DOCUMENT RESUME

ED 390 680 SE 057 312

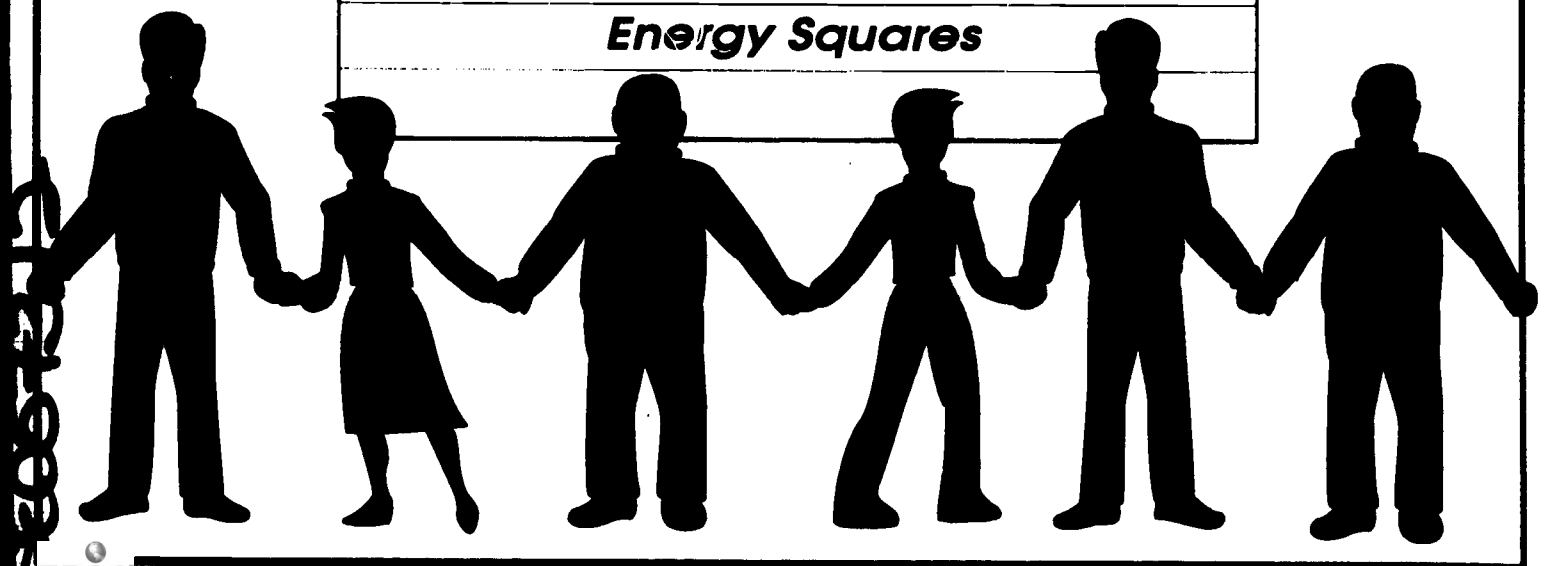
TITLE	Games & Icebreakers.
INSTITUTION	National Energy Education Development Project, Reston, VA.
PUB DATE	[94]
NOTE	25p.; For a related document, see SE 057 313.
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Alternative Energy Sources; Cooperative Learning; *Educational Games; Electricity; Elementary Secondary Education; *Energy Conservation; *Environmental Education; Group Activities; *Science Activities; Science Instruction

ABSTRACT

This booklet contains activities related to energy conservation and sources of energy that are suitable for groups containing people of different ages. The activities promote brainstorming, group sharing, and cooperative learning. Activities include: Energy Name Game; Energy Pantomime; Energy Source Relay Race; Energy Chants; This Week in Energy Conservation, Energy Bingo; Energy Roundup; Electric Connections; Energy Match Game; Energy Eliminators; Bumper Stumpers; Most Wanted Energy Wasters; and Energy Squares. (JRH)

Games & Icebreakers

INSIDE



ENERGY NAME GAME

Purpose of Activity

Energy Name Game is a short and easy way to introduce people in a group. It requires no preparation and very little time. This activity is suited for all ages.

Preparation: None

Time: 10 minutes for a group of 12

GET READY

No preparation required.

GET SET

Seat the members of the group in a circle facing inward.

GO

The group leader should tell the students that they will now be choosing new second names. Their new second names should begin with the same letter as their first names and be energy related. The second name could be a source of energy, an energy consuming or producing device, or energy term. For example: Bob Biomass, Martha Microwave, Georgette Generator, or Michael Megawatt. Tell the members of the group that no relatives will be allowed in the game—there can't be both Bob and Barbara Biomass. Therefore, everyone should think of two or more last names.

The group leader or a random group member begins by saying, "My name is..." and then his first name, followed by his new energy last name. Then the person to his left says the first person's first and last name, and then his new energy name. Then, the third person gives the first two names and then his own energy name. This continues until the final person, sitting to the right of the group leader, gives everyone's name and then his own.

Before you get started, ask if anyone in the group is having a problem thinking of an energy last name. For those who are having a problem, ask them to tell the group their first name. Then have the group brainstorm several last names for them. If during the game someone in the group has a problem remembering a person's first or last name, have members of the group give that person a hint. For example: If the person's name is Tim Toaster, someone in the group could say "you put your bread in it in the morning." If the person's name is Peter Petroleum, a group member could say "you make gasoline from it."

ENERGY PANTOMIME

Purpose of Activity

Energy Pantomime is a quick and easy way to break a group into several smaller groups. It gets the audience moving, looking, thinking, and acting. Energy Pantomime will produce a random mix of groups or a mix of groups by ages depending on how the slips are handed out. It is short, easy to prepare, and fun for your audience. It requires only one staff member to run, although many can be involved. This activity is suited for all ages.

Preparation: Low

Time: 5 minutes

GET READY

Duplicate the sheet of pantomimes (ten per sheet) according to the number of people you want to have in each group. The sheet of pantomimes is included in this booklet on page 16. Feel free to use this sheet, or to make up your own. You will need enough slips to hand out to everyone. If you have a small group, you may want to use less than ten pantomimes.

GET SET

Cut the pantomime sheets into separate pantomime slips. If you want your groups to contain a random mixture of people, hand out the slips randomly. If you want to divide the groups by age level, or by students' strengths and personalities, fold the pantomime slips in half, write a student's name on each slip, and distribute the slips.

GO

Explain to the students that they are going to be broken into smaller groups. Tell the students that each of them will be handed a slip of paper with an energy source or user on it. They must not say the name of their source or energy producing or consuming device aloud—just read it, and put it in their pockets. Hand out (or have assistants hand out) the pantomimes. Once all the slips have been handed out, tell the students that they must now begin to pantomime their energy source or user. They may make sound effects and hand motions, but no talking, whispering, or reading lips. The students should walk around the room searching for others pantomiming the same source or object. Once all the members of the groups have found each other, the students will be neatly divided into groups.

CONSERVATION FOR OUR NATION

Purpose of Activity

This activity teaches brainstorming and cooperation skills to a group or groups of eight to 15 people. It reinforces ideas of group sharing and cooperative education, as well as assuring knowledge of some conservation tips. It is a short activity, useful as an icebreaker for new groups. There is also a possibility of light competition between groups. This activity is suited for all ages.

Preparation: Low

Time: 20 minutes for a group of ten

GET READY

You will need a marker and a large sheet of paper (about poster-size) for each group. Seat the group in a circle near a chalkboard or wall where you can hang up the paper.

GET SET

Select one person from each group as the group leader, and one person from each group as the recorder.

GO

Instruct the group to brainstorm ideas on energy conservation in the home and on the road. The group leader should call on people from the group for energy conserving tips or measures. The recorder should list these tips on the paper. Each idea should be simple and no longer than four or five syllables. For example, "Turn off lights," "Tune-up," and "Insulate" are simple and short. The members of the group should all contribute to the list, and help each other with ideas. Continue brainstorming until the group has at least the same number of ideas as there are group members. This should take five minutes or so, depending on the size of the group.

Explain the game to the group with this introduction: slap your thighs once with both hands and say CON, clap once and say SER, snap your right fingers and say VA, and then your left and say TION. Slap your thighs again and say FOR, clap your hands and say OUR, snap your right fingers and say NA, and snap your left and say TION. Slap your thighs a third time and say CON, clap once and say SER, snap your right fingers and say VA, and then your left and say TION. Slap your thighs a fourth time and say READY, clap your hands and say BEGIN. This time between the snaps you must give a conservation tip. Each cycle should take three to four seconds.

After the introduction, you should give three or four conservation tips between the snaps. Do not repeat the introduction with each tip. You can reinforce the cadence by giving the instructions to the group between the snaps. For example: slap, clap, snap YOU CAN ONLY snap, slap, clap, snap (sscs) GIVE A CON (sscs) SERVA (sscs) TION TIP (sscs) BETWEEN (sscs) THE SNAPS (sscs) IF YOU CAN'T (sscs) THE GROUP MUST (sscs) START OVER (sscs) AGAIN

Tell the group to study the sheet of paper because it will not be posted during the game. Everybody will have to remember three to five of the conservation tips because no one can repeat what someone else has said. If someone forgets or repeats, the circle must begin again. The person who has made the mistake begins with the introduction, and the game continues until you have made a complete circle with everyone giving a tip between the snaps.

NOTE: If you are running more than one circle at a time, instruct the groups that they may have to begin again on their own if someone makes a mistake.

ENERGY SOURCE RELAY RACE

Purpose of Activity:

Energy Source Relay Race tests students' ability to recognize important pictorial representations of energy sources or energy producing, consuming, or conserving devices and materials. It is based on the game show "Win, Lose, or Draw." This activity is suited for all ages.

Preparation: Low

Time: 20 minutes

GET READY

You will need six pieces of paper and two pencils for each group of approximately five students. First, determine which five energy terms to use during the game. For Elementary level students you might choose light bulb, solar, biomass, television and petroleum. For Middle School students, coal, insulation, natural gas, wind and thermostat would be good choices. High School level terms might include propane, nuclear fission geothermal, hydropower and photosynthesis. Arrange students in a circle on the floor or around a table.

GET SET

Divide the students into groups of about five. On five of the six pieces of paper, instruct the students to write the name of their group in small print on the bottom and number the pages one through five. They should fold and tear the sixth sheet into eight equal pieces. Inform the students that there must be no talking at all during the game, and they must walk to the game leader and back to their groups. If they do run, they will be asked to return and walk. If they talk, they will automatically be disqualified.

GO

One student from each group is chosen as the opening artist. He will approach the game leader and receive the first energy term as soon as the starting signal is given. All artists are given the first term at the same time. The artist returns to his group and draws a representation of the term. Tell the students that writing words or letters, pointing, or using numbers is forbidden. When someone in the group thinks he knows the answer, he should take the second pencil and write his guess on one of the eight small pieces of paper. Remind the students that they are allowed eight guesses for five terms, so they can only afford three mistakes. The artist nods to inform whether or not the guesser is correct. If not, guessing continues. If the person is correct, he takes the drawing and slip of paper with the correct term and gives them to the game leader. The leader whispers or shows the next term to the student. The student then returns to the group and play continues with that person as the new artist. The person who correctly guesses the term is always the one who draws next. The leader should move around the room to avoid being closer to one group than another. The first group to correctly guess all five terms wins. Follow up with a discussion of the energy terms and display various drawings from the individual groups.

ENERGY CHANTS

Purpose of Activity:

Energy Chants introduces the ten leading energy sources in an entertaining manner. This activity also divides a large group into ten or fewer small groups. This activity is suited for all ages.

Preparation: Low

Time: 30 minutes

GET READY

For each student playing the game, make one copy of the Energy Chant sheet found on page 17 of this booklet. Then, depending on the number of small groups you need and the number of students in each group, make the appropriate number of copies of the energy symbols, found on page 18. Cut out the energy symbols and have masking tape ready.

GET SET

Hand out one Energy Chants sheet to each student and tape an energy source to his/her back. Inform the students that they are not to look at their backs or ask friends what energy sources they are.

GO

Introduce the energy sources to the students. Go through each source and reinforce one or two of the facts found on the chant sheet. Tell whether the source is renewable or nonrenewable, and add some of your own information about each source. Usually, three or four facts are enough—the students can read the others on their own.

OPTIONAL: You may wish to add visual aids to your presentation. Make posters or overhead projector transparencies that relate to each energy source. You can also use the transparencies from the Transparent Energy activity found in your Local Participation Kit.

After you introduce a source, demonstrate its chant. The words are on the top of the chant sheet and you can create your own hand motions. If you have problems with the motions, you can contact either the NEED Office or your Regional or State NEED Coordinator. A few examples of hand motions are:

Coal: While chanting, "Working in a coal mine," pretend that you are shoveling coal. At "grunt—Hard hat!" throw the coal over your shoulder.

Natural Gas: After chanting, "Nat'ral gas, gas" snap once with your right hand, once with your left, and follow with "a real gas!"

Biomass: Hold your nose while chanting, "Garbage, garbage" and during "Biomass!" shake your hands near your shoulders.

Wind: Throughout the chant, spin your arms like a windmill.

Hydro: With your finger tips touching, hold your hands under your chin and glide your hands down like a waterfall during "Falling water." For "hydropower, hydropower" rotate your hands around each other like a turbine.

After you have demonstrated each chant, give the students a review quiz. Read off one or two easily recognizable facts and tell them to give you the corresponding chant on the count of three. This reinforces the information and reviews the chant. Do this for all ten chants.

Next, tell students they have an energy source taped to their backs. Their job is to discover what source it is. Using their energy chant sheets, they should go around to other students asking yes or no questions, asking each person no more than one question. Naturally, the first question should be, "Am I (non)renewable?" Once the student has discovered his or her source, he or she should start to do the energy chant for that source, in hopes of attracting others who are the same source. After about two minutes of questions and searching, have everyone stop. To help the students who may have not yet found their group, give three clues about one group's source and tell that group to do their chant once. Go through this process with each group, and the large group will be successfully divided into smaller groups by energy source.

THIS WEEK IN ENERGY CONSERVATION

Purpose of Activity:

This Week in Energy Conservation is fashioned after a weekly television show with student-correspondents reporting on a variety of energy conservation topics. This activity will introduce students to ways of saving energy both in the home and on the road.

Preparation: Low

Time: 45 minutes

GET READY

Prior to class, make copies of the six lead stories (found on pages 19 and 20) that you will be distributing among the student groups. You may also want to gather the supplies students may use in constructing props to accompany their energy stories.

GET SET

Review with the students the structure of an actual news program. Explain the role of an anchorperson in providing the background information or "lead" to a news story. Ask the students to recall the various ways they have seen news stories covered in the past (i.e., in-studio, on-site, through interviews, or taped recordings). This will help them understand what they will be asked to do during the "This Week in Energy Conservation" show. Divide the class into six groups, and distribute a news lead to each group.

GO

Explain to the students that each group is now a team of energy reporters. They should read the introduction to their segment of "This Week in Energy Conservation," making note of the energy facts listed below each lead. Their job will be to develop a story that follows the guidelines of the anchorperson's introduction and includes six of the energy facts listed on their sheet of paper. Each story should be limited to two or three minutes and the groups will be allowed 20 minutes to develop and rehearse their story.

After each story is presented, the other groups will have one minute to try to list six energy tips from the presentation they just heard. Next, the presenting group reveals their tips. Each group grades themselves using the honor system, getting one point for every tip they remembered correctly. Tally the scores of all the groups watching the presentation, and award this amount to the presenting group. This gives the presenters an incentive to do a thorough job conveying their facts and information to the audience. The team with the highest score after all the presentations is the winner. Either you or a student from each group can serve as the anchorperson, providing the show's introduction and the lead-in to each news story.

ENERGY BINGO

Purpose of Activity

Energy Bingo is a great ice-breaker for a NEED workshop or conference since each person playing the game will meet at least 16 other people. As a classroom activity, it also makes a great introduction to an energy unit.

Preparation: Low

Time: 45 minutes

GET READY

Duplicate as many Energy Bingo sheets (found on page 21) as needed for each person in your group. In addition, decide now if you want to give the winner of your game a prize and what the prize will be. (NOTE: each box on the Energy Bingo sheet has two blank lines. One line is for a player's name and the other is for his or her class, school, or state. Decide what you want the players of your game to write in the second line.)

GET SET

Pass out one Energy Bingo sheet to each member of the group.

GO

Give the group the following instructions for how to play the game:

Energy Bingo is very similar to regular Bingo. However, there are a few things you'll need to know to play this game. First, please take a minute to look at your Energy Bingo sheet and read the 16 questions at the top of the page. Shortly, you'll be going around the room trying to get 16 people to answer these questions so you can write their names in one of the 16 boxes.

When I give you the signal, you'll get up and ask a person one of the questions at the top of your Bingo sheet. If the person gives what you believe is a correct response, write the person's name in the corresponding box on the lower part of the page. For example, if you ask a person question "D" and he or she gives you what you think is a correct response, then go ahead and write the person's name and school/class/state in box D. A correct response is important because later on, if you get Bingo, that person will be asked to answer the question correctly in front of the group. If he or she can't answer the question correctly, then you lose Bingo. So, if someone gives you an incorrect answer, ask someone else! Don't use your name for one of the boxes or use the same person's name twice.

Try to fill all 16 boxes in the next 20 minutes. This will increase your chances of winning. After the 20 minutes are up, please sit down and I will begin asking players to stand up and give their names. Are there any questions? You'll now have 20 minutes. Go!

During the next 20 minutes, move around the room to assist the players. (You can also be placed on a person's Bingo card if you wish. However, if you do this, make sure you call on yourself later to give your name.) Every five minutes or so tell the players how many minutes are remaining in the game. Give the players a warning when just a minute or two remains. When the 20 minutes are up, stop the players and ask them to be seated. Then give them the following instructions.

When I point to you, please stand up and in a LOUD and CLEAR voice give us your name and tell us where you are from. Now, if anyone has the name of the person I call on, put a big "X" in the box with that person's name. When you get four names in a row—across, down, or diagonally—shout "Energy Bingo!" Then I'll ask you to come up front to verify your results.

Let's start off with you (point to a player in the group). Please stand and give us your name and tell us where you're from. (Player gives name and place. Let's say the player's name was "Joe.") Okay, players, if any of you have Joe's name in one of your boxes, go ahead and put an "X" through that box. (NOTE: You may have to repeat a player's name if others can not hear. Also, be sure to point to players in all areas of the room and not just in one section.)

When the first player shouts "Energy Bingo," ask him (or her)

to come to the front of the room. Ask him to give his name and tell the group where he's from. Then ask him to tell the group how his bingo run was made, i.e., across from A to D, down from C to O, and so on.

Now you need to verify the bingo winner's results. Ask the bingo winner to call out the first person's name on his bingo run. That player then stands and the bingo winner asks him the question which he previously answered during the 20-minute session. For example, if the question was "can name two renewable sources of energy," the player must now name two sources. If he can answer the question correctly, the bingo winner calls out the next person's name on his bingo run. However, if he does not answer the question correctly, the bingo winner does not have bingo after all and must sit down with the rest of the players. You should continue to point to players until another person yells "Energy Bingo."

In case of a tie, ask the bingo winners to come to the front one at a time to verify their results. If time permits, you may wish to continue the game for second or third place winners. You may want to change some of the questions to fit your group. Below are eight extra questions you can use instead.

- Knows what energy source C_3H_8 is.
- Knows what gasohol is made of.
- Knows which state produces the most oil.
- Knows which state produces the most coal.
- Can name two products made from petroleum.
- Knows which energy source generates the most electricity.
- Knows the chemical name for natural gas.
- Knows which uranium isotope is fissionable.

ENERGY ROUNDUP

Purpose of Activity

Energy Roundup is a good activity to introduce an energy unit or to reinforce students' knowledge of the nation's leading sources of energy. Energy Round-up divides a group of teachers or students into ten or fewer groups.

Preparation: Moderate

Time: 10 - 50 minutes

GET READY

Make ten energy posters, each approximately one foot square. The first step in making the posters is to write down six energy facts for each energy source. These energy facts can be found on the Energy Chants sheet located on page 17. Write the facts on pieces of white paper. Do the lettering neatly, using letters that are about one-half inch in height. Do NOT write the names of the energy sources on these white sheets of paper. Next, take ten smaller pieces of paper and write the numbers one through ten on them.

Mount one white fact sheet and one number sheet on each poster board, using black poster board for the nonrenewable energy sources and yellow poster board for the renewable energy sources. Mount the number sheets near the top of the posters and the fact sheets on the lower half of the posters. Do not secure the bottom edge of the number sheets to the poster; the number sheets will be used as flaps.

Next, write the names of the energy sources on the posters. Write the names beneath the number sheet flaps. Now you should lightly secure the bottom edge of the number sheets (with a tack or Scotch tape, for example) to the posters.

Once you have finished making the posters, mount the posters around the walls of the room. Space the posters as equally apart as possible and set up chairs for each station. Also, put a piece of paper and a pencil by each poster station. The players will use these toward the end of the game.

GET SET

Assign players to groups by writing the names of the ten energy sources on slips of paper—let the players draw these out of a hat. You will need to make enough slips for each person—an equal number of slips for each energy source. (You can assign players to less than ten groups by eliminating one or more energy sources from the hat. Even if you have fewer groups, keep all ten posters on the walls.) Instruct the players NOT to tell anyone which group they've picked; that would only hurt their chances of winning.

GO

Give the players these instructions for playing the game:

You have all been assigned to one of ten energy source groups. Shortly, you'll be getting into these groups. First, though, follow my instructions.

You cannot speak or communicate with anyone during the first eight- to ten-minute phase of the game.

Decide if the energy source you selected from the hat is a renewable or nonrenewable source of energy. The ten posters on the walls around the room have been color-coded to help you find your energy source. The yellow posters represent renewable energy sources; the black posters represent nonrenewable sources. If you don't know if your energy source is renewable or nonrenewable, then it may take you a little longer to find your group.

When I say go, walk to the closest poster and read the six clues that describe the energy source. If you think these clues describe your energy source, simply sit down in one of the chairs (or bring over a chair). If the clues don't describe your energy source, move on to another poster. Repeat the process until you think you've found your energy source.

You'll now have three minutes to find your energy source. Remember, no talking or communicating is allowed. Does anybody have any questions? Ready? Go!

(The first round lasts three minutes.)

Your three minutes are up and everyone must be seated. Remember, remain silent. Now, will the person closest to each poster lift the flap of the poster so that the people in your group can see which energy source the clues describe.

(Players lift flaps to reveal energy sources.)

Please close the flap. If you're in the correct group, remain seated. If you're not, stand up and look for your energy source again. This time you have only one minute. Go!

(Round two lasts one minute. You can continue rounds until everyone has found his or her energy source. Subsequent rounds last one minute each.)

After all the rounds are finished, give the groups these instructions.

You will be allowed to talk during this part of the game. The members of your group must now decide which three of the six clues reveal the least about your energy source. Eliminate the three clues that reveal the most. I'll give you two minutes to do this, and then I'll ask three people in your group to stand up one at a time and read a clue. After the third clue has been read, everyone in your group will say in unison, "Who are we?"

Now, one person in your group should take the pencil and paper at your station and write the numbers one through ten down the side of the paper. After a groups says "Who are we?" the other groups will have 15 seconds to write down the name of the energy source. Since every source has a number, just write the group's name by the corresponding number on your piece of paper.

The group that identifies the most energy groups wins. Spelling counts!

ELECTRIC CONNECTIONS

Purpose of Activity

Electric Connections teaches students how different energy sources contribute to the generation of electricity. This activity demonstrates the advantages of working together in a group and reinforces the ideas of group sharing and cooperative learning.

Preparation: Low

Time: 30 minutes

GET READY

Make an appropriate number of copies of the Electric Connections Game Instructions sheet and the U.S. Electric Power Generation Sources sheet found on pages 22 and 23.

GET SET

Divide the students into groups of three to five. Give each student a copy of the Game Instructions sheet. Review the game instructions with the students.

GO

Have the students individually rank the ten sources of energy in order of their contribution to the U.S. electricity demand —give them two minutes to complete this task. As a group, give the students six minutes to rank the ten sources of energy. When they are finished, give each student a copy of the Power Generation Source sheet.

OPTION: Before making copies of the Power Generation Source sheet, you may wish to white out the numbers under the "Ranks" column. Have the students fill in their own rankings by checking to see how many million kilowatt-hours of electric power generation each source produces.

ENERGY MATCH GAME

Purpose of Activity

Energy Match Game reviews and reinforces students' knowledge about energy. The activity can take as little as ten minutes or as much as an entire class period. It is suitable for all ages.

Preparation: Low

Time: 30 minutes

GET READY

Select eight of the energy match questions listed below, according to the grade level of the students playing the game. The two most difficult questions of the eight will serve as the final Energy Match Game questions and will be awarded a double point value. For each student, take two sheets of 8 1/2" x 11" paper and cut them in half.

GET SET

Put students into four to six rows so that students cannot see what their fellow team members are writing. You need a minimum of four students per team. Prepare a score board to keep point values for each team. Give each student four sheets of paper. Explain to the students that they will have to write on both sides of each sheet of paper in order to have enough paper for all eight rounds.

GO

Give the students the following instructions for how to play the game:

During the past few weeks, you have all learned a lot about energy. The Energy Match Game will review and reinforce what you have learned. There will be eight rounds in the game. The final two rounds will have a double point value.

To begin a round, I will read a statement and you will have to write your answer in large letters on one of the pieces of paper I have given you. You may not look at the responses that any of your team members are writing down. If you do, your team will be penalized 25 points and will be eliminated from that round. You will have 15 seconds to write your answer and then you must put your pen or pencil down. Every match will be worth five points for the first six rounds.

Let me give you an example of how the game is played and scored. The sample question is "Name a renewable source of energy." You would have 15 seconds to write your answer on one of the sheets of paper, and then everyone would put their pens and pencils down. Next, the first person on team one would show me his answer while telling the class what his answer is. Say, for example, he had written SOLAR. The next person on the team would then show me his answer. If the second person had written SOLAR, then team one would have a match and it would receive five points. If the second person had written WIND, then there would be no match. The third person on the team would then show me his answer. If the third person's answer matched either the first or second person's answer, then team one would receive five points. The fourth person on the team would then show me his answer. If the fourth person's answer matched either the first, second, or third person's answer, then team one would receive five points. We would continue in this fashion until all members of team one had revealed their answers. Then, we would repeat this process for the remainder of the teams. Are there any questions?

MATCH GAME QUESTIONS

- Name an energy source, other than coal, that is used to generate electricity.
- Name a nonrenewable source of energy.
- Name a way to save energy in your car by proper driving habits.
- Name a way to save energy in your car by proper maintenance.
- Name a major energy consuming device in your home.
- Name a country from which the U.S. imports petroleum.
- Name a product, other than gasoline, made from petroleum.
- Name a chemical characteristic of propane.
- Name a unit used to measure electrical power.
- Name a source of energy that does not produce air pollution when used.
- Name an abundant source of energy that is used in the United States.
- Other than the United States, name a country that uses a lot of energy.
- Name a major petroleum producing state in the U.S.
- Name a major coal producing state in the U.S.
- Name an energy consuming device you could not live without.
- Name your favorite source of energy.
- Name the first energy source used by people.
- Name the leading provider of U.S. energy in the year 2020.
- Name the leading transportation energy source in the year 2020.
- Name a way of saving energy for home heating.
- Name a famous energy-related American, alive or dead.

ENERGY ELIMINATORS

Purpose of Activity

Energy Eliminators strengthens students' brainstorming skills while reviewing major energy topics.

Preparation: Low

Time: 45 minutes

GET READY

For each team, make a list of five to ten words or phrases that describe the team's energy source. The number of words or phrases you use will depend on the age level and experience of the students playing the game. You may use the lists below and cross out the words and phrases that you do not want to use, leaving five to ten words or phrases for each energy source. (If you feel that the words we have provided are too difficult, please feel free to make up your own list of words.) Next, write the name of each energy source on the top of a blank sheet of paper. Students will use these sheets to brainstorm their own lists.

GET SET

Divide the students into ten teams. Give students an overview of the game. Give each team the sheet of paper with their energy source name. Explain to the students that they should not show their name to the other teams.

GO

Give the students the following instructions for how to play the game:

Each team has been given a sheet of paper with the name of an energy source. Remember, don't let the other teams see your name. You will have four minutes to brainstorm as many words or phrases as possible that relate to your energy source. For example, if your energy source is ***ELECTRICITY****, what words might you brainstorm that relate to electricity? (List student examples on the board—words might include: kilowatt-hour, generator, megawatt, power plant, and peak demand.) You will now have four minutes to brainstorm words and phrases for your energy source. Write the words you have brainstormed on the sheet of paper that I have given you. Please do your brainstorming quietly so that the other teams will not be able to hear you.*

Now, I will give each team a list of (number) words and phrases that I have selected for their energy source. Compare my list with the list of words you developed. On your list, cross off all the words that match the ones on my list. I will come around and verify your results.

Next, take your sheet of paper and write the numbers one through ten on the reverse side. A student from team one will now stand up and tell the class in a loud, clear voice the words and phrases that you have not crossed off your list. The other teams will write these words next to the number one on their sheet of paper. We will continue in this fashion until all ten teams have had a chance to give their remaining words. You will now have three minutes to decide which energy source the other teams represent.

One at a time, each team will stand up and tell the class the energy source they represent. On your sheet of paper, place an X next to the teams that you guessed correctly. Do not place an X next to your own team—the most you can guess correctly is nine. You receive ten points for each correct guess.

Starting with team one, how many teams did NOT guess the first team's identity? Team one receives ten points for each team that did not guess their identity. (The teacher continues this process with the remaining teams.) Teams should now add up their scores.

Energy Source Names

BIOMASS
- organic matter
- photosynthesis
- burning
- bacterial decay
- methane
- wood
- renewable
- fermentation
- corn
- landfills
- garbage
- gasohol
- ethanol

GEOTHERMAL
- Earth
- electricity
- hot springs
- volcanoes
- radioactive decay
- plate tectonics
- Ring of Fire
- magma
- heating buildings
- steam
- core
- renewable

SOLAR
- nuclear fusion
- radiation
- hydrogen & helium
- renewable
- "space" heating
- collector
- greenhouse effect
- passive system
- active system
- photovoltaic cells
- silicon
- electricity
- water heating

HYDROPOWER
- water
- water wheels
- grind grain
- electricity generation
- Niagara Falls
- kinetic energy
- turbine generator
- dams
- reservoir
- tidal power
- Grand Coulee
- renewable

WIND
- air
- windmill
- rotor blades
- electricity generation
- wind farms
- anemometer
- renewable
- Holland/Dutch
- pump water
- tower
- kinetic energy
- California

NUCLEAR POWER
- uranium
- fission
- chain reaction
- radioactive
- electricity
- 1957
- 109 power plants
- reactor
- neutrons
- cooling towers or ponds
- Three Mile Island
- Chernobyl
- Yucca Mountain
- nonrenewable

COAL
- surface mines
- underground mines
- sulfur
- trains
- electricity
- fossil fuel
- carbon
- nonrenewable
- black lung
- shaft
- bituminous
- anthracite
- preparation plant
- decayed plants and trees

PETROLEUM
- oil
- crude
- imported
- spill
- OPEC
- refinery
- gasoline
- heating oil
- transportation
- tankers
- ANWR
- offshore drilling
- air pollution
- fossil fuel
- nonrenewable

PROPANE
- heating
- transportation
- LP gas
- pressurized tanks
- odorless
- portable gas
- Dr. Walter Snelling
- refining
- nonrenewable
- farms
- industry
- barbecue grills

NATURAL GAS
- heating
- fossil fuel
- methane
- processing plant
- wells
- cubic feet
- compressor stations
- pipelines
- industry
- CNG
- LNG
- nonrenewable

BUMPER STUMPERS

Purpose of Activity

Bumper Stumpers reviews and reinforces students' knowledge about energy. This activity was developed by Cora Ho lon, a Missouri teacher and NEED coordinator.

Preparation: Low

Time: 20 minutes

GET READY

Before class, choose five to ten of the license plates listed below. The number of license plates you use will depend on the age level and experience of the students playing the game.

GET SET

Divide the students into five or more teams. Explain to the students how the game is played. Instruct each team to take out one sheet of paper for their answers. Next, write the license plates that you have chosen on the blackboard.

GO

In the first round, give the students five to ten minutes to solve the Bumper Stumpers without the clues. Once the round is over, check the teams' answers. The teams receive ten points for each Bumper Stumper they guessed correctly. In round two, read the clues that correspond to the license plates on the board. The teams should now try to guess the Bumper Stumpers they missed in the first round. When round two is completed, check the teams' answers again. The teams receive five points for each Bumper Stumper they guessed with the clues. The team with the most points is the winner.

Bumper Stumpers

1. NRGWSTR—This license plate would be ideal for a person who doesn't believe in conserving our resources. (Energy Waster)
2. B8RAA—This plate would be ideal for someone used to making split decisions. (Beta Rays)
3. NDOESTRE—This plate would be appropriate for the leading consumer of electricity. (Industry)
4. SIRAMICK—This plate describes the protective covering that surrounds a uranium fuel pellet. (Ceramic)
5. DSTIL8ON—This plate refers to the process in which petroleum is separated into various components. (Distillation)
6. ALEKHAUL—This plate describes another term for the product of fermentation of biomass. (Alcohol)
7. SWNDOO—This plate identifies the most favorable method of access for passive solar heating. (South Windows)
8. CREWDOYL—This plate suggests another name for a liquid fossil fuel. (Crude Oil)
9. CHAIRNBL—This plate names the site of a nuclear disaster. (Chernobyl)
10. 3MIISLND—This plate names the site of a nuclear accident. (Three Mile Island)
11. SEWLRNRG—This plate describes a type of renewable energy. (Solar Energy)

12. GINOR8OR—This plate names a device containing a magnet and a coil of wire. (Generator)
13. NSIL8ORS—This plate describes the type of materials that do not conduct electricity well. (Insulators)
14. POWRLYIN—This plate identifies the method of transporting electricity across our nation. (Power Line)
15. NCANDSNT—This plate refers to one type of device that turns electrical energy into light energy. (Incandescent)
16. FILAMNT—This plate describes the device inside a light bulb that conducts the electricity. (Filament)
17. YRAINEM—This plate refers to the source of a nonrenewable energy that is not a fossil fuel. (Uranium)
18. POLUTNT—This plate identifies a hazard of burning fossil fuels. (Pollutant)
19. DAREICK—This plate refers to the instrument used to recover petroleum. (Derrick)
20. GRENHOWS—This plate describes a building that effectively uses passive solar heating. (Green House)
21. NEWKLEYE—This plate identifies the place where nuclear fission takes place. (Nuclei)
22. RAYD8T—This plate describes heat energy transfer. (Radiate)
23. SILLYCON—This plate identifies the materials used in turning solar energy into electrical energy. (Silicon)
24. POWRTOWR—This plate refers to a device used to collect solar energy. (Power Tower)
25. RECRE8NL—This plate names the vehicle that often is associated with propane. (Recreational)
26. POWRPUL—This plate names the cooperative of utilities linked together to share electricity efficiently. (Power Pool)
27. BBCUGRIL—This plate names a device that many people use during the summer, some of which require propane to operate. (Barbecue Grill)
28. DSYLFUL—This plate identifies a product of petroleum distillation used by large trucks. (Diesel Fuel)
29. SIZMICK—This plate names the method most often used to locate types of fossil fuels. (Seismic)
30. CANIMALS—This plate names what scientists believe to be the source of several fossil fuels. (Sea Animals)
31. SADMINT—This plate refers to the material that settled on top of ferns to form coal. (Sediment)
32. FIRTLIZR—This plate identifies a way to encourage plant growth for biomass fuels. (Fertilizer)
33. YOTYLTEE—This plate identifies the companies responsible for distributing electricity. (Utilities)
34. RSIRFOR—This plate names the location of potential energy at a hydropower plant. (Reservoir)
35. PNSTOK—This plate signals the portion of a hydropower plant that brings the water to the turbine. (Penstock)
36. FASYLFUL—This plate identifies a term given to several of the nonrenewable energy sources. (Fossil Fuel)
37. TITLPOWR—This plate names a type of hydropower that is affected by the moon. (Tidal Power)
38. WINTRBIN—This plate refers to another name that a windmill might be known as. (Wind Turbine)
39. UNUTTRAN—This plate identifies the method of transportation most commonly used when moving coal. (Unit Train)
40. LYMSTOAN—This plate identifies a type of rock in which petroleum is often trapped. (Limestone)

ENERGY SQUARES

Purpose of Activity

Based on the old game show "Hollywood Squares," *Energy Squares* reinforces students' knowledge of the various energy sources and energy related topics.

Preparation: Low

Time: 30 minutes

GET READY

Before class, make nine nametags for the celebrity energy guests. Names are provided, but you are free to come up with your own first names. Next, make a transparency of the game board found on page 24. Cut out X and O shapes from black construction paper. There are five questions provided for each guest. Most likely, only three or four questions will be needed, so choose the ones you feel are most important. You can also come up with alternative questions appropriate to the grade level of the students playing the game.

Energy Names

Peter Petroleum	Natalie Natural Gas
Christopher Coal	Rebecca Renewables
Nate Nuclear	Christy Conservation
Paul Propane	Elaine Electricity
Herman History	

GET SET

Choose nine students to act as energy guests for the game. Provide each guest with a nametag and stand him in front of the room. Another student acts as the game show host. Divide the remaining students into four teams. Each team must choose one spokesperson. Only two teams can participate at one time—decide which two teams will play in the first round and which two will play in the second round. Flip a coin to determine which first round team begins the game. The winner of the coin toss decides who goes first, and the losing team chooses either X's or O's as their symbol. Repeat this procedure with the second round team.

GO

Give the students the following instructions for how to play the game:

This game is similar to "Hollywood Squares." The goal is to get three X's or O's in a row on the game board. The first two teams will play each other and then the remaining two teams will play. The winners will face off in the final championship round.

The first team chooses a guest and his or her accompanying square on the game sheet. The guests' names correspond to the topic of the question they will be asked. The host asks the guest a question and the guest answers to the best of his knowledge and ability. It is now the team's responsibility to decide whether or not they agree with the answer given by the energy guest. If they answer correctly, the team's symbol is placed in the square. However, if they answer incorrectly, the other team's symbol is placed in the square. After each question, it is the other team's turn to choose a guest.

When choosing guests, keep in mind that this game is played like tic-tac-toe. You are trying to get three of your symbols in a row while blocking your opponents from doing the same thing. Play continues in this manner until all squares are filled with either X's or O's. One final rule—when a team is going for the winning square to get three in a row, the team members must answer the question correctly. If the question is answered incorrectly, the other team does not place its symbol in that square. Again, this is only applicable when one of the teams is going for the winning square. In case neither team succeeds in getting three in a row, the team with the most symbols on the board wins.

Questions and Answers for Petroleum

1. What is the major use of petroleum in the U.S.?
   Transportation
2. What is the major product produced during petroleum refining?
   Gasoline
3. How many gallons of oil are in one barrel?
   Forty-two
4. True or false—Alaska is the nation's top oil producing state?
   False, Texas is the top state
5. What percentage of the U.S.'s petroleum is imported—25%, 45%, or 65%?
   Forty-five percent

Questions and Answers for Natural Gas

1. How is natural gas transported?
   By pipeline
2. True or false—Natural gas is a light yellow color?
   False, it's colorless
3. What is the major use of natural gas by a family?
   Home heating
4. What is the chemical name for natural gas?
   Methane
5. True or false—Natural gas is measured in, and sold by, gallons?
   False, by cubic feet

Questions and Answers for Coal

1. What is the major use of coal?
   Producing electricity
2. True or false—Canada is the world leader of known reserves of coal?
   False, the United States is the world leader.
3. How is coal mainly transported?
   By railroad
4. Is coal the youngest or the oldest fossil fuel?
   The youngest
5. Today, most U.S. coal is produced from which type of mining, surface or underground?
   Surface

Questions and Answers for Renewables

1. What type of solar cell produces electricity directly from sunlight?
   Photovoltaic cell
2. Renewables supply approximately what percentage of total U.S. energy demand—1%, 8%, or 25%?
   Eight percent

3. Which renewable source of energy is NOT a result of the sun's energy striking the earth?
Geothermal

4. True or false—wind is the result of uneven heating of the earth's mantle?
False, uneven heating of the earth's surface

5. Which energy source gets its energy from garbage and agricultural wastes?
Biomass

Questions and Answers for Nuclear

1. Which western state may be the site of the nation's first nuclear waste repository?
Nevada

2. True or false—the isotope of uranium that splits is U238?
False, its U235

3. What is the name of the subatomic particle that causes nuclear fission when it strikes U235—an electron, a neutron, or a proton?
A neutron

4. Plus or minus ten years, in what year did America's first nuclear power plant go into operation?
1957

5. In what part of a nuclear power plant does nuclear fission take place?
The reactor

Questions and Answers for Conservation

1. Which letter of the alphabet is used to measure the value of insulation?
R value

2. True or false—incandescent light bulbs provide the same amount of light that fluorescent bulbs do for one-fourth the energy?
False, it's exactly the opposite

3. After home heating and cooling, what is the most energy-consuming job in the home?
Heating water

4. What two items are used to seal cracks a· d windows and doors?
Caulking and weather stripping

5. As the energy efficiency rating of an appliance increases, the amount of energy it requires to operate: increases, decreases, or remains the same?
Decreases

Questions and Answers for Propane

1. Is propane used mostly in metropolitan or rural areas?
Rural

2. In what quantity is propane sold?
By the gallon

3. What physical state does propane turn into when it's stored under moderate pressure or cooled to -45° F.?
A liquid

4. Fifty-five percent of propane comes from processing which fossil fuel?
Natural gas

5. Is the weight of propane lighter than, heavier than, or equal to the weight of air?
Heavier than

Questions and Answer for Electricity

1. How is electricity used, measured, and sold?
By the kilowatt-hour

2. Plus or minus five cents, what is the cost of a kilowatt-hour of electricity?
Eight cents

3. Is electricity produced by rotating wires in a magnetic field in a turbine or a generator?
A generator

4. In the summer, during what time period does the demand for energy peak—6:00 a.m. to noon, noon to 6:00 p.m., or 6:00 p.m. to midnight?
Noon to 6:00 p.m.

5. What is the leading energy source used to generate electricity?
Coal

Questions and Answers for History

1. Whose motorized vehicle created a great demand for gasoline?
Henry Ford

2. Where was the nation's first hydroelectric power dam plant built in 1895?
Niagara Falls

3. Who invented the steamboat, Robert Fulton or Edwin Drake?
Robert Fulton

4. Who invented the light bulb and other electrical devices?
Thomas Edison

5. After World War II, this energy source replaced coal as the number one energy source.
Petroleum

This activity was submitted by Doug Blemker, Mike Daubs, and Brian Gorman in cooperation with the Indiana NEED Project.

AMERICA'S MOST WANTED ENERGY WASTERS

Purpose of Activity

America's Most Wanted Energy Wasters increases students' awareness of their energy wasting habits and reinforces simple energy-saving behaviors.

Preparation: Low

Class Time: 30 minutes

GET READY

Before class, make a sample wanted poster. Procure a camera and sufficient film for two pictures per student.

GET SET

Explain the activity to the students. Exhibit the sample wanted poster. Take mug shots at this time to generate enthusiasm for the activity.

GO

Brainstorm with the students to produce a list of the common ways that they waste energy daily, for example:

- Leaving the TV on.
- Taking long (or too many) showers.
- Running water while brushing teeth/washing dishes.
- Leaving doors/windows open with heat/AC on.
- Asking for a ride when walking or riding a bike would be appropriate.
- Running dishwasher/washing machine half empty.
- Leaving unnecessary lights on.

Brainstorm appropriate punishments for the crimes. (Skipping a favorite TV show, for example, as punishment for leaving the TV on. Or, washing the dishes by hand as punishment for running the dishwasher half empty.)

Using the list, have each student keep a daily record of the energy crimes that he/she has committed over a designated time period.

Construct wanted posters for each student. If you did not take mug shots of the students before you began the activity, have the students draw pictures of themselves. Use a water-soluble ink pad to take fingerprints. Students should write their own crime descriptions using their daily crime records.

Display the wanted posters prominently for reinforcement. Encourage students to enforce their own punishments.

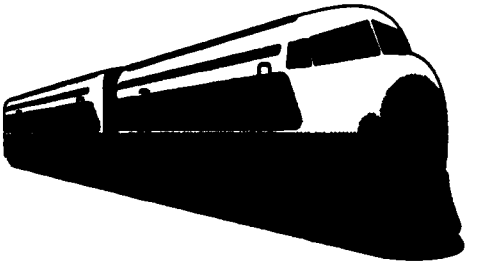
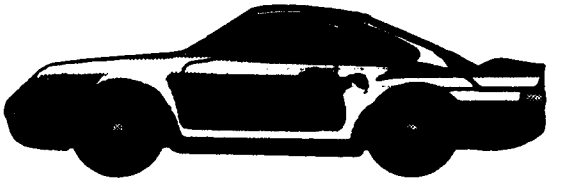
AMERICA'S MOST WANTED
ENERGY WASTER

Charlie Hall, age 10, is suspected of being an energy waster

He is charged with forgetting to turn off the TV before going out to play, asking for a ride to a friend's house just three blocks away, and going to sleep with the radio on. If you see this criminal, call:

1-800-SAVE-NRG

Fingerprints

TRAIN 	**AUTOMOBILE** 
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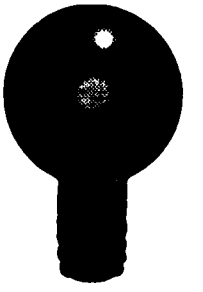
TELEVISION SET 	**LIGHTBULB** 
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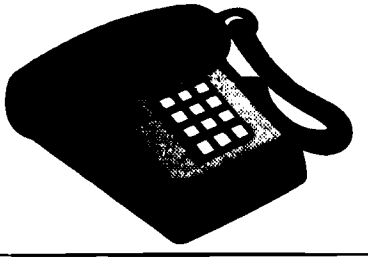
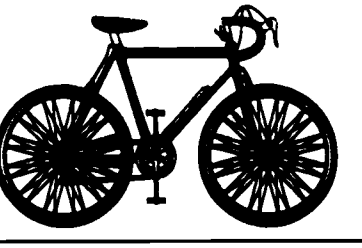
TELEPHONE 	**BIKE** 

ENERGY CHANTS

Petroleum: Blup, Blup, PETROLEUM!

Coal: Working in a coal mine (grunt)—Hard hat!

Natural Gas: Nat'ral gas, gas, (snap, snap) . . . a real gas!

Nuclear: Nuke, Nuke . . . Nuke cle—ar!

Propane: Compress, Compress, Compress . . . Pro—pane!

Hydro: Falling water, hydropower, hydropower!

Biomass: Garbage, Garbage, Biomass!

Geothermal: Shhhhhhhh, Ge—o—ther—mal!

Wind: The answer is blowin' in the wind!

Solar: Sunshine Energy, Yes, Sunshine Energy!

Nonrenewable Energy Sources

Petroleum

1. My major use is for transportation.
2. Almost half of me must be imported from other countries.
3. Most of me is refined into gasoline.
4. I'm number one in the U.S., providing 39 percent of America's total energy.
5. Texas, Alaska, and Oklahoma are the leading states that produce me.
6. Saudi Arabia has the world's largest known reserves of me.

Coal

1. I generate 55 percent of the nation's electricity.
2. I'm transported chiefly by trains.
3. Efforts are made to remove sulfur from me.
4. I'm America's most abundant source of energy.
5. Seven percent of me produced in the U.S. is exported to other countries.
6. West Virginia, Wyoming, and Kentucky are states that produce me.

Natural Gas

1. I heat more than half of the nation's homes.
2. I'm colorless and odorless.
3. My chemical name is methane.
4. Industry is my largest consumer in the U.S.
5. I'm the cleanest burning fossil fuel.
6. I'm transported mostly by pipeline.

Nuclear Energy

1. I'm the nation's second leading source for generating electricity.
2. I'm presently being used in 109 locations in the U.S.
3. I was first used in 1957 to make electricity.
4. I supply about 21 percent of U.S. electricity.
5. The U.S. leads the world in production of electricity from me.
6. Nevada may some day store my waste products.

Propane

1. I'm colorless and odorless.
2. More than half of my supply comes from processing natural gas.
3. My largest use is in rural areas.
4. I supply one percent of the nation's energy.
5. I'm a portable source of heat energy.
6. I'm normally stored under pressure.

Renewable Energy Sources

Hydropower

1. I supply 8.5 percent of U.S. electricity.
2. I'm limited to certain geographic areas of the U.S.
3. I provide 25 percent of the world's electricity.
4. I'm presently being used in 2,000 locations in the U.S.
5. I might disrupt wildlife and fish when my production facility is built.
6. I require the earth's gravity to work.

Biomass

1. Methane gas can be made from me.
2. Photosynthesis stores radiant energy in me.
3. I get my energy from wood, garbage, and agricultural waste.
4. I can be used to generate electricity.
5. Ethanol can be made from me and used as a transportation fuel.
6. Burning me can produce air pollution.

Geothermal

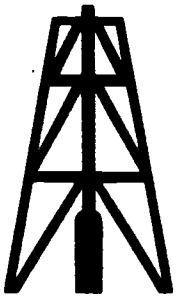
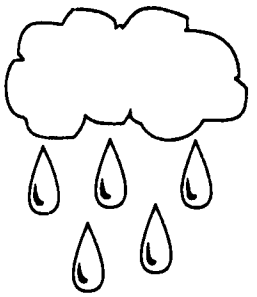
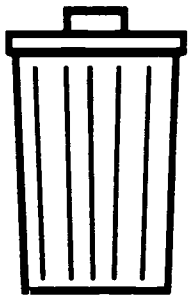
1. I contribute 0.4 percent to U.S. energy production.
2. I'm used mainly in western states.
3. I can be used for home heating.
4. My energy comes from beneath the earth's surface.
5. My major job is production of electricity.
6. I get my energy as a result of radioactive decay.

Wind

1. Ninety-eight percent of the electricity produced from me comes from California.
2. I convert my mechanical energy directly into electrical energy with no cost for the fuel.
3. I produce noise pollution, but no air pollution.
4. In California, my turbines operate 25 percent of the time, mostly in summer.
5. I contribute less than 0.1 percent to U.S. electricity production.
6. I'm caused by uneven heating of the earth's surface.

Solar

1. I'm not available all hours of the day.
2. I can be converted directly into electricity using photovoltaic cells.
3. I'm great for water and home heating.
4. I work better in some parts of the country than others.
5. I've been stored for millions of years in fossil fuels.
6. I'm free, but you have to purchase and maintain my equipment.

PETROLEUM 	**HYDROPOWER** 
COAL 	**BIOMASS** 
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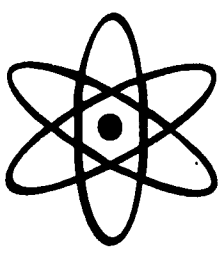
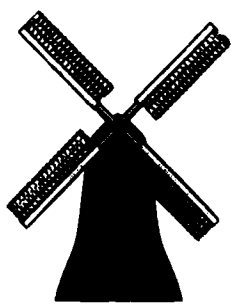
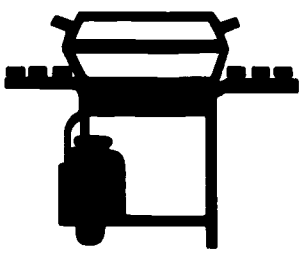
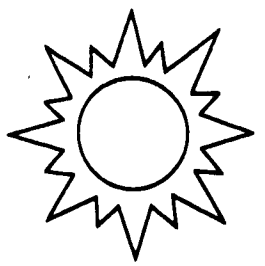
NUCLEAR ENERGY 	**WIND** 
PROPANE 	**SOLAR** 

Hot Water Heating Energy News Team Introduction

Now for tonight's micro-cam report. We have once again miniaturized a member of our Energy News Team staff to give you an inside look at what actually goes on inside your hot water heater. Heating hot water is the second largest energy consuming job in the home, using about 20 percent of total household energy. So, it's important to know what these drops of water are thinking while they're still inside the tank. We find their biggest fear is that their lives may be wasted by carelessness. Here's _____, who always seems to be getting into hot water, with this in-depth report.

* Do not let hot water run needlessly.
  About 20 percent of all the energy we consume in our homes is used to heat water.
* Use cold instead of hot water when running the garbage disposal, and when rinsing dishes before they go in the dishwasher.
  Using cold water saves energy.
* Repair leaky faucets promptly.
  One leaky faucet can leak 6,000 gallons of water each year. That's about 200 baths.
* Wash clothes in warm water and rinse in cold.
  Operating a washing machine takes very little energy. About 90 percent of the energy goes to heating the water.
* Use low-flow shower heads.
  These easy-to-install devices save energy and still provide more than adequate shower pressure.
* Lower the water heater's thermostat to 120 degrees.
  Most hot water heaters are set for 140 degrees or higher. You can save over 10 percent on your energy bill by lowering the temperature.
* Insulate hot water tanks and piping.
  A well-insulated tank can save $10-20 in energy costs over a 12-month period.

Home Heating Energy News Team Introduction

The theft of home heating energy is a normal occurrence. So why the next story? Because our undercover reporter has been able to infiltrate a gang of home heating energy criminals. For the first time ever, we can bring you the story from the point of view of the criminals. Seeing how they operate might help you, our Energy News Team viewer, prevent them from stealing your energy dollars.

* Keep heating equipment well maintained.
  To get the most from your heating fuel, keep furnace filters clean and equipment well tuned.
* Add insulation in the attic and walls where needed.
  Insulation can reduce the load on your heating and cooling equipment by as much as 20 to 30 percent.
* Plant trees to act as a windbreak.
  Trees act as a natural barrier to cold air in the winter and hot sun in the summer.
* During the winter, lower the thermostat to 68 degrees during the day, and 60 degrees at night.
  If every home in the U.S. lowered the heating temperature six degrees, we'd save 570,000 barrels of oil per day.
* Close off unoccupied rooms, and shut off their heating vents.
  Shutting heat vents in rooms that are not used every day saves fuel.
* Caulk and weather-strip doors, windows, and other areas in the home where drafts might occur.
  Proper caulking and weather-stripping can cut fuel costs as much as 10 percent.
* Keep draperies and shades open in sunny windows, and closed at night.
  Energy from the sun provides natural warmth. Close drapes in summer when you want the house cooler.

Cooking Energy News Team Introduction

Do you hate to cook? If slaving over a hot stove isn't your idea of a good time, tonight's Energy Gourmet segment is for you. Imagine telling your family, "We're having microwaved pizza for dinner tonight because I'm trying to save energy." The Energy Gourmet has a few simple tips that will save you energy and money. Who knows, you may even save enough money to eat out more often.

* Never boil water in a pan that is not covered.
  Water will boil faster and use less energy in a covered pan.
* Whenever possible, use a toaster oven or microwave instead of a regular oven.
  These smaller appliances take less time to cook food so you save energy.
* When baking, keep the oven door closed rather than opening it to look inside.
  An open door lets valuable heat escape; maintain the heat by keeping the door shut.
* Clean range pans regularly.
  A clean range pan reflects more heat than a dirty one.
* Only preheat the oven for five minutes or not at all.
  It's also a good energy practice to cook several dishes in the oven at once to make maximum use of this concentrated heat source.
* Use the right size pan for each burner.
  A small pan on a large burner wastes energy because the air surrounding the pan will be heated too.

Lighting Energy News Team Introduction

And now for the segment of the show that enables you, the viewer, to help put a dangerous energy criminal behind bars. It's time for America's Most Wanted Energy Criminals. The FBI has just put Killer Kilowatt-hour on its most wanted list. He has been terrorizing homes throughout the nation by forcing families to waste energy in lighting their homes. Recently, he forced a family to leave ten 100-watt light bulbs on for an hour. If you recognize him from this next segment, please don't try to apprehend him yourself, just call our toll-free number, 1-800-TURNOFF. Remember, he's very dangerous because he's very bright.

* Make sure lights are turned off in rooms where you don't regularly go, such as the cellar or attic.
  Consider installing indicator lights to tell you when those unseen lights are on.
* Use outdoor lights only when needed.
  Consider using an automatic timer that switches off outdoor lighting in the morning.
* Use fluorescent lights whenever possible.
  A fluorescent light lasts 13 times longer and uses 75 percent less energy than an incandescent bulb.
* Dust bulbs and light fixtures frequently because dirt absorbs light.
  Clean fixtures give you up to 50 percent more light.
* Reduce light in non-working areas.
  Lighting needs vary with each task. Adjust your lights accordingly.
* Turn down three-way light bulbs to the lowest setting when watching television.
  Dimmer light reduces glare on the tv and saves energy.
* Use one large bulb, instead of several small ones, in areas where bright lights are needed.
  Concentrate lighting in study areas and in stairwells where it's needed for safety.

Auto Driving Habits Energy News Team Introduction

Our next story may have some of you saying that group therapy sessions have gone too far. This time it's automobiles. Their operators have very bad driving habits, and these habits are driving the cars crazy. We visited one of these sessions to learn what can be done to reduce this conflict between cars and their drivers.

* Do not exceed the speed limit.
  Driving more than 55 MPH uses more gas and oil. Slow down to save fuel.
* Do not overfill the gas tank.
  To avoid spilling gasoline, consider your tank full when the automatic valve shuts off.
* Eliminate jackrabbit starts and stops.
  A smooth, even start can save as much as two miles per gallon over quick, jerky starts.
* Eliminate unnecessary trips, and plan trips carefully.
  If Americans eliminate only 10 percent of the miles they travel each day, the U.S. could save 600,000 barrels of oil per day.
* Be a car pooler, and share a ride.
  Carpooling can save energy, reduce pollution, and make your car last longer.
* Do not let an automobile idle for more than one minute when waiting for someone.
  Less gas is used to restart an engine than allowing it to idle.
* Use public transportation.
  Try to substitute another means of transportation (bus, subway, bicycle, walking) for your automobile at least once a week.

Auto Maintenance Energy News Team Introduction

I've just been handed a bulletin. American automobiles have just called a wildcat strike. They refuse to operate again until their list of demands is met. Their major concern is health care. They feel that their owners are not giving them the maintenance they deserve. An Energy News Team mobile unit brings us this late breaking story from a new car showroom, where new cars are refusing to leave the car lot with their owners. That's right folks, these autos are demonstrators.

* Replace conventional tires with radials.
  Radial tires can improve your car's gas mileage by three to five percent in the city and seven percent on the highway.
* Keep the oil and air filters clean.
  Clogged filters waste gasoline.
* Remove unnecessary weight from the car.
  A heavier car uses more gas to reach its destination. The lighter the load, the better the gas mileage will be.
* Check tire pressure every two weeks.
  Properly inflated tires help maintain good gas mileage. Under inflated tires decrease fuel economy by as much as one mile per gallon.
* Have the car's engine tuned regularly.
  A well-tuned engine can improve gas mileage as much as 10 percent.
* Select the correct gasoline octane and grade of oil for your car.
  If you change the oil yourself, take the used oil to a service station for recycling.

Energy Bingo

Instructions: Find 16 people who can answer questions A through P and write their names in the corresponding boxes below.

A. knows the cost of a kilowatt-hour

B. can name a fossil fuel

C. can name two ways to increase a car's MPG

D. can name two renewable energy sources

E. has visited a power plant

F. can name two ways to save energy at home

G. uses a hand-operated can opener

H. has never seen coal

I. recycles aluminum cans

J. has taken a cold shower

K. has seen a photovoltaic cell

L. knows how natural gas is transported

M. knows one way to use solar energy at home

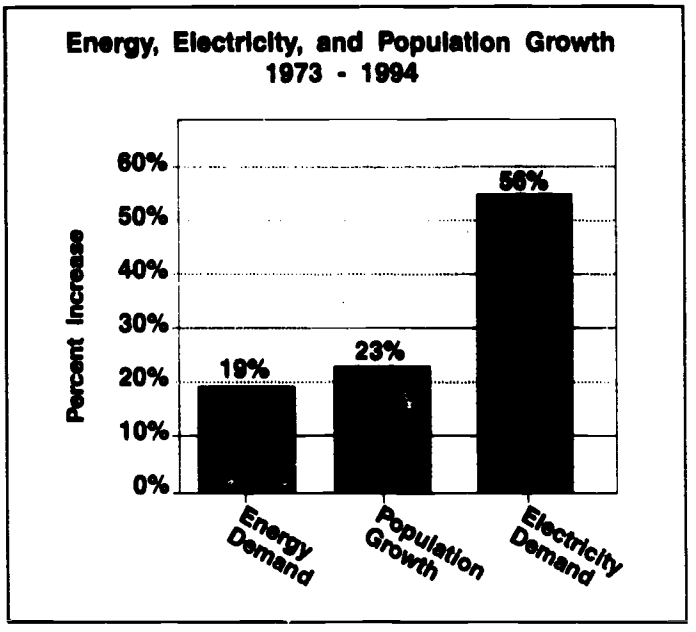
N. uses a solar clothes dryer

O. knows which fuel is used in barbecue grills

P. knows how uranium atoms give off energy

A _____ name _____	B _____ name _____	C _____ name _____	D _____ name _____
E _____ name _____	F _____ name _____	G _____ name _____	H _____ name _____
I _____ name _____	J _____ name _____	K _____ name _____	L _____ name _____
M _____ name _____	N _____ name _____	O _____ name _____	P _____ name _____

ELECTRIC CONNECTIONS
Game Instructions



Thirty-five percent of the nation's energy is used to make electricity. Experts predict that the figure will be forty percent by the year 2000. The United States is becoming more dependent on electricity to meet its energy needs. In the past 20 years, the U.S. demand for electricity has grown by 56 percent, even though the population has grown only 23 percent and our energy demand by 19 percent. To meet this demand a variety of energy sources are used to make electricity. Some energy sources produce a substantial amount of the electricity we need, while others produce less than one-half a percent.

Individual Instructions

Your task is to rank the ten sources of energy in order of their contribution to U.S. electricity production. Place a number one by the source that provides the largest amount of electricity, a number two by the source that provides the second largest, down to a number ten by the one that provides the least amount of electricity. As you are doing this, try to think of good reasons for your ordering.

Group Instructions

Starting at the top of the list, ask members to contribute any knowledge they have about each energy source. Brainstorm by asking group members questions such as:

- Is this source limited to a certain area of the country?
- Are there any problems or limitations associated with this source?
- Have you ever seen a power plant that uses this particular source of energy?

One person in the group should take notes. Once the group has gone through the list, it should divide the ten energy sources into three levels of importance: the top three most significant energy sources, the middle four moderately significant energy sources, and the bottom three least significant energy sources. The group should then rank the ten sources of energy in order of their contribution to U.S. electricity production.

Here are the ten sources used to generate electricity:

Source	Your Rank	Group Rank
Biomass		
Coal		
Geothermal		
Hydropower		
Natural Gas		
Nuclear Energy		
Petroleum		
Propane		
Solar		
Wind		

U.S. Electric Power Generation Sources

Name	1994 Statistics	Ranks	Your Ranks	Error Points	Group Ranks	Error Points
Biomass	Biomass produces 61,477 million kilowatt-hours of electricity. This represents approximately two percent of the nation's electricity. Biomass energy is usually the result of burning wood waste and solid waste.	6				
Coal	Eighty-eight percent of the nation's coal is consumed by electric utility companies to produce electricity. Coal produces 1,635,000 million kilowatt-hours of electricity, which is 55 percent of the nation's electricity.	1				
Geothermal	Geothermal energy produces 18,117 million kilowatt-hours of electricity, chiefly from geothermal facilities in the western United States. Geothermal energy produces 0.3 percent of the nation's electricity.	7				
Hydropower	Eight and one-half percent of the nation's electricity is generated by 2,000 dams nationwide. Hydropower produces 247,000 million kilowatt-hours of electricity. It is the leading renewable source used to provide electricity.	4				
Natural Gas	Natural gas produces 291,000 million kilowatt-hours of electricity, generating ten percent of the nation's electricity. Approximately one-half of this natural gas is used by gas turbines to provide electricity during peak hours of demand.	3				
Nuclear Energy	One hundred and nine nuclear power stations provide the nation with 21 percent of its electrical energy needs. Nuclear energy produces 639,000 million kilowatt-hours of electricity.	2				
Petroleum	Petroleum provides 3.1 percent of the nation's electricity through 91,000 million kilowatt-hours of electric power generation.	5				
Propane	There are no statistics available for propane's contribution to electrical production. Very little propane, if any, is used to produce electricity.	10				
Solar	Solar provides less than 0.0001 percent of the nation's electricity through 0.9 million kilowatt-hours of electricity. Electricity can be generated from the sun by solar thermal systems or photovoltaics.	9				
Wind	Wind energy produces 3,500 million kilowatt-hours of electricity. Wind energy provides less than 0.1 percent of the nation's electricity. Ninety-eight percent of the nation's wind generated electricity is produced in California.	8				
				TOTAL _____		_____

Error points are the absolute difference between your ranks and EIA's (Disregard plus or minus signs).

Scoring for individuals:

0-12—excellent
13-18—good
19-24—average
31-36—poor
37-42—very poor

Source: Energy Information Administration

Energy Squares

Peter Petroleum	Natalie Natural Gas	Christopher Coal
Rebecca Renewables	Nate Nuclear	Christy Conservation
Paul Propane	Elaine Electricity	Herman History