DOCUMENT RESUME

ED 175 712 SE 028 750

AUTHOR Land, Amy A.
TITLE Energy Conservation.
INSTITUTION Mississippi State Univ., State College. Cooperative Extension Service.
SPONS AGENCY Department of Energy, Washington, D.C.
REPORT NO MEEC-33
PUB DATE 78
GRANT DOE-EU-76 -05-5873
NOTE 27p.; For related documents, see SE 028 747-757; Contains occasional light type
AVAILABLE FROM Mississippi Energy Extension Center, P.O. Box 5406, Mississippi State, MS 39762 (no price quoted)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Conservation (Environment); *Curriculum Planning; *Energy; *Energy Conservation; *Environmental Education; Interdisciplinary Approach; Natural Resources; *Secondary Education
IDENTIFIERS *Energy Education; Mississippi

ABSTRACT

This selection of class activities involves a sequence of 10 class sessions. The goal of the collection is to aid students in learning the concepts of energy conservation and to put this knowledge into practice. Attention is also given to the development of alternate energy sources. Each lesson includes an activity title, motivational hints, lesson purpose, materials needed, and instructions to students. A list of free and inexpensive resource materials and sources of them is provided at the end of the document. (RE)

ENERGY CONSERVATION

by Amy A. Land

Prepared for the 1978 Faculty Development Workshop, Mississipp Energy Extension Center and Golden Triangl Regional Educational Service Agency cooperating

This teaching unit was prepared with the support of the U.S. Department of Energy (DOE), Grant No. EU-78-G-05-5873. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author, and do not necessarily reflect the views of DOE.

For more information on this teacher's unit or others, contact:

Mississippi Energy Extension Center
P.O. Box 5406
Mississippi State, MS 39762
(601) 325-3137

Energy Conservation

RATIONALE:

Americans need to learn and practice energy conservation; the place to start is with our young people, through our school systems.

GOAL:

The students need to learn that although alternate energy sources are being sought and developed, each person needs to take conservation seriously to survive the energy crisis and maintain the present standard of life.

SUBJECT AREA, LEVEL:

Eighth grade English, average and above average achievers.

PREREQUISITES:

Students should be able to do these things:

-read with comprehension.
-express himself/herself effectively in writing.
-utilize previously learned language skills.
-use knowledge about energy from science courses or a previously taught energy awareness unit.

TEACHER'S GOALS:

The teacher will endeavor to accomplish these things:

-present factual information to facilitate the students' learning about conservation.
-urge the necessity of implementing conservation as a partial solution and as a national economic response to the energy problem.
-lead students to understand America's dependency upon energy.
-encourage students to think in terms of wise and efficient use of resources before buying or using consumer products.
-bring students to understand that recycling is a necessary part of conservation.
-involve youth in "learn-by-doing" activities which point out the need for conservation.
-present opportunities for students to become aware of their community's energy concerns and problems, and the effects of those problems.
-involve parents and community--through the students--in the execution of conservation projects.
-develop an energy information center for the school.
-help students develop an energy conservation ethic.

INTRODUCTORY CONTENT:

The teacher should order before hand from the resource list, so that as much material as possible is on hand before the unit is begun. Make sure there is a copy of "Mickey Mouse and Goofy Explore Energy" and "Mickey Mouse and Goofy Explore Energy Conservation" for each student. These materials should be read by the teacher beforehand. All unit material ordered by the teacher and collected by the students should be placed in the school's media center after the unit, so all students can use them.

EVALUATION:

In the course of the unit, students will compile a notebook which will include:

1. Multiple choice energy exercise
2. Energy shortage problem and solution
3. Energy priorities list
4. Residential energy checklist
5. Energy logs
6. Results of interviews
7. Newspaper recycling results
8. Short stories

As a suggested outside activity, each student may be asked to develop a slogan to decorate his notebook cover. Each should strive for creativity and originality.

These notebooks will serve as a unit evaluation.

DAY 1

Activity:

Energy Multiple Choice

Motivation:

Teacher announces a pop test. After initial shock, the teacher further announces that the test will not be graded but will be used for an assessment of their energy knowledge.

Lesson purpose:

By means of a multiple choice energy exercise and class discussion, the students will become more aware of the need for energy conservation.

Materials needed:

Mimeographed sheets for multiple choice exercise, copy of "Mickey Mouse and Goofy Explore Energy" and "Mickey Mouse and Goofy Explore Energy Conservation" for each student.

Instructions to students:

1. Hand out sheets; give students 10 minutes to answer.
2. Go over correct answers; point out the need for more information.
3. Give each student a copy of each magazine to read silently.
4. Discuss energy sources; lead them to realize that conservation is the answer to our energy crisis.
5. Before class meets again, have students: list five things in their homes that depend on electricity to make them work; make a complete sentence with each one, describing its use; list five things in their homes that require electricity for production, and make a complete sentence with each one.

MULTIPLE CHOICE: Answer these multiple choice questions. This material is based on information available from the U.S. Department of Energy.

_____1. Fossil fuels include all of the following except:

a) coal
b) natural gas
c) oil
d) wood

_____2. The primary source of energy that meets the greatest percent of U.S. energy demands is:

a) coal
b) nuclear
c) natural gas
d) oil

_____3. The group using the largest share of U.S. energy is:

a) industry
b) residential
c) transportation
d) commercial

_____4. According to estimates, at current levels of use the U.S. has enough coal to last approximately:

a) 50 years
b) 500 years
c) 150 years
d) 350 years

_____5. The amount of oil used in the U.S. as compared to the amount produced is:

a) only as much as
b) slightly more than
c) only half as much
d) almost twice as much

_____6. Consumer products made from petroleum include all but:

a) plastic wrap
b) synthetic leather
c) acrylic knits
d) batteries
e) pet food
f) detergent

_____7. Disadvantages of solar energy include all but:

a) difficulty of storage and transportation
b) technology not fully developed
c) pollution of air and water
d) high expense of installation for both new and existing structures

_____8. For its oil supply, the U.S. imports from the Organization of Petroleum Exporting Countries (OPEC) approximately:

a) 30 percent
b) 50 percent
c) 70 percent
d) 90 percent

_____ 9. The primary economic problems resulting from ever-increasing oil imports and ever-increasing prices are:

a) trade deficit
b) unemployment
c) recession
d) short supply

_____10. Ways to dampen the demand for oil could include all but:

a) rationing
b) letting prices go up as supplies dwindle
c) government price controls
d) tax and price penalties for heavy users

_____11. In American homes the greatest amount of energy is used for:

a) lighting
b) heating and cooling
c) electric appliances
d) gas appliances

_____12. The disadvantages of turning to nuclear energy as an alternative to fuel oil include all but:

a) high cost of developing and building breeder reactors
b) high levels of radioactive waste
c) inefficiency of nuclear fuel
d) the plutonium by-product which is used for atomic bombs and must be isolated and protected from theft

_____13. The home appliance using the highest number of kilowatt hours per year is a:

a) range
b) frostless freezer
c) water heater
d) color television set

_____14. Measures for conserving fuel in the home include all but:

a) insulating properly
b) installing storm windows and doors
c) extensive use of fireplace
d) laundering in cold water and limiting the use of a dishwasher

Answers to multiple choice:

1-d
2-d
3-a
4-d
5-d
6-e
7-c
8-c
9-a
10-c
11-b
12-c
13-c
14-c

DAY 2

Activity:

Energy Shortage Problem

Motivation:

The teacher says: "There was a radio announcement this morning that warned of a complete residential electrical and gas cut off from 7 - 9 p.m. What plans will you make for tonight? Give 3 - 4 minutes for thinking. Have students answer. Teacher says: "Let's look at the things in your home that depend on electricity for their manufacture or operation."

Lesson purpose:

By means of class discussion and presentation/solution of problem, the students will discover the necessity of conservation as a partial solution to the energy crisis and will recognize their dependency on energy.

Materials needed:

Mimeographed Residential Energy Checklist, pencils, paper, problem for consideration to be written on chalkboard.

Instructions to students:

1. Have students read their assignment from the previous day aloud. Point out the uselessness of listed equipment if there were no energy supplies.

2. Have students consider this problem:

   It is a very cold winter and there is a critical shortage of fuel. The government has reduced each family's fuel allocation by 25 percent.

3. List ways to deal with the problem. What can each person's family do? Father? Mother? Children? How can they still be comfortable if they reduce the temperature in their home?

4. Rewrite in acceptable form to be placed in notebook.

5. Give checklist to each student to take home for completion. Allow two days for completion.

Procedure:

The following checklist can be used by you (the student), your parents, friends, and relatives as a handy guide to systematically search for residential energy waste and potentials for conservation. The checklist does not attempt to quantify the energy loss, or estimate the cost to alleviate the problems.

RESIDENTIAL ENERGY CHECKLIST

House: The Shell

YES	NO		
___	___	1.	Are plants properly located around the house to provide a break against wind and shade against unwanted sun?
___	___	2.	Are drapes and furniture located so they do not obstruct heating, air-conditioning or ventilation?
___	___	3.	Are draperies insulated?
___	___	4.	Do draperies fit snugly around the window?
___	___	5.	Are exterior house doors closed quickly after use?
___	___	6.	Are lights and appliances turned off after use?
___	___	7.	Do you have storm windows and doors?
___	___	8.	Are all doors and windows properly caulked and weatherstripped?
___	___	9.	Are draperies and shades closed at night and on cloudy, windy days during the heating season?
___	___	10.	Are draperies opened to admit sunlight on sunny days in the heating season?
___	___	11.	Are draperies and shades closed on sunny days during the cooling season?
___	___	12.	Is the attic ventilated?
___	___	13.	Is the attic insulated to 6-8"?
___	___	14.	Are the walls insulated?
___	___	15.	Do floors exposed to unheated or cooled air have from 2 - 3 1/2" of insulation?
___	___	16.	Is the fireplace damper closed when not in use?

YES	NO		
___	___	17.	Is the den, gameroom or family room oriented to the south?
___	___	18.	Is the house shaded from the western sun?
___	___	19.	Does your home have window area equivalent to 10 percent or less of its square footage?
___	___	20.	Is your home sealed from drafts? Is it free from cracks and holes?
___	___	21.	Does your home have wall-to-wall carpeting?
___	___	22.	Does your home have fluorescent lighting where appropriate?
___	___	23.	Do all windows have drapery, shades, blinds, shutters or other covering?

Environmental Control

___	___	24.	Are ducts, radiators or air-conditioners closed off in unused rooms or closets?
___	___	25.	Are hot water pipes insulated in unheated and uncooled spaces?
___	___	26.	Are air ducts insulated in unheated and uncooled spaces?
___	___	27.	Is the thermostat set at 68 degrees Farenheit or below during the heating season?
___	___	28.	Is the thermostat set at 78 degrees Farenheit or above during the cooling season?
___	___	29.	Are heating and cooling filters clean?
___	___	30.	Is the thermostat turned back at night?
___	___	31.	Are windows and doors tightly closed while mechanically heating or cooling?
___	___	32.	Is an attic fan used in the summer?
___	___	33.	Do thermostats indicate correct temperature settings?
___	___	34.	Is an outside air-conditioning unit located on the shady (north) side of the house?
___	___	35.	Is the water heater insulated?

YES	NO		
___	___	36.	Is the water heater temperature setting at 140 degrees Farenheit or less?
___	___	37.	Is the air-conditioning unit properly sized for your needs?
___	___	38.	Do you have a heat pump?
___	___	39.	Do you use natural ventilation as much as possible?
___	___	40.	Are radiators and other heating or cooling equipment clean and dust free?
___	___	41.	Is the water heater located in a heated space?

Housing Selection

___	___	42.	If you live in an apartment, is it an "inside apartment"?
___	___	43.	If you live in a mobile home, does it have a "skirt"?
___	___	44.	If you live in an older home, have its plumbing, wiring, insulation and chimneys been checked by "experts"?

Food

___	___	45.	Is the frost on the refrigerator and freezer less than 1/4 inch thick?
___	___	46.	Is the refrigerator set at 40 degrees Farenheit?
___	___	47.	Is the freezer set at 10 degrees Farenheit?
___	___	48.	Are gaskets around refrigerators and freezers tight?
___	___	49.	Is the oven used to bake more than one food at a time?
___	___	50.	Is the gasket around ovens tight?
___	___	51.	Are frozen foods thawed completely before cooking?
___	___	52.	Is the cooking range turned off immediately after use?
___	___	53.	Are dishes washed only when there is a full load?
___	___	54.	Are dishes allowed to air dry?
___	___	55.	Are appliances clean and dust free (particularly cooling coils)?

YES	NO		
___	___	56.	Is the oven never used as a dryer or heater?
___	___	57.	Are flat bottom pots and pans used?
___	___	58.	Is a timer used to avoid over-cooking?
___	___	59.	Are pots covered during cooking?
___	___	60.	Is as little water used as possible during cooking?
___	___	61.	Is the heated dry cycle on the dishwasher not used?

Clothing

___	___	62.	Does your family dress warmer in cool weather to avoid mechanical heating?
___	___	63.	Does your family dress cooler in warm weather to avoid mechanical cooling?
___	___	64.	Are clothes washed only when there is a full load?
___	___	65.	When washing, is cold or warm water used when possible?
___	___	66.	Are clothes line dried when possible?
___	___	67.	Are most of your family's clothes wash-and-wear, permanent press to avoid dry cleaning and ironing?
___	___	68.	Are clothes always rinsed with cold water?
___	___	69.	Is the washer located near the water heater?
___	___	70.	Is the dryer lint screen cleaned after each load?

Personal Care

___	___	71.	Do the members of your family take short showers or use only small amounts of water for tub baths?
___	___	72.	Are all water faucets repaired and not leaking?
___	___	73.	For washing, shaving or make-up is the lavatory filled rather than allowing water to run?

Entertainment

___	___	74.	Are entertainment devices turned off when not in use?
___	___	75.	Do members of your family try to entertain themselves rather than rely on devices?

DAY 3

ACTIVITY:

Student awareness of priorities in lifestyle

MOTIVATION:

"Save it." Two students are given suckers. One student is told to bite and eat rapidly; another, to lick to make it last longer. Ask: "What if a magician changed them to something else - coal, oil, gas? How could I make sure I would have some for tomorrow?" Response should be to conserve. Lead students to the idea of priorities in his lifestyle.

LESSON PURPOSE:

By means of a priority list, the student will learn by doing an activity that further points the need for conservation in his personal life.

MATERIALS NEEDED:

Paper, pencils, chalkboard.

INSTRUCTIONS TO STUDENTS:

1. Students will list the appliances they use each day.

2. Have them place them in the following chart:

Luxury	Convenience	Necessity

3. Ask these questions: Are there any items in the "necessity" column that were once considered either "luxury" or "convenience" items?

4. Ask students to list the ten appliances every family would choose if it could only have ten.

5. Compile data by putting a chart on board. Try for agreement on ten most necessary items.

6. Put list in notebook.

DAY 4

Activity:

Residential Energy Checklist

Motivation:

Teacher says, "Let's check your energy checklists to see whether you are a good conservation advocate or whether you need to reform."

Lesson purpose:

By means of a residential energy checklist, the student and his family will have been involved in a conservation awareness effort.

Materials needed:

Residential Energy Checklist already completed by each student, pencils, energy log information on chalkboard.

Instruction to students:

1. Have each student total the number of yes responses on his checklist.

2. Give students these guidelines:

   -If you answered with 65 or more yeses, you are truly an energy conserver and will make a good conservation advocate.

   -If you answered with 55 to 65 yeses, you are energy-conscious but lack willpower or drive.

   -If you answered with 45 to 54 yeses, you are wasting energy but with minor changes could make a conserver.

   -If you answered with 35 to 44 yeses, you are an energy waster and should make an all-out effort to reform!

   -If you answered with less than 35 yeses, you are making an effort to waste energy and should consider the long range and immediate effects! What if everyone were like you?

3. As homework have the students keep an energy log for one day (from this calendar to the next,) checking each time they do one of these things:

   -Use energy directly - (example: turn on an appliance)

   -Use energy indirectly - (example: run hot water)

-Use public energy - (example: ride the bus)

-Use a product made of petrochemicals - (example: synthetics)

-Use a product which requires energy in manufacturing

DAY 5

Activity:

Energy Logs

Motivation:

Teacher suggests a hidden source of energy that students may have overlooked on their energy logs. Call for responses from energy logs.

Lesson purpose:

By means of an energy log, the students will see hidden sources of energy to further point out individual dependence on energy.

Materials needed:

Energy logs compiled by students, pencils, chalkboard, mimeographed sheets for interviews.

Instructions to students:

1. Have each student give one use from his energy log; be sure there is no repetition.

2. Have students check off unnecessary uses of energy.

3. Based on the logs, list on the chalkboard 25-30 most frequent uses of energy and arrange in order, from most necessary to least necessary. Discuss.

4. Hand out interview questions to be returned on second day of second week. (Tuesday)

5. For Monday, have students collect and bring to class all boxes, wrappings, trays, foil, plastic, etc., used to supply one week's groceries.

6. Assign a short story due on Thursday of the second week. It should be in acceptable form for their notebooks. These are the choices:

   Why I Prefer Small Cars

   Conserving Energy is the Best Thing That Ever Happened at Our Home

   Car Pools - A Great Way to Meet People and Make Friends

Interview questions:

1. Do you believe there is an energy crisis?

2. Have you seen evidences that forms of energy are being used up?

3. Has the energy shortage affected your job?

4. In the year 2000 what energy source do you think will be most used? Why?

5. What are you doing personally to conserve energy? Can you do more?

These questions are to be asked of two adults, preferably someone other than a family member.

DAY 6

Activity:

It's In The Bag

Motivation:

Teacher brings to class an item from the grocery store. It should be a convenience item, ready-to-eat or quickly prepared. Point out the advantages, but be sure to point out the disadvantages, price, packaging, etc. Make the point that although they are convenient, they waste energy.

Lesson purpose:

By means of samples brought to school, students will recognize sources of wasted energy and realize the value of recycling as a means of conservation.

Materials needed:

Materials brought by students, paper, pencils, old newspapers.

Instructions to students:

1. Have students show items they have brought.

2. Discuss ways these are wasteful.

3. List ways to reduce packaging. List possibilities for recycling.

4. Give each student a double sheet of newspaper to take home. By Wednesday he should find at least one way to recycle the paper. If he finds three ways, he will receive extra points; five ways, even more points. This is to be written up for his notebook.

DAY 7

Activity:

Interviews

Motivation:

Teacher asks for any unusual findings from interviews. She should ask for the students' feelings about the results of the interviews.

Lesson purpose:

By means of interviews conducted prior to class, students will learn of the community's energy concerns and how it has been affected by its energy problems.

Materials needed:

Interview results

Instructions to students:

1. Students will respond orally to the results of their interviews. Each student is to have a turn.

2. Ask for overall evaluation. (Do you think this community is concerned about the energy crisis, etc.)

3. Have students write up the results for their notebooks.

4. Remind students of the recycling project to be returned for tomorrow. The results are to be written up for their notebooks.

DAY 8

Activity:

Newspaper Recycling Results

Motivation:

Teacher brings an item made from newspaper.

Objective:

By means of recycling a piece of newspaper, the students will learn that recycling is a valuable part of energy conservation.

Materials needed:

Items brought by students.

Instructions to students:

1. Students will show and describe orally what they have recycled from a sheet of newspaper.

2. After each student has shown his work, the results are to be written up to put in notebooks.

3. If there is time, discuss other items that can be recycled.

4. As an assignment, have the students write down three things in their homes that could be recycled but are now being wasted. This may be written on the page with the newspaper recycling.

5. Remind students of short stories due tomorrow.

DAY 9

Activity:

Short Stories

Motivation:

Teacher will call attention to guidelines for good writing and give time for proofreading.

Objective:

By means of a short story, the students will be forced to think about what they have learned and to further develop a conservation ethic.

Materials needed:

Short stories written prior to class; pencils, paper.

Instruction to students:

1. Each student will proofread his own story. Let students proof each other's paper.

2. If there is time, some may want to read their papers orally. If all who want to read do not have time, schedule another time when they may be read.

3. Remind students that completed notebooks are due tomorrow. Remind them that they will have the opportunity to have other students check their notebooks before turning them in.

DAY 10

Activity:

Energy Notebooks

Motivation:

Teacher should call attention to points on which their notebooks will be graded. Students should be reminded that they will have an opportunity to check with each other and with the teacher before turning them in.

Lesson purpose:

By means of a notebook on the conservation of energy, the students will begin to develop a conservation ethic.

Materials needed:

Notebooks compiled by students during the two-week conservation unit, list of items on chalkboard

Instructions to students:

1. Remind students to check with the list on the chalkboard to make sure they have all the required items.
2. Give opportunity for students to ask any questions concerning the notebook.
3. Give opportunity for students to check with each other and to proofread.
4. Turn in notebooks.

Available Resources - Free and Inexpensive Materials

Publications

America's Energy Dilemma: Facts Versus Fallacies
Independent Petroleum Association of America
1101 Sixteenth Street
Washington, DC 20036

Energy-Environment Mini-Unit Guide
An Energy History of the United States
National Science Teachers Association
1724 Connecticut Avenue, N. W.
Washington, DC 20009

"Factsheet Energy: The American Perspective Energy Basics"
Department of Energy Technical Information Center
P. O. Box 62
Oak Ridge, TN 37830

Looking For Energy? A Guide to Information Resources
American Petroleum Institute
1801 K. Street, N. W.
Washington, DC 20006

"Mickey Mouse and Goofy Explore Energy"
"Mickey Mouse and Goofy Explore Energy Conservation"
Available from
Exxon Company
Public Affairs Department
P. O. Box 2180
Houston, TX 77001

"Our Energy Problems and Solutions"
Kitty Borah
Special Services Representative
Shell Oil Company
P. O. Box 2463
Houston, TX 77001

"101 Ways to Conserve Electricity at Home"
Commonwealth Edision
P. O. Box 767
Chicago, IL 60690

Information

American Public Power Association
2600 Virginia Avenue, N. W.
Washington, DC 20037

Consumer Information Services
Sears, Roebuck & Co.
D/703
Sears Tower
Chicago, IL 60684

Energy & Man's Environment, Inc.
0224 SW Hamilton
Portland, OR 97201

Produced and distributed in Mississippi by Mississippi Energy Extension Center, Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. W.M. Bost, Director.

MEEC-33 (300-2-79)