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AUTHOR Abbott, Verlin M.
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ABSTRACT

This unit, developed for use with junior high school students, focuses on industry as an integral part of community life. It discusses factors industry should consider before choosing a location; it attempts to demonstrate that industry should not always be regarded negatively in a given community, but rather that it can benefit a community by providing employment opportunities and additional tax revenue. The unit stresses the manufacturing and processing aspects of production and not the distribution and retailing features. It also emphasizes the value of cooperation between industry and local citizens. Two publications necessary to teach the unit are listed along with additional teaching aids in a section for the teacher. The unit includes the behavioral objectives and the expected student criteria for evaluation, pretests and posttests, teacher background information, a suggested instructional sequence, a bibliography of both student and teacher resources, student data sheets and readings. (MLB)

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ENVIRONMENTAL ECOLOGICAL EDUCATION PROJECT



Parkway School District
Chesterfield, Missouri



DR. WAYNE FICK, Superintendent
VERLIN M. ABBOTT, Project Director

OCT 1 1973

UNIT: "BCOMSVILLE TO DOOMSVILLE"
Development of Industry
Within a Community

Revised July, 1973

Jr. High

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SETTING

For the purposes of this unit, industry is considered as any productive enterprise that indirectly provides goods for people in a community. The unit stresses the manufacturing and processing aspects of production and not the distribution and retailing features of business. Like most aspects of American life, industries require capital investment and making a profit from that investment in order to survive.

Industry is an integral part of community life. Without it a community may die. On the other hand industry creates its share of problems when it locates in any local area.

In this unit we are trying to show that an industry needs to consider a number of important factors in choosing a location in order to help achieve its profit making goal so that it can survive. We are also trying to show that industry does not necessarily mean "bad news" because it locates in a given community, but that in fact it brings some benefits with it, such as employment and additional tax revenue that is used to benefit other segments of the community. We have also tried to point out problems that industry can bring with it.

It is our hope that anyone teaching the unit will stress the value of cooperation between industry and the citizens living in the community.

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TO THE TEACHER

IT WILL BE NECESSARY FOR YOU TO ORDER THE FOLLOWING MATERIALS WELL IN ADVANCE OF TEACHING THE UNIT. SEVERAL ACTIVITIES IN THE UNIT ARE BASED ON THESE MATERIALS. IN EVENT YOU HAVE SOME PROBLEM ACQUIRING THESE MATERIALS CALL JUANITA MCKEE, SOUTH JUNIOR HIGH, 527-0270.

OUR POLLUTED WORLD
American Education Publications
Education Center
Columbus, Ohio 43216

These are inexpensive paperback booklets and you should order approximately 30, or one classroom set.

ENERGY AND ECONOMIC GROWTH
American Petroleum Institute
1271 Avenue of the Americas
New York, New York 10020

These materials are free. Along with 30 student copies ask that they send you the TEACHERS MANUAL AND THE 6 COLOR WALL CHARTS.

We suggest that you make every effort to order the following classroom aides and references as classroom resource materials this year.

THE GAME MONOPOLY
Available at department stores

THE POLLUTION GAME
Available at department stores or
Houghton Mifflin Company
Geneva, Illinois 60134

YOU AND THE INVESTMENT WORLD (THESE ARE FREE)
New York Stock Exchange, Educational Division
11 Wall Street
New York, New York 10005

LIFE ON THE RIVER by Norbury Wayman
Crown Publishing Company
Available at The Museum of Transport
Barretts Station Road
Kirkwood, Missouri 63122

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NEEDED: CLEAN AIR. THE FACTS ABOUT AIR POLLUTION.

Channing L. Bete Company, Inc., Box 112

Greenfield, Massachusetts 01301

Booklet (Catalog # 1454-1616)

May be obtained from the publisher for 25¢ each (16¢ each
in lots of 100; 10¢ each in lots of 1,500)

Note to teacher-order at least enough for your particular class.

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TO THE TEACHER

The following booklets and pamphlets may be ordered free of charge. They are excellent student aids in the classroom.

1. **MONSANTO AND THE ENVIRONMENT**
Monsanto Co. (Public Relations Department)
800 N. Lindbergh Blvd.
St. Louis, MO 63166
2. **OPERATION GREEN EARTH**
Public Relations Dept.
Peabody Coal Co.
301 Memorial Dr.
St. Louis, MO 63102
3. **Union Electric's Goal: ECONOMICAL ELECTRICAL POWER WITHOUT AIR POLLUTION**
Public Relations Dept.
Union Electric
P.O. Box 87
St. Louis, MO 63166
4. **WOOD RIVER REFINERY AND THE ENVIRONMENT**
Shell Oil Co. Refinery
Wood River, IL
5. **AIR AND WATER POLLUTION**
Granite City Steel Co. Public Relations Dept.
Granite City, IL
6. **BUDCASTER-1970-A PLEDGE AND A PROMISE**
Anheuser-Busch Public Relations Dept.
St. Louis, MO
7. **Statement of Environmental Policy**
National Lead Co.
111 Broadway
New York, NY 10006

CONCEPTS

Development of Industry Within a Community

(Note to the instructor: The concepts III and XIII may have been covered partly in the Transportation unit. If this is the case, you may wish to cover these concepts with less emphasis)

- I. Capital investment and profit making are necessary for the survival of industry.
- II. The acquisition of appropriate land is important to all industry.
- III. Types of available transportation must be considered by industry before locating so they will be assured of meeting their specific needs, such as, availability of raw materials and transporting the goods to market.
- IV. Available energy sources and their cost may determine the kinds of industry that will locate in an area.
- V. Industry will investigate local zoning laws, building codes, and tax structure before locating in a community.
- VI. Industry provides many jobs and career opportunities for people in a community. (i.e. professional, semi-professional, skilled, semi-skilled, and unskilled.)
- VII. Industry benefits the community because it is a major part of the tax structure for that community.
- VIII. Industry disrupts the environmental processes within a community.
- IX. Industry may aesthetically contribute to OR detract from a community.
- X. Industry may create pollution problems within a community.
- XI. Industry may create problems concerning the community's existing facilities. (i.e. sewage disposal, waste disposal, and water facilities.)
- XII. Communities sometimes have to solve the problems created by industry and its great demand for electrical power.
- XIII. Industry may create a strain on existing roads and traffic facilities when it enters a community.
- XIV. Industry may create problems for a community when it goes out of business or moves away.

BEHAVIORAL OBJECTIVES

CONCEPT NO.

- I. 1. Seventy-five percent of the students will be able to state in writing in twenty-five words or less one reason why capital investment and profit making are necessary for industry to survive.
- II. 2. Eighty percent of the students will be able to list two factors that industries take into consideration in acquiring appropriate land.
- III. 3. Given a list of several types of transportation, ninety per cent of the students will be able to match the specific industrial need supplied by that form of transportation.
- III. 4. Eighty-five percent of the students will be able to list two reasons in writing why transportation is an important consideration of a locating industry.
- IV. 5. Ninety per cent of the students will be able to list in writing two reasons why, before an industry locates in an area, they would investigate the availability of various forms of energy.
- V. 6. Each student will choose one of the following three factors: zoning laws, building codes, tax structures. Each will investigate why an industry will consider that factor before locating. As a result of the students investigation and other group reports, eighty-five per cent of the students will be able to state one reason each, why industries will investigate the zoning laws, building codes, and tax structure.
- VI. 7. Eighty-five percent of the students will be able to complete a chart listing four career opportunities that exist in various industries and the levels of training required for each particular career.
- VII. 8. Given the dollar value of an industry, the dollar value of a home, and the real estate tax formula, students will be able to compute the amount of taxes the industry contributes and amount of taxes the home contributes. After comparing these amounts, eighty-five percent of the students will be able to conclude, in one sentence, that industries benefit the community because they are a major part of the tax structure.

CONCEPT NO.

- VIII. 9. Ninety-five per cent of the students will be able to list, in writing, at least five environmental processes that will be disrupted when an industry locates in a community.
- IX. 10. Eighty-five per cent of the students will be able to sketch an industrial complex and identify five aesthetic qualities an industry contributes to a community OR aesthetically detracts from a community.
- X. 11. By drawing a poster, ninety per cent of the students will be able to show three forms of pollution that are related to industry.
- XI. 12. Ninety per cent of the students will be able to name and explain in two or three sentences, one problem industry may create in a community in one of the following areas; adequate water facilities, sewage facilities, or waste disposal facilities.
- XII. 13. Ninety per cent of the students will be able to suggest, in writing, two workable solutions for increasing electrical power when an industry or industries in a community place a strain on the existing supply of electrical power.
- XIII. 14. Ninety per cent of the students will be able to list, in writing, three effects on road and/or traffic facilities that are likely to arise within a community when a new industry or industries first locate in a community.
- XIV. 15. After reading a hypothetical setting of an industry leaving a community, ninety percent of the students will be able to state in fifty words or less, at least four effects of an industry leaving a community.

PRE-POST TEST

BEHAVIORAL OBJECTIVE NO.

1. 1. In twenty-five words or less write one reason why capital investment and profit making are necessary for business to survive.

2. 2. List two factors that industries take into consideration in acquiring appropriate land.

a. _____

b. _____

3. 3. From the lists below match the specific industrial need supplied by that form of transportation. INSTRUCTIONS: Match the letter answers in list B to the Types of Transportation in list A.

- LIST A
TYPES OF TRANSPORTATION
- ___ AIRPLANE
 - ___ TRAIN
 - ___ RIVER BOAT OR BARGE
 - ___ TRUCK
 - ___ OCEAN TANKER

- LIST B
SPECIFIC INDUSTRIAL NEED
- A. OIL REFINERY
 - B. COAL to STEEL MILL
 - C. AUTOMOBILES TO THE WEST COAST.
 - D. COCA COLA to a RESTURANT
 - E. LIVE LOBSTER from MAINE

4. 4. List two reasons why transportation is an important consideration in locating an industry.

a. _____

b. _____

BEHAVIORAL
OBJECTIVE NO.

5. 5. List two reasons why an industry investigates the availability of various forms of energy before it locates in a community.
- a. _____
- b. _____
6. 6. Industries investigate the zoning laws, building codes, and tax structure before locating in a community. Give one reason that tells why each item below is investigated.
- a. ZONING LAWS - _____
- _____
- b. BUILDING CODES - _____
- _____
- c. TAX STRUCTURE _____
- _____
7. 7. Complete the chart below: INSTRUCTIONS - List four (4) types of career opportunities that exist in industry today. Indicate the level of training you think is needed for each career you name. Levels of training: professional, semi-professional, skilled, semi-skilled, unskilled.
- | CAREER OPPORTUNITES | LEVELS OF REQUIRED TRAINING |
|---------------------|-----------------------------|
| a. _____ | _____ |
| b. _____ | _____ |
| c. _____ | _____ |
| d. _____ | _____ |
8. 8. The real value of an industry is \$6,000,000. The property tax formula is \$8.00 per \$100.00 assessed valuation. Assessed valuation is 1/3 of the real value. Find the amount of property tax the industry would pay:

The real value of a home is \$30,000. The property tax formula is \$8.00 per \$100.00, assessed valuation. Assessed valuation is 1/3 of the real value. How much property tax will the home owner pay?

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**BEHAVIORAL
OBJECTIVE NO.**

8.
cont.

8. Compare the amount of taxes paid by the industry to the amount of taxes paid by the home owner. Do industries benefit the community? Why or why not?

9.

9. List four (4) environmental processes that will be disrupted when an industry locates in a community.

a. _____

b. _____

c. _____

d. _____

10.

10. Draw a sketch in the space below. In the sketch draw and label five (5) aesthetic qualities an industry might add to its complex to make it more appealing to the community.

OR

Draw a sketch in the space below. In the sketch draw and label five (5) items that an industry might have on its complex that would detract from the aesthetics of the community.

11. 11. In the space below draw a poster that will show three (3) forms of pollution related to industry.
12. 12. Choose one of the following: water facilities, or waste disposal facilities. In two or three sentences name and specifically explain a problem that an industry might create in a community regarding one of these facilities.
13. 13. Suggest two workable solutions for increasing electrical power when industry places a strain on the existing supplies of a community.
- a. _____
- b. _____
14. 14. List three (3) effects on road and/or traffic facilities that are likely to arise within a community when an industry first locates there.
- a. _____
- b. _____
- c. _____
15. 15. Read the following story: Approximately 20,000 people live in the community of Doomsville. About 8,000 of these people are attending elementary school and high school. 5,000 men and 3,500 women are employed by the Big Bad Bunny Baking Company. There are about 500 retired couples living in the community and the remainder are engaged in such businesses as: filling stations, grocery stores,

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cleaning shops, barber shops, beauty salons, and clothing stores. Because Nalph Rader discovered that the Bunny Baking Company was big and bad, the 4 B's had to get out of town. By the end of a two year period, the Doomsville community was still unsuccessful in getting a new industry to locate there. In fact there were no other factories within a radius of 75 miles around Doomsville.

In 50 words or less, state at least 4 effects of an industry leaving a community.

Answer Sheet

1. We get this money from our savings. If our business did not make a profit we would eventually lose our savings and go out of business. Eventually there would be no goods produced.
2. a. The surface of the land (land form).
b. The cost of the land or the cost of preparing the land to make it suitable for industry.
3. E AIRPLANE
C TRAIN
B RIVER BOAT or BARGE
D TRUCK
A OCEAN TANKER
4. a. Convenient and adequate in terms of need
b. Cost factor
5. a. Continued availability in sufficient amounts to run the industry.
b. Cost of extraction, transportation, and handling of the energy source.
6. a. Before an industry can build on a piece of land it must be sure the land is zoned or set aside for that particular kind of industry.
b. Will building codes for that area permit the type of building plans the company has in mind?
c. Property taxes must fit the budget of the company and not be too prohibitive.
7. a. Engineer Professional
b. Mechanic Skilled
c. Assembly-line worker Semi-skilled
d. Janitor Unskilled
8. INDUSTRY
 $1/3$ of \$6,000,000 = \$2,000,000
\$2,000,000 divided by \$100 = 20,000
20,000 times \$8.00 = \$160,000

HOME

1/3 of \$30,000 = \$10,000
\$10,000 divided by \$100 = 100
100 times \$8.00 = \$800.00

- a. Industries do benefit the community. Because they pay a larger portion of taxes that in turn support the various services and facilities of the community.
- 9. a. Create noise which may scare away bird communities.
- b. Grading and razing - destroy grass habitats of wildlife.
- c. Water run-off may cause erosion of the soil.
- d. Impure emissions into streams may kill fish, plants and other animal life.
- e. Smoke may kill the trees.

10. Students may draw the following

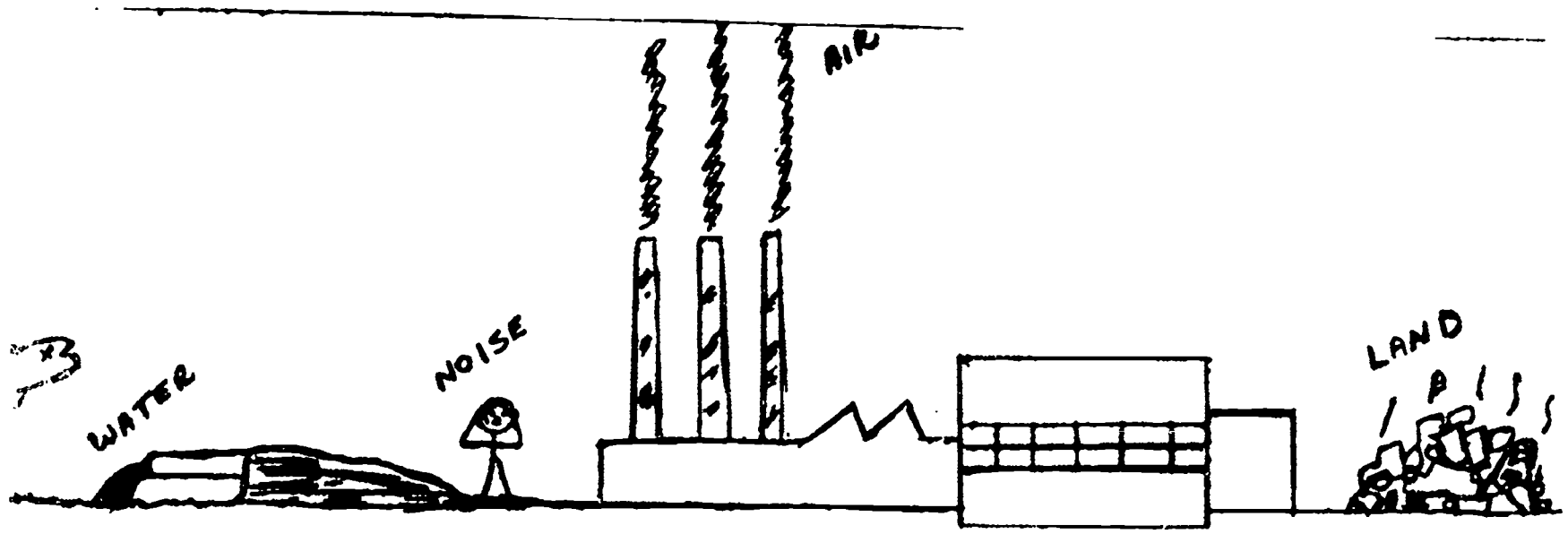
Aesthetic

- fish pond
- trees
- flowers, flower boxes
- shrubs
- water fountains
- attractive architecture
- exterior texture of building (rock, brick, marble, etc.)
- how building blends in with lay of land.
- art works, sculpture
- grassy lawns

Non-aesthetic

- parking lot not hidden from view
- unpainted concrete block building
- gravel or dirt roadways and parking lots
- unattractive signs (advertising)
- litter around building
- bare ground around building

11.



12. a. May create need for installing larger water mains.
 - b. May create pollution problems related to local sewage plant. Industrial sewage may be hazardous for existing sewage plants and sewer lines (oil, gas, poisonous chemicals.)
 - c. May create need for larger landfills, the waste disposed by the industry may be difficult or impossible to break down and may cause the community to resist efforts of the industry to use landfill.
13. a. Cut back on consumption and restrict the use of electrical energy. Community may have to build another power plant or cause the industry to build their own, or else find another energy source.
 - b. Nuclear energy may be used to power electrical plants.
14. a. Traffic jams. More traffic accidents caused by more vehicles.
 - b. Noise and air pollution from increased numbers of vehicles.
 - c. Cost factor of widening roads, installing traffic lights.
15. (1) Widespread unemployment.
 - (2) Unemployed begin to move immediately.
 - (3) No sale for property, many buildings are empty.
 - (4) Retail businesses slump.
 - (5) Unemployment benefits run out, people go into debt.
 - (6) Property no longer has value.
 - (7) Tax structure falters - public services become limited (i.e. police, fire fighters, garbage collectors.)
 - (8) Many of the people who remain unemployed finally are forced to seek work elsewhere.
 - (9) Progress in the community dies.

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BACKGROUND INFORMATION

Vocabulary

1. Capital: A major factor in the production of goods. Capital is money, buildings, tools, and machines needed to start a business.
2. Asset(s): Any item of property having value as land or money. The individual has personal assets as clothing, bicycle, savings account. A business has assets such as buildings, machines, tools, stocks.
3. Liabilities: The money a person or business owes in rent, salaries, utility bills, raw materials.
4. Profit: The amount of money gained in a business transaction after deducting all expenses such as taxes, salaries, utility bills, rent, raw materials.
5. Cooperative: A form of business organization like an apartment house owned and managed by an association of people. (i.e.) a government (an association of people) that owns and operates business. Communism is an economic system.
6. Eminent Domain: Right of government to take private property for necessary public use. (i.e.) parks, schools, roads. Government must pay owner the market value of property taken.
7. Steel: Mixture of pig iron and small definite amounts of carbon and other materials.
8. Primary Energy: A term applied to natural resource fuels and energies such as wood, coal, oil, gas, uranium, wind, water.
9. Zoning Laws: Legislative method of controlling use of land by establishing standards and requirements concerning the use of land and buildings. (Based on constitutional power that allows government to provide for the general welfare of all the people.)
10. Building Codes: A group of laws that specify in detail the many structural requirements of any building proposed to be erected. (Based on constitutional power that allows government to provide for the general welfare of all people)
11. Real Property Tax: Tax based on ownership of land, buildings, and all other items permanently attached thereto.
12. Personal Property Tax: A tax based on material items owned by an individual or business. It is a tax based on movable items. Examples would include rings, cars, tools, machinery, stocks on hand.

NOTE TO THE TEACHER: SEVERAL ACTIVITIES IN THE "BOOMSVILLE TO DOOMSVILLE"
UNIT ARE BASED ON THE MEAT PACKING INDUSTRY

The Meat-Packing Industry

The following information is condensed from Encyclopedia Americana, Volume 18, Page 484 and Encyclopedia Britannica, Volume 20, Page 627.

MEAT-PACKING INDUSTRY

The production of meat and of the livestock from which it is derived constitutes one of the world's greatest industries. In the United States alone, more than 4,000,000 farmers and ranchers produce the livestock processed at 4,500 plants devoted to meat packing and meat processing. Meat is sold in the United States at more than 230,000 retail outlets, supplied by about 5,000 wholesale distributors. The sale of livestock accounts for about one third of the total income of U.S. farmers and ranchers.

The meat-packing business is unusual in that its basic operating principle is not one of assembling but of disassembling: the meat animal is split up into many separate cuts and glandular derivatives. The industry is also somewhat seasonal, since more livestock is marketed at certain periods of the year than at others. About two fifths of the hogs, for example, are marketed during four months of the year, and greater numbers of cattle normally come to market during the late summer and fall months than at other seasons. The time of marketing is affected by many factors, including weather, availability of feed, and prices.

Meat animals are produced on large numbers of individual farms throughout the United States and meat packers therefore have no practical way of controlling the flow of livestock. Moreover, meat is a highly perishable product, most of which must be used within a few days after it has been dressed. It is true that some meat is cured, some canned, some made into sausage, and some frozen, and that these processes lessen its perishability. In general, however, meat may be considered a perishable in uncontrolled supply. As is the case with other commodities in this classification, prices are determined by the interplay of supply and demand, adjusting to the level which will move existing supplies into consumption.

In meat packing there is some specialization. Some packers handle beef only and others pork only; some confine their operations to sausage making; still others can meat and perform no other operation. Many packers combine two or more of these operations, and a score or more throughout the United States produce a full line of meat. Some packers conduct slaughtering operations; others buy their meat from packers who do.

After meat animals have been slaughtered, they are chilled preparatory to their sales as fresh meat or to such further operations as curing or canning. Beef is sold chiefly in the side, although substantial quantities are boned for sausage making or canning. Pork

usually is divided into cuts before sale; such parts as the loin, spare-ribs, and, at times, the shoulder are sold fresh, while the ham and the side usually are sold cured and smoked.

METHODS OF SLAUGHTER

In early times domestic meat animals were slaughtered by strangulation or by piercing the brain through the eye with heated spears. Blood was left in to cure as an essential part of the meat. Later, the Judaeo-Christian distaste for blood led to new practices: animals were dispatched by a head blow or by severing the jugular vein, the carcass being hung head downward to bleed. After bleeding, cattle and sheep were skinned; pigs were dipped into vats of scalding water so that hair or hide or both could be easily removed.

With increased interest in humane considerations, the practice of rendering animals unconscious before slaughter was advocated, and before the end of the 19th century various mechanical devices for animal stunning were in use in the United States and Europe. Stunning is now normal procedure in modern abattoirs; since 1960 U.S. federal legislation has required federal agencies to buy meat produced only from animals slaughtered by humane methods. In the United Kingdom and some other European countries, stunning is required by law, ritual slaughter sometimes being exempt. Cattle are stunned by captive bolt pistol or pneumatic gun; small animals by pistol, by electric shock, or by anesthetizing in a carbon dioxide chamber.

In addition to stunning devices, large modern abattoirs use a wide variety of mechanical, electrical, and pneumatic equipment for the various slaughtering and processing operations. The moving chain-conveyor production line system is widely used where the scale of operations warrants it.

THE FOLLOWING RESOURCE MATERIAL MAY BE DESIRABLE FOR CONCEPT VI WHICH INVOLVES OCCUPATIONS AND CAREERS. CHECK WITH YOUR COUNSELOR AND LIBRARIAN FOR ACCESS TO THESE OR SIMILAR RESOURCES.

Handbook of Job Facts

Occupational Outlook Handbook (1970-1971)

Occupational Outlook Handbook (1972-1973)

Dictionary of Occupational Titles - Volume I

Dictionary of Occupational Titles - Volume II

Dictionary of Occupational Titles - Volume III

Selected Characteristics of Occupations - A supplement to the Dictionary of Occupational Titles

Encyclopedia of Careers and Vocational Guidance - Volume I (Blue)

Encyclopedia of Careers and Vocational Guidance - Volume I (Green)

Encyclopedia of Careers and Vocational Guidance - Volume II (Green)

Occupational Briefs - Volume I

Occupational Briefs - Volume II

Occupational Briefs - Volume III

Vocational-Technical Schools and Programs in Missouri (1971)

SRA Job Experience Kits

To assist the teacher, the following background information has been organized according to concept and behavioral objective.

CONCEPT BEHAVIORAL
 OBJECTIVE

NUMBER

- I 1. Our economic system is capitalistic. Our objective in concept one is that students must realize there are at least two very important factors necessary to this economic system. These are: 1. Raising capital through our individual assets and money savings (capital investment) and 2. Achieving a profit from this investment.

Before an industry can begin operating it must raise capital. Capital is the money used to start the business, it also includes land, buildings, machines, etc. Capital can be raised in many ways (e.g., 1 large numbers of people can pool their assets and 2. these people can borrow some money from banks, insurance companies or the government).

In activity A we are trying to familiarize the students with the term assets by bringing the term to them on their individual level. Such items as clothing, bicycles, and savings in a piggy bank are very similar to assets that adults acquire through savings and can use as security to borrow money for establishing an industry. People starting an industry would use such items as automobiles, stock, bonds, buildings and land as securities for borrowing cash that would then be used to start the business. This is capital investment. Of course these people may also have cash savings that they use to purchase land, buildings, machines and checking accounts for payment of salaries and bills as they prepare to start their first day of business.

After a reasonable length of time these people must have more assets or money than they began with (Profit). If they do not they will eventually go out of business. The banks, insurance company, government, or individual that loaned them money will foreclose on the land, buildings, machines, and remaining checking account. They will foreclose in order to salvage as much of the money they loaned

CONCEPT BEHAVIORAL
OBJECTIVE

NUMBER

- I. 1. as possible. People to whom they owe salaries and
(cont.) unpaid bills will do likewise. No one will be inter-
 ested in loaning them more money because now they will
 have nothing to offer as security for a loan.

Profit making serves as an incentive to people to risk their assets and savings by going into business. This seems to be a very necessary incentive because the Soviet Union has taken several steps toward a form of profit making since the inception of communism in that country. For example, farm workers have been given one or two acres of land on which they can raise whatever they like. They may sell the products to anyone they please. Of course the work must be done on their own time after their days work on the government owned land. Managers of large factories were first given better apartments to live in and now they are allowed to interject their own design into the product they are manufacturing. If their products sell better than another like product, they will receive additional benefits, one of which may be more salary.

- II. 2. Industries must have appropriate land for building factories. For obvious reasons one would not build a factory on top of a mountain, on river bottom land that frequently flooded, or an area that experienced frequent earthquakes. Since the industry must make a profit, it will obviously consider the cost of grading land for a building and providing proper drainage. Proper drainage may entail the cost of building retaining walls and/or laying large pipes. Cost may also involve a land fill in a swamp area. The industry will be interested in the ability to lay water pipes in order to obtain the purified water it will need in its operation. They will also need to consider laying adequate sewage disposal pipes for disposing of liquid sewage. It will be necessary to consider the ability to adequately dispose of solid waste materials.

Through the use of a physical map you will be able to point out land areas that are mountainous and land that is probably swampy because it is so low and close to large bodies of water. You will be able to point out rivers, lakes and coastlines. Water is very important to industries for several reasons: 1.) it is used in the general operation of the plant 2.) reasonably purified liquid wastes must be returned and 3.) transportation for its raw materials and finished products.

CONCEPT BEHAVIORAL
OBJECTIVE

NUMBER

- II. 2. An industry will not locate without giving consideration to the ability to bring needed transportation to its location. This would involve building roads, laying rail-road tracks, and in some cases airports are needed.

The industry will likewise consider the surrounding neighborhood. If homes are too close they would receive complaints about noise, smell, and other forms of pollution.

In activity C we are asking the students to assess the school grounds for the possibility of locating a slaughter house meat packing operation. Such an operation would undoubtedly require large quantities of water. Water would be needed for the animals in pens, to clean equipment and floors, and for scalding. They would have large quantities of liquid and solid waste matter. This would require installing adequate disposal facilities. They would need road facilities to accommodate large semi-trailers to bring in the animals, or train tracks for that purpose. Roads or train tracks would be needed to transport the finished product. Even a small operation of this type would probably require 50 or 60 acres of land. They will need a reasonably flat area so they can fence it in for cattle pens. This operation would not be able to locate very close to a residential area because of noise and smell, etc. In event the land had to have much grading done on it, they would have to consider erosion problems.

Even though an industry may locate suitable land for building its complex, the owner of the land may not want to sell. Sometimes the owner may ask a price for the land that would not be realistic. The industry will consider the price of the land because they need to meet competition and make a profit. Most privately owned industries may not use the legal right of eminent domain (i.e. the right to condemn private property for needed public use.) The exceptions to this are public utility companies and privately owned transportation companies.

- III. 3. In the topic of transportation we are interested that students become aware of the idea that the location of an industry is dependent upon the accessibility of raw materials and the shipment to market of its finished product. The cost and availability of appropriate transportation are important considerations of locating industries. Students are asked to trace the history of transportation in terms of industrial growth in the

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- III. 3. United States. The Mississippi River made St. Louis the Gateway to the West. River travel can be traced from: paddled; poled; horse drawn along river banks; to stream; and then diesel driven boats or barges. Land travel from St. Louis might have been: human pack; pack horses or mules; horse drawn wagons; trains (wood, coal, and diesel burners); development of the automobile and trucks from gasoline to diesel burning; development of the airplane from propeller to jet driven present today. Transportation needs of Industry can be reduced to terms of: speed of delivery, quantities of goods to be handled, kinds of goods to be handled - perishable vs nonperishable, and cost factor.
- III. 4. We chose the reading: The Dennison Manufacturing Company to indicate to the students in a simple fashion, how a small industry was able to grow and succeed because it recognized that location was related to appropriate and available transportation for obtaining its needed raw materials and the shipment of its finished products to market. Major types of transportation employed by this company were: horse drawn wagon (too slow, the industry chose to move), ocean going vessels became a factor, finally trains were used country wide. The student is required in the topic of transportation to select a particular industry and determine its transportation needs in relation to raw material needs and the accessibility of a market for its product. Students are asked to build models of transportation vehicles employed by various industry and associate with them the types of raw materials needed and the shipment to market of that industry's product.
- We have gone one step farther in the topic of transportation. What kinds of industries will exist in the future, what will be their transportation needs, and what types of transportation devices will they utilize? This is a fascinating subject even for the adult. In a world of change - what kinds of changes can we foresee for future industry and its transportation needs? Youth is often more imaginative along these lines than are the older. This should be an interesting area of study to pursue!!!
- IV. 5. The United States today has the world's largest iron and steel industry. It includes more than 250 iron and steel companies. The industry in the United States has the capacity to produce 150 million tons of steel a year. This is almost one-third the combined steel production of all other countries of the world. More than 1 1/2

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IV. 5.
(cont.)

billion tons of iron and steel now are in use in the United States. This is enough steel to build six cars for each man, woman, and child in the country. Each year steel companies in the United States produce about 1350 pounds of steel for each United States Citizen. The iron and steel plants in the United States are worth over 8 billion dollars.

The big iron and steel centers in the United States are located near supplies of coal. That is because it is less expensive to transport iron ore to the furnaces than it is to carry the coal to the steel plants. About three-fourths of the workers in the industry are employed in the five states of Pennsylvania, Ohio, Indiana, Illinois, and New York.

The companies of the steel industry often own iron ore mines, coal mines, and limestone quarries. Some operate their own railroad lines and iron ore boats to carry raw materials.

IRON MAKING - The iron maker starts out with a basic material, iron ore. He adds coke made from coal and limestone. Then he cooks all these together in a blast furnace into which a great blast of hot air is blown. He uses water to cool the outside of the furnace. The recipe for making one ton of iron calls for about 1 and 3/4 tons of iron ore and other iron-bearing materials, 3/4 of a ton of coke (made from coal), 1/4 of a ton of limestone, and 4 tons of air. It takes about 11,000,000 gallons of water a day to cool a furnace which makes 1,000 tons of pig iron.

STEEL MAKING - Steel is an alloy (mixture) of pig iron, and small definite amounts of carbon and other materials. Steel is stronger than iron, and can be shaped into many more useful products. Pig iron contains as much as 4 or 5 per cent carbon and other impurities. Therefore the steel making process is largely one of removing the excess carbon and impurities from the pig iron and adding desired materials in controlled amounts.

Scrap iron and scrap steel provide one of the most important raw materials in steel making. On the average, about as much scrap as pig iron is used to make each ton of steel. Making steel requires a number of different raw materials gathered from many states and countries. A ton of steel may require iron ore, limestone, coal converted to coke, manganese, fuel oil, magnesite, ferrosilicon, and scrap iron.

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IV.

5.
(cont.)

THE OPEN HEARTH FURNACE - The fuel used may be blast-furnace gas (carbon monoxide), oil, tar, or two or more of these in combination (the fuel burns above the hearth). The furnace has a temperature of about 3,000 degrees Fahrenheit. Each open hearth furnace is about as big as a two story house. Each batch of steel made in a furnace is called a heat. A heat may be 50 to 500 tons of steel. It usually takes from eight to ten hours to make a heat. About 18 out of every 20 tons of steel used in the United States are made in the open hearth furnace.

THE ELECTRIC FURNANCE - Electricity is the energy source and a temperature of 3500 degrees fahrenheit is reached. Electric furnaces are used to make most of the exacting grades of alloy and carbon steel.

THE BESSEMER CONVERTER and THE BASIC OXYGEN PROCESS - Both methods utilize coal as a heat source. Both methods are dependent on passing huge quantities of air or oxygen through the molten material to burn out the impurities contained therein.

VACUUM MELTING - Is a way of making new improved steels for special purposes. It takes place in a small electrically operated furnace from which the air has been removed. This causes a vacuum that withdraws gaseous impurities from the iron.

THE CRUCIBLE - This is the oldest method of making steel. Only a few tons of steel are made by this method. A crucible is a small pot made of fire clay and graphite. Several crucibles are placed on the hearth furnace which is heated by gas. Carefully selected scrap is melted in these crucibles.

The foregoing information has been presented to familiarize you with the kinds of raw materials and energy needs of the Iron and Steel Making Industries of the United States. Hopefully it will cause you and students to ascertain where the materials are located, how they must be transported, and what kinds of transportation must be employed to obtain them. Consider the kinds of fuels employed: coal (coke), fuel oil, tars, gas, electricity. Also consider where the raw materials originate from. Which factor really determines why an industry locates where it does? In the case of the Iron and Steel Industry coal is the primary factor.

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IV. 5. In activity D we have designated two kinds of energy, primary energy as opposed to secondary energy. Primary energy refers to natural resource fuels (wood, coal, oil, gas, radioactive uranium) or water used for power. The fuels are burned to release their energy with the exception of uranium. Secondary energy refers to electricity and steam that is produced from a primary energy source. Water power may be used to generate the electricity. A primary fuel may be used to heat water which is converted to steam, and the steam in turn runs the electric generator to obtain electrical energy.

V. 6. Lecture outline for V-6, Activity B. (See page 70)

Before locating in community - company must check zoning laws of land it is interested in.

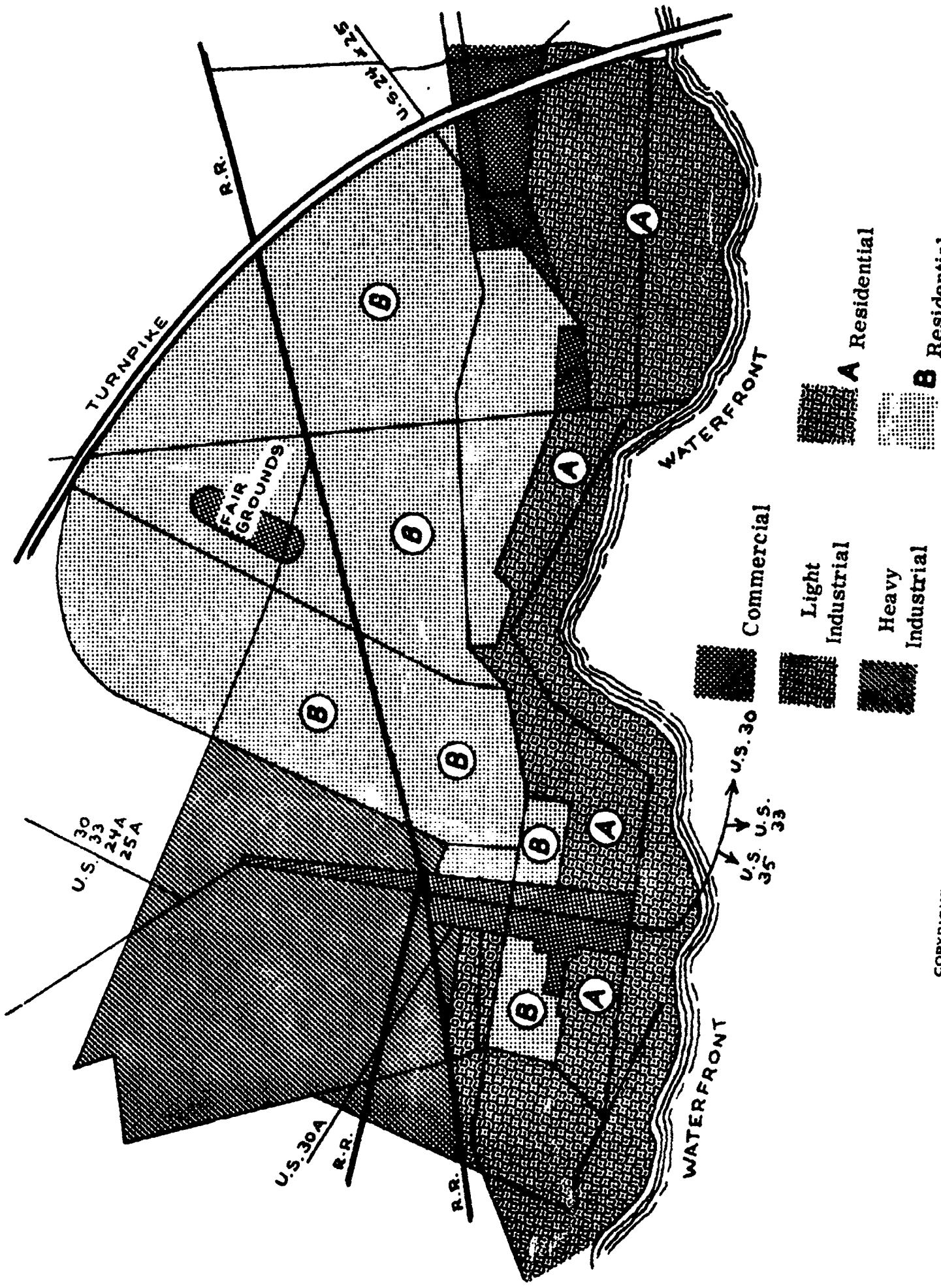
Zoning - legislative method of controlling the use of land through establishment of standards and requirements concerning the use of land and buildings.
i.e. A well zoned community will have certain areas zoned for parks, apartments (multi-family residence), single family residential areas, industry, retail outlets, schools, agriculture, hospitals, garbage dumps, etc.
If a certain area is zoned for residential use, the land cannot be used for a drive-in theatre unless it is re-zoned. (Use form #10 located on Page 136 to make a transparency to illustrate zoned areas.) Zoning protects you from somebody coming in and building an oil refinery next door to your house in a subdivision.

Conclusion: An industry cannot build on the land unless that land is zoned for industry or will be re-zoned for industry.
(e.g.) Before Western Electric (Woods Mill and Clayton Roads) could build, the land has to be re-zoned from agriculture to industry.

Before locating in a community - company must check the county, and/or city building codes that apply to the land it has purchased before it begins construction.

NOTE: The diagrams on the following two pages may be used for transparencies or student handouts.

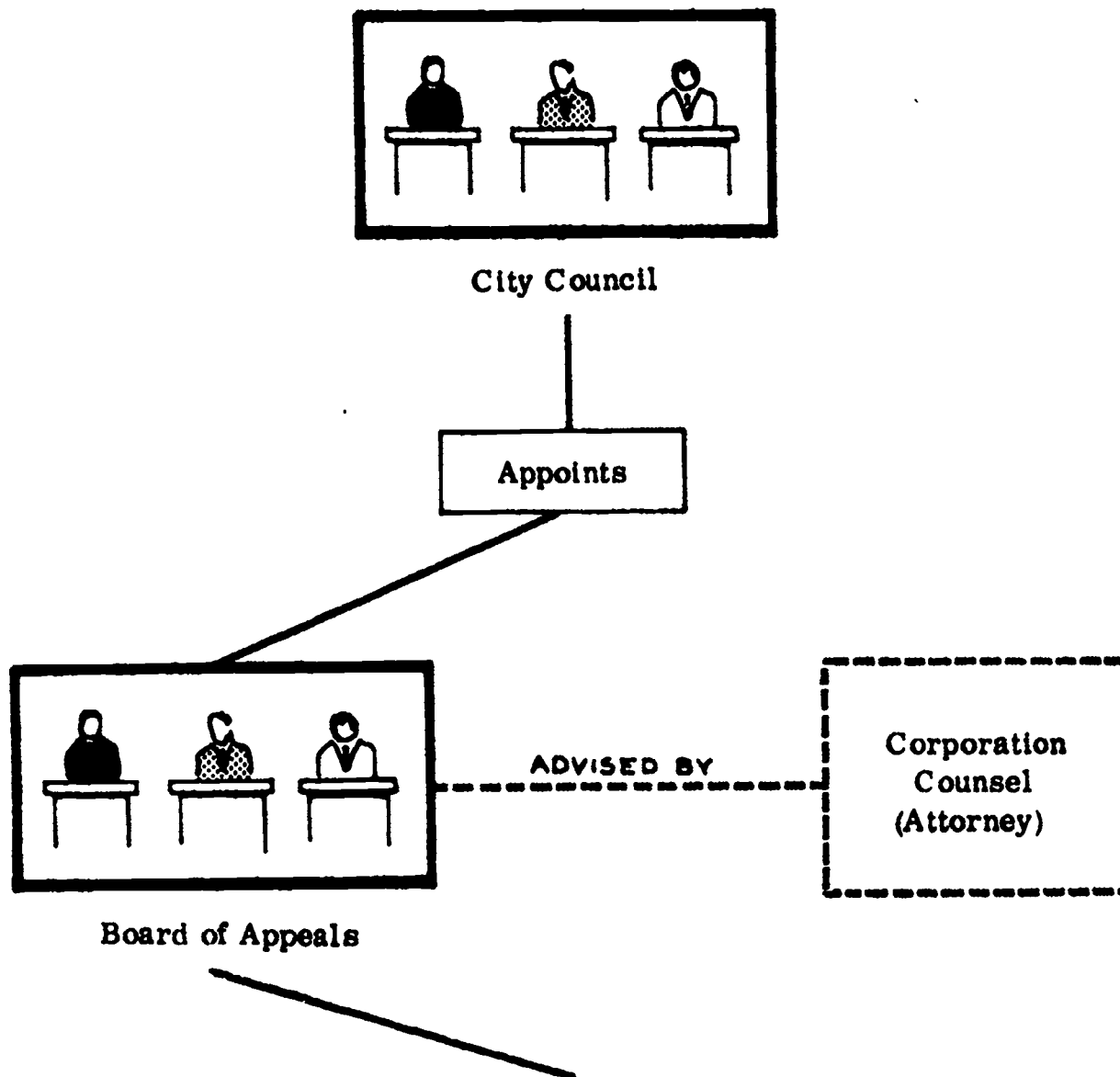
ZONING MAP



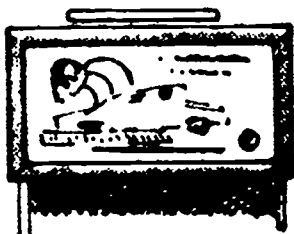
COPYRIGHT, 1972, J. WESTON WALCH, PUBLISHER, PORTLAND, MAINE 04104



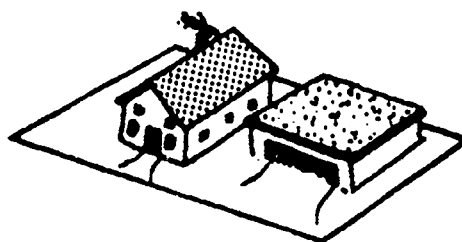
25 A ZONING BOARD OF APPEALS



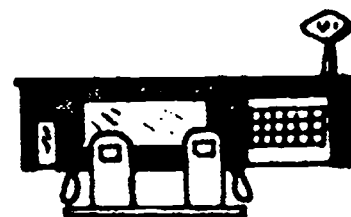
1. Hears hardship cases under zoning laws
2. Under certain conditions, grants exceptions, such as in:



Billboard height and size



Lot use restrictions



Business use

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- V. 6. Building Code - building laws which specify in detail the many structural requirements of any building proposed to be erected on a piece of land. These requirements include size and location on property, types of fireproof construction, ventilation, electrical installation, plumbing requirements, etc.

In other words, building codes are set up to ensure safe, sanitary, and pleasant looking buildings.

Because of building codes, Western Electric had to build an attractive looking, safe, and sanitary building.

Tax Structure - an industry will want to make sure property taxes are not prohibitive before it builds.

Property Taxes - are based on value of the property and are used to support public services, i.e. schools, roads, fire protection, etc.

Residential areas that have high property taxes will not likely attract lot of industry. (e.g. Parkway)

On the other hand, an industry will probably pay less taxes in an area that has a high concentration of industry. Heavy industry concentrations provide enough revenue for that community to permit it to lower taxes. (e.g. Clayton)

- VI. 7. The effects of automation on jobs of the future is an activity included in this sub-topic. The following readings on automation and computers should give the teacher enough background to handle the activity.

World Boom in Computers and the Challenge to the United States.

Many other methods of production in industry, are being scrapped as computers take over. In other countries, a race is on to pull even with United States technology in computers.

These machines are designing money in Brazil, running an entire steel plant in Japan, monitoring river levels in Italy and keeping tabs on the weather in France.

The social implications are great. Citizens worry that the machines will put them out of work and invade their privacy. Others welcome with open arms the changes computers will bring. Computers are also being used to study pollution levels in cities and the information they gather may be the guidelines for establishing effective pollution control devices.

LABOR:

The Four-Day Week

Like most retailers, Philip Lansdale and Don Carr must make things convenient for their customers if their small Los Angeles tire business is to prosper—and they pride themselves on doing just that. Yet potential tire buyers had to wait all through Monday, Tuesday and Wednesday last week before Lansdale and Carr finally opened their doors. In fact, with descriptive simplicity, the partners call their shop the 4day Tire Co., and they expect to gross about \$1.5 million this year from seven separate outlets operating only four days a week. "We run the 40 hours that are most productive, and that's Thursday through Sunday in the tire business," says Carr. That, he explains, is when customers like to go shopping—and furthermore, "Our employees like it. They'd rather work hard for four days and rest for three."

While 4day Tire Co. is an extreme example, other U.S. companies are nibbling away at the entrenched concept of the Monday-through-Friday workweek—a fixture on the industrial landscape since World War II. In Chicago, headquarters employees of McDonald's Corp., the hamburger-store chain, report to work on summer Fridays in casual weekend clothing—and leave the office at 1 p.m. Last month, 3,000 employees of the Reader's Digest enjoyed four weeks of three-day weekends for the second consecutive year. The idea seems to have spread rapidly in the New England area, where several small manufac-

uring firms and at least one hospital have been experimenting with four-day weeks on a full-time basis. But nationally, interest in the concept seems to be rising. When word got around that tiny (1969 sales: \$5 million) Kyanize Paints, Inc., in Everett, Mass., was experimenting with a four-day week, some 300 firms wrote the company and asked for more information.

Fears: The main factor in these four-day week experiments is not fear of economic slowdown, which in the past has forced shorter workweeks in some industries and prompted union leaders to call for four-day weeks to spread work and conserve jobs. Rather, the experimenting companies see the short week as a powerful recruiting tool. If only as a morale booster that helps cut turnover and absenteeism (traditionally bad on Friday anyway), the abbreviated week with its assured long weekend is proving its worth. "This is really a great setup,"

beamed a young mill worker in Lowell, Mass., last week. "I can get all my housework done on Friday and spend the entire weekend with my husband."

Kyanize Paints is generally credited as being one of the first companies to test the concept. While negotiating a union contract in 1968, Kyanize looked hard at requirements for startup time, wash periods, coffee breaks and shutdown time—and figured it could get as much production in four nine-hour days as in five eight-hour ones. The union, a bit stunned by management's proposal, agreed to a three-week trial—and later, by 9 to 1, voted to work four days on a regular basis. The results, according to the company, have been gratifying indeed; production has risen by 4 to 7 per cent a month since the plan went into effect last spring, and absenteeism has dropped almost to zero. Following the Kyanize lead, 142-year-old Lawrence Manufacturing Co., one of Lowell's original textile mills, initiated a four-day week (ten hours a day) in December, and has seen absenteeism and turnover plunge, while job applications have gone up more than fourfold. "Now," says an official, "we can be more selective in our hiring."

Snags: To be sure, the four-day system has snags—particularly for companies with heavy investment in capital goods that must be used intensively to be profitable. Then, too, some companies have so much work that a shorter workweek is out of the question. "It's all we can do to meet orders with a six-day week," says an official of TRW, Inc., in Houston. "I'd like it, but it's not in the cards." Similarly, management consultant Kenneth E. Wheeler of Lowell, while strongly in favor of the four-day plan, acknowledges that there are cases where it simply isn't feasible. "For the company that operates on a round-the-clock basis," Wheeler says in an article in the current Harvard Business Review, "the shortened schedule has many problems indeed." Still, there are examples of success in that area, too. At the Roger Williams General Hospital in Providence, nurses work a new schedule that allows time off after three consecutive workdays. Says Lorraine Fraser, director of nursing services: "People were calling in sick when they were just plain tired. They aren't so worn out now."

As the skeptics see it, a four-day week for the majority of the nation's 85.8 million jobholders is a long way off. "All those great liberal ideas seem to emanate from the East Coast," scoffs John Coulter, director of research for the Chicago Association of Commerce and Industry. "It will be a long, long time before you hear of changes in the workweek here." But consultant Wheeler predicts that some big companies might shift to the system next year, especially if the economy keeps slowing down. And once a few giants take the plunge, he says, three-day weekends will be on the way. "The four-day week is coming," he says, "sooner than most of us expect."

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- VI. 7.
(cont.) Education is being affected. People that have traditionally downgraded technical education are now pushing computer courses to meet the demand for trained operators.

Source: U.S. News and World Report. March 9, 1970.

Students will be studying about job possibilities and how to apply for jobs. Applications and interviews will be covered as activities.

APPLYING FOR A JOB

1. How to find job possibilities.

- A. Newspaper want ads.
- B. Posters.
- C. Employment office.
- D. Placement Bureaus.
- E. Application.
- F. Personal contacts.
- G. Send out letter of request for job with personal résumé.

2. Letter of Application.

Pass out student application form and have students complete. (Form #15 data sheet .) When looking for a job be prepared to fill out an application form. (i.e. social security number, pen, information needed.)

3. How to handle an interview.

- A. Be on time---not too early.
- B. Be well groomed and neatly dressed. (Many employers are no longer concerned about long hair as long as it is clean and neat.)
- C. Be polite. (shake hands, etc.)
- D. Try not to express nervousness. (e.g. twiddle thumbs, bite nails, etc.)
- E. Answer all questions. (Try to figure out ahead of time what questions the employer will ask. In other words, be prepared.)
- F. Be ready to ask questions. (But don't ask about salary first.)

4. Divide into groups for mock interviews.

One student can go over another student's application (employer-applicant relationship). The employer then asks the prospective employee questions concerning his application and about the job.

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- VI. 7. The teacher might choose one of the more extroverted students in the class to be interviewed by another student and display how a prospective applicant should not conduct himself. The other students would then try and pick out all the negative points about the way the applicant conducts himself. The students will learn a lot this way and it is also fun, depending of course on the student you choose to be the applicant.
- (cont.)

Automation and Jobs of the Future.

VI. 7. (cont.)

Trends in automatic manufacturing. Highly automatic production systems exhibited these trends in the 1950-1960 decade:

1. Mechanization of work feeding and removal techniques.

2. Mechanization of material handling between machines, departments, and buildings.

3. Mechanization of more direct labor tasks, especially assembly operations.

4. Mechanization of indirect labor tasks, especially inspection and testing.

5. Compounding of the production equipment (compression of several or many production functions on one machine base and the performance of multiple operations while the workpiece is clamped in one location.).

6. Centralization of the control of the production system through remote-control panels.

7. Use of feedback control to maintain automatically optimum performance or to achieve extremely precise process control.

8. Use of program control devices, such as magnetic and punched tapes and cards, to direct intricate action sequences without the need for human attention.

9. Mechanization of trouble detection, prevention, and correction by safety controls, indicating lights, built-in control tests circuits, and so on.

10. Mechanization of information collection, transmission, and interpretation through computers and other data-processing machines.

11. Integration of production equipment with information-handling systems.

Some or all of these developments, in many combinations, are interwoven to create automatic systems for manufacturing or data processing.

Understandably, therefore, any definition of automation is difficult to use accurately if it is intended to credit all the advances in automatic systems to

one phenomenon such as feedback control. It must be recognized, however, that the refinement and spread of automatic control (not necessarily

feedback control) lies at the heart of many current and potential advances in mechanization.

In 1959-1960, the first three chemical plants under digital computer control were built. Computer process control subsequently has extended

to refineries, many types of chemical processes, steel and brass rolling mills, blast furnaces, paper mills, and at least one parts-producing line

(semiconductors). It is also controlling one automatic bakery warehousing system (Sara Lee Kitchens).

More than 500 computer (or computer-monitored) control systems were installed as of 1966, and this must be recognized as an important new trend.

Numeric control, now applied to almost 2,000 machine tools, also is an important expansion of this trend. Another development is only in its infancy, but it soon may begin to inspire new

concern about automation: the tape-controlled transfer arm, which can be readily programmed to perform a complex set of actions, such as feeding a

turntable or performing an assembly action. As the price of these machines moves toward the \$15,000 mark and the annual cost of labor moves above

\$4,000, such machines will become more attractive to industry.

Since the late 1950s a growing demand for product variation has forced industry to adopt more flexible manufacturing systems. Thus, automation of some assembly lines has decreased, although automation of many individual parts-manufacturing systems has increased.

[JAMES R. BRIGHT]

Bibliography: American Assembly, *Automation and Technological Change*, 1962; *Automation and Technological Change*, Report of the National Commission on Technology, Automation, and Economic Progress, 1966; J. R. Bright, *Automation and Management*, 1958; E. M. Grabbe, S. Ramo, and D. E. Wooldridge (eds.), *Handbook of Automation, Computation and Control*, vols. 1-3, 1958; A. M. Hilton, *Logic, Computing Machines and Automation*, 1963; V. L. Lossiyevskii (ed.), *The Automation of Production Processes*, 1963; J. F. Schuh, *Principles of Automation*, 1965.

Source: Encyclopedia of Science and Technology, McGraw-Hill. Pp. 745, 746.

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VII. 8.
 (cont.)

Land used for industry produces more personal and real property tax than homes or apartments built on the same land. The reason is that land used for industry is assessed at a higher dollar value than land used for homes. Also, industrial buildings are far more expensive than homes and are therefore more valuable.

Personal property means property that is removable such as machines, tools, raw materials and finished products on hand.

Real property means land, buildings and the permanent fixtures in the buildings.

By working the tax problems in activity A we are attempting to show the students that industries are a major part of the tax structure in a community. The tax formula you will use is explained in the instructions for carrying out the activity.

The next step in teaching the concept is having the students list community facilities that real property taxes benefit. Schools, junior colleges, parks, fire districts, community libraries are some examples of community facilities that are almost entirely supported by property taxes.

The tax rates we are using in activity B are the actual tax rates in the districts. (Clayton \$3.69, Valley Park \$4.65, Parkway \$5.62). The assessed valuations of all property in these districts are, Clayton \$111,012,527, Valley Park \$11,822,614, Parkway \$265,238,887. (Note: These figures come from assessed valuations of 1970. To get the total valuation, multiply each of the three figures by three.)

You can see from these figures that land and buildings are valued much higher in one district than another. This is primarily due to commercial and industrial land usage. Of course some of it is due to larger and/or newer homes in the area. The activity will help students understand the value of industry in a community in terms of the amount of property taxes their parents must pay for quality services based on the fact that industry

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- VII. 8. is or is not located there. Clayton for example has many commercial operations and these are assessed at a very high value. Valley Park on the other hand has little industry and only small commercial operations, the homes are small and many of them are old. Their property is assessed at a low value and their tax rate is therefore high. You should note that Parkway has some industry and commercial areas as well as new and medium sized to large homes. The tax rate is high because residents demand quality services and there is actually insufficient industry here to maintain quality services and lower tax rates. You will need to point out that Clayton covers about one square mile, Valley Park approximately 5 square miles, and Parkway 55 square miles. This accounts for the very large figure for total assessed valuation in Parkway as compared to Clayton. In other words Clayton has as much as 1 square mile as Parkway has in about 26 square miles.

- VIII. 9. Note to Teacher: The best way to illustrate to you the importance of environmental processes is to reproduce below a segment of Aldo Leopold's A Sand County Almanac.

"There are some who can live without wild things, and some who cannot. These essays are the delights and dilemmas of one who cannot.

"Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild, and free. For us of the minority, the opportunity to see geese is more important than television, and the chance to find a pasque-flower is a right as inalienable as free speech.

"These wild things, I admit, had little human value until mechanization assured us of a good breakfast, and until science disclosed the drama of where they come from and how they live. The whole conflict thus boils down to a question of degree. We of the minority see a law of diminishing returns in progress; our opponents do not.

"Conservation is getting nowhere because it is incompatible with our Abrahamic concept of land. We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanized man, nor for us to reap from it the aesthetic harvest it is capable, under science, of contributing to culture.

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VIII.

9.
(cont.)

"That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics. That land yields a cultural harvest is a fact long known, but latterly often forgotten.

"Such a view of land and people is, of course, subject to the blurs and distortions of personal experience and personal bias. But wherever the truth may lie, this much is crystal-clear: our bigger-and-better society is now like a hypochondriac, so obsessed with its own economic health as to have lost the capacity to remain healthy. The whole world is so greedy for more bathtubs that it has lost the stability necessary to build them, or even to turn off the tap. Nothing could be more salutary at this stage than a little healthy contempt for a plethora of material blessings.

"Perhaps such a shift of values can be achieved by reappraising things unnatural, tame, and confined in terms of things natural, wild, and free."

Madison, Wisconsin
4 March 1948

ALDO LEOPOLD

One of the more important activities in this topic involves a field trip to the Parkway 98 acres. The following should introduce you to the area.

98 Acre Area

Approximately 83 acres were purchased by the Parkway School District and the remaining 15 acres were donated under an agreement with the Kodner Construction Company, builders of Big Bend Woods Subdivision. The two circular areas on the west side of the property will be turnabout areas as agreed on by the builder and the Parkway School District.

WHAT HAPPENED IN THE AREA IN THE PAST:

1. fence posts were cut in the woods for the Crutchfield Farm.
2. about 20 years ago, there was a motorcycle race through the creek bed, from the south to the north, west through the woods to the boundary of the property and then south through the next farm.

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- VIII. 9.
 (cont.)
3. the woods have been burned several times over the past thirty years, the cause is thought to be the children in the area.
 4. the area known as Big Bend Woods was farmed for many years until 1968, when the contractors graded the area and destroyed the topsoil.
 5. the creek bed was all loose gravel, now there is much exposed limestone bedrock, the cause being changes in the area north and west of the property.

THE PAST FEW YEARS:

1. the corn field has had corn on it for the years 1970 and 1971, gets 12-12-12 fertilizer and weed killer.
2. the soybean field gets weed killer but no fertilizer. It has had soybeans during 1970 and 1971. The field was planted in wheat before that but the price dropped and the type of crop was changed.

THE FUTURE:

1. the farmer hopes to farm the area for the next two years or until the district begins construction on the land.
2. the woods are to be left unchanged except for trails for use by the Environmental Ecological Education staff, the teachers and students in the district.

- IX. 10.
- We have included the topic of how industries may contribute to or detract from the aesthetics of a community. In times past industry tended to locate in fairly large cities. Little attention was given to the aesthetics of the industrial plant, it was built mainly from a utilitarian standpoint. Most of us think of factories as being boxy, dirty, bleak, and forlorn. Cities have become very much like their benefacting industrial plants. Cities are becoming defunct, both industry and people are moving out of congested, blighted areas. Government and various other individuals advocate that industries locate in small rural towns throughout the United States. This is to reduce congestion that results when large populations come together.

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- IX. 10.
 (cont.)
- Industry and people in general have observed the mistakes of the past and are not willing to see blighted cities reduplicated. Most small towns are receptive to industries locating because they will provide jobs and aid the economy. The people of these small towns will not accept the "eye sore" type buildings of the past. They demand that the building be unobtrusive and that it blend in with the residential environment. Ugly, dirty, buildings devalue the real property of an area, people move away, and the community declines. Most small town people have lived here all their lives and are reluctant to change. Industries must meet the demands of the community before they locate. They have found that the cost of beautifying the grounds and buildings of the industrial site pays off in terms of image that enhances their public relations role in the community.

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- X. 11. AIR POLLUTION: Air pollution is a serious problem relating to industry in the United States. The following readings will help the teacher understand what some of these problems are and how we have tried to solve them. (The following information comes from an article by Virginia Brodine in Environment, Volume 14, No. 1, page 2 and 3.)

"Between the individual and his natural environment stands another complex system—the economic, political, and social system of the country we live in. This is the medium through which most of our relationships with our natural environment are conducted, and it is here that we must look for the reorganization of human activity required for reducing the burden of contaminants in the atmosphere and in our own bodies.

"Those individuals who seek their recreation in a remote mountain wilderness and those who seek it where the city lights are brightest may feel and think very differently about nature; the household that recycles its newspapers rather than burning them, that uses a bicycle or public transportation rather than a second car, may be expressing a greater concern about air pollution and contributing a mite less to its city's total. Nevertheless, if we actually reduce the burden, it will not be through the choices individuals make in their private lives, but through the choices they make collectively to adapt or change the economic system which is now heavily dependent upon the largely uncontrolled exploitation of nature and the political system whose decision-making processes were not developed to cope with environmental problems.

CURRENT EFFORTS TO REDUCE THE BURDEN

"Air pollution control programs scarcely went beyond a few smoke control ordinances and nuisance laws until 1947 when Los Angeles launched its long fight against smog. It was more than a decade later that the California city was followed haltingly and unevenly by other cities. In the last decade, the federal government increasingly provided education, research, technical assistance, monitoring, and finally, in 1967, some steps toward control. Without the efforts of those years, the situation would undoubtedly be worse than it is today; nevertheless, although some communities succeeded in holding the line or even in making some gains, overall we were almost certainly worse off at the end of the decade than at the beginning.

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- X. 11.
(cont.)
- "We started the seventies with new federal legislation (an overhauling of the Clean Air Act) and with uniform air quality standards for six major pollutants: sulfur dioxide, nitrogen dioxide, particulates (particles small enough to remain suspended in the air), carbon monoxide, non-methane hydrocarbons, and photochemical oxidants. Attainment of the air quality specified by these standards is up to the states, but they are required to submit their plans to the federal Office of Air Programs for approval. Once the plans are approved, the states have three to five years to reach the goals.
- "When the primary standards, which are based on human health effects, have been attained in any air pollution control region, the region is expected to move on to still better air quality, described by more restrictive secondary standards (based on environmental effects) for sulfur dioxide and particulates. Those regions where air quality is now as good as or better than, the primary standards are to move directly to secondary standards. Outlying areas where the air quality is even better than secondary standards should not allow "significant deterioration" of this quality. Emergency provisions are required in all states to prevent "excessive buildup" of pollution levels during periods of stagnant air, when pollutants cannot disperse.
- "The standards for the open air (ambient air) are reinforced by some restrictions on what can come out of the stacks (emission standards). These are for new installations in a number of categories, regardless of where they are built. There are also uniform national emission standards for a few of the contaminants that are hazardous even in small amounts; the new beryllium, mercury, and asbestos standards are in this category, and others may be added. Emission standards for automobiles have been specified: New cars in 1975 and thereafter are to emit 90 percent less hydrocarbons and carbon monoxide than they emitted in 1970, and 90 percent less nitrogen oxides than they emitted in 1971.
- "This sounds as if we should have the air cleaned up within the next few years, but that is far from being the case. While there is some hope that automotive emissions will drop substantially in coming years, what the public has yet to learn is that the present approach to air pollution control of stationary sources, in the long run, will not reduce the total burden of pollutants from stationary sources-industry, power generation, agriculture, space heating, and waste disposal. Gains in controlling emissions from each

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- X. 11.
(cont.) single source will be offset by the increase in the size and number of sources. Moreover, it is still quite uncertain just what the control devices on automobiles will achieve, and in any case these devices will have their maximum effect on pollution reduction about 1990 and emissions from this source will then begin to climb again if the number of automobiles on the road continues to increase. Either we will fail to meet the goal of improving air quality in the cities over the long haul, or we will fail to meet the goal of protecting air outside the cities from deterioration, or both.

FOSSIL-FUEL BURNING

" A very big part of our air pollution problem arises from the burning of fossil fuels (coal, oil, and gas) for the generation of electric power, for industrial processes, and for space heating. Federal air pollution control engineers have summarized the situation for the remaining years of this century:

" If we assume that the work we are doing now to develop and apply control methods is successful, overall amounts of sulfur oxides and nitrogen oxide emissions can be held to relatively modest increases over present levels. SO₂(sulfur dioxide) emissions from the power industry are expected to increase with controls by an estimated two to three times by the year 2000. (Emphasis added)"

TABLE 1

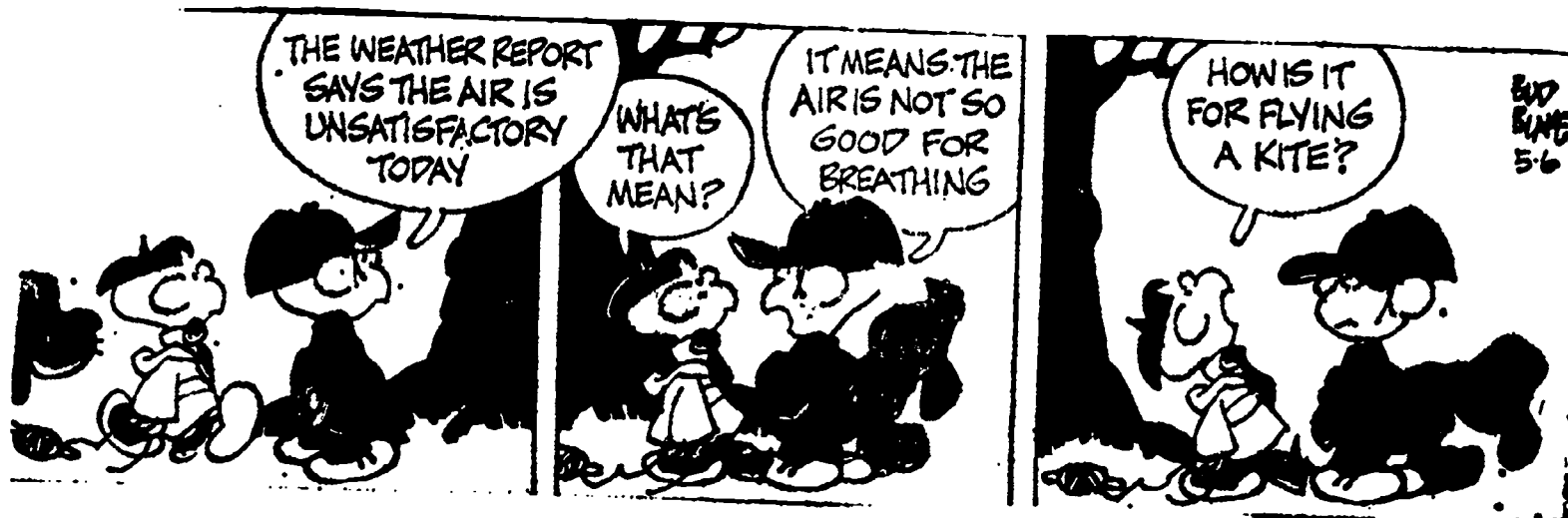
MAJOR INDUSTRIAL SOURCES OF PARTICULATE POLLUTANTS*

Source	Emissions in Tons per Year	
Coal-Fired Boilers		
Electric Utilities	5,107,000	7,151,000
Industrial Power Generation	2,044,000	
Forest Products		
Forestry Operations	6,096,000	6,793,000
Plywood, Hardboard & Particle Board	70,000	
Pulp Mills	627,000	
Agriculture & Related Operations		
Field Burning	1,000,000	2,210,000
Grain Elevators	1,210,000	
Crushed Stone		1,490,000
Cement		1,233,000
Iron and Steel (includes Iron Foundries)		722,000
Fertilizers (solid)		312,000
Nonferrous Metals		
Aluminum	80,000	215,000
Copper	61,000	
Zinc	39,000	
Lead	35,000	
Clay		147,000
Lime		142,000
Asphalt		95,000
Phosphate Rock		49,000
Acids (Sulfuric & Phosphoric)		48,000
Petroleum Refining		24,000
Paint and Varnish		20,000
Detergents		2,000
TOTAL		20,803,000

*Excerpted from "Particulate Pollution in the United States," by A. Eugene Vandergrift, et al., presented at the 63rd Annual Meeting of the Air Pollution Control Association, 1970, Table 11, pp. 23-24.

X. 11.
(cont.)

One student activity involves making a scrapbook of political cartoons and comics dealing with pollution. The following are two examples of political cartoons and comics commenting on pollution problems.



'... And, You See, We Haven't Neglected Esthetic Values'

CONCEPT BEHAVIORAL
 OBJECTIVE

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- X. 11.
 (cont.) One student activity involves a visit to the riverfront to study pollution problems in that area and to see first hand what some of the problems on the east side are. The following reading should help the teacher to understand the problem concerning east side industry.

The following reading was taken from the St. Louis Post-Dispatch, April 20, 1972, E. F. Porter, Jr.

UGLY AIR
(PROBLEMS OF AIR POLLUTION ON THE ILLINOIS SIDE OF
METRO ST. LOUIS)

"The smoky heavy industries bordering the Mississippi River's edge on the East Side are out of sight and out of mind to many St. Louisans much of the time, but they are among the chief reasons pollutant levels throughout much of the region are still well above the level the Federal Government considers safe for human health.

" The metropolitan atmosphere has been gradually getting cleaner since Missouri adopted tough rules in 1967, but even on a clear day, as air travelers can attest, St. Louis is often distinguishable at a distance only as a brownish purple blister of smog, swelling a thousand feet or more above the surrounding countryside.

" Federal requirements now call for a rollback of pollution so that by 1975 they will be at a level where breathing would be no longer hazardous to your health.

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X. 1..
 (cont.)

"For at least one contaminant, sulfur dioxide, that goal would already have been attained were it not for the heavy discharges of the East Side industries, Missouri officials maintain.

"Color coded pollution from Granite City Steel leaks into Horseshoe Lake through a breach in a holding pond.

"Coke ovens of Granite City Steel belch clouds of sulfurous smoke each time one is opened for fresh charging with metallurgical coal, making them one of the most offensive sources of air pollution in the region. The company has agreed after months of hearings before the Illinois Pollution Control Board, to install close-fitting connections and a vacuum system to prevent the escape of pollutants during charging.

"Now under the Federal gun, Illinois is hastening to catch up. The Illinois Pollution Control Board, which two years ago replaced the unaggressive Air Pollution Control Board, has adopted emission regulations in some respects more restrictive than Missouri's. But many experts, including some Federal clean-air officials, harbor private doubts as to whether Illinois can move fast enough to meet the Federal deadline.

"According to estimates calculated by a computer at the Argonne National Laboratory near Chicago, total daily discharges of flyash, soot and dust in Madison and St. Clair counties, which total 317 tons a day.

"Shell Oil's vast refinery complex at Wood River may face a costly cleanup job to meet new Illinois rules and the 1975 Federal deadline. On the other hand, Illinois officials, who have not tested the plant, admit they are unsure how close it is to compliance today. Strict as the new rules are, they are more lenient for petroleum refineries than most other industries.

"Three years may not be enough time, the skeptics say, to design and install the costly equipment necessary to do the job. Furthermore, if industries resist and avail themselves of the law's delays with courtroom challenges and requests for variances, the attainment of the clean air goal will be harder still to attain.

CONCEPT BEHAVIORAL
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- X. 11.
(cont.) "Some experts seriously question whether acceptable air quality ever will be achieved, or whether, in fact, industrial growth will add new pollutants to the air faster than remedial measures can take them out.

"For some pollutants the solution may be palliative and temporary: relocating industrial sources so as to spread out the problem or flushing captured pollutants into the sewer system where they become water pollutants."

- XI. 12. Industries may create problems that strain the existing water, sewage disposal and waste (solid) disposal facilities of a community. This is a very broad topic and is directly related to the preceding Concept X, Behavioral Objective 11. Water facilities of a community may become taxed by an industry that uses large quantities of water (a steel mill for example uses 11,000,000 gallons of water for every 1000 tons of steel produced or about 22,000,000 gallons per day per 2000 tons of steel produced. Twenty such furnaces may be operated in a single mill.) Industries that use large amounts of water may have their own wells and/or adjacent bodies of water. In the event neither of these possibilities exist, larger water mains may have to be installed. Who picks up the cost, the industry or the community? It may be a combination of both.

Sewage disposal facilities are directly tied to the water facilities of the community. Community growth often corresponds to the types of sewage disposal facilities available in an area. Primary sewage facilities use the "settling" technique that removes the solid residue (sludge) from sewage as a result of gravity. Cess pools, septic tanks, and lagoons are examples of primary treatment facilities. A secondary facility removes the sludge and then treats it with chemicals or simply lets natural microorganisms render it harmless. Primary and secondary facilities make sewage harmless from a health and disease standpoint. Tertiary treatment facilities have been developed as a result of detergents and other difficult-to-remove chemicals that adversely affect the quality of water to be used by man, animal and plant life in bodies of water.

Another major problem is the getting rid of solid wastes produced by both community residents and industries. The problem has become more severe with each passing year. In the past a open city dump was adequate for solid wastes, except it usually became rat infested and created health problems. Then much solid was incinerated, but this method

CONCEPT BEHAVIORAL
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- XI. 12. proved unsatisfactory because of air pollution. The
,cont.) last method of solid waste disposal presently in use
 is the land fill. The future of land fills is dubious
 because of the various problems they create. Normally
 a community's days waste is trucked to the fill site,
 dumped and spread out and packed down by a bulldozer.
 Then the layer of waste must be covered with six inches
 of gravel, clay, and soil. This earth cover is readily
 obtainable where the building industries are booming.
 The cost of transporting the earth cover where it is
 needed is no small matter. Another problem is that items
 such as washing machines, stoves, or refrigerators take
 a long time to disintegrate and thus sinking land forms
 may result in future years. A three foot final earth
 cover is required when land fill is completed.

The final and best avenue for waste disposal will come about when technology is developed that will permit us to refine and recycle most of our man-made materials. Attitudes of the public and industry must also change. We will have to give up some of our luxuries and conveniences. We will have to use recyclable glass rather than plastics or aluminum containers. Glass can and is being used to construct roads, the paving material is called "glassphalt."

Following is a story which we have titled "MOUNT TRASHMORE": Du Page County, Illinois has found a sensible and certainly useful way to dispose of it's trash, including industrial waste. The county, which is located West of Chicago, is geographically flat and this of course limits winter recreational activities. To alleviate the problem, Du Page County is literally building a mountain of trash. Each days collection is spread out, pressed and packed, and covered with clay and gravel which controls decomposition and unpleasant odors. The hill, when completed, will become the highest elevation in the county accommodating six toboggan runs and five ski slopes. The garbage filled mountain has, at this writing, not been formally named but has been dubbed "Mount Trashmore" by area residents.

The following is a résumé of the reading in "OUR POLLUTED WORLD" (pages 17 to 27.) The articles denote the importance and man's need for water through his direct and indirect use, such as, raising food crops both plant and animal. It identifies how water is polluted by careless dumping of nonbiodegradable materials into it. It points out how specific industries and cities are responsible for pollution. Steel mills dump hot water used in cooling phases of the steel operation, this causes an increase in

CONCEPT BEHAVIORAL
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XI. 12.
(cont.)

river temperature and kills the fish, which in turn decay and foul the water. Meat packing plants have been found guilty of dumping animal remains directly into rivers and this results in the formation of poisonous gases that bubble up from the river's bottom. The reading discusses types of sewage treatment facilities, introduces the concept that cities need to install two kinds of sewer systems. Storm sewers should be constructed to carry only rain run-off and not be mixed with the polluted domestic sewage as is the present case in most cities. This would assure that rain water would not be polluted and have to be treated before entering water tributaries. The article gives evidence that much study and progress is being made in the cleaning up of our water, but much yet remains to be done. The article stresses the point that it will cost much for us to accomplish the goal of clean water, but that it can be done. It concludes that changes must come and will come when we have an informed and interested citizenry.

XII. 13.

Electric power is quickly becoming overloaded and problems have accelerated with the great demand for electricity by industry. The following article discusses possible solutions to those problems and possible future problems.

The following reading was taken from the St. Louis Post-Dispatch, December 29, 1970, E. F. Porter, Jr.

NEW DIRECTIONS IN THE SEARCH FOR POWER

"Sun power, moon power, earth power and a hydrogen bomb stuffed in a bottle may be summoned to meet the energy demands of a power-hungry society.

"To accommodate the insatiable American appetite for pitiless illumination and ear-splitting music, for gadgets that cool, heat, freeze, defrost, blend, mend, roast, toast, wash, dry and open tin cans, the nation's power industry must double the production of electrical energy every decade. In the future the demand may double every eight years, or even every seven.

"Notwithstanding growing opposition to more power plants and more high-tension towers, few persons appear to be willing to endure power shortages, or to cut back on consumption.

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XII. 13.
 (cont.)

"The strain is greatest on hot summer days. Then the city dweller sits indoors with the shades drawn, the lights on, the air conditioner going full blast and the color television set on--to drown out the air conditioner.

"The effects have been most conspicuous on the East Coast, where the power companies have had the hardest time abreast of demand. As they learned last summer, when they attempted to stretch a limited output to feed the demand, the voltage drops. Color television sets go gray, subways grind to a halt and computers in banks and brokerages get fuzzy-headed and suffer temporary attacks of amnesia, giving credits (and debits) where no credit (nor debit) is due. Appliances left plugged in during a brownout can be ruined when the full voltage surges back through the lines.

"The problem is double-edged. To meet the rising demand, the nation will need an estimated total of 250 new power-generating plants over the next 20 years. This means more pollution.

"Conventional electrical power plants today rate second only to the automobile as a source of air pollution. They generate 25 per cent of all the airborne particles (fly ash and the like), 25 per cent of all the nitrogen oxides and half of all the sulfur dioxide.

"Nuclear reactors, which so far account for only a tiny fraction of the nation's power-producing capacity, still are considered potentially explosive.

"Both nuclear reactors and conventional steam plants use vast quantities of cooling water that can raise the temperature of lakes and streams and unbalance aquatic ecology.

"Even hydroelectric projects have run into opposition from environmentalists. Although they cause no direct pollution of the water or air, they alter natural river flow, the topography, the environment and perhaps even the weather. Suitable sites for hydroelectric dams, furthermore, have nearly run out.

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XII. 13. "In a conventional steam power plant, burning fuel heats the steam, which drives a turbine, which spins a generator. Unless the fuel is superclean, like natural gas, the exhaust from its burning pollutes the air. And reserves of natural gas, experts estimate, will be exhausted before the end of the century."

Students will study the causes and effects of power failures in communities. The following information discusses the great northwest power blackout of 1965 and the dangers of power blackout.

The Great Northeast Power Blackout of November, 1965.

Contrary to common public belief, the 1965 blackout was not caused by a shortage of generating capacity.

Electrical relays in the Canadian powerhouse at Niagara Falls operated in such a manner that power which had been going north into Canada suddenly was sent south into the United States. This excess power surged into New York, Massachusetts and New Jersey. Charles Luce, utility expert states. . . .

"But then, because Canada was power-deficient, power surged back from the United States to Canada over other interconnections. Our generators in the Northeast couldn't respond quickly enough to this tremendous demand, and figuratively they chugged to a halt. We have since installed the equipment and made changes necessary to guard against a recurrence of that disaster."

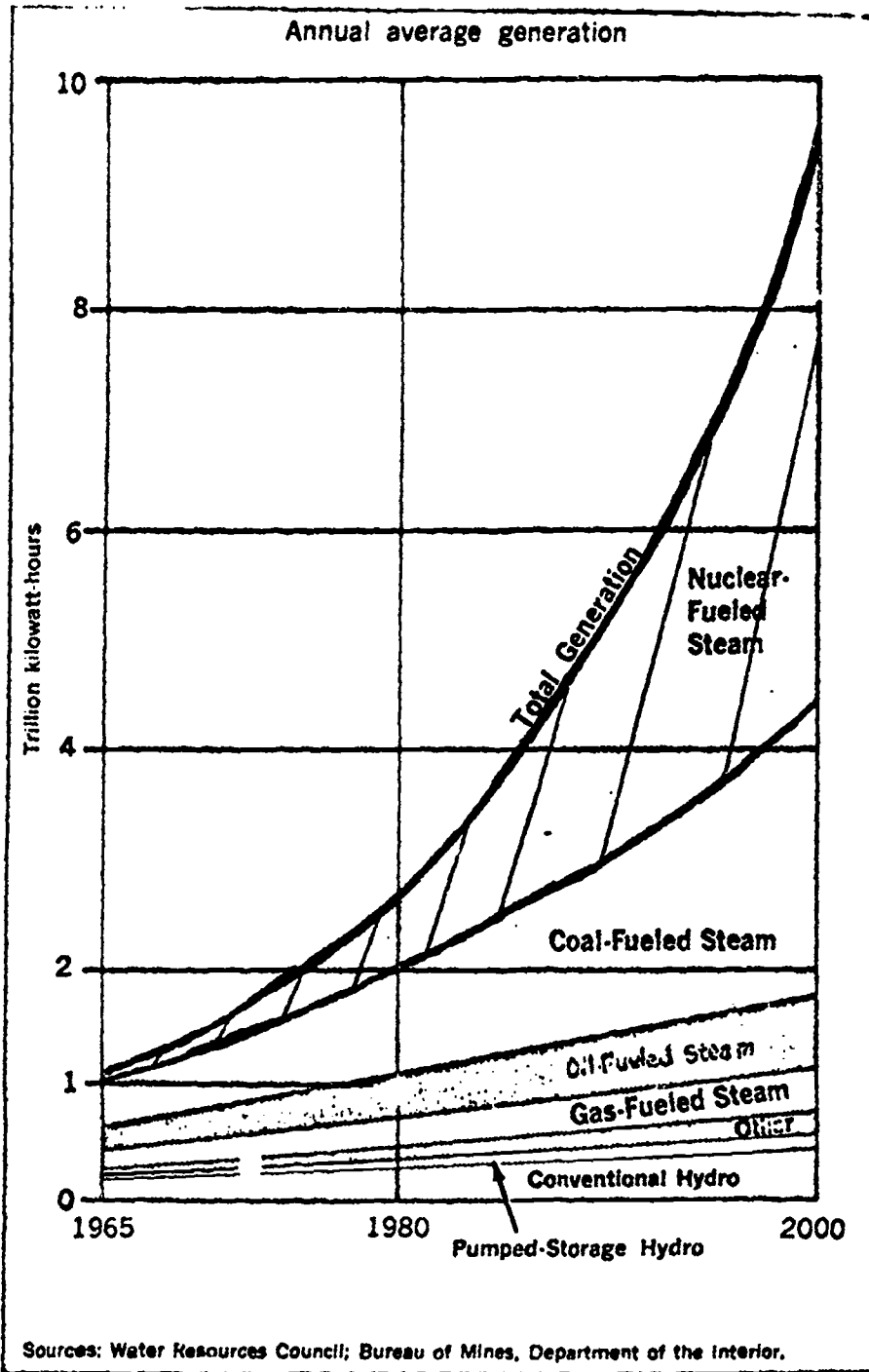
Dangers of massive power blackouts in cities.

People trapped in subways, elevators.
Airports without power for directing planes safely in at night.
Hospitals
Food spoilage
Public safety (looting, assault)
Accidents from darkness.

Many companies of course are required by law to have auxiliary power along with institutions like hospitals, but how long would this power last in a massive blackout?

XII. 13.
(cont.)

PROJECTED ELECTRIC GENERATION by SOURCE 1965-2000



CONCEPT BEHAVIORAL
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XIII. 14.

One of the major reasons residents use in fighting against an industry locating in a community is that the industry creates traffic problems. The problems that are usually pointed out are such things as traffic jams, the necessity to put up more stop signs, widening of roads and more hazardous driving conditions due to the general increase in traffic. Today people are also concerned about the additional air and noise pollution near their homes.

The purpose of activity A is to make the students aware of the great variety in types and sizes of vehicles by industry. For example the telephone company uses many pick-up size trucks and panel trucks. Concrete mixers, gasoline trucks and finally the medium to large size semi-trailers are seen on all major highways and roads. We felt that activity B would make students aware of the large numbers of vehicles that industry adds to our highways, roads and streets.

In most cases the size of the vehicle will coincide with the size of the product the industry makes or the raw materials the industry needs. For example the Chrysler plant needs trains or large semi-trailer transport trucks for its product. On the other hand many chemicals are transported in small vehicles or by air. (Monsanto is an example) An industry needing large quantities of oil will bring large tank trucks to the area.

Industries usually agree to help underwrite some of the expenses in installing stop signs and widening the road immediately in front of their land site. Sometimes they hire their own private police to help direct traffic during the rush peaks. Sometimes they set working hours in such a way as to help distribute their traffic.

The community may find it necessary to limit industrial vehicle use of certain streets and roads. This becomes necessary due to the noise and pollution factors near hospitals, schools or residential areas. It also becomes necessary when bridges, roads or streets are not wide enough to accomodate such vehicles safely. Of course provisions are made when major construction is taking place, or people are moving or road construction is taking place. Obviously, at such times, needed large vehicles would be allowed on the road or street.

CONCEPT BEHAVIORAL OBJECTIVE

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- XIII. 14. (cont.) It is impossible to get statistics pin-pointed directly to numbers of accidents due to an industrial location. In spite of this we felt that students could benefit from a positive encounter with police and therefore included activity E. We also felt that local police could state expert opinion on such accidents out of their own personal experience.
- XIV. 15. The following summary discusses what happens when a crucial industry leaves town or declines in business.
- City: Seattle, Washington
- Industry: Boeing Company
- Type of Industry: Aircraft manufacturing (jumbo-jet 747) and aerospace.
- Importance of company to city in terms of employment:
During peak year-101,500 or
1 out of 12 people in Seattle.
- Effect of hard times on Boeing: Employment cut from 101,500 to 25,000-forced to sell a plant, close another, auction off surplus equipment, consolidate assembly lines, cut production.
- Problems of unemployment for former Boeing engineer:
New engineering jobs hard to find.
Difficult to adjust to lower budget.
Expensive houses.
- How the Boeing decline hurt Seattle's total economy:
- Unemployment compensation services increased many times.
Many unemployed moved out of Seattle.
City government forced to cut expenditures for city programs and employees.
Schools-budgets cut drastically.
Automobile sales agencies "losing their shirts." - typical of many consumer retail agencies.
Housing-apartments become vacant-homes difficult to sell.
People who are working are afraid to spend too much money because of uncertainty (just like depression) which causes a chain reaction of more business slumps and more unemployment.

INSTRUCTIONAL SEQUENCE

(Note to Teachers) - Activities marked with an asterick (*) are highly recommended. The numerals preceeding each activity refer to the related concept and behavioral objective (e.g., IV-5 refers to Concept IV, Behavioral Objective 5).

Topic: Industries Consider Certain Important Factors before Locating in a Community

Time: Maximum two weeks

Sub-topic: Capital and Profit Making

Suggestion to teacher: If you know someone who is a stock broker and willing to speak to a class about the need for capital investment and making a profit in a capitalistic society, you could add this as an activity for Concept I, Behavioral Objective 1.

*I-1 Activity A - Have the students make a list of their personal assets and place a dollar value on each asset. The student will total these assets.

- Note to teacher -
1. Before assigning the activity explain the term "assets." Explain that personal assets are analagous to capital assets in a business.
 2. The students should list such things as clothing, bicycle, money in a piggy bank. The teacher may want to give the students one or two of these examples in order to get the students started on the assignment.

*I-1 Activity B - Have the students read hypothetical facts for two industries. After reading the facts have them determine whether or not each industry had a profit or suffered a loss.

- Note to teacher -
1. Explain the terms capital investment and profit. (see background information pages 15-46)
 2. Give each student a copy of the hypothetical facts. (see form #1, p. 122)
 3. After students have completed each problem have them write approximately 25 words or discuss reasons why one industry is likely to stay in business while the other may close down and resell the property and machines.
 4. See Data Sheets with answers on following two pages.

Note: When assets equal liabilities the business breaks even.
 When assets exceed liabilities the business has made a profit.
 When liabilities exceed (are greater than) assets the business has
 suffered a loss.

1. Total the assets and liabilities for Company A for the month of December.
2. Complete the chart for Company A for the year and total all assets and liabilities.

Company A
ASSETS

LIABILITIES

\$44,300 sales	wages	\$25,000
	electric	5,000
	water	500
	gas	2,000
	materials	5,400
	freight	600
	taxes	5,000
		<u>\$43,500</u>

1. Total the assets and liabilities for Company B for the month of December.
2. Complete the chart for Company B for the year and total all assets and liabilities.

Company B
ASSETS

LIABILITIES

\$56,450 sales	salaries	\$33,000
	electric	6,000
	water	600
	gas	3,000
	raw materials	7,000
	transportation	700
	transportation	900
	taxes	6,500
	<u>\$57,700</u>	

Teacher note: things like patents, land, machinery, and buildings can be pointed out to be assets.

COMPANY A

Assets		Liabilities
JAN.	45,500	46,200
FEB.	45,300	46,700
MAR.	43,100	44,050
APR.	43,600	41,100
MAY	44,400	41,300
JUN.	44,800	42,600
JUL.	46,700	44,600
AUG.	45,900	43,700
SEP.	42,050	42,100
OCT.	41,200	41,800
NOV.	43,900	43,850
DEC.	44,300	43,500
Total \$530,750		\$521,500

Assets		Liabilities
JAN.	55,200	57,900
FEB.	54,500	55,800
MAR.	55,900	55,500
APR.	56,750	54,600
MAY	57,200	55,100
JUN.	56,500	56,400
JUL.	55,250	55,700
AUG.	55,100	55,750
SEP.	53,800	55,650
OCT.	52,550	56,400
NOV.	53,600	56,200
DEC.	56,450	57,700
Total \$662,800		\$672,700

I-1 Activity C - Students may play a game of monopoly.

- Note to teacher -
1. If this game is not available in your school, you may ask students to bring one in, or order a game through you school budget. These games are available in all major department stores.
 2. Playing this game may help some students better understand capital investment and profit making.

*I-1 Activity D - Students will read an excerpt from a St. Louis Post-Dispatch story on the Soviet Union under Leonid Brezhev. They will analyze the article from the viewpoint of profit making and capital investment, perhaps jot down their ideas, and be prepared to discuss in class.

- Note to teacher -
1. The teacher will find the article in the student data sheets (form #2), and run off copies for students.
 2. In discussion, students should conclude that production is dropping in the Soviet Union because incentives are taken away from the producer and the worker by not offering a share of the profits. Profit making is therefore a major factor in production: output and the Soviet Union is considering adopting some capitalistic practices on a limited basis. Is it possible that communism is hanging itself?

Sub-topic: Appropriate Land for Industry

*II-2 Activity A - From a selected group of pictures or slides have students analyze why an industry would or would not use that land.

- Note to teacher -
1. Teacher may obtain example pictures of various land forms (i.e. low lying bottom land, deserts, swamps, mountain ranges and discuss them with the students so they will know what to look for).
 2. Students may get their own pictures from newspapers and magazines.
 3. Teacher should bring pictures or magazines to class for students who will inevitably forget their materials.
 4. Slides of various land forms are available at the EEE Office if you wish to use these in lieu of magazines. On the following page you will find a synopsis of slides.

Slide Synopsis

1. Mountains and cattleland in Wyoming.
2. Alaska: Ice fields with mountains in background
3. Erie Canal, New York
4. Three forks converge in Montana to form the Missouri River
5. Sand dunes with the San Andres Mountains; California, in the background
6. Shark River in the Florida Everglades
7. Vancouver
8. British Columbia
9. Farmland in Southwest Wisconsin
10. Hoover Dam, Arizona and Lake Mead
11. Topography of Missouri
12. San Francisco Bay
13. Strip Mining
14. Virgin Islands
15. Dry hills of desert in Southern California
16. Columbia River Basin, Washington
17. Sand dunes near coast 7 miles below Tel Aviv, Israel
18. Canadian rugged terrain
19. Rolling hills surrounding St. Lawrence River, Quebec
20. Vacation land, U.S.A.
21. Steel mill plant in Gary, Indiana
22. Steel mill plant in Gary, Indiana
23. Air pollution from steel mill
24. Power lines
25. Power lines, railroads
26. Railroads
27. Transportation: rail and water

5. After the students have viewed the slides or obtained their picture they will in writing or general class discussion, state why the land is suitable or not suitable for industry to locate on it.

***II-2 Activity B - Have students study a physical map.**

- Note to teacher -
1. Familiarize the students with land surface information that can be read from a physical map. Examples are hills, low flood areas, streams or rivers, natural drainage.
 2. You may use a physical wall map of the county, state or nation that your social studies or science department will make available to you.
 3. Have students suggest land surface features they think would be beneficial for building a large factory building.
 4. Have class discuss the feasibility of each suggestion as it is made.

***II-2 Activity C - Students will assess the school grounds to see if the land could be made suitable for locating a slaughter house meat packing plant on it.**

- Note to teacher -
1. Data sheet (form #3) is provided in the student data sheets. The data sheet explains the assignment to the teacher and the student.
 2. The teacher will come across several activities in this unit that use the school grounds as a hypothetical setting for a slaughter house meat packing industry.

II-2 Activity D - Have students do a contour model map of your school grounds.

- Note to teacher -
1. This activity is suggested for average to slow students.
 2. When map has been completed have students orally or in writing determine its feasibility for building a large factory building on it.

II-2 Activity E - Have students do a model contour map that illustrates the student's ideas of the best possible land form on which to build an industry.

- Note to teacher -
1. Activity E is suggested for above average students.

2. After activity has been completed have each student hand in two or three written paragraphs justifying the ideas he illustrated on his contour map.
3. Contour maps may be done with colored pencils illustrating flat areas and shading to illustrate height. Water and possibly vegetation could be illustrated also.
4. You may want to challenge the student's creativity by having the student use other materials to construct a contour model map, for example, cardboard or plywood on which the student molds clay, plaster of paris, or paper mâché - Remember art teachers are helpful to students and other teachers when involved in a project of this nature.

*II-2 Activity F - Have students read a hypothetical story. After reading the story the students will discuss whether or not the owner of the property will sell it to an industry.

- Note to teacher -
1. The story to be handed out to each student will be found in the student data sheets (form #4). The major point of discussion is at the end of the story.
 2. You may discuss it orally or have the students write their ideas and turn them in.
 3. The hypothetical story is based on real facts of a case in St. Louis County. As of this writing the farmer was offered two million dollars and a farm in Illinois to be purchased for him by the company wishing to buy. The offer was turned down for these reasons:
 - A) This is where he was born and raised
 - B) He would not know what to do with that much money and he had all the things in life he needed or wanted on this farm.
 - C) He had a need to work the ground, be close to nature, yet another farm would not be the same as the "home place."
 4. This story will give you an opportunity to point out the difference in values among individuals.

Sub-topic Transportation Needs of Industry

***III-3 Activity A** - The students will choose an industry located in Metro-St. Louis and determine the specific transportation needs of that industry in terms of obtaining its raw materials and shipping its products to market.

- Note to teacher -
1. Before making the assignment the teacher should help the students through discussion identify various industries in the area. The phone book may be used as a source.
 2. The students can be instructed to use reference books to determine the raw materials and products of that industry and the kinds of transportation used.
 3. Ralston Purina might be used as an example industry. River Barges and trains may bring in raw materials. Trains and trucks may distribute finished product.
 4. The student will report their findings to class for general information and discussion.

***III-3 Activity B** - The students will do a comparative study of types of transportation (river barges, trains, airplanes, trucks) and determine their suitability in terms of cost, speed, kinds of goods carried, size and weight of goods carried, perishable as opposed to nonperishable goods handled. The information obtained will be compiled in chart form.

- Note to teacher -
1. Run off copies of data sheet (form #5).
 2. Show film Development of Transportation (BW - 11 minutes), available from County A V.
 3. Briefly discuss the factors in question with the class before making the assignment.
 4. The activity may be either done in groups or assigned as an individual project.
 5. To obtain pertinent information the students will need to contact various transportation agencies. You might have the students write to the Interstate Commerce Commission, Washington, D. C. for this information.

*III-3 Activity C - Have students research the history of transportation by sketching models or clipping pictures from magazines and newspapers.

- Note to teacher -
1. Explain that types of transportation have changed over the years, that as it has changed so have changes occurred in industrial locations. Example - after the railroad was invented some industries found it possible to locate farther away from rivers since they would no longer have to be dependent on barges to bring them raw materials.
 2. Student pictures should include examples of the following: Pack horse, horse wagon, trains, poled or paddled boats and barges, sail boats, trucks, airplanes, steam boats, diesel ships, nuclear ships, wood burning-coal burning - diesel burning-electric trains, propellor or jet air planes.
 3. Have students mount sketches or pictures and at the bottom of the picture indicate: (a) example of type of industry that used that transportation, (b) the energy source for that type of transportation - human, wood, coal, gas, oil, water (steam), nuclear.

Sub-topic Transportation Needs of Industry

*III-4 Activity A - Have students read: The Dennison Manufacturing Company 1844 to 1865. Have the students list chronologically the changes and the need for changes in the types of transportation used by the company.

- Note to teacher -
1. Run off copies of Form #6 (starting on page 129).
 2. The book Individual Enterprise and National Growth which contains the above excerpt is available at West Junior High. Each school is encouraged to obtain a copy if at all possible. Excellent background information on development of large industry.
 3. This activity reinforces Concept I and Behavioral Objective 1.
 4. The reading deals with types of and speed of transportation used by this company and its success because it recognized the importance of changing modes of transportation.

5. You should stress the idea that speedier transportation afforded larger markets at reduced costs - accessibility of both raw materials and markets for the finished products.

***III-4 Activity B** - Have students hypothesize about future types of industry, the types of transportation used by these industries, and the consequences of these developments. What will be the most feasible types of transportation in the future?

- Note to teacher -
1. Show film Industry of the Future (28 minutes) available from County A V.
 2. Class discussion could center around depletion of raw materials versus man-made materials that will replace the former. Industry of the future may be concerned with recycling of used materials, rather than natural raw materials.

***III-4 Activity C** - Have students build models of various types of transportation and associate it with a particular type of industry that will use it in terms of the raw materials needed and how the manufactured products will be shipped to market.

- Note to teacher -
1. Use steel industry as an example. River barges deliver iron ore to plant site where it is processed into steel that is sent to market via river barges or railroads. Refer to background material.
 2. Make a class display of the chosen industry by pictures and words, the model of transportation carrying the needed raw material and/or the finished product which is to be sent to market.
 3. Good activity for slow learners.

***III-4 Activity D** - Hypothetical Problem - You are a civil engineer and your company has assigned you to survey the proposed location of a new Slaughter House Meat Packing plant in terms of transportation facilities. Assume that the plant is to be located on your school grounds in place of the school building. Assess your school area to see if needed or necessary modes of transportation are available or feasible for obtaining resources (cattle, hogs, sheep, etc.) and transporting the processed product to market. Also consider the handling of employee traffic. Your survey should be submitted in the form of a report under the headings: Roads, Railroads, Water and Air transportation indicating whether they are feasible, adequate, or inadequate.

- Note to teacher - 1. Run off copies of the Hypothetical Problem, (form #7) to be handed out to the students.
2. Students doing the activity should include some of the following ideas in their report:
- (a). Roads - Report on the roads immediately surrounding the school site. Are they wide enough to accomodate large trucks? Do immediate roads connect with major road arteries (state and interstate highways), i.e. Interstate 70 and 244 or 44-66?
 - (b). Railroads - Are there rail lines close by? Would it be possible to connect the proposed industrial site by spur rails to the main railroad trunks?
 - (c) Water - Are there rivers nearby large enough to carry barges that could be used to transport resources and products? (i.e. Missouri or Mississippi Rivers.)
 - (d). Air - Is the industry close to major airports? Can the air traffic handle the type of resource and product that the company produces - is this idea at all feasible? (i.e. Spirit of St. Louis Airport, Lambert Field.)

Sub-topic Use of Available Energy Sources

*IV-5 Activity A - Using a Standard Reference have students find out the primary energy needs and material needs of a steel mill and have them explain orally or in writing, why a steel mill is not likely to locate in Metro-St. Louis.

- Note to teacher - 1. When making the assignment you might pose the question: Do steel mills in fact exist in this area - if so, why?
2. You and the students might consider the Peabody Coal from Illinois that cannot be burned in St. Louis - why?
3. Refer to background information and note that coal with high sulfur content cannot be used in the St. Louis area.

***IV-5 Activity B** - Have students analyze a graph that shows various energy sources as they have decreased or increased in use during this century.

- Note to teacher -
1. Make an overhead transparency of graph paper. Use the transparency in giving students directions on how to prepare the graph.
 2. Run off copies of graph paper to hand out to students, (form #8).
 3. From the ordered sets of charts accompanied by the booklet Energy and Economic Growth, use chart 5 accompanying the booklet (see page 2) for this activity. Read: The Changing Picture of Energy Use.
 4. From the above chart identify different natural sources of energy. Have the students observe the changes in types of energy sources that have occurred in this century.
 5. Have students suggest how the availability of these energy sources may affect an industry locating in a particular area.
 6. Have students prepare a bar graph based on chart 5 to see if students really understand and interpret the chart in terms of changing types of energy and their use in this century. See sample graphs on pages 66 and 67.

***IV-5 Activity C** - Have the students make a survey of their homes to determine the various sources of energy used by them in their daily lives.

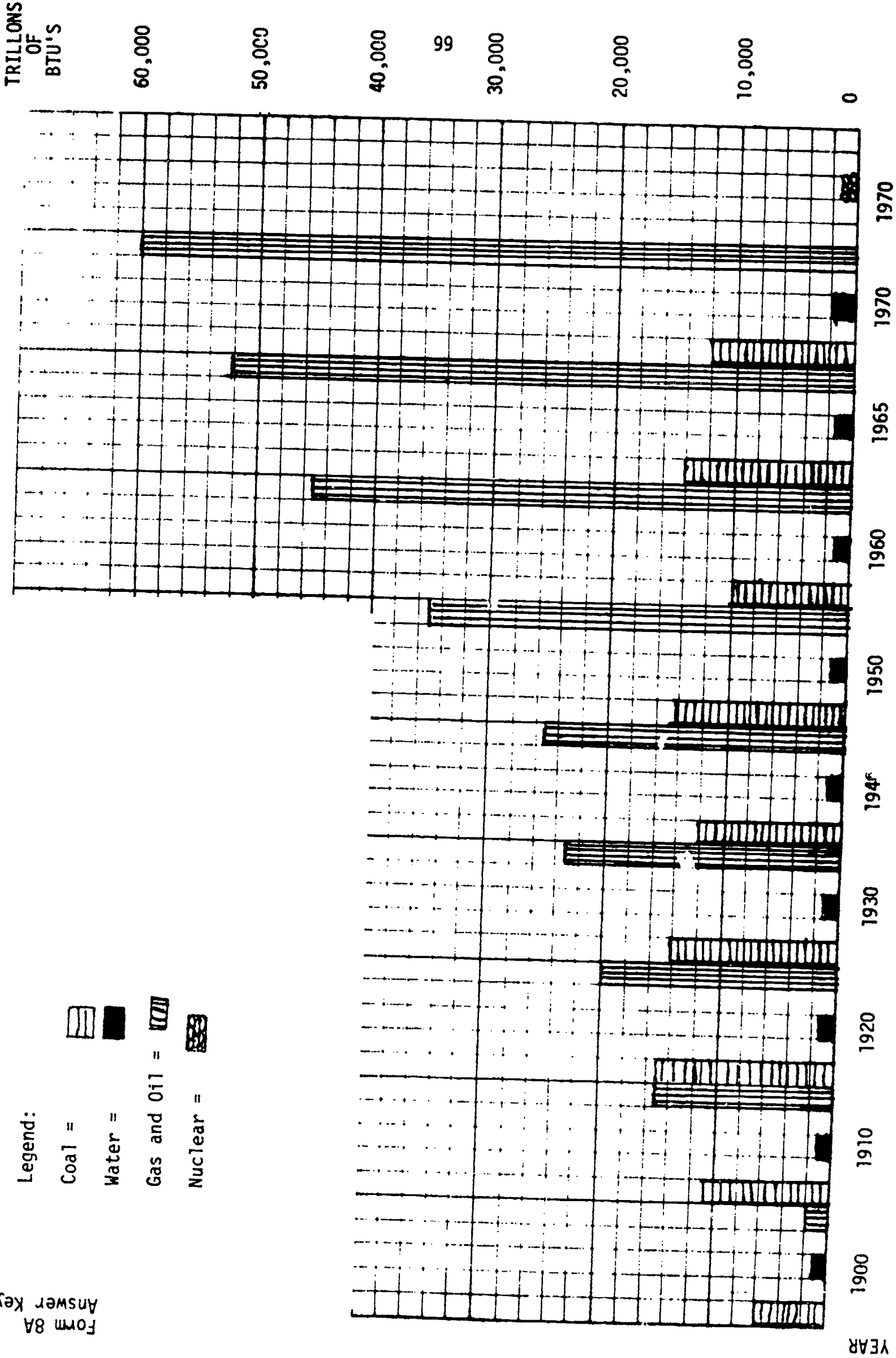
- Note to teacher -
1. Examples might be: Natural or Propane gas, oil, wood, coal, gasoline, motor oil, kerosene, fats or wax in candles, coke, electricity.
 2. The students will turn in a written list of these energy sources that may be compared with classmate lists to determine what energy sources are most widely used in the area.

3. The activity should make the students aware of their major energy sources.
4. The students should be able to identify minor of energy, such as, lighter fluids, butane gas, candles.

*IV-5 Activity D - Have students determine what types of energy would be suited for use in a Slaughter House Meat Packing plant that is to be located on the school grounds.

- Note to teacher -
1. Explain the difference between primary and secondary energy sources. Refer to background information page 26 - IV-5.
 2. Have students read: The Changing Picture of Energy Use in the booklet Energy and Economic Growth.
 3. Run off copies of data sheet for each student, see (form #9).
 4. See data sheet with answers and explanations for suggested answers on the following three pages.

CHANGING ENERGY USE FROM 1900 to 1970




Form 8A
Answer Key


Per Cent
100
90
80
70
60
50
40
30
20
10
0

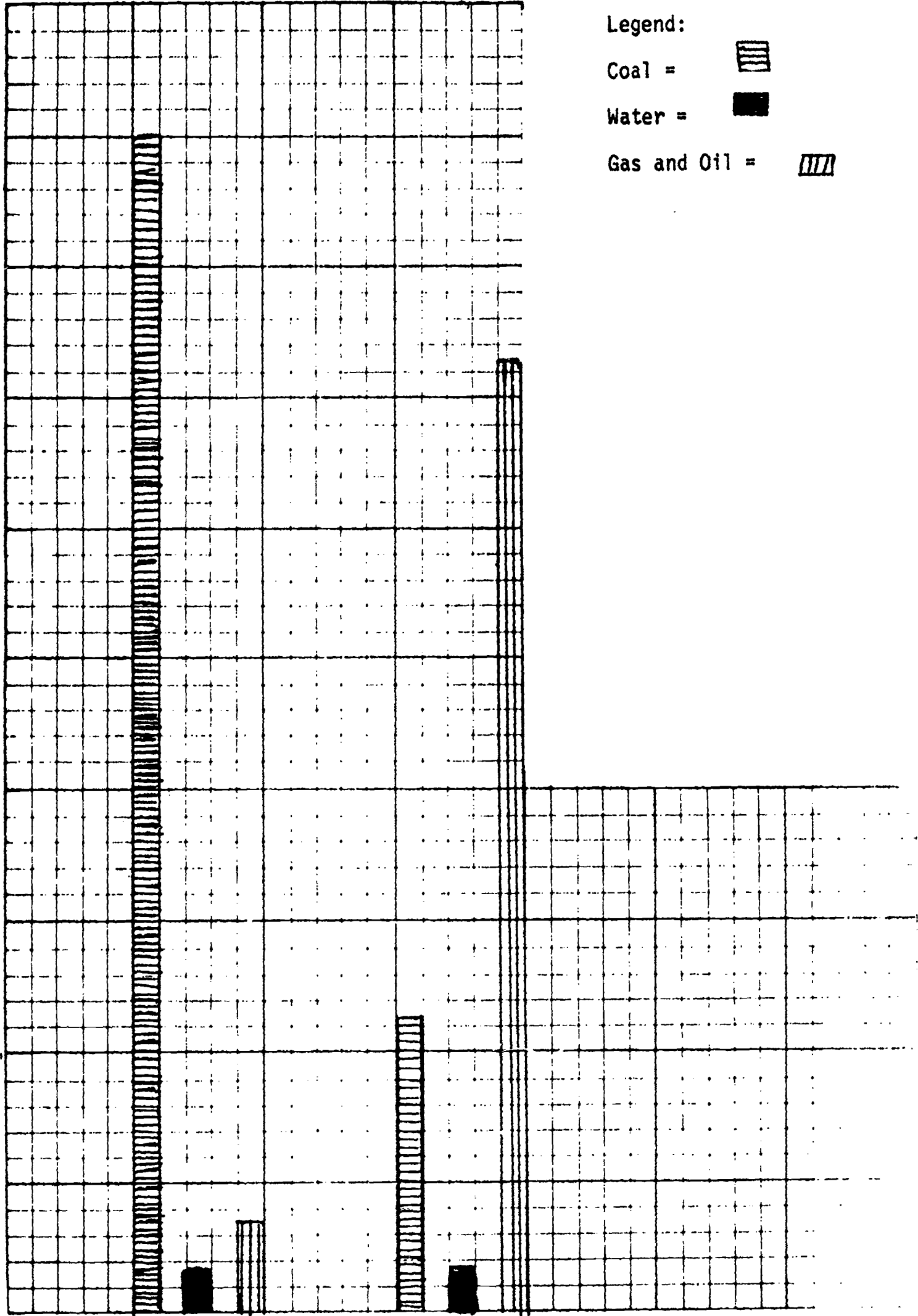
CHANGING ENERGY USE - 1900 - 1965

Legend:

Coal = 

Water = 

Gas and Oil = 



1900

1965

USE OF AVAILABLE ENERGY SOURCES

1. List 4 types of natural (primary) energy sources.

- water
- coal
- gas
- oil

2. Name the main kind of secondary energy used by industry today.

- electric

3. List 4 facts about primary and/or secondary sources of energy an industry would consider before locating in a given area.

- continued availability (will local source of energy be used up)
- efficiency (does coal heat more effectively than oil for the industry's needs)
- cost (which source can the industry buy more cheaply)
- convenience (is gas cleaner than oil or electric)
- transportation

4. Which of the energy or energies do you think a slaughter house meat packing plant on your school grounds would select?

- _____ (is coal easier to handle for the industry than oil or gas)
- _____
- _____

5. Based on the facts you listed for #3, justify in about 50 words your answer to the above question.

*Suggestion to the teacher: If you know a lawyer, or someone who is elected to a city or county government office or employed by them, you may want to have such a person in to talk with your class. This is merely a suggestion because we do not have a name to offer you at this time.

Sub-topic: Zoning Laws, Building Codes, and Tax Structure in the Community.

*V-6 Activity A - Have students choose one of the following topics: Zoning Laws, Building Codes or Tax Rates Personal and Real. The student will find out how the average citizen goes about getting information he may need on these topics. The student will report this information to the class.

- Note to teacher -
1. Explain that incorporated cities as well as the county government have different zoning laws and building codes. They may be similar but generally will not be exactly alike.
 2. The average citizen usually goes to the city hall or the county court house as the case may be. At the court house he will want directions to the county zoning board in order to find out existing zoning on a specific piece of property.
 3. Building codes will not be found in one single place, for example there are building material requirements, plumbing and electrical requirements, and design requirements as well as others and these will be found in different county departments.
 4. By calling the St. Louis County Court House you can get a copy of the St. Louis County Charter which will tell and show you the different governmental departments in the county government.
 5. The basis for tax structure is laid in the Missouri Constitution. However county and local governments set many tax rates that affect the specific location of an industry. For these tax rates (personal and real property taxes) again a citizen would have to call or go to a city hall or the tax equalization board in St. Louis County.
 6. All St. Louis County laws can of course be researched at the County Court House in Clayton.

***V-6 Activity B** - Teachers should present a short lecture on (a) zoning laws, (b) building codes, and (c) tax structure.

- Note to teacher -
1. The lecture should be very short (approximately ten minutes) and should provide students with basic information on zoning laws, building codes, and tax structure.
 2. Illustrations and examples of the preceding should be given in class.
 3. Teacher may consider using transparencies or slides to illustrate the concept. (form #10)
 4. The lecture outline is given in teacher background. (Starting on page 26)

V-6 Activity C - Have the students interview their parents and list the kinds of taxes home owners pay. Also have them choose a person in industry and interview this person to find out what taxes industries pay.

- Note to teacher -
1. Explain that industries pay taxes just as home owners do. Since industries must make a profit to stay in business they must obviously be concerned with kinds of taxes and rates before locating in a given area.
 2. See data sheet on the following pages and form 11 to run off for students.

V-6 Activity D - The students will speculate on the possibility of building a slaughter house meat packing plant on the school grounds based on their knowledge of zoning laws gained from the lecture. They will also speculate on building materials they think could be legally used in this area. Finally they will estimate the amount of personal and real property taxes they think such an industry would pay.

- Note to teacher -
1. Prepare handouts for students to do this activity. (see form #12)
 2. See suggested answers on data sheet on following pages.
 3. You may suggest that the students observe building materials in their school for ideas in completing the data sheet.

V-6

HOME OWNERS

Types of Taxes

INDUSTRIES

Types of Taxes

personal property

personal property
(machines, tools, products on hand)

real estate

real estate
(buildings and land)

sales

excise tax
(passed on to consumer in
price of product that in-
dustry pays to the federal
government for each part
they manufacture)

income

corporate income tax
(tax paid on income before
it goes to stockholders)

To Teacher - These are some of the taxes students will probably come up with - be sure they learn about the real and personal property tax because these are the most important to industry when they choose a place to locate a factory.

V-6

1. Do you think St. Louis County has this property presently zoned for possible industrial use or would St. Louis County consider changing it to industrial zoning?

no

2. In 25 words tell why or why not?

citizens would fight it due to smell, and other pollution

problems such as water, sewage, and waste disposal

3. List several types of building materials that you think building codes would allow such an industry to use. In one phrase or sentence state why you think that building material would be allowed.

brick - fire-prevention

concrete blocks, concrete floors

wood pens as opposed to metal pens

grave or tar roofs

Main reason given for materials should be fire prevention,

aesthetics and sanitation

4. Estimate the amount of taxes you think this industry would pay.

A) Personal Property Tax _____

B) Real Estate Tax _____

Topic: Industries Benefit Communities.

Time: One week

Sub-topic: Employment and Career Opportunities.

*VI-7 Activity A - The instructor should make arrangements with the counseling office to administer the Kuder Interest Test and discuss with students opportunities in careers and occupations.

- Note to teacher -
1. The test is a fairly accurate method of determining where an individual's interest lies in terms of possible future occupations.
 2. The test of course does not measure ability necessary to go into that occupation, only compatibility with the individual's interests.
 3. Have counselor discuss with students where information is available about occupations and careers.
 4. A question-answer session should follow the presentation.

VI-7 Activity B - Have each student choose an industry and chart jobs available in that industry. (professional, semi-professional, skilled, semi-skilled, non-skilled) Students should utilize facilities such as the school counseling offices, public employment office, libraries and parents who work in industry.

- Note to teacher -
1. A data sheet with examples is available. (form #13)
 2. Teachers should realize that there may be some difference of opinion as to what constitutes skilled and semi-skilled, etc.

VI-7 Activity C - Students will prepare a line graph on one occupation (example: Engineering: show how demands for that occupation have gone up or down during a set period of time.)

*VI-7 Activity D - Have each student complete an information form on an occupation he or she would like to enter.

- Note to teacher -
1. Run off copies of Occupation Information. (form #14 a & b)
 2. If the Kuder Test was administered this is an excellent follow up activity.

3. The source of this information can be obtained from the counseling office
Source books are
 - (a) Encyclopedia of Careers and Vocational Guidance
 - (b) Chronicle Occupation Briefs
4. Students may wish to discuss some of their findings as relates to various topics on the information form.
5. Will the students be able to locate in Metro-St. Louis on basis of occupations they have chosen?

VI-7 Activity E - Have the student interview someone in the occupation that he or she is interested in pursuing.

- Note to teacher -
1. First have the student select a specific occupation.
 2. Secondly have the student develop ten or twelve good questions to ask on an interview.
 3. Using these questions have students interview someone in that occupation.
 4. You may want to put these together in booklet form that would be available to other students in the class to read as a way of familiarizing all students with as much career information as possible.

VI-7 Activity F - Students will research the possible effects of automation on jobs of the future and write a one-page paper on the topic.

- Note to teacher -
1. Students should list their sources.
 2. See teacher background information.
 3. This topic would be excellent for class discussion because of its controversial nature.

VI-7 Activity G - The four day work week is a much discussed and very controversial issue today. Students should research the four day week and write a one-page report on the positive and negative aspects of the four day week on industry and how it will effect the individual worker and his family.

- Note to teacher -
1. Students should list their sources.
 2. See teacher background information.
 3. The four day week issue could be an excellent and certainly controversial class discussion topic.

*VI-7 Activity H - The instructor will discuss with the students

1. How to find a job.
2. How to fill out an application.
3. How to conduct themselves at an interview.
Students can then be divided into groups for a mock interview presentation.

- Note to teacher -
1. An outlined lesson plan can be found in teacher background.
 2. The application form that students can fill out prior to their mock interview is in the student data sheets (form #15).

VI-7 Activity I - Guest Speaker

- Note to teacher -
1. Mr. Brexler is an expert in an on-the-job safety program (public and hospital safety) sponsored by the federal government. His job at the present time is based at St. John's Mercy Hospital, Ballas Road, Town and Country.
 2. He can be contacted through Mr. Polette in the Community Relations Office at the hospital.

VI-7 Activity J - Field Trip. (South County Technical School or any other technical or vocational school)
After returning from the field trip, the teacher and counselor should discuss the requirements for admission and graduation, benefits, job assistance, and curriculum.

*VII-8 Activity A - Students will work several tax problems to determine the amount of taxes paid by various priced homes. Students will also work several problems to determine the amount of taxes paid by various sized industries. From these problems students will draw conclusions about industries' tax contributions to the community.

- Note to teacher -
1. Prepare handouts for students.
Form #16, Form #17, and Form #18.

2. Explain that the tax formula is established by law as well as the tax rate. The county assessor examines the property and records its real value. (Real value means the amount of money the land and buildings on it could be sold for if the owner in fact sold.) The assessor will then divide that amount by one third. For each \$100 of that amount you pay a certain number of dollars worth of taxes. (i.e. the tax rate - in Parkway the total property taxes are for most people nearly \$8.00 per \$100 of assessed valuation. To keep the problems simple mathematically, the problems are based on this tax rate.) Use home taxes form #16
3. Form #17 is designed to help students understand that industries are a major part of tax structure and should be used next.
4. Form #18 should now be used. It is designed to help the students compare taxes produced from land used for homes to land used for building industry.
5. See following 3 pages for more information.

INDUSTRIAL TAXES HELP COMMUNITY

Real property tax problems for homes.

We pay taxes on 1/3 of the amount of money we actually paid for our homes. Tax rates will vary from one incorporated town to another. They will also vary from one school district, fire district and other districts in which you may live. Included in the tax rate are tax dollars that go to St. Louis County Government and the State of Missouri. All residents of the Parkway School District pay tax rates between \$7 and \$8 per hundred dollars assessed valuation. In this exercise we will use the following tax rate: \$8 per \$100 assessed valuation

1. Real value of home; \$21,000
1/3rd of \$21,000 equals \$7,000
\$7,000 divided by \$100 equals 70
70 times \$8 equals \$560.
2. Real value of home; \$36,000
1/3rd of \$36,000 equals \$12,000
\$12,000 divided by \$100 equals 120
120 times \$8 equals \$960.
3. Real value of home; \$42,000
1/3rd of \$42,000 equals \$14,000
\$14,000 divided by \$100 equals 140
140 times \$8 equals, \$1,120.
4. Real value of home; \$48,000
1/3rd of \$48,000 equals \$16,000
\$16,000 divided by \$100 equals 160
160 times \$8 equals \$1,280.
5. Real value of home; \$60,000
1/3rd of \$60,000 equals \$20,000
\$20,000 divided by \$100 equals 200
200 times \$8 equals \$1,600.

INDUSTRIAL TAXES HELP COMMUNITY

Real property tax problems for industries.

Real property tax for industries is figured on the same formula as used for homes. However the real value of land containing industrial buildings is much higher than the real value of land containing homes.

1. Real value \$6,000,000
 $\frac{1}{3}$ rd of \$6,000,000 equals \$2,000,000
 \$2,000,000 divided by \$100 equals 20,000
 20,000 times \$8 equals \$160,000. example Ramsey Corp.

2. Real value \$9,000,000
 $\frac{1}{3}$ rd of \$9,000,000 equals \$3,000,000
 \$3,000,000 divided by \$100 equals 30,000
 30,000 times \$8 equals \$240,000.

3. Real value \$15,000,000
 $\frac{1}{3}$ rd of \$15,000,000 equals \$5,000,000
 \$5,000,000 divided by \$100 equals 50,000
 50,000 times \$8 equals \$400,000. example Western Electric

4. Real value \$30,000,000
 $\frac{1}{3}$ rd of \$30,000,000 equals \$10,000,000
 \$10,000,000 divided by \$100 equals 100,000
 100,000 times \$8 equals \$800,000. example West County Shopping Center

5. Real value \$48,000,000
 $\frac{1}{3}$ rd of \$48,000,000 equals \$16,000,000
 \$16,000,000 divided by \$100 equals 160,000
 160,000 times \$8 equals \$1,280,000. example Chrysler Corporation plant on highway 66

Note to teacher - These are example industries comparable to amounts in problems of industries located in or near the Parkway School District. You might point out that Parkway receives no taxes from an industry unless it is actually located in the Parkway District.

INDUSTRIAL TAXES HELP COMMUNITY

Company A is located on 25 acres. Its value is approximately \$6,000,000. As you know from working tax problem 1 (Form #17) on industries, this 25 acres with industry built on it is bringing in approximately \$160,000 in real estate taxes each year.

On 25 acres approximately 75 homes could be built. This is approximately 3 homes per acre and the average in the Parkway School District. Assume these 75 homes would each have an approximate value of \$30,000. Figure how much taxes the same 25 acres would produce in taxes if homes were built there instead of an industry.

75 times \$30,000 equals \$2,250,000
 1/3rd of \$2,250,000 equals 750,000
 750,000 divided by \$100 equals 7,500
 7,500 times \$8 equals \$60,000.

(Industry therefore brings in approximately \$100,000 more than homes.)

Work the problem assuming \$40,000 homes were built on the 25 acres.

75 times \$40,000 equals \$3,000,000
 1/3rd of \$3,000,000 equals \$1,000,000
 \$1,000,000 divided by \$100 equals 10,000
 10,000 times \$8 equals \$80,000.

In this case the industry brings in \$80,000 more than the homes.

List at least 5 community facilities benefited by these industrial taxes.
 (example County Library)

Note to teacher - Apartments built on the same land would bring in more tax dollars than homes, but not as much as industry. Land is valued higher when apartments are built on it than when the land is used for individual homes. A second reason is that there are more buildings on the land thus giving it an even greater value. It might be noted that industries as such do not produce any children and statistics show that apartments produce fewer children than homes.

vII-8 Activity B - Students will compare the tax rate of three St. Louis County school districts (Clayton, Parkway, and Valley Park) and discuss why differences exist.

- Note to teacher -
1. A student data sheet listing the districts and their tax rates is in the student data sheets (form #19).
 2. The teacher should pass the data sheet out to student groups, have them write why they think taxes are higher or lower or moderate, and then discuss their answers. (Groups of 4 or 5 would be recommended)
 3. Taxes in Clayton, of course, are lower (lowest in St. Louis County) because property value is high and there is a tremendous amount of industry (retail and administration) in this city. Valley Park has moderate taxes because there is little industry, property values are low, and the residents are simply unable to pay extremely high taxes. Parkway has high taxes because of little industry, mostly residential, perpetual growth, and a demand for good education facilities.

Topic: Industries May Create Problems for the Community.

Time: 3 weeks.

Sub-topic: Disruption of Environmental Processes.

*VIII-9 Activity A - Introduce with film, "Cry of the Marsh." (12 minutes - Color - county A. V.)

- Note to teacher -
1. The concept that industry disrupts the environmental processes within a community is very well illustrated in the film which relates events when the water in a wildlife supporting marsh is drained and the land is converted for industrial use.
 2. Students might be asked to prepare a before and an after contrast list.

***Activity B** - Have students take field trip to the Parkway 98 acre Area (on Hanna Road about one mile south of Manchester Road - Highway 100) to study a land site that has not been built on by a subdivision or industry. An Environmental Interpretation Center Trail Guide should be ordered from the EEE Office for each student prior to taking the field trip.

Note to teacher - 1. (a) We strongly urge that this field trip be taken.

(b) Run off copies of data sheets maps for the field trip. Form #20 A, B, C.

2. The students will write or draw in on map 2 the location of specific elements observed in the natural environment: a stream, pond, meadow, bird nest, animal niche, trees by name, wooded areas, grass areas, animal tracks, etc.
3. The purpose of the field trip is to have students become aware of the environmental disruptions that may occur if an industry should locate here.
4. The student should also be able to identify and plot on map 1 specific environmental disruptions caused by man to date. Examples: cleared ground, burned over woods, plowed cropland, bare ground paths.
5. As a follow up of this activity the students might like to enlarge the map (using an opaque projector) and compile their observations as a class on this map.
6. Students will locate and plot on map 2 an ideal building site for an industry. The students will have to defend the industry and the site the industry was to be built on. (Applies to concept II, behavioral objective 2.)
7. After the field trip you may wish to use 6 topography slides of the 98 acres as an aid to discussion. These slides are available at the EEE Office. You will find an outline of the slides on the following page. (Call 434-8412, ex. 79)

***Activity C** - Students should assess the school grounds from the point of view of environmental disruptions that can be noted as a result of the school plant having been built there.

Topography Slides of the 98 Acres

Slide 1. Contour of the land and access roads. The blue denotes flood plains.
Would an industry have ample transportation for it's activities?

Slide 2. Contour of the land.
Where on the 98 acres would you build an industry?
Would it be suitable for a slaughterhouse operation? Any other type of industry?

Slide 3. Surrounding subdivisions.
Would an industry be able to get necessary zoning laws passed?
Meat processing? Any other types of industry?

Slide 4. Creek and pond. (water on the 98 acres)
Do you think there are ample supplies of water for industry?
Slaughterhouse? Other types of industry?

Slide 5. Fish Pot Creek.
What type of pollution would different industries create? How would pollution of the creek and its tributaries affect the over all community?

Slide 6. Flood plain and tributaries.
(use same questions as in Slide 5)

Note to teacher - 1. A data sheet (form #21) is provided in the appendix for the student survey.

2. The teacher should point out to the student that they should view the school grounds as it looks now and attempt to picture in their minds what the area may have looked like before the school was established there. Then, they write down what changes or environmental disruptions possibly took place (e.g. trees cut down to make room for construction force small animals and birds to leave for another location. This is an environmental disruption.)

Activity D - Based on data sheet from activity C have students suggest ways that a slaughter house packing plant might disrupt the environmental processes even more than the school plant already has.

Note to teacher - 1. Additional environmental disruptions resulting from the slaughter house might be noise which scares away birds, animals holding pens become bare grounds, water run off may cause erosion or pollute nearby pond or stream, smoke might kill off the trees, traffic snarls, large paved area for roads and parking lot, odors.

Activity E - Students may interview their grandparents or any other senior citizen they know and interview them (and bring old pictures if possible) comparing environmental processes today with those of the past. For example, the student might ask his grandparents to tell him about the land several years ago before industry was located there.

Note to teacher - 1. Students could use a written interview or cassette.

Sub-topic Industry May Create Aesthetic Problems

- *IX-10 Activity A - Take a field trip to a nearby industry and observe:
- (a) Architecture
 - (b) Landscaping
 - (c) Paved areas
 - (d) Other unique features.

Note to teacher - 1. Run off copies of data sheet (Form #22 A and B).

2. Read over the data sheet and become familiar with the types of information the student is expected to obtain. You may wish to tie concepts of cost and/or appropriateness of acquiring the land for this particular industry.

3. This may be done as a class or assigned to the individual student to do as an outside-of-class project.

IX-10 Activity B - Have students sketch industries and the surrounding grounds and present the sketches in poster form. The poster is to show an industry that did a good job aesthetically and an industry that did a poor job aesthetically.

OR

Have the students do a comparative study via their own snapshot photographs (polaroid cameras are best as they supply instant pictures) mounted and brought to class. The study should show one factory the students believe did an excellent job aesthetically and one factory the students believe did a poor job aesthetically.

Note to teacher - 1. Magazine pictures could be substituted.

2. As this is a value oriented activity, you and the students will have to establish the criteria of what is aesthetic as opposed to what is un-aesthetic.

Sub-topic Industry May Create Aesthetic Problems

IX-10 Activity C - Have students design a factory building including the landscaping for the building.

Note to teacher - 1. This is an activity for very bright students. Perhaps some student is thinking in terms of Architecture or landscaping as a career and would enjoy an activity of this nature.

2. Any student choosing this activity should pay particular attention to aesthetics in his building design and landscaping.

*IX-10 Activity D - Have a guest speaker on landscaping and/or architecture.

Note to teacher - 1. Mr. Wayne Kennedy is Commissioner of Parks and Recreation for St. Louis County. He or someone on his staff is available as a guest speaker. The address is:

Mr. Wayne Kennedy
Commissioner of Parks and
Recreation
7922 Bonhomme
Clayton, Missouri 63105

We especially recommend Mr. Kennedy for landscaping.

2. If you know of an architect or possibly one of your students may know of someone. You may want to invite that person to guest speak instead of Mr. Kennedy.

*IX-10 Activity E - Have students through sketches and/or discussion (written or oral) present their ideas on improving the landscaping around their school.

- Note to teacher - 1. You might divide the class into four groups, one for each side of the school plant site. Have students tour the outdoor area and record their observations of what in their opinion could be improved on in terms of landscaping.
2. You might have each group do all four sides of the school plant site and determine if there was a consensus of opinion by all four groups as to landscape improvements that could be undertaken.
 3. After completing the outdoor survey have the students return to class and formulate their ideas for improving the landscaping.

Sub-Topic Air, Water, Noise, and Land Pollution Created by Industry.

X-11 Activity A - The following films may be shown as aids to understanding air, water, noise and land pollution.

1. Junkyard. 10 minutes, Cooperating School Districts
2. This Vital Earth. 10 minutes, Cooperating School Districts.

3. Conservation of Resources. 10 minutes, Cooperating School Districts.
4. Ear Protection in Noise. 12 minutes, Cooperating School Districts.
5. Lakes . . . Aging and Pollution. 15 minutes, Cooperating School Districts.
6. Heritage of Splendor. 18 minutes, Cooperating School Districts.
7. The following two films should be shown in sequence.
 - A. Nature's Plan. 14 minutes, Cooperating School Districts.
 - B. Man's Problem. 20 minutes, Cooperating School Districts.

In the event you have not used "Cry of the Marsh," it can also be used at this point in the unit.

*X-11 Activity B - Students are assigned to survey the school grounds and catalog the sources of pollution on the grounds. Students should take a litter sack with them and pick up trash as they come across it. Students should discuss and suggest solutions to the problems after returning to class.

Note to teacher - 1. Data sheet with examples is provided on form #23. Perhaps you may want to consider having the students catalog the types of trash on their data sheet and have them suggest ways to remedy the problems of trash from that company.

X-11 Activity C - Each student will find within the time allocated for this study, two local newspaper articles or magazine articles on air, water noise, or land pollution. Do only two out of the four preceding types of pollution. The student should summarize the main points made in each of his articles in a short paragraph. The articles will be compiled in a class scrapbook under the appropriate pollution headings.

Note to teacher - 1. For evaluation purposes, the teacher will simply check off the students name as he turns in the articles.

*X-11 Activity D - Students will be given reading selections on air, water, noise, and land pollution and answer guided study questions.

Note to teacher - 1. The readings are in the student data sheets (forms 24A through 24D.)

2. Question sheets for the students are also in the student data sheets (forms 25A to 25D.)
3. The same questions accompanied by an answer key is in your teacher instructional information on pages following this sub-topic.

X-11 Activity E - Students can take pictures of water in the area of an industry (lake, pond, stream, river). Write a paragraph or discuss that body of water and the steps industry seems to be taking to reduce or prevent pollution or identify and discuss how the industry is polluting the water.

Note to teacher - 1. Examples of possible subjects would be Grand Glaze Creek (Ramsey Corporation), Creve Coeur Lake, Mississippi River, Missouri River.

X-11 Activity F - Students can take samples of some body of water and analyze it for various pollutants using the investigative approach. Cooperation with the Science department would probably be necessary for this project.

*X-11 Activity G - Have students keep a daily record of pollution and weather in metro-St. Louis for one week (at least).

- Note to teacher -
1. Run off copies of data sheet (form #26).
 2. Have students listen to radio (i.e. KXOX) for pollution description. Pollution count for today will be low, moderate, or high.
 3. Students may obtain their weather information from a variety of sources. (i.e. T.V., newspapers, radio.) Some students may wish to obtain the information (or parts of it) first hand using their own rain gauges, barometers, anemometers, or thermometers. Considerations:
 - (a) Sky condition (sunny, partly cloudy, cloudy, haze)
 - (b) Precipitation (rain, hail, sleet, snow)
 - (c) Wind Speed
 - (d) Wind Direction
 - (e) Temperature
 4. Is there any relationship between pollution and weather? Could the record be kept over a longer period of time for more conclusive results? The students should convey their interpretations to the class. Did their information come from the same source at the same time of day? Other considerations might come to light through discussion.

X-11 Activity H - Comparative study. Students could visit the river front by the arch or go up in the arch and observe industrial air, water, noise, and land pollution on both the east side (Illinois) and the west side (Missouri). Students would complete the data sheet provided in the data sheet (form #27).

- Note to teacher -
1. Background information contains information on the problem in Illinois.

X-11 Activity I - Students may devise experiments connected with pollution and report findings.

Note to teacher - 1. A list of nine possible experiments that can be used are in the student data sheets (form #28A and 28B).

2. Teacher may wish to cooperate with the science department for this activity.

X-11 Activity J - Students will keep a scrapbook containing comics and cartoons that illustrate pollution. Students may draw their own cartoons. The scrapbook should also contain political cartoons dealing with pollution followed by a short paragraph analyzing that cartoon.

Note to teacher - 1. Examples of cartoons are in teacher background information.

X-11 Activity K - Students may keep a pollution bulletin board on current problems in class.

*X-11 Activity L - Students can play the "Pollution Game."

Note to teacher - 1. It was suggested earlier to order some of these games. This would be an excellent in-class activity for those students working on an activity that involves mostly outside work. It also provides as an excellent activity for slower students or students that are not easily motivated in class.

X-11 Activity M - Students could read the booklet, "Needed: Clean Air. The Facts about Air Pollution." This booklet is excellent reading material and can be followed by discussion.

Note to teacher - 1. It was suggested earlier to order several copies of this booklet.

2. The booklet would be especially good for slower students.

3. Through discussion it should be concluded that air pollution is a very dangerous problem and can seriously impair one's health.

- X-11 Activity N -
1. Give each student a copy of the maze and data sheet (student data sheet form #29 a & b). Have students solve the maze.
 2. Have students identify several positive methods people may use to help solve pollution problems.
 3. Have students identify the "dead end" results of man's actions creating pollution.
 4. Discuss how many positive steps are underway today and how many still need positive action.

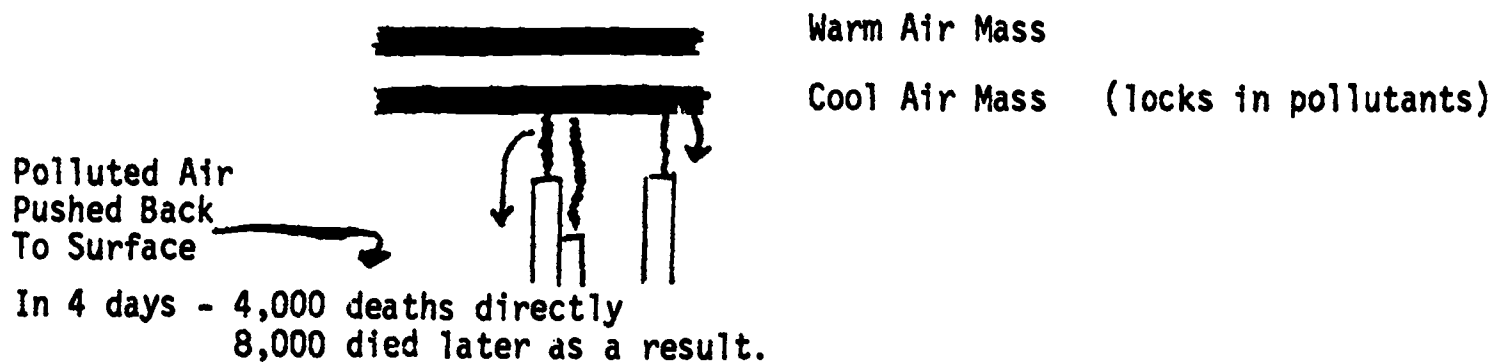
WATER POLLUTION:

1. Describe the Cuyahoga River before it became polluted.
Clean, pure, full of fish. Source of transportation, water supplies, etc.
2. Describe the Cuyahoga today and why it is polluted so badly.
Industries dump chemicals. Junkyards spill into it. Heavy rains flood sewer system of Cleveland and sewage empties into river. No fish. Oil and chemicals. Leeches and sludge worms can't even survive it. "You don't drown-you decay" - (this is what people say, tongue in cheek about the river) "natural sewer." Fire hazard. - (Water is so oily it actually caught fire.)
3. If you were a leading politician in Cleveland, what would you recommend in regard to the Cuyahoga?
Lawsuits against companies polluting it. (Make them face charges)
Boycott industries causing pollution.
Improve sewage facilities.
4. Where is Lake Erie and why is it so badly polluted?
North of Cleveland. One of the Great Lakes. Cuyahoga runs into it. Also used for wastes of several industries on its shores. Algae choked.
5. What does McCall's magazine have to say about drinking water in the U.S.?
102 cities in 32 states and Puerto Rico have water supplies dangerously close to minimum safety standards.
6. Trace the history of the gradual decay of the nation's lakes, rivers, and streams.
Sewage and garbage from farmhouse dumped into river. (cheap, convenient way to get rid of wastes.) River at this time, could handle it.
Towns developed-dumped wastes into river.
Industrial revolution-factories sprang up and dumped wastes into river.
Too much wastes and sewage eventually chokes the rivers, lakes and streams and creates dead body of water.
7. Would you drink water from Lake Erie? What city does? What substance is added to water to purify it? How can this substance be harmful?
Cleveland.
Chlorine purifies water for drinking.
Too much chlorine would be harmful to water. Large quantities of chlorine can be poisonous.
8. What dangers threaten Minnesota lakes and streams according to Senator Mondale?
Lake Superior - taconite (iron ore)
Metal industries dumping refuse into lakes.
Thermal heat-Mississippi River.
lakes-algae

9. What does Senator Mondale say about the water of the Mississippi River just south of St. Louis?
toxic-signs warn against eating food near its banks.
10. How much will it cost approximately to clean up the nation's waterways?
Is it out of sight?
100 billion dollars.
We have already spent that much on Vietnam. (as of 1970.)

AIR POLLUTION. (industrial)

1. What factors contributed to pollution of the air in London and in other cities?
Smoke from factories, automobile fumes, gases from electrical firms, combined with temperature inversion.
2. Describe temperature inversion as it happened in London in 1952.
Burning of soft coal was largely responsible for fogs.



3. What groups of people were hurt most by the killer smog in London?
Older people, young children, people with lung and heart disease.
4. How did the old horror and detective movies picture London?
What did Dickens say about London?
Jack the Ripper, Dr. Jekyll-Mr. Hyde, Sherlock Holmes, London After Dark.
All of these movies pictured London as dark and extremely foggy and wet.
1852 Charles Dickens - said that black soot looked like snowfall.
5. What did London do to eliminate much of the pollution of the air and to clean up the buildings in the city?
Study-found that pollution cost country 700 million a year in lost efficiency and cleaning bills.
Soft coal burning prohibited - Clean Air Act passed.
British industry had to clean up and stop pollution. Buildings scrubbed down.
6. According to the article, "The People vs. the Smog", what was the reason for the sudden pollution of the air in California?
Post war-heavy industrialization-auto.
7. What did Los Angeles County government do to try and stop pollution of the air?
Did it stop the smog? Why or why not?
Abolished coal burning entirely. Oil burning banned for 7 months of year.
Incinerators banned. Got worse because of more automobiles.
8. Is the air surrounding the earth's surface an unlimited resource? Why or why not?
No. Air only goes up 12 miles.

9. What effect does dirty air have on homes and buildings?
Discolors, corrodes metals.
10. What effect does dirty air have on vegetation?
Reduces vegetation-destroys it or stunts growth.
11. What effect does dirty air have on the health of human beings? It is especially harmful to people with what diseases?
Respiratory diseases-lung cancer, asthma, bronchitis, emphysema.
12. The government has passed legislation to fight pollution but it is not enough. We need more legislation passed and more participation by every citizen in this country. What is the biggest problem or obstacle in fighting pollution in this country according to the statement on the last page?
Citizen apathy - little pressure on politicians.
13. John Gardner has stated four alternatives to the air pollution problem. What are they?
1. Remain indoors and live like moles for an unspecified number of days each year.
 2. Issue gas masks to population.
 3. Live in doomed cities.
 4. Take action to stop the pollution of air.

Sub-topic Industries May Create Problems for Existing Community Facilities

*XI-12 Activity A - Introduce this topic with the film: WEALTH OF THE WASTELAND
1969 - color - 28 minutes - County A V.

- Note to teacher -
1. The film is excellent as it deals with industrial waste problems. It describes the phenomenal growth and productivity of industry in the United States. It deals with how industry meets its waste disposal problems.
 2. Discuss the film and point out industrial waste is an ever growing problem and that industries cannot solve the problem but that the community gets involved directly or indirectly through bond issues or taxes to help meet the need for disposing of the industrial wastes.
 3. Industrial packaging is also taxing the community facilities as consumers use the products of industry.

*XI-12 Activity B - Have the student visit the local community sewage disposal plant.

- Note to teacher -
1. Prepare data sheet for student found in student data sheets (form #30A and B.)
 2. There is a secondary sewage plant operation on Dietrich Road, 1/4 mile south of Manchester Road (Highway 100). There is a Lagoon (primary treatment system) on Barretts Station Road, 1/4 mile south of Manchester Road. Fee Fee Trunk Sewer Incorporated located on Olive Street Road (secondary treatment system).
 3. This activity may be used as a field trip or as an individual assignment. If used as an individual assignment be sure you instruct your students on courtesy and politeness because these operations do NOT have to show students around, but they are presently willing to give it a try.

4. If you plan to use the plant on Dietrich Road, call the Manchester City Hall to make arrangements. Mr. Harold Eschenbrenner is the man in charge of the plant.
5. From information the students get on their data sheet have them report their findings and opinions on the adequacy or inadequacy of the system, and especially on industrial sewage problems the plant is experiencing. Finally it is important to discuss possible solutions to these problems.

XI-12 Activity C - Have the students investigate the waste disposal of a particular industry. Industrial wastes may exceed or severely tax existing community facilities for disposal of this waste.

- Note to teacher -**
1. The students need to identify particular kinds of waste to be disposed of (paper, oil, detergent, animal by-products.)
 2. Next students should find out how industry disposes of this waste (burn it, recycle, wash it down the drain, haul it off to a land fill.) Does this waste create problems for the waste disposal facilities of a local community? Oil or gasoline gets into sewage, damages sewer lines if they are exploded, may damage sewage plant, or may pollute a creek in a nearby public park.)
 3. A data sheet is provided for in the student data sheets (form #31.)

***XI-12 Activity D -** Have students determine possible sites for land fill operations as a solution for part of the industrial waste problem in the St. Louis area.

- Note to teacher -**
1. You may have students draw a topography map, use a written report, or take pictures showing an actual landfill site or a possible site chosen by them.

2. Introduce the story from teacher background where a ski resort hill was constructed from solid waste near Chicago. Have the students suggest or devise similar waste constructed recreational facilities. Leisure time gives rise to need for more recreation facilities, more people, more waste, growing need for waste disposal facilities, maybe this is one avenue for resolving several problems with one solution.

***XI-12 Activity E - Have the students trace the history of sewage disposal.**

Note to teacher - 1. This activity was designed to familiarize the student with various methods that can be used and how methods have been improved over the years. Also to familiarize the student with the fact that sewage disposal has always been a problem to mankind.

2. It will be necessary to use reference books in your library. We suggest that the history begin with the proverbial outhouse, to the various stages of development of the septic tank, cess pools, to lagoons (primary treatment) to secondary treatment plants and finally the tertiary treatment plants. It would be interesting to note that the historical growth of a community could be traced through the various stages of sewage disposal methods.
3. There are various ways students can report on this activity - for example it could be done entirely in writing or it could be done primarily with sketches and photographs used as illustrations needing only "caption" writing.

XI-12 Activity F - Have the the student suggest in one paragraph that would happen in the event the community water works broke down and could not supply water.

Note to teacher - 1. Get the students to think in terms of obtaining water from neighboring areas. They should consider types of transportation that could be used on a practical basis. Air travel would automatically be ruled out on basis of cost and the quantity that could be carried. Students might come up the idea of using existing pipelines (oil or gas) that could be converted for water used in an emergency

2. Would it be practical to drill a well for a short period of time? Would well water be safe to drink or to cook without having to be chemically treated?
3. Have the students hypothesize what effects industry would have on the water supply of a community during a drought. Could the community afford a temporary shut down of the industry?
4. What kinds of problems would be created if industry needed more gallons of water than the existing water mains could carry? Would it affect them? Bond issues and taxes probably revert back to the public. Is that industry really important enough for this kind of investment?

***XI-12 Activity G -** Have the students hypothesize the needs of locating a meat packing plant slaughter house in terms of:

- (a) water facilities
- (b) sewage disposal facilities
- (c) waste (solid) disposal facilities

Note to teacher - 1. The purpose of this activity is to draw to the attention of the students the vast demands made on existing community facilities by various kinds of industry. You might have the students project present school demands on these facilities. You might pose the problem, that the meat packing plant might locate on the school grounds and what would be some of the foreseeable problems that would have to be resolved concerning the facilities serving the school at this time.

2. It is not our intent that the students come up with actual figures involved in locating the meat packing plant, but rather be able to indicate the increased demands placed on the existing facilities. For example, water needs of a packing plant would be tremendous (animals would need to have water, all cleaning phases in meat processing need large amounts of water, large quantities of scalding water is needed in processing swine or poultry.)

2. (cont.) This water need might necessitate the installing of larger water mains to supply the need. Solid waste disposal would create problems (animal wastes would have to be removed - How?, animal by-products that cannot be recycled for farther use would have to be disposed of, how much of this solid waste would the industry try to liquify and introduce into the community sewage system?) Because of increased amounts of sewage, larger sewer mains might have to be installed.
3. Final awareness on the part of the student should be as to whether the industry would really be an asset or a liability to the community. Just who, the industry or the community, would be saddled with the responsibility for resolving these problems created by the locating industry?
4. Have the students determine (use reference book) how many phases or steps of meat processing require the use of water. Have them find out if sewage is processed by the industry before disposing of it in the community sewage system. What happens to the unrecyclable animal by-products, are they incinerated or dumped in landfills? The students can write a report and discuss their findings in class. Some students may want to get first hand information from local packing plants.

*XI-12 Activity H - READING from OUR POLLUTED WORLD, pages 23 through 35.

Note to teacher - 1. Each teacher should obtain a room set of AEP - OUR POLLUTED WORLD as a classroom reference (see page 2).

2. The reading is an excellent background source that discusses:
 - (a) Man's need for water
 - (b) The importance of water in food production both plant and animal.
 - (c) How water is polluted and identifies major pollutants.
 - (d) Types of sewage disposal treatment plants.
 - (e) Industries that specifically interfere with natural water processes.

- (f) Solutions to cleaning up our polluted water.
 - (g) Stresses idea that if man is to survive he must learn to use his water resource in a much wiser manner.
3. The teacher should refer to the STUDY GUIDE of Our Polluted World, page 35 for student response from the reading. The student may be required to answer the questions or do the suggested research projects.

Sub-topic Problems of Electrical Power

XII-13 Activity A - Have students survey their home and identify the devices used to generate electrical energy in daily living.

Note to teacher - 1. In doing this activity you may have meager results and on the other hand tremendous response. It will depend on the backgrounds of the students.

- 2. Some home generating devices to consider are the old-fashioned crank wall telephones, the automobile generator, some bicycles may be equipped with a wheel generator for its head light, there are flash lights on the market that are hand squeezed to produce electrical energy. Some rural areas still have windmills that generate electrical energy for farm use.

XII-13 Activity B - You are Secretary of the Interior and you have received a request from an electrical company for permission to install a nuclear power plant in the St. Louis area. You will research nuclear power and list some of the benefits and dangers of nuclear power plants and why it is important not to build such a plant in certain areas. In your conclusion of the report, write your decision on whether or not you would allow the company to build the nuclear power plant in the St. Louis area. Your report should be approximately one page in length.

- Note to teacher -
1. Union Electric Company is supposedly considering installing a nuclear power plant in the St. Louis area.
 2. You will find information on nuclear energy in your teacher background.
 3. Dangerous locations of nuclear power plants would include areas that are known to have earthquakes (California), floods (river banks), high winds (Galveston, Texas) etc.
 4. Pollution dangers of course include thermal pollution of water and radiation.

*XII-13 Activity C - Students will read "Our Polluted World", pages 37 through 42 and "Energy and Economic Growth", pages 13 and 14. They will write a 200 word essay on "Future Growth and Energy Needs."

- Note to teacher -
1. This activity should begin with the reading questions to be handed out to students when they begin the reading assignments. (see form #32 A & B.) You may want to collect these assignments since this may be the only part of the assignments slower students will be able to do. You ordered these materials at the beginning of the school year.
 2. You should spend 10 or 15 minutes helping the students analyze the wall chart #6 that came with the materials you ordered on "Energy and Economic Growth." (see page 2)
 3. After these steps have been accomplished, have the students write the 200 word essay, "Future Growth and Energy Needs". The essays should contain information on future energy needs and problems connected with our acquiring this needed energy.

STUDENT READING GUIDE

OUR POLLUTED WORLD pp 37-42

1. List 6 ways in which we come into contact with radiation.

outer spacewatch dialsores in the earthatom bomb testingx-raycolor tv

2. Name 3 ways in which radioactive waste is being accumulated.

mine radioactive materialswhen we process these materials or refine themin reactors

3. Indicate where we dispose of this waste.

riversair

4. The first problem to be solved in disposal of these materials is better

storage

5. Name one other problem in moving toward the use of nuclear materials to produce electricity for the future.

costENERGY AND ECONOMIC GROWTH pp 13 -14

1. By the year 2000, how large will the population be according to the wall chart?
- up 84%

2. How much additional energy will probably be needed by the year 2000?
- up 198%

3. GNP means the amount of goods we produce in the United States every year. If our standard of living is to continue to improve than we must continue to produce more goods. What will we need most in order to continue producing more goods for more people?
- energy

4. Why are radio active materials especially needed in the future?
- production of electricity

XII-13 Activity D - Have students find out where the electrical energy for this area is produced, and what natural resources are used to generate this energy.
(example: water power, coal, gas, oil, nuclear.)

- Note to teacher -
1. You might ask students how they think electrical energy is made and then have them use reference books to confirm their ideas.
 2. You may want students to write letters to local electric companies. (the best choice being Union Electric.)
 3. The class might be divided up into three groups and have them research the development of Bagnell Dam, Labadie Plant, and Taum Sauk-all owned by Union Electric. Taum Sauk has free literature available.
 4. Students may want to do sketches or even build models of these generating plants. Taum Sauk would especially lend itself to this because of the unique engineering problems associated with it and its method of operation.
 5. After researching these areas you might want the students to determine the percentage of electric energy produced by water power as opposed to fuels as a group or on basis of the different fuels. (gas, oil, coal.)

XII-13 Activity E - Have a class discussion centered around the advertised concept that electrical usage is really a "clean" form of energy.

- Note to teacher -
1. You may present this topic to the class and see where it leads you.
 2. You may have the students do research on how electrical energy is produced. The major method is use of steam generators that burn coal mainly, some may be fueled by oil or gas. Water power has very little significance. Use reference book.
 3. Students should arrive at the concept, electrical energy makes for clean living in the home, but because fuels are burned to generate it air pollution is the result.

XII-13 Activity F - Students should research and write a one page paper on the great power blackout in the northeastern United States in November, 1965. In the paper, they should comment on the following:

1. causes
2. effects
3. Will it happen again? Why or why not?
4. What are some of the serious effects of a power blackout in a city?

Note to teacher - 1. The incident occurred in November of 1965 and most magazines of that month carry articles on the event. Yearbooks and encyclopedias should also have comments on the blackout.

2. Information on power blackouts is in teacher background information.

Sub-topic Industries May Create Traffic Problems

Suggestion to teacher - All students should probably do or take part in Activity A. In addition, every student should probably choose to do either Activity B, C, or D. It is recommended that all students do Activity E if at all possible in order to thoroughly cover the concept. You may want to assign Activity F to only average to above average students.

* XIII-14 Activity A - Have students collect pictures of various types of vehicles used by local industry and make a bulletin board display. Under each picture the student will suggest the use of that particular vehicle. From these pictures have the students classify them according to size and weight (i.e. small vehicle equals pickups, panel trucks, medium equals 5 ton range, concrete mixers, gasoline trucks. Large equals semi-trailer trucks.)

- Note to teacher -
1. Students may obtain their pictures from newspapers and magazines.
 2. The bulletin board is a class activity and gets low ability students involved.
 3. The purpose of the activity is to make the students aware of the vast variety of types of transportation vehicles used by industry. In most cases size of vehicle will coincide with size of commodity of a particular industry. Use of semi-trailers are utilized by large range markets.

XIII-14 Activity B - From the bulletin board display have students use the classification system they devised to do a count of the numbers of industrial type vehicles and their use, that they see on local major roads and highways (e.g. Manchester Road, I-244 and Page).

Note to teacher - 1. Run off copies of data sheets found in student data sheet (form #33).

2. To simplify data sheet use:
Class A to represent small vehicles (pickups, panel trucks).
Class B to represent medium vehicles (5 tons, concrete mixer, gasoline truck).
Class C to represent large vehicles (semi-trailers).
3. The students may prefer to write the type of vehicle under the class or merely insert a number.
4. The student should also indicate what the vehicle is used for in the appropriate column.
5. This activity should be conducted at varying intervals in the day in order for students to see when various types of industrial vehicles are most active or if such a relationship does exist.

XIII-14 Activity C - Given a specific intersection or allowing the students to choose their own, have students observe an intersection during rush hour and list problems created by a nearby industry.

Note to teacher - 1. The data sheet explains the assignment to the student and should be completed by the student. (see form #34).

2. The following intersections are recommended for each school but of course are not mandatory.

Central -Woods Mill and Olive Street Road
East -I-244 and Ladue Road
North -I-244 and Page Boulevard
South -Woods Mill and Manchester Road
West -Woods Mill and Clayton Road

XIII-14 Activity D - The students will count the cars on an industrial parking lot. Then the students will list problems they can think of that would be created by the vehicles at certain times during the day. They will list existing facilities that have been added to alleviate traffic problems and finally suggest additional possibilities for further alleviating such traffic problems.

Note to teacher - 1. Any student choosing to do this activity should be given data sheet (form #35 A and B).

2. The student could simply hand in the data sheet or give a report of his findings to the class. If he simply turns in the data sheet he must have suggested at least two possible solutions otherwise the activity would be basically meaningless.

XIII-14 Activity E - Students will investigate the possible rise in numbers of traffic accidents due to industrial locations and industrial vehicles on the roads and highways.

Note to teacher - 1. It is suggested that you have students carry out this activity via an interview with local, county or state police. We felt that a positive contact between a student and police officer would be good for both.

2. The purpose of the activity could also be carried out by having a state highway patrolman speak to your class on the topic of accidents near industrial sites and accidents involving industrial vehicles on the highways.

3. The officer could also serve as a source of information for the essay in activity F.

4. The county police department could also furnish a speaker. You can call the St. Louis County Courthouse or the State Highway Patrol Office on Mason Road near Highway 40.

5. In the event you choose the interview method for individual activity, you should have the student develop good questions to ask and these questions should be approved by the teacher before the student conducts his interview. After he has conducted the interview he should draw conclusions as to whether or not industrial sites give rise to more accidents. This can be handed in, in written form or he could give a short report to the rest of the class.

XIII-14 Activity F - Have the students write an essay or discuss why certain streets are zoned against heavy industrial vehicles.

- Note to teacher -
1. You might introduce this topic by pointing out to students that some streets have signs stating NO TRUCKS and other streets have signs stating TRUCK ROUTE. Ask the students to give some reasons for this.
 2. You might want students to locate streets zoned in this manner and by direct observation come up with an explanation for zoning. (Examples of roads containing such signs are; Baxter Road, Fee Fee Road, Dietrich Road, Forest Park)
 3. Some considerations:
 - A) Roads are very narrow to accomodate autos and large trucks
 - B) Road beds cannot stand stress of heavy weighted vehicles
 - C) Bridges on residential roads were not built to withstand heavy loads.
 - D) Noise of heavy trucks, especially around hospitals and churches and sometimes schools.
 - E) In residential area heavy vehicles on narrow streets are dangerous for small children.
 - F) Heavy vehicles tend to slow down traffic flow on major arteries that were designed to carry work force in cities and so trucks are prohibited from using this roadway.

- G) Heavy large vehicles cut down auto driver visibility and thus create traffic hazards.

Sub-topic Indistries Create Problems For A Community When They Go Out Of Business Or Move Away

*XIV-15 Activity A - Students will study the effects of the decline of a large industry on the community.

1. Students will read the excerpt from Time Magazine (January 4, 1971), "Seattle Under Siege: The Troubles of a Company Town."
2. Students will answer questions based on the article.
3. Students will hypothesize McDonnell-Douglas moving out of St. Louis and complete a vertical continuum.
4. Discussion: Teachers will discuss with students the Seattle situation and the McDonnell hypothesis.

Note to teacher - 1. See (form #36, 37A and 37B) for reading assignment and question sheet.

2. Answers to the questions provided on the following page.

Additional Ideas and Activities

Possible activities and resources that may be used will be found at the end of this unit on pages titled, Environmental Resource Inventory. These inventory pages are arranged according to specific school sites, however, you will find that the idea may apply to your building as well.

Assignment: Students will read the excerpt from Time Magazine (January 4, 1971), "Seattle Under Siege: The Troubles of a Company Town." Answer the following questions based on the article and be prepared for discussion on the topic.

1. What type of industry is the Boeing Company?
Aircraft manufacturing (i.e. commercial jumbo-jet 747)
Aerospace
2. How important was the Boeing Company to Seattle in terms of employment?
At its peak, Boeing employed 1 out of 12 people in Seattle. (101,500)
Taking their families into account, Boeing was the direct provider for almost 400,000 people.
3. Boeing Company ran into hard times after a peak year in 1968. What effect did the hard times have on the Boeing Company?
Forced to cut employment from 101,500 to approximately 25,000. The company was forced to sell a plant, close another, auction off surplus equipment and furniture, consolidate assembly lines, and cut down on its production of the 747 jumbo-jet.
4. Discuss the problems of unemployment for the average former Boeing engineer.
New jobs hard to find in Seattle or elsewhere in engineering.
New and difficult experience because most of these people have never been out of work before and to adjust to living on a small budget after living on a high budget is also difficult. (i.e. expensive house payments)
Work as cab drivers, Santa Claus, etc.
5. When a nuclear bomb hits ground zero (target) it virtually destroys the area immediately surrounding ground zero. However, fallout from the blast can severely damage and even destroy areas some distance away from the blast. In the same way, unemployment, due to Boeing's decline, caused fallout in Seattle's total economy. Discuss some of those "fallout" problems in Seattle in a few short paragraphs.
Unemployment compensation services increased many times.
Many unemployed moved out of Seattle. (rental agencies for U-Haul ran out of equipment.)
City government forced to cut expenditures-led to city job freeze-summer park programs decreased; no growth in city tax revenue; etc.
Schools - 50 times as many children on free lunch program - expensive.
Tax levy for schools difficult to pass. School budgets cut considerably.
Automobile sales - "losing their shirts" - sales off 30 to 50%. Going out of business. This is typical of many other retail businesses that produce consumer goods.
Housing - Apartments become vacant (vacancy rate up to 40%.) Rents cut.
People who are working are afraid to spend too much money which causes a chain reaction of more business slump and more unemployment.

PRE-POST TEST

BEHAVIORAL
OBJECTIVE NO.

Teachers should give the Pre-Post Test again now that the activities are complete.

1. 1. In twenty-five words or less write one reason why capital investment and profit making are necessary for business to survive.

2. 2. List two factors that industries take into consideration in acquiring appropriate land.

a. _____

b. _____

3. 3. From the lists below match the specific industrial need supplied by that form of transportation. INSTRUCTIONS: Match the letter answers in list B to the Types of Transportation in list A.

LIST A
TYPES OF TRANSPORTATION

- ____ AIRPLANE
- ____ TRAIN
- ____ RIVER BOAT OR BARGE
- ____ TRUCK
- ____ OCEAN TANKER

LIST B
SPECIFIC INDUSTRIAL NEED

- A. OIL REFINERY
- B. COAL to STEEL MILL
- C. AUTOMOBILES TO THE WEST COAST.
- D. COCA COLA to a RESTURANT
- E. LIVE LOBSTER from MAINE

3. 4. List two reasons why transportation is an important consideration in locating an industry.

a. _____

b. _____

4. 5. List two reasons why an industry investigates the availability of various forms of energy before it locates in a community.
- a. _____
- b. _____

5. 6. Industries investigate the zoning laws, building codes, and tax structure before locating in a community. Give one reason that tells why each item below is investigated.
- a. ZONING LAWS - _____
- _____
- b. BUILDING CODES - _____
- _____
- c. TAX STRUCTURE _____
- _____

6. 7. Complete the chart below: INSTRUCTIONS - List four (4) types of career opportunities that exist in industry today. Indicate the level of training you think is needed for each career you name. Levels of training: professional, semi-professional, skilled, semi-skilled, unskilled.

CAREER OPPORTUNITES	LEVELS OF REQUIRED TRAINING
a. _____	_____
b. _____	_____
c. _____	_____
d. _____	_____

7. 8. The real value of an industry is \$6,000,000. The property tax formula is \$8.00 per \$100.00 assessed valuation. Assessed valuation is 1/3 of the real value. Find the amount of property tax the industry would pay:

The real value of a home is \$30,000. The property tax formula is \$8.00 per \$100.00, assessed valuation. Assessed valuation is 1/3 of the real value. How much property tax will the home owner pay?

Compare the amount of taxes paid by the industry to the amount of taxes paid by the home owner. Do industries benefit the community? Why or why not?

8. 9. List four (4) environmental processes that will be disrupted when an industry locates in a community.
- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
9. 10. Draw a sketch in the space below. In the sketch draw and label five (5) aesthetic qualities an industry might add to its complex to make it more appealing to the community.
- OR
- Draw a sketch in the space below. In the sketch draw and label five (5) items that an industry might have on its complex that would detract from the aesthetics of the community.
10. 11. In the space below draw a poster that will show three (3) forms of pollution related to industry.
11. 12. Choose one of the following: water facilities, or waste disposal facilities. In two or three sentences name and specifically explain a problem that an industry might create in a community regarding one of these facilities.
12. 13. Suggest two workable solutions for increasing electrical power when industry places a strain on the existing supplies of a community.
- a. _____
- b. _____
13. 14. List three (3) effects on road and/or traffic facilities that are likely to arise within a community when an industry first locates there.
- a. _____
- b. _____
- c. _____
14. 15. Read the following story: Approximately 20,000 people live in the community of Doomsville. About 8,000 of these people are attending elementary school and high school. 5,000 men and 3,500 women are employed by the Big Bad Bunny Baking Company. There are about 500 retired couples living in the community and the remainder are engaged in such businesses as: filling stations, grocery stores,

BEST COPY AVAILABLE

cleaning shops, barber shops, beauty salons, and clothing stores. Because Ralph Rader discovered that the Bunny Baking Company was big and bad, the 4 B's had to get out of town. By the end of a two year period, the Doomsville community was still unsuccessful in getting a new industry to locate there. In fact there were no other factories within a radius of 75 miles around Doomsville.

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10. "Experiments for the Science Classroom based on Air Pollution Problems" --may be obtained from Mrs. Ruth S. Hartman, Health Education Consultant, Department of Public Health, 2151 Berkely Way, Berkeley, California 94704. Free.
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13. Leopold, Aldo. The Sand County Almanac. Ballantine Book. 1970
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15. New York Stock Exchange Educational Division. New York Stock Exchange. You and the Investment World
16. Railroads of America. Association of American Railroads. Washington, D.C.
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18. Rienow, Robert and Rienow, Leona Train. Man Against His Environment.
Ballantine Book
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20. "Scientific Experiments in Environmental Pollution"--Describes 18 experiments which include the problems of water pollution and solid waste disposal as well. Can be purchased from Holt, Rinehart and Winston, Inc., 383 Madison Avenue, New York, New York, 10017. Price--\$1.00.
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3. Battan, Lewis J. The Unclean Sky. Anchor Books. 1966
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16. Wayman, Norbury. Life on The River. Crown Publishing Company
17. World Book Encyclopedia. 1970 Edition. Field Enterprise Educational Cooperation

Further information on air pollution can be obtained from the following sources.

Donald A. Pecsok
St. Louis County Health Department
801 South Brentwood Boulevard
Clayton, Missouri

Charles M. Copley Jr.
Commission of Air
City Hall, Market Street
St. Louis, Missouri

Missouri Air Conservation Commission
Box 1062
Jefferson City, Missouri Attention: Mrs. Alexander

Information on water pollution.

Miss Margaret Keilholz
Missouri Water Pollution Board
Jefferson City, Missouri

FILM BIBLIOGRAPHY

- Everglades: Conserving a Balanced Community. (11 minutes - 1968 county A. V.)
- Grassland Ecology: Habitats and Change. (13 minutes - 1970 county A. V.)
- Pollution Control. (5 minutes - Western Electric Company)
Clayton at Woods Mill Road
- Problems of Air Conservation. (15 minutes - 1968 county A. V.)
- A Land Betrayed. (10 minutes - 1970 county A. V.)
- Air Pollution. (10 minutes - 1969 county A. V.)
- Challenge of Urban Renewal. (30 minutes - 1966 county A. V.)
- We and the Computer. (5 minutes - Western Electric Company)
Clayton at Woods Mill Road
- Cry of The Marsh. (12 minutes - 1968 county A. V.)
- Wealth of The Wasteland (28 minutes - 1969 county A. V.)

ADDITIONAL FILM LIST

Russian Life Today	21 minutes	Cooperating School Districts
Factories, Mines, and Waterways	20 "	"
The River	30 "	"
Why Communities Trade Goods	10 "	"
Transportation by Inland Waterways	10 "	"
Communities Depend on Each Other	10 "	"
Your Job: Applying For It	14 "	"
Your Job: Fitting In	16 "	"
Your Job: Getting Ahead	16 "	"
Your Job: You and Your Boss	16 "	"
Your Job: Finding the Right One	14 "	"

Note: There are also a number of films on occupations and jobs in the St. Louis County and City Public Library.

STUDENT DATA SHEETS

Industries Consider Certain Important Factors Before Locating in a Community

Company A - This company received a patent from the federal government for manufacturing hula hoops. The company then bought some land, built a building and purchased machines. After that they employed fifty people who lived nearby to operate the machines and manage the factory.

At the end of December the company had to pay the following bills: Wages were \$25,000, electricity to operate the machines cost \$5,000, water to cool machines and for employee use cost \$500. Gas to heat the building in January cost \$2,000, raw materials needed to make the hula hoops cost \$5,000. The transportation cost of shipping in the raw materials was \$400, and it cost another \$600 to ship the finished hula hoops to customers. Since the company will have to pay taxes to the federal state and local governments at the end of the year it was necessary for them to put \$5,000 in the bank at the end of the month for that purpose.

During the month of December Company A sold \$44,300 worth of hula hoops. From these facts determine whether or not Company A made a profit or suffered a loss.

Company B - The company recently received a patent from the federal government for the manufacturing of a new and better water gun. Like Company A they went out to acquire land on which to build a building and bought machines to make the water guns. Feeling they had a very large market for their new product (i.e. many people would want to buy it) they bought a larger tract of land and built a larger building than Company A. They hired 75 people who lived nearby.

At the end of December they paid \$33,000 in wages. The electric bill for operating the machines and other uses was \$6,000, the cost of water for cooling machines and other uses was \$600, gas to heat the building cost \$3000, and raw materials for making the water guns cost \$7,000. The bill for transporting these raw materials was \$700 and the cost of delivering the finished product to customers came to \$900. Since they would have federal state and local taxes to pay at the end of the year it was necessary to put \$6500 in the bank for that purpose. They sold \$56,450 worth of guns during the month of December.

From these facts determine whether or not Company B had a profit or suffered a loss.

In 25 words give reasons why Company A will stay in business but Company B will likely go out of business.

Note: When assets equal liabilities the business breaks even.
When assets exceed liabilities the business has made a profit.
When liabilities exceed (are greater than) assets the business has suffered a loss.

1. Total the assets and liabilities for Company A for the month of December.
2. Complete the chart for Company A for the year and total all assets and liabilities.

Company A
ASSETS

LIABILITIES

--	--

1. Total the assets and liabilities for Company B for the month of December.
2. Complete the chart for Company B for the year and total all assets and liabilities.

Company B
ASSETS

LIABILITIES

--	--



COMPANY A

	Assets	Liabilities
JAN.	45,500	46,200
FEB.	45,300	46,700
MAR.	43,100	44,050
APR.	43,600	41,100
MAY	44,400	41,300
JUN.	44,800	42,600
JUL.	46,700	44,600
AUG.	45,900	43,700
SEP.	42,050	42,100
OCT.	41,200	41,800
NOV.	43,900	43,850
DEC.		

Total

	Assets	Liabilities
JAN.	55,200	57,900
FEB.	54,500	55,800
MAR.	55,900	55,500
APR.	56,750	54,600
MAY	57,200	55,100
JUN.	56,500	56,400
JUL.	55,250	55,700
AUG.	55,100	55,750
SEP.	53,800	55,650
OCT.	52,550	56,400
NOV.	53,600	56,200
DEC.		

Total

Form #2

The following article is an excerpt from a St. Louis Post-Dispatch story on the Soviet Union under Leonid Brezhnev, First Secretary of the Communist Party. (January 1972)

Brezhnev's empire produces about the same amount of steel as the United States; more cement, but only a quarter of the synthetics; one fifth the automobiles and one tenth as many computers.

Brezhnev's citizens are well nourished, healthy, disciplined people who desire the good life in peace. They still have the lowest living standard and the most backward social order of all industrial countries. Brezhnev's subjects cannot produce or buy, or read and write what they like. They cannot vote for whom they want nor can they go where they want. Isolated from the world around them--enveloped by party, police and censorship--they are drilled in patriotism, moral duty and prudery.

The bureaucrats decide what shall be produced; the producer has little interest in increasing output because the state skims off the profits, principally for the benefit of what is known in the Soviet Union as security. This is why productivity is only half that of the United States. The rate of growth is declining and the output of important goods is falling.

Name _____

Appropriate Land for IndustryASSIGNMENT

You are a civil engineer specializing in topography. You have been hired by a meat packing plant to help them plan for their new complex. They have just purchased the property of your school building and would like to take down the school building and build their new plant. Before they build they want to know if the land is feasible for the new plant. Your job is to assess your school grounds to see if the land could be made suitable for locating a meat packing plant on it.

1. Is the property large enough to accommodate the industry?
2. Is the land flat enough to construct the main building complex?
If not, what has to be done?
3. Is there a reasonably large area that is relatively flat that could be fenced off to provide a corral for in-coming animals?
4. Is there enough land for adequate parking facilities? How many cars (approximately) can be parked on the grounds?
5. Are there adequate sewage disposal and water lines in the area?
6. Is there any danger of flooding on that piece of land comprising the school grounds?
7. Is there any swamp area that will have to be filled?
8. Is the property surrounded by a residential area, industrial area, agriculture area, vacant property or a mixture of these?
9. Can you find any evidence of erosion preventive techniques on the property?
10. Other information or factors.

Appropriate Land for Industry, Can it be Acquired?

Mr. Sam Jones is 60 years old. He was born to parents who were farmers. The parents owned and farmed 75 acres of land. When Sam was 20 years old his father died. Since Sam wanted to be a farmer anyway he decided to stay home and take over the farm for his mother. When Sam was 35 years old his mother died and willed the 75 acre farm to Sam. Sam had two sons, one son wanted to be a farmer also and Sam sent him to a university where he majored in Agriculture. This son is presently in the process of taking over the management of the farm for his father.

One day a man knocked on Sam's door. He introduced himself as Mr. Scott Tiffany, a representative of the Speedy Home Building Materials Corporation. He informed Sam that his company was interested in purchasing Mr. Jones' property for a building site for a new factory and that he was prepared to pay a good price for the property.

He then proceeded to offer Mr. Jones \$500,000 for the 75 acres. Mr. Jones turned him down stating that he had been born on this farm and did not want to move away.

Mr. Tiffany went back to his company, informed the Board of Directors of Mr. Jones' answer.

The Board of Directors discussed the matter. The land was zoned by the county government for industry so there would be no problem or expense involved in getting the property re-zoned. A freight train track ran along the southern boundary of the property so there would be no expense in bringing in needed transportation. Their industry desperately needed to locate a plant in that metropolitan area in order to better meet competition from other companies in the same manufacturing business.

After reviewing all these facts the Board of Directors authorized Mr. Tiffany to offer Mr. Jones one million dollars for his farm plus a farm to be purchased by the company in a neighboring state.

Do you think Mr. Jones sold his property? _____

Back your answer to the above question with logical reasons.

NAME _____

Form #5

TYPES OF INDUSTRY - TRANSPORTATION NEEDS - SUITABILITY IN TERMS OF RAW MATERIALS AND PRODUCTS SHIPPED TO MARKET.

FACTOR	RIVER BARGES (boats)	RAILROADS	TRUCKING	AIRPLANES
COST				
SPEED				
SIZE AND WEIGHT				
PERISHABLE GOODS (CHECK IF APPLICABLE)				
NON-PERISHABLE GOODS (CHECK IF APPLICABLE)				
NAME OF GOODS TRANSPORTATED				

CONCEPT 3
Andrew Dennison

The Dennison
Manufacturing Company
1844-1865

UNIT I
THE FOUNDING OF THE FIRM



By 1844, Andrew Dennison, a shoemaker of Brunswick, Maine, was experiencing the difficulty of competing successfully in a rapidly changing American economy. Like centuries of cobblers before him, he made shoes in his own shop. He would measure the foot size of a customer, then cut and stitch the leather by hand to fit each person's foot. This was slow and expensive.

Near Boston, shoemakers had long since begun to specialize. If several men worked together, each making a particular part of the shoe, shoes could be produced more quickly and cheaply. By adopting standard shoe sizes in a range of widths and lengths people could make shoes in one place to be shipped to other places. A customer could buy **READY-MADE shoes** less expensively than he could have a cobbler make him a pair.

Andrew Dennison could not compete with these mass-produced shoes, and looked about for a better way of earning a living. Andrew's two sons had moved to Boston to engage in the jewelry business. One of them, Aaron, was a successful watchmaker who later helped establish the Waltham Watch Company. For his business he bought from France small jewelry boxes similar to those used by jewelers today to display their merchandise. The trip across the ocean on a sailing ship, however, made their delivery uncertain and their price high. Aaron took some sample boxes home to his father and two sisters with the idea that copies made in the United States would sell more cheaply and be more dependably delivered than the French boxes.

Dennison BEGINS a Business

Andrew was persuaded to begin manufacturing jewelry boxes. Using what money he had, he bought cardboard, fabric, wood, glue and tools and, with the help of his family, started making jewelry boxes in his own home. To establish a price for his boxes, he added up his total cost for materials, wages and transportation, including shipping the raw materials to Brunswick and the finished boxes to Boston. Then he added twenty per cent to this cost, which he would keep for himself as **PROFIT***. His son Aaron, the jeweler, who had originally recognized the existing **MARKET** for cheaper boxes, sold the boxes to jewelers in Boston and New York.

Before long Andrew Dennison was able to increase his profit to forty per cent. He did this in two ways. First, he raised his prices, although he still made sure that his prices were less than those of the French box makers. Secondly, he decreased the costs of **MANUFACTURING** the boxes. By searching out new sources and buying larger shipments, he learned to obtain his raw materials more cheaply. The fact that each store originally demanded boxes of different sizes and shapes made producing them slow work at first. He had learned a lesson from the changes in shoemaking, however. By persuading the stores to settle for a limited variety of boxes in standardized sizes, he was able to cut his production costs.

Soon Andrew's second son, Eliphalet, became involved in

* Dennison did not use this term as we would use it today. In figuring his costs he did not include either the expenses of upkeep on his shop and tools, which is called depreciation, or payment for his own time.

the business. His father's comment that he "suffers his outgoes to exceed his income" may indicate that Eliphalet was somewhat careless with his money, more willing perhaps to RISK it than his more conservative father. Indeed, this son had not been very successful in the jewelry business in Boston. In 1849 he began to purchase supplies for the box business as an agent of his father. More important, he began to use his talents as a salesman to MARKET or find buyers for his father's boxes.

Eliphalet recognized markets for other products, similar to boxes and knew that the more products they could sell the more money they could make. He was anxious to expand the business by DIVERSIFYING, or manufacturing other products he was sure would sell. Soon the Dennisons hired neighbors to help, and were selling cards, fine cotton, tissue paper and tags. They purchased their supplies in even larger quantities. Many of the new growing businesses in the United States found it cheaper to buy boxes and tags from Dennison, who specialized in their production, than to make their own as they traditionally had.

The location of the Dennison business in Brunswick, Maine, was unnecessarily far from major markets. Delays in transportation by wagon over the poor New England roads occasionally caused loss of orders. Eliphalet suggested moving the business to Boston, where the new railroads would provide fast regular delivery to New York and other eastern markets. His father, however, did not wish to leave his home town.

The Business MOVES to Boston and GROWS

In 1855 Andrew Dennison agreed to sell the business to Eliphalet so that he could move it to Boston. Eliphalet had little cash, so he bought the business on CREDIT; that is, he agreed to pay his father part of his earnings every year until \$9000 was paid. Eliphalet now rented a building in Roxbury, later to become part of Boston, and hired people in the area to work for him.

In 1858 Eliphalet added merchandise tags to his list of products. These were large tags for addresses or prices, with strings to tie them to packages or other articles for shipping. After eyes for the string were cut by machines, the tags were sent out to families who tied the strings to the tags. Since the tag had been designed by the Dennisons, Eliphalet applied for and received a PATENT from the United States Patent Office in Washington. This was a legal document, good for seventeen years, prohibiting others from duplicating the tag without Dennison's permission. To expand his market, Eliphalet bought the business of a New York tag importer. Now he could sell tags to those companies which had previously bought from the New York company as well as to his original customers. Tags quickly became one of the most important products of the company, more important by far than the original jewelry boxes.

The Dennison Manufacturing Company grew rapidly, and as the company expanded, its profits increased. Measured by almost any standards, its first few decades in business were immensely successful. During both 1863 and 1864, profits came to almost 125 per cent of the CAPITAL INVESTED in the company.

These large profits in the early stages of the business were used for DIVIDENDS and for expansion. Each of the persons who had supplied some of the money invested either in the original company or in later expansions received a yearly dividend, or share of the profits proportionate to the amount of his original investment. Some of the profit, however, was used for expansion. Equipment for manufacturing larger boxes, gummed labels and sealing wax was added. Branch offices to expand sales were established in Philadelphia, Chicago, Cincinnati and St. Louis.

Problems of GROWTH

The growth of the company was not without problems. One of the more delicate policy decisions concerned the methods of selling merchandise. Most of Dennison's sales came to be made through WHOLESALE DISTRIBUTORS. Instead of selling small numbers of tags to each of their CONSUMERS—that is, the companies and businesses who used their products—the company simplified the process by selling a large shipment to wholesale distributors, then letting them worry about selling to consumers in their areas.

In 1870, however, Dennison became unhappy about this method of selling. In order for a distributor to make a profit, the company had to sell him products for 40 per cent less than the price he charged the consumers. This limited the manufacturer's profit. Furthermore, the fact that distributors did not always carry all of Dennison's products cut down on its potential market.

To remedy this situation, the company started sending out salesmen to compete with its distributors in selling to consumers. Aroused at loss of sales, distributors threatened to stop carrying Dennison products. The company feared it would lose sales. Modern advertising was unknown, and the companies and stores which used its products had frequently never heard of Dennison. They were accustomed to buying from the local distributor, whom they knew personally, regardless of what kind of labels he sold. The company feared that these customers would be unwilling to give their business to a strange salesman who said he represented the Dennison Manufacturing Company. Dennison management decided it was running too great a risk, withdrew its salesmen and continued to market its products through wholesale distributors.

The American BUSINESS Scene

It would be difficult for a company to grow so fast today; it would have been almost impossible in the seventeenth century. Indeed, a large part of Dennison's growth in the nineteenth century can be accounted for by the fact that it was swept into the all-encompassing expansion taking place in the American economy at that time.

Before 1775 the thirteen colonies, as undeveloped regions usually do, exchanged raw materials for the manufactured goods of the mother country, England. In other words, America exported tobacco, wool, indigo, tar, pitch, turpentine, hemp, lumber, furs, copper, iron and rice, and it imported English finished products.

After the American Revolution citizens of the new republic wanted to manufacture as many of their own finished goods as they could. The industrial revolution had originated in England within the textile industry. The English had developed water-driven machines for spinning and weaving during the last half of the eighteenth century. By 1789 American businessmen had begun to copy the British machines and to develop a textile industry of their own.

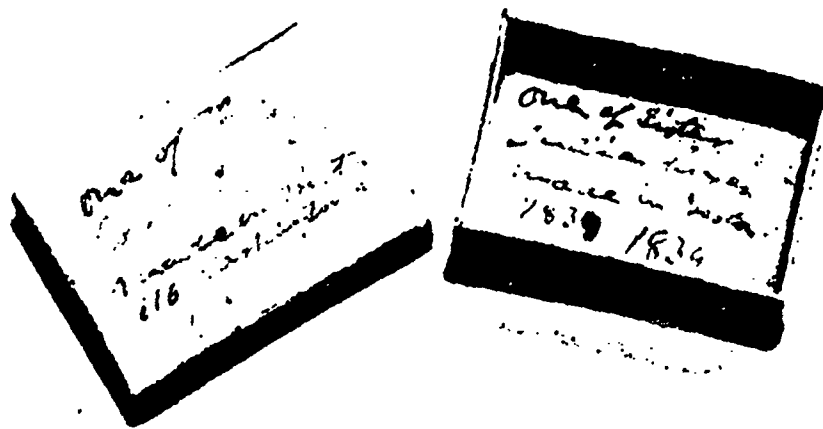
The early American textile industry settled in New England originally because of the satisfactory combination of ECONOMIC RESOURCES found there. Not only could New England

THE DENNISON MANUFACTURING COMPANY

supply waterpower, it also had workers who learned quickly how to run textile machinery and businessmen with money to invest in the new industry. By 1850 New England textiles were competing with British textiles in numerous parts of the world.

Only slightly later did other industries develop, nourished by a variety of factors. America had abundant supplies of land, raw materials and immigrant labor. New markets were opening up as a result of better transportation, growth of cities and the expanding western frontier. New machines were invented or copied from England—the sewing machine, the steam hammer, the cylinder press, the telegraph, looms for producing figured fabrics, air-heating stoves, firearms, boot and shoe machinery, rubber goods and most important, the steam engine. The threshing machine, the reaper and the mowder were enabling the farmer to produce enough food to feed the populations of the cities growing up around the factories. Perhaps most spectacular of all was the contribution of the railroad. By 1870 it was freeing business from the limitations of geographical location, and goods produced in one area could be sold across the whole nation.

To be sure, the tags, boxes and other paper products of the Dennison Company were a small item in the total picture of national growth. But the rapid expansion in the shipment of merchandise opened up a growing market for the company's products.



The material in this case was taken from articles in the *Journal of Economic and Business History*, "History of the Dennison Manufacturing Company," by E. P. Hayes, vol. I (1928-29), pp. 467-502, and "History of the Dennison Manufacturing Company—II," by Charlotte Heath, vol. II (1929-30), pp. 163-202; from the survey of the company in *Casebook in American Business History*, by N. S. B. Gras and Henrietta Larson (Appleton-Century-Crofts, New York, 1939), pp. 437-460; from annual reports of the company; and from interviews generously given by officials of the company and representatives of the International Association of Machinists.

Hypothetical Problem - You are a civil engineer and your company has assigned you to survey the proposed location of a new Slaughter House Meat Packing plant in terms of transportation facilities. Assume that the plant is to be located on your school grounds in place of the school building. Assess your school area to see if needed or necessary modes of transportation are available or feasible for obtaining resources (cattle, hogs, sheep, etc.) and transporting the processed product to market. Also consider the handling of employee traffic. Your survey should be submitted in the form of a report under the headings: Roads, Railroads, Water, and Air transportation indicating whether they are feasible, adequate, or inadequate.

Name _____

Form #8

																														Legend																																																																													

NAME _____

Form #9

USE OF AVAILABLE ENERGY SOURCES

1. List 4 types of natural (primary) energy sources.

2. Name the main kind of secondary energy used by industry today.

3. List 4 facts about primary and/or secondary sources of energy an industry would consider before locating in a given area.

4. Which of the energy or energies do you think a slaughter house meat packing plant on your school grounds would select?

5. Based on the facts you listed for #3, justify in about 50 words your answer to the above question.

GAR
DUMP

INDUSTRY

INDUSTRY

INDUSTRY

INDUSTRY

INDUSTRY

Form #10

AGRICULTURE

RESIDENTIAL

RESIDENTIAL
(SINGLE FAMILY)
SCHOOL

RESIDENTIAL
(SINGLE FAMILY
HOMES)

PARK

MAIN STREET

RETAIL

APARTMENTS

RETAIL

BUSINESS DISTRICT

RETAIL

PARK

APARTMENT
(MULTI-FAMILY HOMES)

RETAIL

HOSPITAL

NAME _____

Form #11

HOME OWNERS

INDUSTRIES

types of taxes

types of taxes

NAME _____

1. Do you think St. Louis County has this property presently zoned for possible industrial use or would St. Louis County consider changing it to industrial zoning?

2. In 25 words tell why or why not?

3. List several types of building materials that you think building codes would allow such an industry to use. In one phrase state why you think that building material would be allowed.

4. Estimate the amount of taxes you think this industry would pay.

A) Personal Property Tax _____

B) Real Estate Tax _____



NAME: _____

ASSIGNMENT:
Each student should choose an industry and chart jobs available in that particular industry.

INDUSTRY: _____

PROFESSIONAL	SEMI-PROFESSIONAL	SKILLED	SEMI-SKILLED	UN-SKILLED
Engineer doctor certified public accountant Examples	laboratory technician computer operator	mechanic lathe operator dye cutter	Assembly line worker	janitor

NAME _____

Form #14 A

OCCUPATION INFORMATION FORM

1. Name of Occupation
2. Related Jobs or Positions
3. Work performed
4. Physical demands
5. Personal Qualifications or Requirements
6. Education and Training Requirements
7. Where employed
8. Hours and Earnings

9. Working Conditions

10. Employment Outlook

11. Opportunities for Men

12. Opportunities for Women

13. Educational or Training Opportunities

14. Would you be able to obtain this occupation in this area?

NAME _____

Form #15

This example application form is similar to one you will be asked to fill out when you look for work. Pretend you have finished the 9th grade (3 years junior high) and fill out application accordingly. Unless you have a Social Security card just leave that space blank.

Personal Information _____ Date _____

Name (last name first) _____ Social Security No. _____

Address _____ Telephone _____

Age _____ Date of Birth _____ Place of Birth _____

Height _____ Weight _____ Physical condition (health) _____

Name of parent or guardian _____

Education	No. of years and school	Graduated? (diploma)	Favorite subjects
Grammar School (Elementary)			
Junior High School			
Senior High School			
College			
Other (trade school)			

Work Experience. (Most recent employer first.)

Employer (company)	Dates (from-to)	Kind of work

Activities in School.

Scholastic honors _____

Athletic and extracurricular _____

Other activities and hobbies _____

Reference (teachers, ministers, employers, etc.)

Name _____ Address _____

Name _____ Address _____

NAME _____

INDUSTRIAL TAXES HELP COMMUNITY

Real property tax problems for homes.

We pay taxes on 1/3rd of the amount of money we actually paid for our homes. Tax rates will vary from one incorporated town to another. They will also vary from one school district, fire district and other districts in which you may live. Included in the tax rate are tax dollars that go to the Louis County Government and the State of Missouri. All residents of the Parkway School District pay tax rates between \$7 and \$8 per hundred dollars assessed valuation.

In this exercise we will use the following tax rate: \$8.00 per \$100.00

assessed valuation

1. Real value of home; \$21,000

2. Real value of home; \$36,000

3. Real value of home; \$42,000

4. Real value of home; \$48,000

5. Real value of home; \$60,000

INDUSTRIAL TAXES HELP COMMUNITY

Real property tax problems for industries.
 Real property tax for industries is figured on the same formula as used for homes. However, the real value of land containing industrial buildings is much higher than the real value of land containing homes.

1. Real value \$6,000,000 example Ramsey Corporation

2. Real value \$9,000,000

3. Real value \$15,000,000 example Western Electric

4. Real value \$30,000,000 example West County Shopping Center

5. Real value \$48,000,000 example Chrysler Corporation plant on Highway 66

NAME _____

Form #18

INDUSTRIAL TAXES HELP COMMUNITY

Company A is located on 25 acres. Its value is approximately \$6,000,000. As you know from working tax problem 1 on industries, this 25 acres with industry built on it is bringing in approximately \$160,000 in real estate taxes each year.

On 25 acres approximately 75 homes could be built. This is approximately 3 homes per acre and the average in the Parkway School District. Assume these 75 homes would each have an approximate value of \$30,000. Figure how much taxes the same 25 acres would produce in taxes if homes were built there instead of an industry.

Work the problem assuming \$40,000. Homes were built on the 25 acres.

List at least 5 community facilities benefited by these industrial taxes.
(example County Library)

_____	_____
_____	_____
_____	_____

NAME: _____

INDUSTRIAL TAXES HELP COMMUNITY

ASSIGNMENT:

Compare the tax rate of the three school districts listed below and list your reasons why taxes are high or low in that particular district. Be prepared to discuss.

SCHOOL DISTRICT	TAX RATE	WHY ARE TAXES HIGH OR LOW (or moderate)?
Clayton	\$3.69	
Valley Park	\$4.65	
Parkway	\$5.62	



BOUNDARY MAP

98 Acre Area

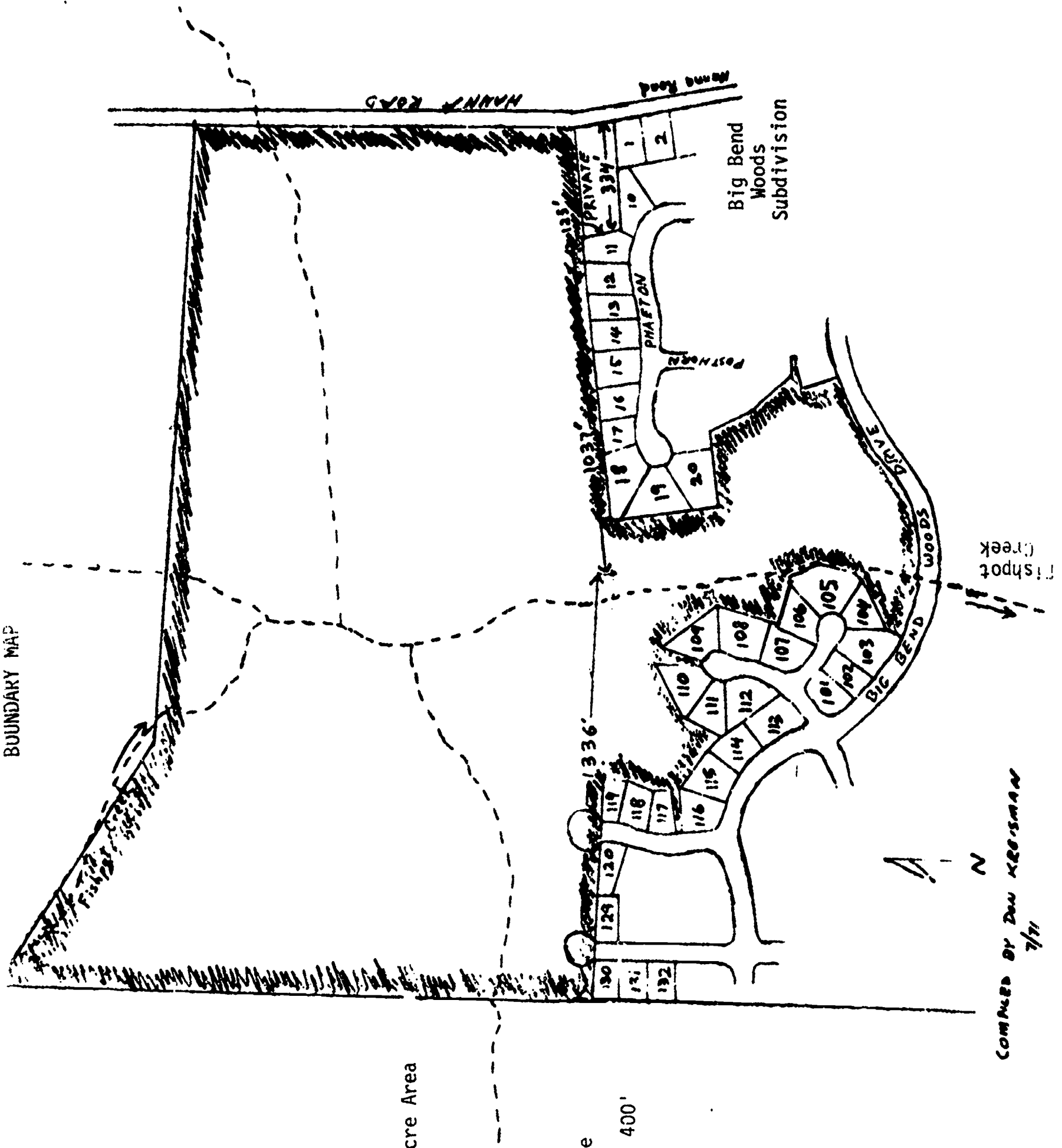
Scale
1" = 400'

A - N

COMPILED BY DON KRISMAN
7/71

MAP 1.

71



WEST 1/2 "98 ACRE AREA"

Scale 1" = 375'

ENVIRONMENTAL INTERPRETATION CENTER

Sulphur Springs Road
←

Hanna Road
→

FISHPOT CREEK →

Foot Path

Weeds, Grasses
0' - 4'

Foot Path

Weeds, Grasses
0' - 4'

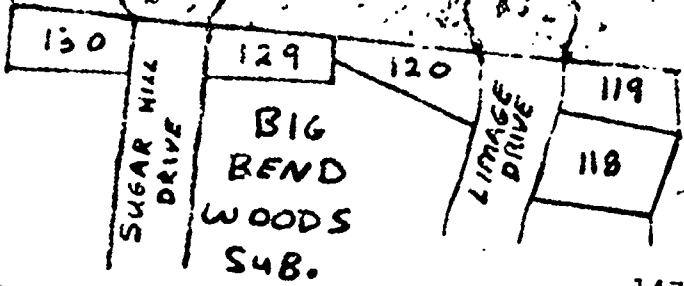
Cart Path

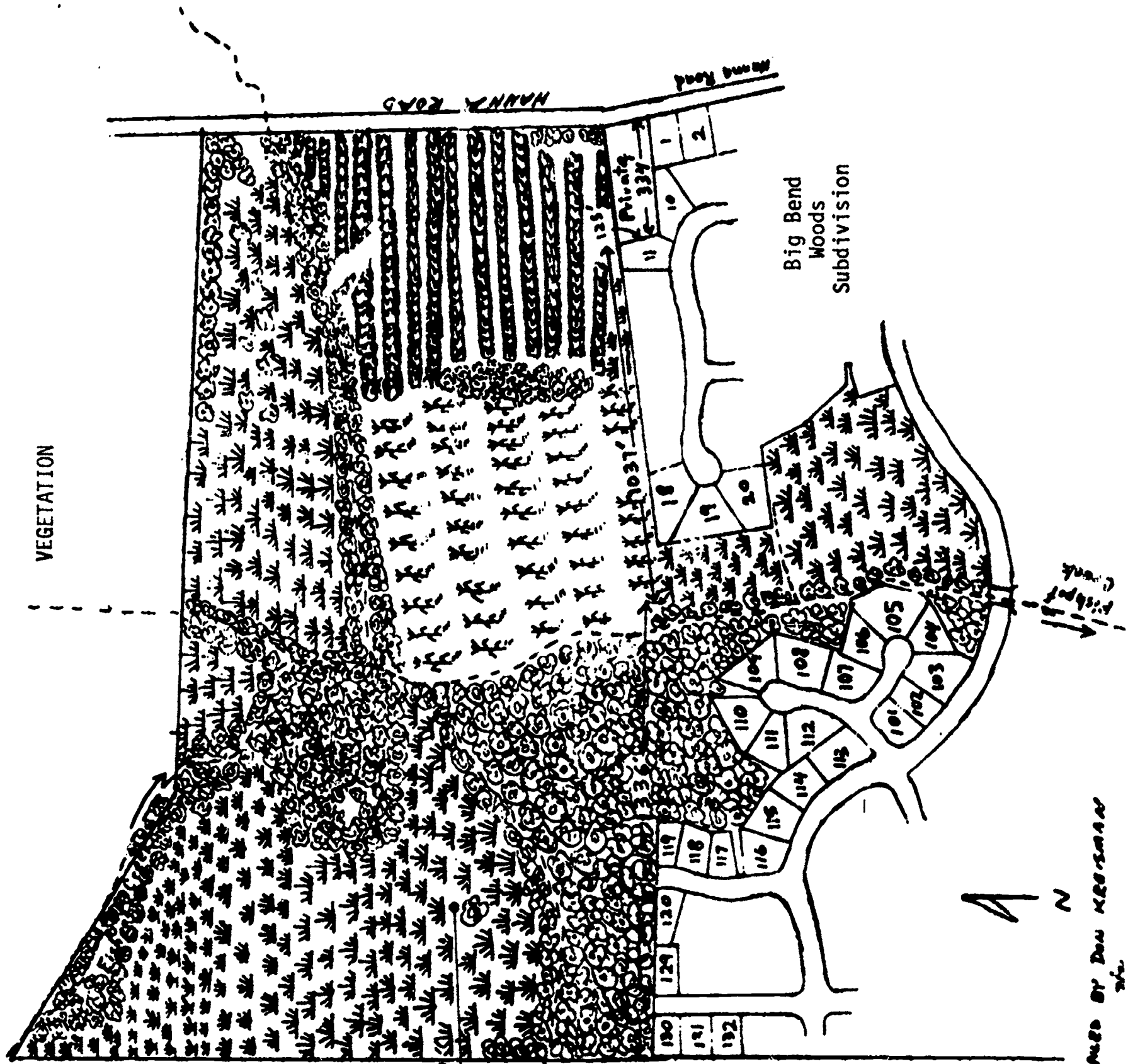
REST AREA

FISHPOT CREEK

Woods
(Mixed Species)

Revised 6/72
DON KREISMAN





- Weeds, Grasses 0-4'
- Mixed Trees
- Soy Beans
- Corn

98 Acre Area

Scale

1" = 400'

N

COMPOSED BY DON KERRISMAN
7/81

FIELD TRIP TO PARKWAY 98 ACRE AREA

INDUSTRIES MAY CREATE PROBLEMS FOR THE COMMUNITY:

- a. Industries may disrupt the environmental processes in a community.
- b. Industries may add to or detract from the aesthetic features of a community.

FIELD TRIP ACTIVITIES:

PURPOSE: To provide students with an opportunity to explore a relatively untouched, wild area. To have them identify and hypothesize the problems a locating industry may create for a community. What environmental disruptions (both immediate and permanent) will the locating industry cause? What will be the aesthetic impact (positive or negative) in terms of the over-all community?

Map 1: a. Identify and plot on Map 1 environmental disruptions caused by man to date. Examples: cleared ground, burned over woods, plowed crop land, bare ground paths.

Map 2: a. Write in or draw the location of specific elements observed in the natural environment. Examples: a stream, a pond, a meadow, bird nest, animal niche, trees by name or type, animal tracks, etc.

- b. Locate and plot an ideal building site for an industry. You will have to defend the industry and the site the industry was to be built on. Considerations:
 1. Suitability of the land in terms of:
 - a. Cost
 - b. topography (hilly, flat, rolling, good or bad drainage, flooding)
 - c. available transportation (air, rail, truck, barge, other)
 - d. available utilities (water, sewers, electric, telephone)
 - e. available energy sources (coal, gas, oil, electric)
 - f. available access roadways (streets, highways, free ways)
 2. Is ample housing available, or is there space for new housing to be developed?
 3. What recreational opportunities are there? Are there land areas that can be set aside and developed for recreational activities?
 4. What environmental disruptions (immediate or permanent) will the industry create if it locates here?
 5. Aesthetically will the industry beautify or blight the surrounding community areas?

NAME: _____

ASSIGNMENT:

Assess school grounds from point of view as to environmental disruptions that can be noted as a result of the school plant having been built there.

LAND

WATER (creek, pond)

TREES

BIRDS

ANIMALS

OTHER

FIELD TRIP TO INDUSTRY

ARCHITECTURE:

1. Shape of building (square - oblong - round - other)
2. How many stories or levels does the building have?
3. Exterior texture (rough - smooth)?
4. Exterior building material
5. Windows (many - few - large - small - dirty - clean)?
6. Exterior color
7. Does building blend well with the lay of the land?
8. Is the building design (old-fashioned - modern - futuristic - way out)?
9. Does the building blend well with other surrounding buildings?
10. Does the building occupy (all - most - little) of the land it is located on?
11. Is the building well maintained and cared for?
12. Is the name sign (in good taste - poor taste - attractive - large - small - compatible with the architecture?) Does the sign use electricity?

LANDSCAPING:

1. Are there trees? _____ Kinds? _____
Numbers? _____
2. Are there shrubs? _____ Kinds _____
3. Where are the shrubs located (near the building - spread out over the grounds - located near tree curbs - surround parking lot area)?
4. Is there grass (natural - artificial - well cared for - poorly cared for)?
5. Is there any evidence of animal life? _____
 - a. natural
 - b. unnatural
6. Has any provisions been made to attract animals to the site?
7. Are there water fountains?
8. Are there water areas (pools - ponds - streams - natural - man-made)?

FIELD TRIP TO INDUSTRY (cont.)

9. Are there flower bed? _____ Flower boxes? _____ Natural or artificial flowers. Are the flowers well cared for?
10. Are there other unique decorations or landscaping techniques that appeal to you?
11. Is there litter on the grounds?
12. Are there litter containers located in strategic places.
13. Where are the large wash bins located? _____
 _____ Concealed or out in the open?

PAVED AREAS:

1. Are entry streets (paved - gravel - dirt)?
2. Are the entry streets (wide - narrow - adequate - inadequate)?
3. Has consideration been given to water run-off from paved areas? _____
 are there signs of erosion anywhere on the grounds because of large amounts of paving?
4. Is the parking lot (paved - gravel - dirty)?
5. Is the parking lot (large - small - accessible - inaccessible - adequate - inadequate)?
6. Is the parking lot (out in the open - concealed)?
7. Do traffic snarls occur at entry streets or in the parking area? If so, why?

What would you suggest to remedy the traffic situation?

COMMENTS:

1. Would you live next door to this industry?

NAME: _____

ASSIGNMENT: Survey the school grounds and catalog the sources of pollution on the grounds. Take a litter sack with you and pick up trash as you come across it.

AIR	WATER	NOISE	LAND
Examples { Smog from Ace Chemical Company	Garbage dumped in creek.	Auto's, trucks on highway.	Erosion due to poor landscaping. Soda and beer cans on grounds.

The story of almost every great American city is tied up with a river.

New Orleans has the Mississippi. The Potomac flows past Washington, D.C. The Hudson gently laps the docks of New York City. And Cleveland has the Cuyahoga.

The 100-mile-long, snakelike Cuyahoga courses past places like Mantua, Kent, Cuyahoga Falls, Akron, and Sagamore Hills, splits Cleveland in half, and spills into Lake Erie a short distance from Cleveland's Municipal Stadium.

Indians once paddled the clear-blue waters of the Cuyahoga in silent canoes. The French built trading posts along its sylvan shores before the English arrived. And the Cuyahoga enabled Cleveland to become a great manufacturing city because of the river's access to the Great Lakes.

On hot summer nights, the Cuyahoga cooled the city. And, at one time, the river was a genuine delight to the eye.

In short, the Cuyahoga was good to Cleveland.

But Cleveland—and other communities along the Cuyahoga's shores—have nearly destroyed the river.

Each weekday steel companies and other industries dump chemical wastes into the Cuyahoga's waters. Junkyards dot the river's edge. Heavy rains flood Cleveland's ancient sewer system. The result? Millions of gallons of human waste pour into the Cuyahoga.

All of this filth has turned the Cuyahoga into a floating junk heap. Its sickening greenish-grayish-brownish water oozes along like dirty soup. Chemical dyes and bubbling gases spot its surface. Stand near the river's edge on a hot night with the wind blowing right, and the foul smell will drive you away.

Fishermen once flung lines into

the Cuyahoga, hooking nifty catches. Today no fish swim there. In many dirty rivers, leeches and sludge worms thrive on watery wastes. Not even leeches and sludge worms can survive in the Cuyahoga.

Local wags tell jokes about the Cuyahoga.

"Anybody who falls into the Cuyahoga doesn't drown," goes one joke. "He decays."

Another joke has it that any nincompoop can walk on water—as long as it's the Cuyahoga.

Mayor Carl B. Stokes once said about the Cuyahoga: "We have the only river in the country which has been legally described a fire hazard."

His listeners laughed.

They don't anymore.

Last June 22 the Cuyahoga caught fire. Immense black clouds of smoke billowed into the air. Flames from the oily river spread ferociously.

Fire trucks raced to the scene. In the water, a fireboat sprayed the flames with powerful hoses. Nearby the smoky inferno, minutes passed like hours. Finally... the blaze was brought under control.

Fire officials began to estimate the damage. Two railroad bridges spanning the river had been nearly destroyed. The heat was so intense that railroad tracks on both charred bridges warped. Total damage came to \$50,000.

David Blaushild, who heads a Cleveland group called Citizens for Clean Air and Water, had this to say: "Every year there's more talk. The governor and the mayor come to the conferences, and make speeches and go home, and the pollution goes on. You don't have to study anymore. You can smell and see it. It's time to file lawsuits."

Why should people take this nonsense? Blaushild asked.

■ A 15-year-old girl went fishing with her father in the Connecticut River. She caught a few fish and her mother fried them up. The only trouble: The fish tasted like the dirty river.

■ A family of four vacationed along Lake Erie's shores. They discovered that only three of 62 beaches on the lake are rated completely safe for swimming. Even wading is unpleasant. Why? Thirty thousand sludge worms may be found in each square yard of lake bottom. The worms feed on filth.

■ *McCall's*, a nationally distributed woman's magazine, did a story on drinking water. The publication found that 102 cities in 32 states and Puerto Rico have water supplies dangerously close to minimum safety standards.

Hundreds of other cases of water pollution could be cited. The Cuyahoga River (see Case Study) may be among the dirtiest of rivers, but foul water is common. Almost every stream, river, lake, and bay in this country is polluted.

The condition is not unique to America. Wherever lots of people, homes, and factories are situated close together, near a waterway, pollution is likely to occur.

Why is it that waterways become polluted?

The UNESCO Courier, published by the United Nations Educational, Scientific, and Cultural Organization, put it this way:

"The trouble arises from the primitive notion that a river is a natural sewer."

'Individual Laziness'

When the country was young and the population was small, pollution was not a problem. The early pioneers and settlers found that most

fresh water was fit to drink. Human wastes and garbage from a farmhouse often were discharged into streams. But a mile down the stream, the water would again be pure enough for human consumption.

Dumping into streams became a cheap, convenient way to get rid of wastes.

When towns began to develop, pollution became more of a problem. Wastes from many houses were dumped into streams. Factories contributed their discharges. Still, sewage from a small town was diluted and made safe within a few miles.

Then other towns developed nearby. Some towns grew into cities. Industry grew bigger and more varied and discharged greater amounts of different kinds of wastes. Trouble really began. Many of the nation's rivers, streams, and lakes became stinking and disease-ridden cesspools. They received so much garbage from so many places that they would be unclean from one end to the other.

Soon only very old men could remember when streams were good for fishing. More and more beaches were declared unsafe for swimming. Communities had to add more chemicals to water to make it safe for drinking.

Congressman Lowell P. Weicker, Jr. of Connecticut says our rivers have become "sacrificed to individual laziness and corporate profits."

Public officials and company managers didn't seem to care. Townspeople didn't want to raise the tax money necessary to remove dangerous materials from human waste before it was discharged into waterways. Nor did factory owners want to spend the money needed to dump industrial wastes elsewhere or to make wastes less dangerous before

they reached the water.

Men feel differently about the value of water conservation.

For example, Congressman Weicker says: "What I am asking for is nothing less than a total commitment on the part of each citizen of this nation to be prepared to act as well as *pay* for the preservation of our environment."

Another man, the owner of an industry criticized for dumping waste, said that the jobs his plant offers are more important than the feelings of "a few bird watchers and dogooders."

Why is water so important? Why should we keep it clean? Sometimes it is hard to come up with quick answers because we take water so much for granted. Our bodies are made up of three-fourths water. The surface of the Earth is three-fourths water.

Plants need water to grow. Water stabilizes the Earth's temperature. We swim and boat in water. Water is used to clean everything from our teeth to the floors of dairy barns. Industry uses millions of gallons of water. Three hundred gallons are used for the manufacture of one pound of synthetic rubber.

Clean water and the plants, fish, and animals that thrive near it are also important for our enjoyment.

And . . . we drink water.

Cleanup Ordered

Cleveland gets its water from Lake Erie. More and more chemicals have to be added to the water to make it safe for drinking. One angry conservationist declared: "The time's going to come when they won't be able to put any more chlorine into the drinking water. What are they going to do then?"

Action to reduce pollution has

WALTER F. MONDALE COMMITMENT TO SURVIVAL

University of Minnesota, April 22



Do you think the cartoon's title is an apt one?

Every five to twenty years, an extraordinary phenomenon takes place in Scandinavia. The lemmings, for reasons unknown, begin their suicidal march to the sea.

We are not unlike this little creature—seemingly bent on the destruction of his own species.

The only real differences are that we don't wait ten years between marches, and we seem determined to take every other creature along with us.

Probably no single resource is as precious to the people of Minnesota as their lakes and waterways.

Yet, every day we pour 25 billion pounds of human, chemical, and industrial wastes into our nation's lakes and rivers. Two million pounds of pesticides, and over 104 million pounds of fertilizer are added to the land each day, to find their way into the nearest waterway and feed the growth of green algae.

Lake Erie is already dead, killed by the steady discharge of poison at the rate of one ton per minute.

The Mississippi, south of St. Louis, is so toxic that signs warn against eating food *near* the banks.

Ohio's Cuyahoga River flowed so thick with oil scum that it caught fire.

According to Gaylord Nelson: "We have in the last forty years polluted every major watershed in America east of the Mississippi to a serious degree, and every major watershed west of the Mississippi to some degree."

Here in Minnesota:

- The magnificent Lake Superior, the third greatest body of fresh water in the world, is threatened with 60,000 tons a day of taconite tailings—only a single example of our abuse of that lake;
- The Boundary Waters Canoe area—with some of the purest water and most unspoiled land in the nation—is threatened by mining interest which would cash in this irreplaceable wilderness for a possible profit in metal;
- The Mississippi, where it is not yet spoiled by chemical and organic discharge, is threatened at Monticello by thermal heat and radioactive discharge;
- Hundreds of our 14,000 lakes are threatened by eutrophication. We have already seen our precious freshwater community lakes fill up with slime and algae which feed upon the nitrates and phosphates washed in from fertilizers, detergents, and sewage. . . .

First of all, we must as a nation stand ready *now* to commit the vast resources needed to undo a history of abuse and neglect—not the vague token commitment of \$4 billion spread over the next ten years as promised by the administration.

The *New York Times* estimated the cost of cleaning all the nation's waterways at \$100 billion. Out of sight? We have already spent that much in Vietnam.

been stepped up by local, state, and federal governments and by industry in the last five years. Last year Cleveland voters approved the spending of \$100 million to improve the city's sewerage facilities.

The Federal Government recently ordered the city of Toledo, Ohio, and five steel companies in the Midwest to clean up their waste discharges in 180 days or face possible court action.

Recently the U.S. Senate voted \$1 billion to fight water pollution.

A spokesman for the Federal Water Pollution Control Administration told *Urban World*: "We expect a significant cleanup in the next five years or so.

"Of course," he added, "that depends on whether the public and private industry are willing to spend the money to get the job done."

From: *Urban World*, 1971

From: *Earth Day - The Beginning* Rantum Press,
1970 pp 44-45

People have caused it
One factory after another
Lack of fresh air
Lack of clean water
Unhealthy conditions, just like a nightmare
Too much trouble for Mother Nature
I hope we can solve this problem
Only we the people can change things
Now is the time to decide.

KILLER SMOG HITS LONDON: 1952

"Hell is a city much like London, a populous and smoky city," the 19th-century English poet Percy Bysshe Shelley once wrote.

For five days in December 1952 the people in England's largest city thought that they were indeed in hell.

A sooty, black, choking smog—smoke mixed with fog—lay just above the ground. There was darkness at noon.

Traffic on London's broad avenues came to a halt.

The smog hung so low that people walking through the darkened streets were struck by birds trying to fly low enough to avoid the choking mixture.

All outdoor sporting events were canceled.

Bodies piled up because they couldn't be buried quickly enough. Crematoriums (ovens for disposal of bodies) were kept burning day and night.

Older people were hurt first by

the smog. Many died. Later young children and people with lung and heart problems were felled by the polluted air.

All told, more than 4,500 deaths were blamed on the smog.

Meanwhile, the rest of England was enjoying bright and sunny skies.

What made this particular fog a killer—different from all the rest?

The answer to that question is fairly easy to find.

For years London, like most heavily populated industrial cities, had been pouring pollutants into the air. Smoke from factories, automobile fumes, and gases from electrical plants all were fouling the atmosphere, usually causing only a minor discomfort to Londoners.

This time the pollution combined with two layers of air to cause, as one member of the House of Commons called it, "almost... mass extermination."

A layer of cool air had been sitting over London since late November and early December of 1952. On December 4 a new layer of warm air arrived.

The warm air moved above the cool air and stopped where it was, locking in the cool air—and all of the pollutants being pushed into it.

For days the two air layers just stood still over London. Scientists call this act of nature "temperature inversion."

The pollutants being spilled into the air could not move very far upward because of the hot air sealing them in. So they stayed close to the ground—spreading death.

Eventually, offshore winds did move the warmer air out of the way, and the pollution moved up into the atmosphere and away from London.

Life went back to normal.

Since then London has not had another killer fog. But many Londoners who remember the disaster of 1952 wonder whether it will strike again, making breathing difficult and killing thousands.

Out of the Fog

For more than 600 years, Londoners alternately cursed and boasted about their famous fogs. In 1852, Charles Dickens wrote of leaden skies filled with black soot that resembled snowflakes "gone into mourning for the death of the sun." Some 60 years later, T. S. Eliot immortalized the ". . . yellow fog that rubs its back upon the windowpanes." Fog shrouded the malevolent doings of London villains from Jack the Ripper to Mr. Hyde, and was all too familiar to Sherlock Holmes, who frequently set forth from Baker Street picking his way through a real "pea-souper."

Yet today, to the dismay of moviemakers and the delight of countless

Britons, London fog has virtually vanished. Only three or four times a year does anything that can credibly be described as fog descend on the city. Even then, it is never the suffocating, smoke-laden, brown or yellow stuff that once mantled the city with dreary regularity—and sometimes lethal results. This year London skies were clear even during November, usually the foggiest month.

The fog crept to its peak in 1952, when Londoners learned a hard lesson: if there was romance and mystery in the murk, there was also death. During the Great Fog of 1952, which cloaked London for four days, some 4,000 people, most of them with respiratory ills, were killed by the polluted air; about twice that number perished later as a direct result of those four terrible days. Until then, a succession of monarchs, Prime Ministers and Parliaments had

tried in vain to ban the burning of soft coal, which was largely responsible for the pea-soupers. But the killer fog—followed by a study concluding that air pollution was costing the country about \$700 million a year in lost efficiency and cleaning bills—jolted the British into action. In 1956, a Clean Air Act aimed at industrial and domestic air polluters was pushed through Parliament. Most important, the traditional burning of soft coal in hearth grates was prohibited in large areas across Britain.

Bright Buildings. To comply with the new regulations, British industry has spent nearly a billion dollars in the past decade to clean up the emissions from its smokestacks.

London has led the way in smoke control. The 156,000 tons of sooty grime it once belched into the air annually have been cut by 80%, and about three-quarters of the city is actually smokeless. "We estimate that London now gets 50% more sunlight in the winter than before the act," says Lord Kennet. What is more, many of Britain's public buildings have been scrubbed down and look brighter than they have in decades, if not centuries.

TIME, DECEMBER 12, 1969

DIRTY AIR

The People vs. the Smog

THE SLEEPY suburb came alive all at once, and soon almost all the men were rushing out their front doors, jumping into cars, and driving off to Los Angeles for work. As Bill Taylor's wife kissed him good-bye at the door, she said, "Good-by, dear. Try not to breathe too much in the city."

The joke was a bad one today. From the moment Bill woke up and took his first breath, it hurt—even in the house that early in the morning. It hurt deep down in his chest. And now he felt suffocated among the thousands of cars that moved along bumper to bumper.

THE SMOG was soupy. Bill could make out gas stations and some houses near the freeway. He could see outlines of mountains that rose on three sides of the county, but just barely.

As Bill approached downtown Los Angeles, he was caught in the usual bottleneck. Bill thought he could see fumes from a thousand exhaust pipes forming a bluish-gray cloud—and he instinctively rolled up the window.

"A lot of good that'll do," Bill said aloud to himself. But without realizing it, he began to take short, quick breaths. He felt

as if somebody had him by the throat, and he began coughing.

"This is madness," Bill exclaimed loudly. "Why do we have to put up with this?" Bill recalled the pure, crisp air and the expansive landscape he had known as a child in the same area of California.

But after the war, industry boomed and smokestacks pumped plumes of black soot into the air. Millions of automobiles crowded onto the land, emitting tons of the colorless, invisible, and deadly gas called carbon monoxide. Pollution alerts began cautioning people with respiratory ailments to remain indoors.

By the time Bill got to the office, he had made a decision. There was talk at the office about how bad the smog was, but Bill didn't hear.

WHEN HE got home that evening, Bill told his wife that he was going to form a citizens' committee to do something about air pollution. "Be practical," she told him. "Who are you, against all those big companies?"

"It's my air, too," Bill replied. "What's more important, it's everybody's air. And that's why I can do something about it."

Could he?

From: A.E.P. Associates,
Harvard Social Studies
Project, 1967.

DIRTY AIR**The War on Smog Has Many Fronts**

THE BILL TAYLOR described on the preceding page is a fictional person. But in Los Angeles during the late 1940's there were many people like him—many Bill Taylors who formed citizens' committees to restore clean air to "Smog Town, U.S.A."

Orders To Clean Up

Los Angeles was both the first major city to alert the nation to the perils of air pollution and the first to do anything about it. In 1947, the Los Angeles County Central Board was formed and given wide powers.

Los Angeles County abolished coal burning entirely. Oil burning—which produces sulfur dioxide fumes, as does coal—was banned seven months of the year. Backyard incinerators were outlawed and municipal garbage incineration was halted. The County virtually eliminated emissions from stationary sources (chimneys, smokestacks, and open fires).

But the smog didn't go away. It got worse. The cause was millions of automobiles. It wasn't until the mid-1950's that scientists discovered that the major source of smog was automobile fumes. Research showed that one out of ten gallons of gasoline escaped into the air as waste.

Persistent Pollution

After lively battles with the automobile industry, California passed a law requiring 1966 model cars to carry fume-control devices. The devices could reduce emissions by about 30 percent.

The Federal Government followed California's example with

a federal law requiring air pollution control equipment on all cars, beginning with 1968 models.

Despite these measures, Los Angeles County today still suffers from severe air pollution, 90 percent caused by cars.

Smog is not a disease of Los Angeles alone. The United States Public Health Service reports that more than 7,000 communities across the nation are afflicted with air pollution. And, unlike Los Angeles, many of them are doing little or nothing about it.

Our Limited Air

Air pollution has crept up on the nation, just as water pollution did. People still think of air—as they once did of land, forests, and water—as an unlimited resource. But air is surprisingly limited. The air around the Earth extends upward only about 12 miles before it becomes thin and useless. The air we can breathe extends upward only a few thousand feet.

Into this precious air America today pumps millions of tons of gaseous wastes. The 6 million residents of Los Angeles County alone average more than 9,000 metric tons per day of air pollution. Some scientists believe that the atmosphere is the principal dumping ground for human wastes.

The atmospheric burden is growing by the day because of the steady increase in population, automobiles, and industry. Many of the comforts of modern life are sustained by burning of some kind—gasoline in cars, coal and oil in factories that produce luxury goods, and more power plants to make more electricity for com-

fortable living. Waste from burning is the basic cause of smog.

The cost of the "good life" is murky skies over many big cities, as well as many smaller communities. Bad air was once the burden of only a few poor people who lived on "the wrong side of the tracks"—so named because the section was downwind of the coal-burning locomotives whose cinders and smoke were unpleasant. But today dirty air plagues rich and poor alike.

Rotting Clothes

In many areas of the United States dirty air soils and even rots clothes. Housewives find they must wash clothes and clean the house more than usual. Dirty air discolors houses, corrodes metals, and mars public buildings.

In every urban area, pollution has reduced vegetation of all kinds. For example, inspect the shrubs and trees continually blasted by exhaust fumes at bus stops and you may discover that they are dead or dying. The costs in wasted fuel and property damage are estimated to be as high as \$11 billion a year.

"There is no doubt," John Gardner, former Secretary of Health, Education, and Welfare, once said, "that air pollution is a contributing factor to the rising incidence of chronic respiratory diseases—lung cancer, emphysema, bronchitis, and asthma."

Dirty air also kills. In 1948, the first health disaster resulting from polluted air hit the town of Donora, Pennsylvania. Four days of smog made 43 percent of the population sick and caused the death of 20 persons.

Fifteen days of heavy smog killed 400 people in New York City in 1963. In November of 1966 a mass of heavily polluted air trapped 16 million people of Greater New York in a huge poisonous balloon. An estimated 80 persons died, but thousands of others spent their Thanksgiving holidays in fear and pain.

Federal Action

The Federal Government has acted on air pollution. The Fed-

DIRTY AIR THE WAR ON SMOG HAS MANY FRONTS

eral Clean Air Act of 1963 provided funds for local programs and for research into scientific air pollution control.

The Air Quality Act of 1967 greatly expanded the federal effort against air pollution. It set aside \$400 million for clean air over a three-year period. However, the Act did not set up standards. That was left to the states.

The states have acted slowly. Few of them are as concerned with air pollution as is California. A recent nationwide survey found that eight out of ten persons did not consider air pollution a community problem.

Because of citizen apathy, state politicians feel little pressure to act on air pollution. They are thus free to find dozens of more popular ways to spend money.

One air pollution control official from a large city in the Middle West spoke bluntly: "The truth is that the critical ingredient in smog

simply is politics.... We know how to cure smog. It's not unduly difficult or expensive. The problem is getting the people in the community to support a clean-up program."

Strangled on Wastes?

Conservationists would like to see more angry people such as Bill Taylor. They would like to see more citizens' committees for clean air. They fear that unless this happens, America will someday be strangled in her own wastes. The smog grows thicker every day.

Former Secretary of Health, Education, and Welfare John Gardner has posed the alternatives: "Our choices are narrow. We can remain indoors and live like moles for an unspecified number of days each year. We can issue gas masks to a large segment of the population. Or we can live in domed cities. Or we can take action to stop fouling the air we breathe."

For Thought and Discussion

1. CONSIDER THE following argument: "Why doesn't the Government take steps to replace private cars in the big cities with mass public transportation, or develop electric or steam-powered vehicles? And why doesn't the Government pass a pollution tax on industrial and municipal polluters, or give them tax incentives for cutting pollution?"

"Part of it is apathy. Part of it is that the Government is influenced by lobbyists for the auto industry, highway and trucking firms, and other special-interest groups. The real cause of air pol-

lution is politics, but the culprit is the Government, not the people."

Do you agree with this view of the problem? Why or why not?

2. HISTORICAL RELEVANCE:

Try to imagine how a pioneer trapper or lumberman might have reacted to the suggestion that someday forest animals, trees, and minerals would be scarce. Now, on the basis of what you have read, how do you think the average American reacts today to talk that the air he breathes is scarce? Do you think the two reactions would be similar? Why or why not?

From: A.E.P. Associates
Harvard Social Studies
Project, 1967.

The following reading on Land Pollution was taken from Time Magazine, February 2, 1970.

"Man's inadvertence has even upset the interior conditions of the earth's crust. One of the most respected U. S. geophysicists, Gordon J. F. MacDonald, reports that wherever huge dams are built, the earth starts shuddering. The enormous weight of the water in the reservoirs behind the dam puts a new stress on the subsurface strata, which are already in natural stress. In consequence, giant sections of the earth's crust sheer past one another and the earth quivers. MacDonald warns that earthquakes may result (and did near Denver) from one of the newest anti-pollution techniques: injecting liquid chemical wastes into deep wells.

If technology got man into this mess, surely technology can get him out of it again. Not necessarily, some people say. Problems are solved but as we solve them we may find that our only remedies will create more of the same problems.

One example is the mighty Aswan High Dam project, built on the Upper Nile River with Soviet aid. When an international team of ecologists studied the effects of the dam, they were shocked. For one thing, waterweeds are clogging the shoreline of Lake Nasser behind the dam. The weeds may well speed evaporation through transpiration to the point where the lake lacks enough water to drive the gigantic generators.

UNEXPECTED SIDE EFFECTS

The dam has also stopped the flow of silt down the Nile, which in the past offset the natural erosion of the land from the Nile delta. As a result, downstream erosion may wash away as much productive farm land as is opened up by new irrigation systems around Lake Nasser. Without the nutrient-rich silt reaching the Mediterranean, the Egyptian sardine catch declined from 18,000 tons in 1965 to 500 tons in 1968. As a final penalty, irrigation projects on the delta plain have allowed a moisture-loving snail to thrive. Since it carries schistosomiasis, most of the delta people have had that agonizing liver and intestinal disease."

NOISE POLLUTION

The following reading was taken from St. Louis Post-Dispatch, October 4, 1970.
Reporter, E. F. Porter, Jr.

NOISE IN URBAN LIFE: THE DEAFENING DIN

"Noise is America's fastest growing pollutant. The average level of sound assailing the ears of the urban dweller has doubled in the last 15 years. Not smog nor sewage nor solid waste can make that claim.

If noise continues to increase at its current rate, hearing may be a lost talent in the year 2000--a special, exotic gift possessed only by the very young and members of primitive tribes. The cacophony of civilization, the roar of traffic, the hum of household appliances, the shriek of jet aircraft, the clatter of machinery and the acid squeal of hard rock music conspire in a mounting tumult that experts warn has reached critical proportions.

The United States Public Health Service estimates that 6,500,000 Americans suffer some degree of impaired hearing. Deafness, full or partial, costs American taxpayers \$8,000,000 a year in disability compensation payments.

Residents of some areas, especially those adjacent to highways and airports, experience a level of general outdoor noise already higher than the legal limit imposed for the safety of workmen in industrial plants with government contracts.

Not only is noise driving us deaf, it may also be driving us insane.

A two-year study of persons living near London's Heathrow airport disclosed an incidence of mental illness significantly higher than that of the rest of the population. Laboratory rats subjected to high sound levels develop high adrenalin levels and other hormonal imbalances."

NAME: _____

WATER POLLUTION

1. Describe the Cuyahoga River before it became polluted.
2. Describe the Cuyahoga today and why it is polluted so badly.
3. If you were a leading politician in Cleveland, what would you recommend in regard to the Cuyahoga?
4. Where is Lake Erie and why is it so badly polluted?
5. What does McCall's magazine have to say about drinking water in the U.S.?
6. Trace the history of the gradual decay of the nation's lakes, rivers and streams.
7. Would you drink water from Lake Erie? What city does? What substance is added to water to purify it? How can this substance be harmful?
8. What dangers threaten Minnesota lakes and streams according to Senator Mondale?
9. What does Senator Mondale say about the water of the Mississippi River just south of St. Louis?
10. How much will it cost approximately to clean up the nation's waterways? Is it out of sight?

NAME: _____

AIR POLLUTION (industrial)

1. What factor contributed to pollution of the air in London and in other cities?
2. Describe temperature inversion as it happened in London in 1952.
3. What groups of people were hurt most by the killer smog in London?
4. How did the old horror and detective movies picture London?
What did Dickens say about London?
5. What did London do to eliminate much of the pollution of the air and to clean up the buildings in the city?
6. According to the article, "The People vs. the Smog", what was the reason for the sudden pollution of the air in California?
7. What did Los Angeles County government do to try and stop pollution of the air?
Did it stop the smog? Why or why not?
8. Is the air surrounding the earth's surface an unlimited resource? Why or why not?

NAME: _____

AIR POLLUTION (industrial)

9. What effect does dirty air have on homes and buildings?

10. What effect does dirty air have on vegetation?

11. What effect does dirty air have on the health of human beings? It is especially harmful to people with what diseases?

12. The government has passed legislation to fight pollution but it is not enough. We need more legislation passed and more participation by every citizen in this country. What is the biggest problem or obstacle in fighting pollution in this country according to the statement on the last page of The Reading On Air Pollution.

13. John Gardner has stated four alternatives to the air pollution problem. What are they?
 - 1.

 - 2.

 - 3.

 - 4.

NAME: _____

LAND POLLUTION

1. What is a possible consequence of man's interference with the earth's surface and under the surface?

2. What were the negative effects of the dam built in Egypt?
 - 1.

 - 2.

 - 3.

 - 4.

NOISE POLLUTION

1. What are some of the sources of noise pollution according to the article?

2. What are two consequences of noise pollution?

NAME _____

POLLUTION - WEATHER STUDY

NOTE to STUDENT:

POLLUTION LEVELS

HIGH

MODERATE

LOW

WEATHER FACTORS

SKY CONDITIONS - SUNNY, PARTLY SUNNY, CLOUDY, HAZE.

TEMPERATURE - DEGREES FAHRENHEIT

PRECIPITATION - RAIN, HAIL, SLEET, SNOW

WIND SPEED - MILES PER HOUR

WIND DIRECTION - NORTH (N), NORTHWEST (NW.), etc.

DATE	POLLUTION	WEATHER FACTORS
		SKY CONDITION _____ TEMPERATURE _____ PRECIPITATION _____ WIND SPEED _____ WIND DIRECTION _____
		SKY CONDITION _____ TEMPERATURE _____ PRECIPITATION _____ WIND SPEED _____ WIND DIRECTION _____
		SKY CONDITION _____ TEMPERATURE _____ PRECIPITATION _____ WIND SPEED _____ WIND DIRECTION _____
		SKY CONDITION _____ TEMPERATURE _____ PRECIPITATION _____ WIND SPEED _____ WIND DIRECTION _____

NAME: _____

ASSIGNMENT: From your observation point on the riverfront describe below in the appropriate place in your own words industrial air, water, noise, and land pollution on both sides of the river.

MISSOURI

ILLINOIS

<p>AIR (color of smoke, etc. Can you identify sulfur dioxide in air?)</p>		
<p>WATER (Mississippi River).</p>		<p>169</p>
<p>NOISE</p>		
<p>LAND (Trash, erosion, ugliness, etc.)</p>		

You will probably notice more industrial air pollution on the east side. What reasons can you give to explain why this is so? (Place your answer for this question on the back.)

ACTIVITIES AND EXPERIMENTS IN AIR POLLUTION

A. SIMPLE EXPERIMENTS

1. Take a series of pictures or slides of air pollution sources in your community.
2. Place a clean cloth over the intake of a vacuum pump or over the hose of a vacuum cleaner. Draw air through the cloth for several minutes. What is observed?
3. Place a few drops of concentrated hydrochloric acid in a small dish. Close by, place a dish containing a few drops of concentrated ammonia. DO NOT MIX THESE CHEMICALS!!!! The gaseous vapors of these two substances will react to form a cloud of white solid ammonium chloride.
4. Smog can be produced by the condensation of water vapors (or other vapors) on solid particles like smoke. Insert a lighted match in a gallon jug to make a small amount of smoke. Blow, with your mouth pressing firmly on the mouth of the jug and release the compressed air quickly. A smog should form in the jug. Try this blowing activity without the smoke from the match. What happens?
5. If a microscope and a Brownian movement apparatus are available, observe cigarette smoke. This demonstrates that tobacco smoke is made up of solid particles. The smoke particles are small enough to be kept suspended in the air indefinitely and are in a constant state of vibration due to the bombardment of air molecules.
6. Remove the rubber bulb from a medicine dropper. Insert a small wad of cotton in the glass tube and replace the bulb. Insert the end of the dropper in a lighted cigarette. Squeeze the bulb a few times to draw the smoke through the cotton. What happens? What conclusions might be drawn as to the nature of tobacco smoke? While tobacco smoke is usually not produced in large enough quantities to constitute an air pollution problem out of doors, indoors it may be another matter to contend with. Compare the probable reactions of a heavy smoker with those of a non-smoker living through an experience such as occurred in Donora, Pennsylvania.
7. Place a clean cold dish in a candle flame. Soot formed is a result of incomplete combustion of the candle fuel. Heating this soot in a hot Bunsen flame causes it to disappear. Why? What ideas for one kind of pollution control might be suggested by this demonstration?

8. Procure a large strip of white felt or cotton batting (or use milk pads). Tack to a board, cover with 5 sections, and remove a section daily to uncover felt for observation. Note and compare build up of impurities over five day period. A magnifying glass may help to determine the density of the polluting elements by observing the five sections.

9. After a snowstorm (if they ever have one of those things in Missouri), collect one quart of snow and, after allowing it to melt, filter it through fine mesh cloth. Do this on several days if possible. Compare the accumulation of pollutants.

STUDENT DATA SHEET

1. Complete the maze.
2. Identify several positive methods people can use to help solve pollution problems.

3. Identify the "Dead End" results of man's actions creating pollution.

4. Be prepared to discuss the positive methods you believe are being used today and those being neglected.

Solve the Pollution Maze

The maze contains the following elements:

- POPULATION EXPLOSION**: A large crowd of people.
- DUST EFFECT... ICE AGE**: A city skyline with falling dust.
- CO₂ EFFECT... ICECAPS MELT**: Buildings and a melting ice cap.
- PESTICIDE POISONING**: A skull and crossbones over a car.
- AUTOMOBILE EXHAUSTS**: A car with exhaust coming out.
- AUTOMOBILE EXHAUST-FILTERS**: A car with a filter on its exhaust pipe.
- PRESERVATION OF WILDERNESS**: A landscape with mountains and trees.
- NUCLEAR CONTAMINATION**: A radiation symbol.
- CLEAN WATER**: A person drinking from a water tap.
- DETERGENTS**: A person washing dishes with bubbles.
- CROP ROTATION**: A field with different crops.
- A CLEAN EARTH**: A sun, a tree, and a leaf.
- MISUSE OF CROPLAND**: A landscape with a large sun or moon.
- RIVER & LAKE POLLUTION**: A polluted body of water with a dead animal.
- REGULATION OF INDUSTRIAL POLLUTION**: A factory with smokestacks.
- THERMAL POLLUTION**: A bird in a cloud of steam.
- CONCERNED-CITIZENS' GROUPS**: A group of people talking.
- EXTINCTION OF SPECIES**: A tombstone for a tiger.
- SOIL EROSION**: A river cutting through a landscape.
- PROTECTION OF THREATENED SPECIES**: A person holding a tiger.
- SOLID WASTE AND LITTER**: A pile of trash.
- OVERDEVELOPMENT**: A shopping center with many stores.
- REDUCTION OF NOISE TO SAFE LEVELS**: A person with a sound meter.
- CONTROLLED USE OF NATURAL RESOURCES**: A large tree and two people.
- LOW CARBON**: A car with a leaf on it.
- SULFUR DIOXIDE**: A factory with smoke.

TO THE STUDENT - Use this data sheet as a guide for information that you will need when reporting back to the class. REMEMBER you are trying to determine how community growth places a strain on such community facilities as sewage disposal operations. You are to be especially concerned about the problems industries create for these facilities.

1. Original capacity of the operation - _____
2. How many years do they estimate it will take before the plant has to be enlarged? _____
3. What alternative plans, if any, exist for enlarging the operation?
What is the cost estimate?

ALTERNATIVE PLANS

COST ESTIMATE

4. How many people are employed at this plant operation?
5. Indicate levels of training required for several of these jobs.

6. What happens to the end product? (i.e. how pure is the water when it is returned to the earth and how is the residue disposed of)

7. Ask the guide if he can point out any sewage problems specifically related to industries that use the plant?

1. _____
2. _____
3. _____

8. Make suggestions of your own for solving the above problems.

1. _____

2. _____

3. _____

9. In your opinion, is this a satisfactory system for your community or do you think major improvements need to be made in processing the sewage? EXPLAIN

NAME: _____

INDUSTRY: _____

TYPE OF WASTE	HOW WASTE IS DISPOSED OF	DOES IT CREATE PROBLEMS FOR THE WASTE DISPOSAL FACILITIES OF THE LOCAL COMMUNITY? IF SO, HOW?
Example { detergents }	Dumped into nearby lake.	Yes. Detergents are dumped into lake in large quantities which provides food for algae and consequently leads to uncontrollable growth of algae.

NAME _____

Form #32 A

STUDENT READING GUIDE
OUR POLLUTED WORLD pp 37-42

1. List 6 ways in which we come into contact with radiation.

2. Name 3 ways in which radioactive waste is being accumulated.

3. Indicate where we dispose of this waste.

4. The first problem to be solved in disposal of these materials is better.

5. Name one other problem in moving toward the use of nuclear materials to produce electricity for the future.

ENERGY AND ECONOMIC GROWTH pp 13-14

1. By the year 2000, how large will the population be according to the wall chart?

2. How much additional energy will probably be needed by the year 2000?

3. GNP means the amount of goods we produce in the United States every year. If our standard of living is to continue to improve then we must continue to produce more goods.
What will we need most in order to continue producing more goods for more people?

4. What are radioactive materials especially needed for in the future?

NAME _____

Form #33

INDUSTRIES MAY CREATE TRAFFIC PROBLEMS

DATE _____

FROM _____

TIME:

TO _____

LOCATION _____

A	CLASS B	C	INDUSTRIAL USE

TOTALS
179

NAME _____

Form #34

INDUSTRIES MAY CREATE TRAFFIC PROBLEMS

ASSIGNMENT: Observe a specific intersection during a busy time and complete the following items relating to that intersection.

1. Intersection (location)

2. Problems of intersection (created by nearby industry or contributed to that industry.)

3. Solutions (that have been accomplished for some of the problems.)

4. Possible solutions to existing problems. (Your own solutions.)

5. Possible problems of the future.

INDUSTRIES MAY CREATE TRAFFIC PROBLEMS

To the student - Choose a specific industry to carry out this activity.

Name of industry: _____

Location of the industry: _____

Give name or names of major highways that are near the industry.

Approximate time you visited the parking lot. _____

Number of cars counted. _____

List traffic problems you believe might exist at the time the people arrive at work and leave at the end of their workday.

- 1. _____
- 2. _____
- 3. _____

List interstate highways that are near the industry.

List roads that are near the industry. (Examples are Baxter, Woods Mill Fee Fee, Ross, McKelvey, Ladue, Olive, Clayton, Manchester)

List minor streets that intersect with the roads you listed.

List facilities you observed at the industrial site that are meant to help solve the traffic problem. (example - someone employed by the industry to help direct traffic)

Are there other facilities nearby that have been expanded in order to help handle the problem? (example clover leaf access)

Suggest at least 2 solutions that would further help solve traffic problems created by industrial sites.

1. _____

2. _____

3. _____

BEST COPY AVAILABLE

Form 35

Seattle Under Siege:

The Troubles of a
Company Town

the end of 1971 it will probably sink to 32,500. It could go as low as 25,000 if the U.S. Senate goes through with its threat to cut off funds for Boeing's SST development program, a project that still employs 4,800 workers. The company has already sold one plant, closed another, auctioned off surplus equipment and furniture, consolidated assembly lines, cut its 747 jumbo-jet production from 7½ a month to 5.

The Boeing cuts have given Seattle unemployment a rather unique texture: a large pool of highly skilled technicians, many of whom have never been out of work before, and for whom prospects elsewhere are hardly encouraging. Cal Lowe, 45, a former flight test engineer, has been luckier than many of his colleagues: from Thanksgiving to Christmas Eve he played Santa Claus at a downtown department store. He and another former engineer were picked out of ten men who applied. Despite the fact that the *Seattle Times* printed ten times more help-wanted classified than situations-wanted last month, good jobs are hard to come by. Most of the ads offer either overseas work, low-paying jobs or commission deals.

Whenever something acceptable opens up, the lines are long: 280 men recently took examinations for 20 police vacancies. Sometimes the Boeing label can actually hinder. "Saying that you've been in aerospace around here is like having a wart on your nose," says Lowe. To counter that, some 100 unemployed have come together in a group called Talent Plus Inc., with the aim of finding new jobs partly by helping each other to write résumés that stress as much nonaerospace background as possible. A few jobs have opened up.

For most others it is the weekly trip to the Unemployment Compensation Services office on Taylor Avenue North, where the queues form well before 8 a.m. in the early-morning gloom. Business has been so heavy that the agency had to take more office space earlier this month. In the beginning of the crisis, many people who had lost employment moved away: the demand for U-Haul trailers was so great in May and June that rental agencies ran out of equipment. But thousands are still hanging on, unwilling to give up life near Puget Sound and the now snow-covered Cascades. For all its woes, Seattle remains one of the most attractive urban areas in the nation.

The downturn in the economy, accentuated by a sagging forest-products industry and a steady net decline in secondary employment, has caused fallout virtually everywhere, from city finances to car sales to housing. As early as last summer, Wes Uhlman, 35, the personable mayor of Seattle, decreed a 5% expenditure cut for the second half of the year in an already conservative budget. A selective city job freeze went into effect, and summer park programs

closed a week early. There is virtually no growth in city tax revenue now, resulting in the stagnant economy. Uhlman has already weathered a frightening bombing spree and a police scandal last year, and he says: "There are days when I wonder why I couldn't have picked another time to become mayor."

The budget squeeze also troubles the schools. For every child in the free-lunch program in 1969, there are now more than 50, and Superintendent Forbes Bottomly is deeply worried that a special school levy in March might not be passed by the voters. If it is not, a \$98 million school budget will have to be cut by \$20 million the first year, another \$20 million the second.

Automobile sales and housing are in bitter straits. "We are losing our shirts," laments the manager of one large car dealership. Auto sales are off by anywhere from 30% to 50%, and more than a dozen dealerships have gone under in recent months. Where one agency had ordered 400 new cars by this time in 1969, it now orders 115. A newspaper campaign comes complete with 400 discount coupons for a new car. It brings a limp reply. A brand-new 1970 Barracuda, which would normally sell for \$3,000, goes on special sale at a mere \$1,495—and draws no takers. Housing is not much better off. Apartments stand vacant everywhere; in some suburbs the vacancy rate reaches 40%. Many landlords have cut rents by as much as a quarter; others are offering such incentives as a free month's rent on a one-year lease, or the use of a color TV, a stereo or free cable TV.

When will it all bottom out? Probably not very soon. Says William P. Jeake, chief economist for Pacific Northwest Bell: "The real day of reckoning is still before us—and the community is not prepared for it." It may very well be, as some Seattle-ites claim, that the 89% of the people who are working are making more money than ever before. But somehow—perhaps because they are afraid—it seems that they are not spending as much as they might. What is more, in the next two months another 10,000 people are expected to join the unemployment rolls, and thousands of others will run out of their 39-week unemployment benefits. The Washington State legislature will probably extend benefits, but that will not go to the root of the problem. Already, a church-sponsored volunteer organization called Neighbors in Need is distributing free food, as is a small commune of the left-wing Seattle Liberation Front. Says Mayor Uhlman: "There is a lot of tragedy all around. The only hope we have lies in our people. They are rugged and resourceful, and eventually we will perhaps come out all the stronger for this."

From: Time Magazine;
January 4, 1971; pp 28-29.

In this bitter winter of high national unemployment, Seattle has the unhappy distinction of leading America's major metropolitan centers with a staggering unemployment rate of 10.9%—almost double the national rate of 5.8%. Seattle's troubles largely have their origin in the troubles of the Boeing Co., which at its peak employed 1 out of 12 people in the Seattle area. But the effects ripple out to touch nearly everyone, as TIME Correspondent Karsten Prager reports:

THE façade is deceptive: busy, brightly decorated city streets, department stores full of holiday shoppers, the freeway humming with traffic. The Seattle SuperSonics are drawing sizable crowds at the Seattle Center Coliseum in the shadow of the Space Needle; their record is so-so, but they are making money and their attendance is fourth in the N.B.A. *M*A*S*H*, now in its eighth month at the downtown Coliseum Theater, is still pulling them in at \$2.50 per seat. All over town, station KIRO-TV's billboards ask, HAVE YOU HEARD A GOOD ONE LATELY?—part of a good-news campaign that has triggered hundreds of calls since its inception last May.

But good news is the individual incident, not the general reality in Seattle. Under the veneer, it is a troubled, uncertain city, its crisis real. It is a town that has had its downs before, but never quite to this degree: cut of an area population estimated at 1,400,000, more than 71,500 are out of work; 16,000 are on county welfare rolls; 2,000 on food stamps. In little more than two years, Boeing employment has plummeted from 101,500 to 46,800. By

NAME: _____

ASSIGNMENT: Students will read the excerpt from Time Magazine (January 4, 1971), "Seattle Under Siege: The Troubles of a Company Town." Answer the following questions based on the article and be prepared for discussion on the topic:

1. What type of industry is the Boeing Company?

2. How important was the Boeing Company to Seattle in terms of employment?

3. Boeing Company ran into hard times after a peak year in 1968. What effect did the hard times have on the Boeing Company?

4. Discuss the problems of unemployment for the average former Boeing engineer.

5. When a nuclear bomb hits ground zero (target) it virtually destroys the area immediately surrounding ground zero. However, fallout from the blast can severely damage and even destroy areas some distance away from the blast. In the same way, unemployment, due to Boeing's decline, caused fallout in Seattle's total economy. Discuss some of those "fallout" problems in Seattle in a few short paragraphs.

NAME: _____

McDonnell-Douglas Corporation of St. Louis is a large aircraft and aerospace industry like Boeing. Although McDonnell doesn't dominate St. Louis as Boeing did Seattle, it remains as St. Louis' largest individual employer.

In reference to Seattle's experience, complete the vertical continuum below on what would happen in the Parkway area if McDonnell-Douglas went out of business. Be prepared to discuss.

POSSIBLE LASTING EFFECTS



MOST IMMEDIATE EFFECTS