroyed, it can only be transformed.)***

Energy Calculations

Now we are going to figure out just how many amps and watts these light bulbs use. Who can tell me which bulb they have most of in their house? ***(Incandescent)***
Which bulb needs more energy to light up? Let's light up each bulb and see what we find. I need two volunteers—one to ride the bike and one to read the meters.

[*Instruct one student to pedal at 12 volts while the other watches the Amp meter to look for any changes in amps. Switch on one incandescent bulb and let the bike volunteer pedal for a few seconds. While the student is pedaling at 12 volts, ask the meter volunteer:*]

How many amps is the incandescent bulb using? ***(Four)***
[*Switch off the incandescent and switch on one fluorescent bulb and let the bike volunteer pedal for a few seconds. Ask the meter volunteer:*]

How many amps is the fluorescent bulb using? ***(One)***

[*To bike volunteer*] Which bulb is harder to pedal? ***(Incandescent)***
[*To meter volunteer*] Which light bulb uses more Amps? ***(Incandescent)***
If amps measure the amount of electrical current and incandescent bulbs use more amps, which bulb uses more energy? ***(Incandescent)***
[*To volunteers*] Thanks. You may sit back down now.

Let's figure out just how much more electrical power, or energy, an incandescent bulb uses compared to a fluorescent. Now, we know that the bicycle generator motor runs on 12 volts. How many amps did the Incandescent bulb use? ***(Four)***
Good. Four amps. So 12 volts times four amps, 12 times four, equals what? ***(48)***
Okay. So, one incandescent bulb uses 48 watts of electrical power.
How many amps did the fluorescent bulb use? ***(One)***
The fluorescent bulb used one amp. 12 volts times one amp equals what? ***(12)***
So, the fluorescent bulb uses 12 watts of electrical power.
So, when we have a larger flow of electrons, or more amps flowing through the wire, the harder it is to pedal the bike and the more electrical power, or energy, we use.

I need another volunteer to ride the bike. [*Choose a volunteer.*]
From the information we just gathered, how much more energy does an incandescent bulb need to light up, compared to a fluorescent bulb? ***(Four times as much)***
[*Have the student pedal up to 12 volts. Turn on one, then two, then three, then four incandescent bulbs, and pedal for a few seconds.*]
That's pretty hard to pedal, isn't it? ***(Yes.)***
[*Turn off the incandescent bulbs. Having the student pedal at 12 volts, turn on one, then two, then three, then four incandescent bulbs.*]
Is that easier? ***(Yes!)***
What about one incandescent bulb compared to four fluorescent bulbs? [*Turn off the four fluorescent and turn in one incandescent.*]
Is it harder, easier, or about the same to pedal? ***(About the same.)***
Good, so you can feel that four fluorescent bulbs use about the same amount of energy as only one incandescent bulb. So, one incandescent bulb uses four times the amount of energy as one fluorescent bulb.

The Energy Education Poll

THIS IS NOT A TEST

This is not a test so don't worry! We are only interested in finding out how much you know, or what your opinion is about an energy subject. Just relax and don't make any wild and crazy guesses. Read the sentence and choose the response that most closely matches your ideas or feelings. Choose "I don't know" if you have absolutely no idea and cannot even make a good guess. Be sure to use a No. 2 pencil, and completely fill in the circle on the Poll Response Card that best completes the sentence or best answers the question.

1. How informed are you about energy and energy related issues?
   A. Very informed
   B. Informed
   C. Slightly informed
   D. Uninformed

2. Which of the following statements best describes your energy using habits?
   A. I don't think about saving energy.
   B. I sometimes try to save energy.
   C. Most of the time I try to save energy.
   D. I always try to save energy.

CONSERVATION

3. Which uses the greatest amount of energy in the American home each year?
   A. Lighting
   B. Heating water
   C. Heating and cooling rooms
   D. I don't know

4. Should people be required by law to save energy in their cars and homes?
   A. Definitely not
   B. Only in an energy emergency
   C. Yes, because people won't do it on their own
   D. I'm not sure

RENEWABLE ENERGY

5. In 1996, about ten percent of the nation's energy was supplied by renewable sources of energy. What percentage of the nation's energy do you think renewables will supply by the year 2010?
   A. 5%
   B. 10%
   C. 25%
   D. 50%

6. Solar, biomass, geothermal, wind, and hydropower energy are all renewable sources of energy. They are classified as renewable because they...
   A. are clean and free to use.
   B. can be converted directly into heat and electricity.
   C. can be replenished by nature in a short period of time.
   D. I don't know

7. Which energy source is not a result of the sun's energy striking the earth?
   A. Hydropower
   B. Geothermal
   C. Wind
   D. I don't know

FOSSIL FUELS

8. The energy in coal, petroleum, natural gas and propane (fossil fuels) is stored as which form of energy?
   A. Nuclear
   B. Chemical
   C. Radiant
   D. I don't know

9. Gasoline is produced by refining which fossil fuel?
   A. Natural Gas
   B. Coal
   C. Petroleum
   D. I don't know

10. Which is the cleanest-burning fossil fuel?
   A. Coal
   B. Natural Gas/Propane
   C. Petroleum
   D. I don't know

11. Half of which fossil fuel is imported from foreign countries?
   A. Natural Gas
   B. Petroleum
   C. Coal
   D. I don't know

12. Propane is used instead of natural gas to fuel appliances on recreational vehicles and hot air balloons. It's mostly used in suburban and rural areas. Why is propane used instead of natural gas?
   A. It's safer.
   B. It's portable.
   C. It's cleaner.
   D. I don't know

13. The major use of coal in the United States today is to...
   A. generate electricity.
   B. fuel trains.
   C. heat buildings and homes.
   D. I don't know

ELECTRICAL ENERGY

14. Electrical energy can be produced directly from...
   A. mechanical and radiant energy.
   B. radiant energy only.
   C. mechanical energy only.
   D. I don't know

15. Which energy source was responsible for generating over half the nation's electricity in 1996?
   A. Coal
   B. Uranium (nuclear)
   C. Hydropower
   D. I don't know

16. Uranium is used to make electricity in a nuclear power plant. The uranium atoms give off energy when:
   A. they combine and produce thermal energy.
   B. they split and produce thermal energy.
   C. they burn and produce thermal energy.
   D. I don't know

Anderson NEED

Student Pre-test/Post-test

Please answer the following questions to the best of your ability to help us determine your level of energy awareness. This is not a real test! Just try your best so that we can help you to learn the most about energy awareness.. Please do not put your name on the scantron form.

Opinion: Please fill in the letter that shows your opinion on your scantron

a= strongly agree, b=agree, c=no opinion, d=disagree, e=strongly disagree

1. Energy is a fun and exciting subject.
2. I learn about energy at school.
3. I like to learn about energy.
4. People can make changes in their energy use.
5. I would like to change my energy use at home.

Please fill in the letter on your scantron of the best answer for the following questions:

6 In 1998, 36 percent of total U.S. energy consumption was used to generate electricity for homes, schools, businesses, and factories. Name the energy source that is a TOP FIVE energy sources that was used to generate this electricity.

a).Coal b)Wind c)Natural Gas d)Hydropower e) Petroleum

7. In 1998, renewable sources provided the U.S. with approximately seven percent of its annual energy demand. Which one of these is **NOT** TOP FIVE renewable energy sources. Not very useful in states like OHIO.

a).Coal b)Wind c)Natural Gas d)Hydropower e) Petroleum

8. Which source of energy is a result of the radioactive decay of elements inside the earth's core?

a).Coal b)Wind c)Geothermal d)Hydropower e) Petroleum

9. Name the renewable energy source that includes garbage and agricultural waste

a).Coal b)Wind c)Natural Gas d)Biomass e) Petroleum

10. What energy source is a result of the uneven heating of the earth's surface?

a).Coal b)Wind c)Natural Gas d)Hydropower e) Petroleum

11. Light bulbs and other home appliances are measured in what electrical power unit?

a) Amps b) Watts c) Volts d) Farads

12. What is the cleanest burning fossil fuel?

a).Coal b)Wind c)Natural Gas d)Biomass e) Petroleum

13. When riding a bike, energy from your food (chemical energy) is directly changed into what form of energy?

a)Mechanical or motion b).Electrical c) Thermal

14)_____ is the fuel used to generate electricity at a nuclear power plant.

A. Hydrogen B. Uranium C. Fission D Zinc

15) Which type of light bulb is more energy efficient?

a) Incandescent b) fluorescent