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P.O. Box 865
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POLLUTION CONTROL
POLLUTION TWO

A162

APPLE (64K) C2031A

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DISKETTE CARE AND HANDLING INFORMATION



Protect Proteger
Protéger Schützen
保護



No No
Non Falsch
注意



Insert Carefully Insertar
Insérer avec soin Sorgfältig Einsetzen
插入注意



Never Nunca
Jamais Nie
絶対禁止



10°C-52°C
50°F-125°F



Never Nunca
Jamais Nie
絶対禁止



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POLLUTION CONTROL
POLLUTION ONE

A161

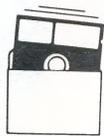
APPLE (64K) C2031A

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 50°F - 125°F



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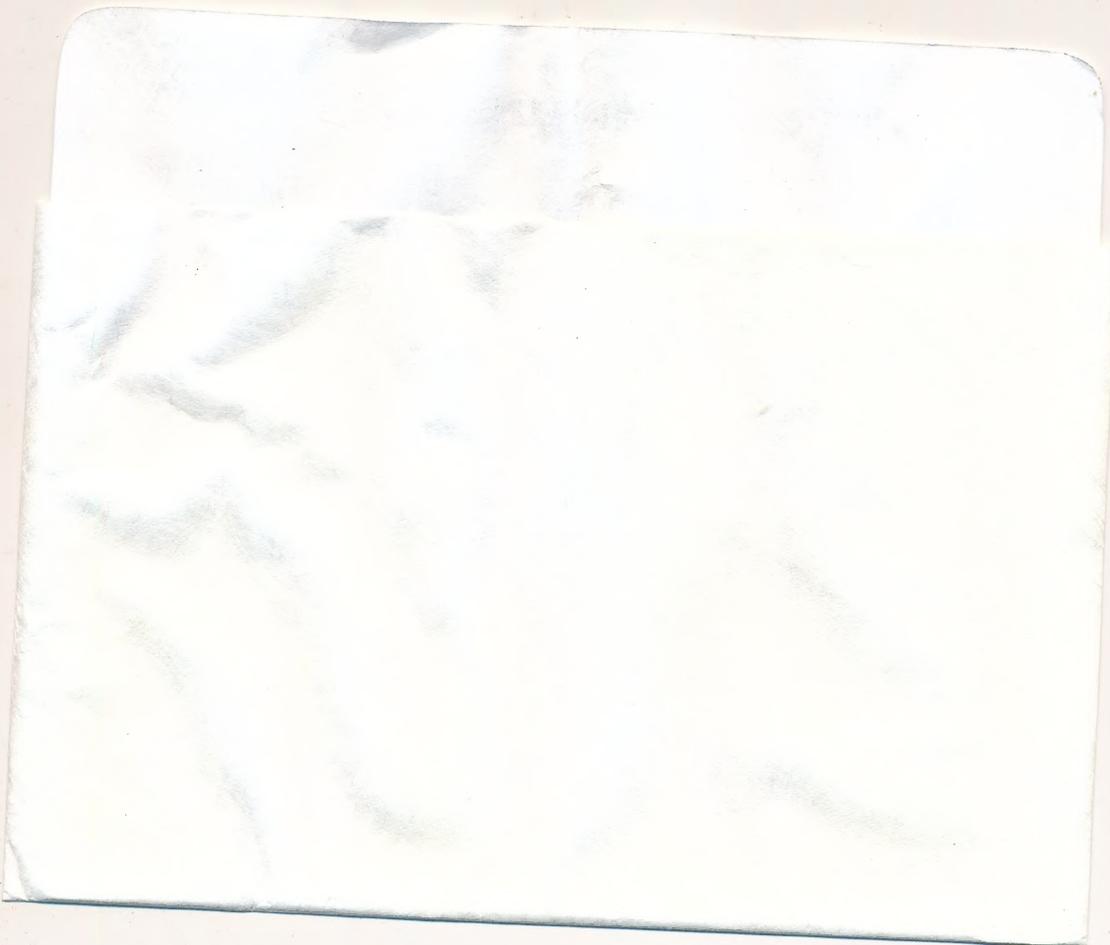
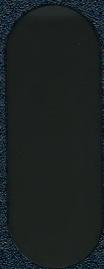
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POLLUTION CONTROL
POLLUTION MASTER

A160

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DISKETTE CARE AND HANDLING INFORMATION



Protect Proteger
 Protéger Schützen
 保護



No No
 Non Falsch
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Insert Carefully Insertar
 Inserer avec soin Sorgfältig Einsetzen
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 Jamais Nie
 絶対禁止



10°C–52°C
 50°F–125°F



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Notes and Tips for Using Focus Media Software Titles

Apple II Computers

Starting Up Apple II Programs

1. With the computer off, insert the disk into the disk drive and close the disk drive door. If there are two drives, use drive 1.
2. Turn on the computer.
3. After the program starts up, follow the instructions on the screen to proceed.

Using Apple 3.5 Inch Disks

When using our 3.5 inch disks, you may occasionally encounter a disk-turn message. A disk-turn message tells you to remove from the disk drive the disk currently in use, turn it over, and replace it in the drive. If do you encounter this message while using a 3.5 inch disk, simply replace the current disk with its side counterpart. For example, if you encounter such a message and the 3.5 inch disk currently in the drive is marked "Side A," you should replace it with the 3.5 inch disk marked "Side B." Conversely, if "Side B" is the current disk, then you should replace it with "Side A." You may also see similar messages using "Side 1" and "Side 2."

MS-DOS Compatible Computers

Please Note: You should use MS-DOS version 2.1 or later—version 3.0 or later for *The Young Learners System* and version 3.1 or later for *Step Write Up!* and *The Physical Science Laboratory*.

Starting Up with Floppy Drives

1. With the computer off, insert a copy of MS-DOS and close the disk drive door. If there are two drives, use drive A.
2. Turn on the computer.
3. When you see "Enter new date:" press the ENTER key.
4. When you see "Enter new time:" press the ENTER key.
5. When you see the "A>" prompt remove the MS-DOS disk and replace it with the Focus Media program disk.
6. Turn to the "Program Description" section in your Teacher's Lesson Planner. If there are instructions with respect to starting the program you should follow them.
7. If there are no instructions in the Teacher's Lesson Planner for starting up the program, type AUTOEXEC at the "A>" prompt; then press the ENTER key. For *Waggs and His Friends*, *Cleo, the Magic Dragon* and *Science Project Mysteries*, type either WAGGS, CLEO, or MYST respectively instead of AUTOEXEC at the "A>" prompt.

Starting Up with Hard Drives

1. Turn on the computer.
2. When you see "Enter new date:" press the ENTER key.
3. When you see "Enter new time:" press the ENTER key.
4. When you see the "C>" prompt type "A:" and press the ENTER key. Place the Focus Media program disk in drive A.
5. Turn to the "Program Description" section in your Teacher's Lesson Planner. If there are instructions with respect to starting the program you should follow them.
6. If there are no instructions in the Teacher's Lesson Planner for starting up the program, type AUTOEXEC at the "A>" prompt; then press the ENTER key. For *Waggs and His Friends*, *Cleo, the Magic Dragon* and *Science Project Mysteries*, type either WAGGS, CLEO, or MYST respectively instead of AUTOEXEC at the "A>" prompt.

POLLUTION CONTROL

Teacher's Lesson Planner



FOCUS
FOCUS MEDIA INCORPORATED



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Focus Media warrants all disks to be free of defects for a period of one full year from date of purchase. After that period, disks may be replaced at a charge of \$10 per program. Please note that Focus Media disks are copy protected, and therefore cannot be duplicated.

Pollution Control

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Student Workbook

Introduction
Common Questions
Student Worksheet
Glossary
Test

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Introduction

Welcome to *Pollution Control*, a motivating simulation that will give your students an appreciation of the effects of pollution and an understanding of the responsibility that each individual has toward our environment.

The program is geared towards social studies and environmental science classes in grades 7-9 with a readability rating of 7-8. A glossary is provided to assist younger students.

The *Pollution Control* simulation focuses on Misery, a port city suffering from air, water, and land pollution. Concern about these problems has led Misery's mayor to form a group he calls the "Pollution Patrol." He has hired the player to lead that group and to coordinate a clean-up of the city.

First, the student must identify the sources of pollution and understand how they affect the environment. Then he/she must propose solutions that will reduce or eliminate the pollution without spending all Misery's money or eliminating too many jobs.

Pollution Control realistically simulates the problems of environmental pollution. Students will learn through experience that it is necessary to approach the pollution problem holistically, understanding how pollution control methods can affect all aspects of the environment.

Pollution Control is designed in such a way that it can be used by individual students, as well as in a lab setting. Users will find it easy to proceed through the program by selecting choices from a menu or by typing simple verb-noun commands. Background information is available on-screen and a save feature allows students to stop the simulation at any time and resume play at a later date. Special teacher utilities that allow students' progress to be analyzed are also included.

Educational Objectives

This program deals with the causes, nature, effects, and methods of controlling air, water, and land pollution, and provides a stimulating, thought provoking experience for students. Students must make informed and thoughtful decisions in order to complete the simulation. They must be able to define and implement a strategy to clean up Misery's pollution.

Decision-making and strategy formation and implementation play major roles throughout the simulation. Social skills are enhanced by group decision-making and strategy planning. Students develop their research skills while seeking solutions in the reference material and in other sources.

Information is presented in the following ways:

- Through the simulation of Misery's pollution problems, the student will learn about the realities of pollution control.
- In reading the handouts and answering test questions, students will learn about the causes, nature, and effects of acid rain, the greenhouse effect, and other specific manifestations of pollution.
- In viewing the graphics, the student will gain a visual appreciation of the effects of pollution.

Cognitive Objectives

Upon completion of the simulation, the students will be able to:

- describe the causes and nature of land, air, and water pollution,
- describe how land, air, and water pollution interact,
- describe the impact of land, air, and water pollution upon the environment as well as animal and plant life,
- discuss the issues which must be taken into consideration when devising pollution control methods,

Pollution Control

- identify the strategies used in pollution control and how these strategies affect all aspects of the environment,
- discuss the environmental consequences of neglecting the pollution problem.

Skill Objectives

The student will also develop the following skills as a result of using this simulation:

- decision-making skills
 - searching for alternatives
 - weighing alternatives
 - evaluating decisions
- social skills
 - contributing to group problem-solving
 - expressing ideas
 - listening to others
 - defending a point of view
 - accepting the opinions of others
 - reaching a consensus
 - cooperating
- research skills
 - searching for information
 - categorizing information
 - record keeping
- strategy formation and implementation
 - defining possible strategies
 - testing strategies
 - examining alternate strategies
 - planning a course of action
 - following a course of action

Program Description

The Apple version of this program contains three disks: Pollution Master, Pollution One, and Pollution Two. These will operate on the Apple II+, IIe, IIc, and IIGS with 64K or more of RAM and one disk drive. The boot (start up) disk is called Pollution Master. Place it in drive one and boot the program by turning on the computer or by pressing the appropriate keys.

MS-DOS versions of Pollution Control will run on any PC (including IBM PC's and the Tandy 1000) with at least 256K RAM and one drive. The PC must be

equipped with a Color Graphics Adapter (CGA) or equivalent. The PC versions of this program will contain only two disks. Pollution One and Pollution Two have been combined onto one disk. Boot the program by loading DOS 2.0 (or higher), then insert Pollution Master and type "Pol."

You will need to provide each student with his/her own copies of Pollution One and Pollution Two [Pollution One on IBM/Tandy]. This can be done very quickly using the "Copy Disks" option described on page 9.

Teacher Menu



When the simulation is loaded, a title screen and Teacher Menu will appear as shown above. To begin the simulation, press RETURN. The computer will instruct you to remove the Pollution Master disk and insert Pollution One.

The introduction screen, which describes the problems in Misery, will appear. When you are ready, press the space bar to proceed to the simulation.

If you have used the program before and have saved a session, the computer will either 1) automatically load that saved session or 2) will ask which session you'd like to restore if you've saved more than one. This will depend on how the options have been set. See "Autorestore Last Session" and "Query on Autorestore" on page 8. If you have not saved a session, you will proceed directly to the simulation.

While using *Pollution Control* you will be asked to use menus, respond to instructions, and exchange disks. You will have more success using the program if you have a complete understanding of these three functions.

Menus

Throughout the program you will want to take advantage of the Command Menu (shown on page 4). This can be accessed from the main simulation screen at any time by pressing the ESCAPE key. The Command Menu consists of the Actions, Info, Report, Quiz, and Quit commands.

To select a command, simply use the space bar or arrows to move the highlight to the desired command. For example, to select Reference from the Info submenu, first select Info by moving the highlight to Info and pressing RETURN. The Info submenu will appear in the top left corner of the screen. Now move the highlight to Reference and press RETURN.

If at any time you wish to escape from a menu or operation, press the ESCAPE key.

Instructions

While using *Pollution Control* you will often see instructions at the bottom of the screen. They will usually inform you of the different command options you have (i.e. RETURN to continue, ESCAPE quits, etc.) or reasons why the computer does not understand your command. You may be asked to press a key or insert a certain disk. Follow these instructions carefully and the program will progress smoothly.

Exchanging Disks

After choosing "Simulation" from the master disk, you will have to replace Pollution Master with Pollution One.

Apple: If you are using a computer with two disk drives, replace Pollution Master with Pollution One in drive one and insert Pollution Two in the second drive. Simply exchange the two disks, then press RETURN. If you are using a computer with one disk drive, replace Pollution Master with Pollution One in drive one. You will be prompted when to replace Pollution One with Pollution Two.

MS-DOS: Exchange the two disks when requested. If you have two drives, you may insert Pollution One in drive two and you will not have to exchange disks at all.

Main Screen Components

The main screen is divided into several sections as shown below: the picture of Misery, the status display, the text input window, the text feedback window, and the message display.



Picture of Misery

The picture of Misery (occupying the top half of the screen) depicts most sources of pollution, including the pulp and paper mill, the mine, the oil refinery, freighters, and the dump. The picture also shows many of the polluted areas, such as the harbor and the beach.

When you select or type an action for reducing or eliminating pollution, the picture of Misery will often change to show the visual results of your action. For instance, if you type "install scrubbers," some of the smoke in the air will disappear.

Status Display

The status display box, on the lower right-hand side of the Main Screen, uses bar graphs to indicate the levels of land, air, and water pollution in the environment. It also shows how much money you have to work with and how much work is available in the city. The longer the bar, the more pollution, jobs, or money there is. The bar graphs will change to show the results of each action you take.

Beneath the bar graph is your score. A perfect score is 160. Any score over 100 is very good.

Text Input Window

The horizontal strip on the left-hand side of the Main Screen, beneath the picture of Misery, is called the input window. If you choose to type your actions they will appear here.

Pollution Control

Your typing will begin where the square (the cursor) is located. The cursor appears at the left-hand side of the input window when you begin typing your command.

To enter an action, simply type it and press RETURN. Most actions should consist of no more than a verb and a noun, in that order, ex. "treat sewage." In some cases, an adjective or modifying word will be necessary, as in "ban leaded gas."

If you wish to erase your entry, press the CONTROL and E keys at the same time. If you wish to insert a letter or word where the cursor is, press the CONTROL and I keys at the same time. If you wish to delete characters beneath the cursor press the DELETE key.

Some actions, such as "install catalytic converters," will not fit in the input window. In these cases the window will automatically scroll to the left to allow you to continue typing. You may also type shortened forms of the longest words; "install catalytic converters" could be entered as "install catal convert." The computer will usually recognize the word from the first four or five letters.

Text Feedback Window

Below the input window is the text feedback window. Here, the computer will display text responses to all valid actions. You will see which type of pollution has been affected by your action, and whether the effect was positive or negative.

The response in the text feedback window will sometimes be a request for you to be more specific. For example, if you type "ban burning," it will ask you to indicate which items (e.g. paper, wood, tires, etc.). The text window may also provide hints as to what action should be taken next.

The feedback window will sometimes display text that describes events which have happened due to a factor other than a direct response to one of your commands. These events may be either positive or negative. For example, it is possible that one of the mills will go on strike, or a dead whale might appear in the harbor, or a rich recluse could give you money to continue the fight against pollution.

Message Display

The message display bar, at the bottom of the screen, provides information as to what you should do next. It will also tell you if the computer does not understand an action you have typed and the reason why.

There are three common reasons why an action may not be understood. The computer may not understand one or more of the words used, or the specific combination of words; or the action may not be possible at that specific time (ex: you cannot treat sewage until you have built a treatment plant).

The computer may search for a reasonable approximation of your action which it does understand. If one is found, it will ask you if this is the action you intended to take.

Commands

When you press ESCAPE at the Main Screen, the Command Menu will appear as shown below. This section provides a detailed explanation of each of the commands available from that menu.



Actions

Leads to a list of possible actions. First select the action's verb and then its noun. Results of the action will be depicted graphically, on the picture of Misery, and in the text window.

Info

This leads to a submenu of five items: Help, Advice, Reference, Vocabulary, and City Guide.

Help—If you are using the simulation for the first time, it is important that you begin with this command. Help explains many of the factors to be considered when deciding on actions. It also tells you how to type a command so the computer will understand it.

Advice—provides a few simple strategies for tackling the problem and should be read by those who are uncertain of how to proceed.

Reference—presents information concerning different types and causes of pollution. Use the space bar and arrows to select a topic, then press RETURN. Press RETURN to select another topic or press the ESCAPE key to return to the simulation.

<p>REFERENCE MATERIALS</p> <p>AIR POLLUTION</p> <p>Carbon Dioxide</p> <p>Industry</p> <p>Acid Rain</p> <p>Automobiles</p> <p>Burning</p> <p>LAND POLLUTION</p> <p>Waste Disposal</p> <p>Waste Reduction</p> <p>WATER POLLUTION</p> <p>Biocides</p> <p>Treatment</p> <p>Eutrophication</p> <p>Oil</p> <p>Sediments</p> <p><ARROWS,SPACE BAR> for other CHOICES and <RETURN> to read, or <ESC> to exit.</p>

Vocabulary—After choosing this option, you will see a list of the words the computer understands, categorized as either "Verbs," "Nouns," or "Modifiers." The computer will not understand all combinations of these words, even if they are in the vocabulary. For example, the computer recognizes "build research lab," but it doesn't accept "build catalytic lab." Combinations of words that have nothing to do with pollution are generally rejected.

The computer will not accept an action unless the first word of the action is a verb. Make sure that the word you use as a verb is from the verb category. For instance, the computer recognizes the word "spill" as a noun. If you use it as a verb, as in "spill oil," the action will be rejected.

City Guide—This option outlines Misery's sources of pollution and identifies the buildings and other items in the picture of Misery.

Report

Select this command when you are looking for information on your status as head of the Pollution Patrol. The first line of the report indicates your score, out of a possible 160. The second line shows your level of skill in the field of pollution control. From lowest to highest, the levels are volunteer, student, apprentice, journeyman, foreman, and master. Your level will change as you solve pollution problems during the simulation.

	* * * REPORT * * *
SCORE:	134/160
LEVEL:	MASTER
POLLUTION:	
Air:	7/60
Land:	7/60
Water:	4/60
JOBS:	33/60
MONEY:	0/60
OTHER STATISTICS:	
Actions:	62
Commands:	9
Coffee breaks:	1 hours

The report also indicates your current values of air, land, and water pollution (out of a high of 60). The higher the number, the more land, air, or water pollution there is in Misery.

Under "Other Statistics," the report indicates the number of actions, such as "reclaim paper," that you have already taken. It also indicates the number of commands you have given, including such actions as using the Help option. The amount of time you sit at the computer without taking an action is given in terms of coffee breaks.

Quiz

Choose this option when you wish to take a multiple-choice quiz based on the information contained in the program. You may take the quiz as often as you wish to improve your score depending on how options are set on the master disk.

The quiz consists of between 1 to 20 questions chosen from a pool of 40. The number of questions is set using the "Set Quiz Controls" utility, described on page 13.

Quit

The Quit command leads to a submenu of five items: Save, Restore, Restart, Utilities and Quit.

Save—You may save a session if you wish to finish it later. After selecting this option, you will be asked to enter a name to identify the session.

Caution

If you do not save your session, no record of it will be kept.

Each student should have a personal copy of the Pollution One and Pollution Two disks. Copies can be made using the copy utility on the Pollution Master disk (see "Copy Disks" on page 9). All sessions are saved on the Pollution One disk. Three sessions may be stored. You may erase any of the sessions and save as often as you like.

Restore—Resume a previously saved session with this option. The name of all saved sessions on your disk will be displayed. Press RETURN to restore the session highlighted or use the arrows to select a different session. Press ESCAPE to return to the main screen without restoring.

Restart—This option allows you to start the simulation over. All previous actions and events in the computer's memory will be erased, though sessions saved to disk will not be affected.

Utilities—Use this option to go to the Options and Utilities menus on the Pollution Master disk. Taking this action will end your current session. Insert Pollution Master and press RETURN. Press ESCAPE to return to the simulation.

Quit—Use this option if you are finished for the day.

Note

Quit does not automatically save your session, so you should choose Save if you haven't already done so.

Scoring

To score points, you must do two things. First, you must solve as many of Misery's pollution problems as you can. For each action that solves a problem, or helps solve a problem, you will receive a number of points. If you can earn 160 points without depleting jobs or money, you are a master in pollution control!

Second, you must not run out of money or eliminate too many jobs. Check the report frequently. If the "Jobs" indicator shows fewer than five or if "Money" runs out, you automatically lose your job, no matter how many points you have!

If you score 100 points, you have done very well. You will have reduced Misery's pollution by a very significant amount—more than has been done in any North American city!

Helpful Hints

There are a number of keys to solving the *Pollution Control* problem. The following is a short list with an explanation of each. If students are having difficulty, pass on some of these hints.

Build treatment plant—Until you have built a treatment plant, no sewage or waste material can be effectively treated. The treatment plant is expensive but necessary.

Build recycling plant—Without this plant, cans, bottles, paper, etc., cannot be recycled, and land pollution will be difficult to solve.

Build research lab—The research lab is optional, though necessary for a perfect score. Using its resources and discoveries, you will be able to treat some wastes not usually handled in a treatment plant, i.e. refinery wastes, mill wastes, etc.

Install scrubbers—This action is the key to reducing pollution from factories and other processing plants. Scrubbers are expensive but effective.

Install catalytic converters—This action, coupled with the action "ban leaded gas" is the key to reducing air pollution caused by cars.

Raise taxes—This is the most unpopular way to raise money. You may raise taxes as often as you like, though the community may rebel if you increase them too frequently.

Ban burning...—To stop air pollution caused by the burning of waste materials, enter this command and then the material, as in "ban burning leaves."

Reduce burning...—It is impractical to ban the burning of many items because it would cause severe disruptions in Misery's economy and/or society. In these cases, encourage the reduction of the burning.

Reclaim...—Anything you can reuse, recycle, or compress should be reclaimed (from the dump, lake, etc.), and then reused or recycled.

Recycle...—Use this verb with any throw away objects that can be made usable again by recycling, i.e. cans, paper.

Treat...—Once you have built a treatment plant, try to treat any waste product that enters the liquid waste streams.

The Solution to Pollution Control

To attain a perfect score of 160, each of the following actions must be undertaken. The order given (from left to right) here is only one possible sequence of actions, and may need to be changed to fit circumstances. For example, if a crisis occurs, pollution in the crisis area must be reduced below 35 points as quickly as possible. Otherwise, a more balanced approach is preferable.

build treatment plant	build recycling plant
build research lab	reclaim bottles
reclaim cans	reclaim motor oil
reclaim paper	reclaim plastics
reclaim tires	recycle bottles
recycle cans	recycle motor oil
recycle paper	reuse bottles
reuse tires	reuse paper
reuse plastics	ban burning leaves
ban burning litter	ban burning plastics
ban burning tires	ban leaded gas
burn oil spills	request volunteers
use car pools	use composting
use wind power	build tailings pond
recycle mill wastes	recycle mine wastes
recycle refinery wastes	absorb oil spills
compress litter	build bricks
install diesel engines	lime lake
plant trees	reduce burning coal
reduce burning oil	reduce burning wood
reduce herbicides	reduce packaging
reduce pesticides	restock harbor
restock lake	treat mill wastes

treat mine wastes
 treat sewage
 use natural gas
 build landfill
 build park
 reuse chemicals
 build rapid transit

treat refinery wastes
 use electric heat
 use solar power
 close dump
 install scrubbers
 install catalytic converters

Aside from these commands, you will probably have to raise money using the "raise taxes" and "fine..." commands.

Teacher Options and Utilities

Setting Options on the Master Disk

You may wish to change factors within the program to make it suit the computer hardware you are using or to streamline the Quiz. This can be achieved by changing one or more of the program options. To make these changes use the space bar to highlight Options at the Teacher Menu (illustrated on page 2). Press RETURN. The following screen will appear:

```

*** CONTROL OF OPTIONAL FEATURES ***
A. Quick Boot:                off
B. Autorestore Last Session:  on
C. Query on Autorestore:      off

D. Color Monitor:             on
E. Sound:                      on
F. Quiz:                       on

G. Action Menu:               on
H. Reference:                  on
I. Session Length:            1

J. Delay Duration Level:      3

Press a letter to change a setting.
Press <ESC> to leave as was; or press
<RETURN> to use the settings shown.
  
```

If you decide to leave all the options the same, press the ESCAPE key. If you want to change an option, type the corresponding letter. For example, to turn sound off, type E. Type E again to turn sound on.

After you have selected your option settings, press RETURN to go back to the Teacher Menu.

The paragraphs that follow describe what happens when each option is turned on.

Pollution Control

Quick Boot

With Quick Boot on, each time a student boots Pollution Master he/she will be able to proceed directly to the simulation, bypassing the Teacher Menu. Since the Teacher Menu is bypassed when Quick Boot is on, you will no longer have access to the options on that menu (shown on page 2), namely: Simulation, Options, Utilities, Credits, Quit. However, you can get the Teacher Menu back in two ways.

You may either:

1. Re-boot the disk, and when prompted for Pollution One simply press RETURN **without inserting** that disk. The Teacher Menu will re-appear.
2. If you are in the simulation itself, choose Quit from the Command Menu and then choose Utilities from the Quit submenu. This will return you to the "Control of Optional Features" screen shown on page 7.

Autorestore Last Session

The program will automatically restore the last session saved, allowing work to continue from that point.

Query on Autorestore

This option allows students to decide, when starting up the simulation if they wish to continue a previous session, or start a new session. The program will proceed to the Restore screen and highlight the last session saved. Press RETURN to restore the session or ESCAPE to start a new simulation.

Color Monitor

If you are using computers with color monitors, this option should be set to "on." If you are using monochrome monitors, set this option to "off." If the option is on, the program text will appear in a character set especially designed for easy reading on a color monitor.

Sound

The program uses sound to indicate that a command or action has not been understood, or to signify the occurrence of a special event. Sound should be turned off if the program is used in a lab.

Quiz

The program contains 40 multiple-choice questions about pollution and pollution control. These questions may be assigned as a pre-test, a post-test, or both. The Quiz may be taken as many times as allowed by the teacher.

Action Menu

If the Action Menu is turned off, students must type all their actions. This means they will require rudimentary keyboarding skills and must know the syntax and diction understood by the computer.

Turn this option on if you wish students to have the advantage of choosing their actions from the Action Menu. The Action Menu makes the simulation much easier to use, but it also simplifies solving Misery's pollution problems.

Reference

A reference section is available which students may use to find solutions to pollution problems and to prepare for the quiz. You might consider turning this option off if you have printed out the material and have given it to the students before they began using the program.

Session Length

Set this option to 1 for a short session, capable of being completed in one or two classes, or set it to 2 for a longer session, requiring two to three classes.

Delay Duration Level

The Delay Duration Level (DDL) adjusts the amount of time the computer will wait for the user to press a key. If the student doesn't make an input within the allotted time, the program advances on its own. Settings range from 1 to 5: where 1 is very quick and 5 is very slow. People using turbo cards or the Apple IIGS may want to slow the DDL so they don't miss any important prompts. The DDL does not affect basic processing speeds.

Using Teacher Utilities

Utilities available to the teacher include the following features: copying disks, modifying quiz questions, setting quiz controls, record keeping, configuring the printer, and printing files.

To reach these utilities, choose Utilities from the Teacher Menu (shown on page 2). You will then see the following screen:

```
***          UTILITIES          ***

1. Copy Disks
2. Record Keeping
3. Configure Printer
4. Print Files
5. Modify Questions
6. Set Quiz Controls

NOTE: if the Printer Configuration is
not accurate then print options may
not perform as expected.

Press <1..6> to choose utility.
      <ESC> to exit back to main menu.
```

Copy Disks

Before you begin working with the simulation, you'll want to make copies of the student disks (Pollution One and Two [Pollution One on IBM/Tandy]). The Pollution Master disk cannot be copied unless you have purchased a license to do so. Copies are not needed, since a single Pollution Master can be used to boot the program on every computer in your classroom.

You may make unlimited copies of Pollution One and Pollution Two. Since Pollution One can store only three sessions, you must make a copy for each student.

To copy disks, choose 1 from the Utilities Menu. The computer will return to the Teacher Menu and then ask you to press RETURN to load the copy disk utility. Press ESCAPE if you have changed your mind or selected the wrong utility.

Single-Drive System: If you are using a computer with one disk drive, answer N when the computer asks if you are using a two-drive system.

Insert the disk you wish to copy and press RETURN. After a few moments the computer will prompt you to insert a blank disk. The computer will display a warning message. Type N if you have changed your mind. Otherwise, type Y to continue the copy process. You will have to exchange the original disk for the blank disk several times.

When the copy is complete, the computer will instruct you to remove the disk. You may repeat the procedure if you wish to make more copies. Press ESCAPE when you are finished. Insert Pollution Master and press RETURN to get back to the Teacher Menu.

Double-Drive System: If you are using a computer with two disk drives, answer Y to the computer's question, "Are you using a two-drive system?" The computer will instruct you to insert the "Source" disk (Pollution One or Pollution Two) into drive one and the "Destination" disk (a blank disk) into drive two.

Press RETURN to copy. When the copy is complete, the computer will instruct you to remove the disk from drive two. You may insert a new blank disk to repeat the process if you wish to make another copy.

When you are finished, press the ESCAPE key. Insert Pollution Master as instructed and press RETURN to go back to the Teacher Menu.

Note

Pollution One and Pollution Two may also be duplicated using any standard disk copier.

Record Keeping

The *Pollution Control* program keeps two types of records: individual and group. Individual data allows you to evaluate an individual student's performance, while group data allows you to compare an individual's performance against members of a larger group, such as a class.

To work with the student records, choose Utilities from the Teacher Menu (see page 2). When you reach the Utilities menu, choose option 2, Record Keeping.

Individual Data: Choose this option to view data saved on individual student disks. The information provided will give quick insight into the student's progress, including any quiz scores, as well as the score and level achieved within the simulation.

```
***      SESSION & QUIZ RESULTS      ***
Name: ROBIN POTTER
Quizzes saved, most recent first:
  Right Wrong Avoided Score Out Of
   1     8     1     1     8     10

Last session saved:
Score: 134/160 Level: MASTER
Air:   7     Land: 7     Water: 4
Jobs: 33     Money: $ 0,000,000

Commands: 9   Actions: 62
Coffeebreaks: 1   hours
Press <ESC> for menu.
  <RETURN> to show NEXT individual.
  <A> to ADD individual to group.
  <E> to ERASE individual data.
```

Press RETURN to look at another data disk. The computer will prompt you to insert the next data disk and then press RETURN.

If you wish to compare the scores achieved by different students, type A to add the individual data to a group (or class) record. Using the Group Data option, you will then be able to compare all students whose data you have saved to the group record. Up to 50 students' data may be saved to the group record, which is stored on the Pollution Master disk.

Note

Only the student's scores are saved to the group record, not the student's actions. Transferring the data is NOT the equivalent of maintaining a copy of the individual data.

Press E to erase the individual data from the data disk. You will have three options: press Q to erase quiz results only; press S to erase saved sessions; or press A to erase both quiz results and saved sessions, **thus preparing the disk for a new student**. If you wish to keep track of the previous student's scores be sure you have added his/her data to the group record.

Press ESCAPE to return to the Teacher Menu.

Group Data: Choose this utility if you wish to view all data that has been saved to the group record. Up to 15 students' records will be displayed on the screen at one time, including their name, their most recent score on the quiz (if any), their current score in the simulation, and the level they have achieved in the simulation.

When a question mark (?) appears before any quiz score, the computer has found a score which is based on different option settings than the first quiz score in the file. (See "Set Quiz Controls" on page 13.)

```
***      GROUP RESULTS      ***

Name          Quiz Score  Level
-----
ROBIN POTTER      8 134 MASTER
DANIELLE          7  63 APPRENTICE
ROBIN SMITH      N/A   8 VOLUNTEER

-----

Press <ESC> for menu.
  <E> to ERASE GROUP data.
  <P> to PRINT hardcopy.
```

Press RETURN to see more students' records (if you have saved more than 15 to the group record) or to repeat the listing.

Type E to erase the group record. Do this only if you want to start a new group record and are sure you have no further use for the current record. It is a good idea to print out the group record before erasing it.

Type P to print out the group record. If the printing results are unsatisfactory, try again using the Configure Printer option (below), to correct any printing problems.

Configure Printer

Use this utility to configure your printer to this program. This needs to be done only once as all settings are saved. If the printer is improperly configured, some print-outs may stretch over page breaks, or may not print out at all. The default settings provided in the program should be adequate for most printers.

Form length: The standard form length for 8.5 x 11 inch paper is 66, or six lines per inch.

Form width: The standard form width for 8.5 x 11 inch paper is 80 characters.

Left margin: Set the number of characters you wish to indent text from the left margin. Default setting is 0.

Right margin: Set the number of characters you wish to indent text from the right margin. Default setting is 0.

Top margin: Set the margin at the top of each page by indicating the number of blank lines you wish to appear before the first line of text. Default setting is 5.

Bottom margin: Set the margin at the bottom of each page by indicating the number of blank lines you wish to appear after the last line of text. Default setting is 5.

Line feed after C/R: Check your printer and printer card manuals about this option. Some printers automatically insert a line feed after each carriage return; other printers require the software to instruct it to perform a line feed.

Form feeds: Check your printer and printer card manuals before adjusting this option. Some printers automatically insert a form feed after printing either 54 or 55 lines. If your printer does not automatically insert a form feed, turn this option on.

Pause at end of form: If you are printing onto single sheets of paper, turn this option on.

Hardware slot: (Apple users only.) Your printer card must be in slot 1 or slot 2.

Print Files

Choosing this utility will allow you to print copies of the text files used in the program, including: Help, Advice, Reference, Vocabulary and the questions used in the Quiz.

To print any of the files, use the arrow keys to select the appropriate file. Then choose either 1 or 2 for 40- or 80-column print. Press ESCAPE to return to the Print Files menu.

If you choose to print the Reference files, a list of the topics will be displayed. Type the number of the topic you wish to print, or type A to print all the topics. Use ESCAPE to return to the Print Files menu.

If you choose to print the Quiz you will be given five options, which are described below.

Set Question/Answer Order— This option allows you to change the order of the questions to discourage cheating. Simply type the number of the question you wish to appear first on the quiz. The computer will automatically scramble the rest of the questions in an order predetermined by which question is printed first.

You may also change the order in which the answers appear with the questions. On one version of the quiz you may wish to have the answers appear in the same order that they are stored on disk, i.e. 1,2,3,4. On a second version of the quiz, you may choose to print the answers in a different order, i.e. 2,4,1,3. In this example, the second answer will be printed first, the fourth will be printed next, etc.

Set Master/Quiz Option— This option allows you to decide whether or not to print the questions with the correct answers identified, as for a master, or without the correct answers identified, as for a quiz.

Set Numbering Option— Use this option to adjust the manner in which the questions will be numbered when they are printed. If the option is set to "Print-out," then the questions will be numbered sequentially, i.e. 1,2,3, etc.

If the option is set to "File" the questions will be numbered according to the sequence in which they are stored on disk regardless of the order in which they are printed out. This is a useful way of numbering the questions if you will be making up several versions of the same quiz, and you will want to refer to questions by their number.

Type Header— This option gives you three lines at the top of the page to write instructions, point values, or anything else you want at the top of the quiz.

The old header will be displayed at the top of the screen. Because the screen's text display is in 40 columns, each of the three lines available for use in the printed header is displayed on screen as two lines. Type the new header where the cursor is, about half way down the screen. Remember, each line on the screen is only one-half a line on paper.

Do not press RETURN at the end of each line. Use the space bar to move the cursor to the next line.

Print Questions— Choose this option when you are ready to print out the quiz. The computer will prompt you to exchange disks. Then press RETURN to print or ESCAPE to avoid printing. Be sure your printer is properly configured.

You may halt the printing at any time by pressing the ESCAPE key and holding it down until the printer stops. This may take a moment, as the printer will always finish the question it is printing before it responds to your command.

Pollution Control

Modify Questions

You may change any of the questions that appear during the simulation. You may also create additional disks with new questions.

The quiz questions are stored on Rock Two [Rock One on IBM/Tandy]. If you change questions on one disk and want all of the students to have the new questions, you will have to make copies of the disk you changed. It is not a good idea to change questions on the original disk. Make your changes to a copy of the disk.

To edit or replace old questions with new ones, use the space bar to highlight the Utilities option at the Teacher Menu (see page 2) and press RETURN.

Choose 5 when the Utilities screen appears. The computer will instruct you on how to use the Modify Questions screen shown below.

```
      * MODIFY QUESTIONS *

# 1 of 40
*-----*
|What problem may occur when|
|fertilizer runs off into  |
|a lake?                   |
| X ozone                   |
| X detoxification         |
| * eutrophication         |
| X acid poisoning         |
*-----*

Press <E> to edit, <N> to see next
question, <P> to see previous question.
<ESC> for main menu.
```

Press E if you wish to edit the question. The cursor will appear on the first letter of the question. Use the arrow keys (<—>) to move the cursor to the portion of the question you wish to change. Type the changes over the old information.

If you wish to write a new question, leave the cursor at the beginning of the original question and simply type the new question over the old.

When editing and writing questions, keep these points in mind:

1. Each question must contain three lines. You cannot reduce the question's length to two nor increase it to four.
2. Question lines may contain up to 27 characters (including blanks). Since there is no wrap-around feature you must be careful to end each line between words, not in the midst of a word.
3. There must be four answer choices to each question, with one choice to a line.
4. Only one answer to a question can be correct. Precede the correct answer with an asterisk (*).
5. Incorrect answers must be preceded by a capital X.
6. Before typing an answer, skip two spaces, type (*) for a correct answer or X for an incorrect answer. Then skip one more space before typing the answer. You may use up to 23 characters for each answer.

Note

If you do not follow the correct procedure for writing questions, the computer will give you an error message and will not allow you to save the modified question.

When you have finished editing a question, press the CONTROL and C keys simultaneously. The computer will ask you if you wish to save the new question. Type Y to save the changes or N if you have changed your mind.

To move to the next question, type N. To move to a previous question, type P. When you have finished editing, press ESCAPE. If you are using one drive, reinsert Pollution Master and press RETURN to go back to the Teacher Menu.

Set Quiz Controls

Use this option to set the number of quizzes a student may take, the number of questions to be answered, and the number of points to be awarded/deducted for each question.

Press a number (1-9) to change the setting of an item, then press RETURN to save the new settings. Press ESCAPE to restore the original settings.

1. **Number of quizzes** may be set from 1 to 10. Each quiz will have different questions, as the questions are chosen randomly from a pool of 40.
2. **Number of questions (per quiz)** may be set from 1 to 20.
3. **Correct answer** sets the points awarded for each correct answer (from 1 to 20).
4. **Wrong answer** sets the points deducted for each wrong answer (from -10 to 0).
5. **Answer avoided** sets the points deducted for avoiding a question (from -10 to 0).
6. **Random/seq. questions** determines whether the questions in the quiz follow a preset sequence or appear randomly.
7. **First question (if sequential)**. If you have chosen to have the quiz questions appear sequentially, choose which question you wish to start the quiz. The rest of the questions will follow in sequence.
8. **Successive quizzes to be the same**. If you wish each quiz to be the same, set this option to "yes"; if you wish different questions to appear in the quiz each time it is selected, set this option to "no."
9. **Reference** can be used to restrict access to the reference material. Set this option to "off" if you wish the quiz to be "closed book" style, or to "on" if you wish the quiz to be "open book."

Strategies for Classroom Use

Using the *Pollution Control* program either with individuals, small groups, or an entire class will familiarize students with many basic concepts of science in general, and with environmental science in particular. Demonstrating the program to an entire class is a good way of acquainting students with the types of activities they will be involved with as they attempt to solve the pollution problems of Misery, and will prepare them to make carefully considered choices.

Below are suggestions for using the *Pollution Control* program and for integrating it into your science curriculum:

1. As a class activity, students could be divided into competing teams. The object would be for teams to accumulate the greatest number of points and reduce land, air and water pollution to the lowest levels.
2. Students could begin using the program with little teacher input to allow them to develop their own learning strategies. Allowing students to work individually will enable them to learn at their own rate.
3. Students working individually might enjoy charting their own progress and trying to raise their scores. A classroom chart can be maintained showing each student's progress.
4. The class can be divided into three groups with each group responsible for studying a specific type of pollution. They could report to the class about their findings and the class could determine possible strategies for reducing the overall pollution in Misery.
5. You could reproduce the student worksheet so that students may fill in the answers while studying and reducing pollution.
6. As students use the program, have them list the sources of pollution in Misery. Then they can categorize them according to the type of pollution, source, or pollutant. This information could be related to possible sources of pollution in the community in which the students live. Further research could involve using newspaper articles to study actual solutions to local pollution problems.

Whatever strategy you choose, some introductory work will be required to ensure the most effective use of the simulation when your students are at the keyboard. You may choose to print the Reference files using the Print Files utility on the Pollution Master disk. This information will acquaint you and your students with the terms and phrases most commonly used in the simulation. You should also make copies of the materials found in the Student Workbook for every student.

Off-Computer Activities

The following activities and suggestions are intended to assist you in developing in-class and homework assignments related to *Pollution Control*.

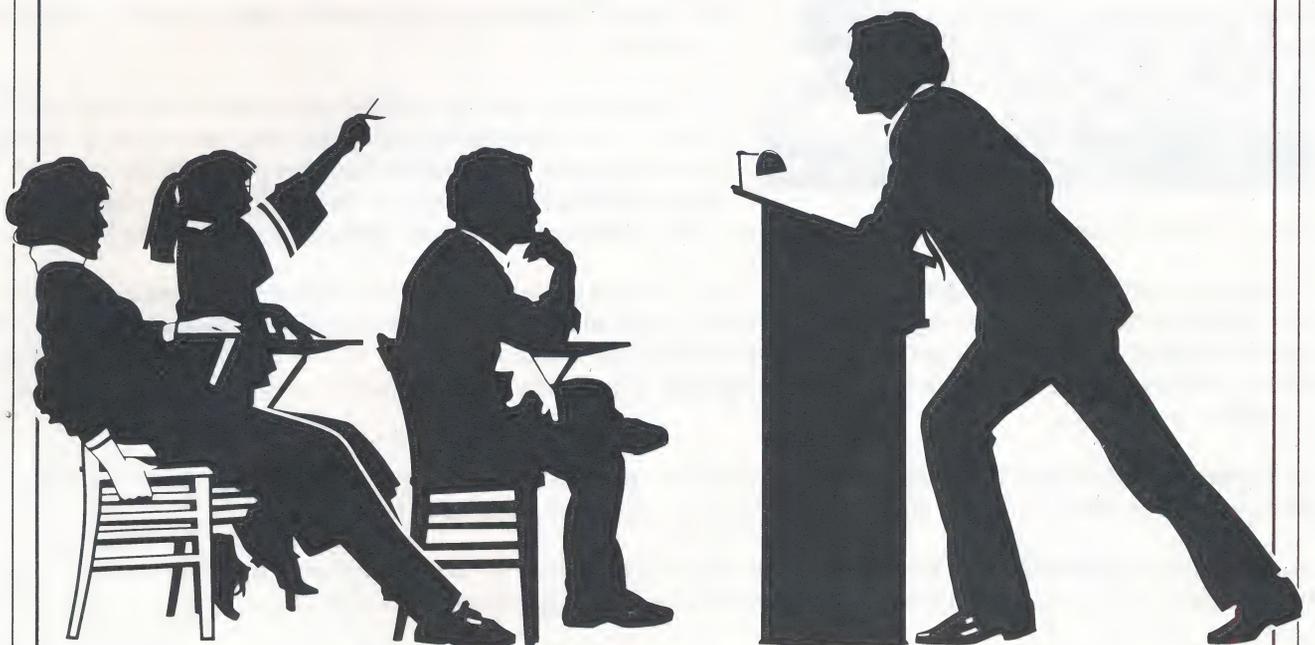
1. Have students write a report that details their strategy and experiences with the program. They might include the problems they encountered, and the relative effectiveness of their actions.
2. Have students study the dangers posed by any one of the sources of pollution (such as nuclear waste) focusing on methods of disposal, long-term dangers of current methods of disposal, and potential harm to living substances.
3. Conduct a close examination of the greenhouse effect. What causes it? How can its effects be reduced?
4. Investigate the problems of acid rain. Then discuss how it has become an international problem. The study can be associated with a unit in geography.
5. After the students have used the program, they could write an essay describing "A Day in the Life of a Pollution Control Manager."

Test Answers

- | | | |
|-------|-------|-------|
| 1. d | 11. c | 21. d |
| 2. a | 12. a | 22. b |
| 3. b | 13. d | 23. d |
| 4. c | 14. d | 24. a |
| 5. c | 15. b | 25. a |
| 6. d | 16. a | 26. a |
| 7. d | 17. c | 27. c |
| 8. a | 18. a | 28. d |
| 9. b | 19. d | 29. d |
| 10. b | 20. a | 30. d |

Pollution Control

Student Workbook



Introduction

The city of Misery needs your help. The land, air, and water are polluted. Through the *Pollution Control* computer program you must find the sources of pollution, suggest ways to clean up the environment, and prevent future pollution.

Your actions will be rewarded with jobs, money, and points. Mistakes, however, can be costly. You can be fired if you do not deal with pollution emergencies quickly and efficiently. Use the reference section of the computer program to become more familiar with the environmental problems and some possible solutions.

Loading The Program



Apple: The boot (start up) disk is called Pollution Master. Place it in drive one, and boot the program by turning on the computer or by pressing the appropriate keys.

MS-DOS: Boot the program by loading DOS 2.0 (or higher), then insert Pollution Master and type "POL."

Getting Started



When the program is loaded, the title screen will appear. Follow the directions that appear on this screen and select the "SIMULATION." The main screen will appear. Press ESCAPE to activate the Command Menu. The commands will appear in the upper left side of the screen as shown below:



Use the Command Menu to advance through the program. Use the space bar or arrows to highlight a command, then press RETURN to activate it. The Commands include Actions, Info, Report, Quiz, and Quit. A brief description of each follows.

Actions leads to a list of twenty four (24) possible activities that enable you to reduce pollution levels in the city of Misery. A very wide range of activities are at your disposal. For example, you may reduce pollution by a series of bans on products and chemicals, or by building treatment and recycling facilities. The existing pollution can be cleaned up while steps are taken to reduce problems in the future.

Once an area is cleared of pollutants you can even restock wildlife. To provide money for your projects, the taxes can be raised. Throughout the program, you must balance your pollution controls with the money available and the jobs that are necessary for the city to

survive. However, before you take action, you may want to study some of the information provided to help you.

Info provides advice on how to proceed. **Help** explains many of the factors to be considered when deciding on actions. **Advice** provides a few simple strategies for attacking the problem. **Reference** presents information concerning different types and causes of pollution. If you choose to type commands, rather than using the Actions Menu, the **Vocabulary** section provides a reference list of terms that the computer understands. The **City Guide** outlines some probable sources of pollution in Misery.

The **Report** section of the Command Menu describes your present status, score, pollution levels, jobs, and money, as well as a detailed listing of the actions, commands, and coffee breaks you have taken.

You may take a multiple-choice **Quiz** based on the information contained in the program. Once you decide to begin a quiz you must complete it. The quiz contains between 1 and 20 questions chosen from a pool of 40.

The **Quit** option of the Command Menu allows you to save your current session, restore a previously saved session, restart the simulation, use the utility option, and of course end your current session. If you wish to complete your work at a later time, be sure you save the session before you quit.

Common Questions

1. How can I possibly get a score of 160? I've tried everything I can think of and I have no money.

It is possible, but you must remember that 160 is a perfect score. To reach it you will have to reclaim and recycle everything possible. You will have to eliminate (as much as possible) every source of water pollution. You will have to curb all emissions from cars, factories, etc. And you will have to do this without making a single mistake.

It is not the claim of this simulation that pollution can be totally eliminated; rather, every source in the simulation can be attended to, and must be to reach 160!

2. Now that I'm at the Main Screen, what do I do?

The time has come to offer Misery some solutions to its problems. Directly below the Misery graphic, on the left side, you will see a flashing cursor. The cursor indicates the position of the Input Window. You may type your actions in this window.

Rather than type your actions you may be able to select them from the Actions Menu depending on how your teacher has set up the simulation. Press the ESCAPE key to enter the Command Menu, then select Actions. A list of verbs will appear in the upper left-hand corner of the screen. Select the desired verb then match it with one of the nouns that appears in a list in the upper right-hand corner, after you have selected the verb.

3. How can I possibly get rid of the oil spill near the freighter?

This will not be easy. You must think of all the different ways to reduce the likelihood of future spills, while also trying every possible way to diminish the effect of the current spill.

4. What am I supposed to do if a dead whale appears in the harbor, or if the computer says too many Misery residents are having problems breathing?

The dead whale and the breathing problems are examples of events that may occur throughout the simulation if pollution levels remain too high. As soon as they occur you must take actions to reduce the pollution that has caused the event. If, after a period of time, you have not significantly reduced the pollution, you will be dismissed from your job.

5. Is it possible to get rid of all Misery's pollution?

Not really. However, it is possible to reduce each of the air, land and water pollution indicators to zero. If this is achieved, you will have attended to all the sources of pollution in Misery.

6. Will the skies above Misery ever be totally clear?

Certainly. If the air pollution indicator indicates an air pollution value of five or less, the skies will clear and a plane will be seen near the top of the screen.

7. Why doesn't the computer understand most of my typed actions? What does it take to get my actions understood?

Your action must be typed as: verb, noun, or verb, modifier, noun. All possible actions are listed in the Actions file, which is part of the Info submenu. If the program rejects your action, check to see if it is on this list.

The vocabulary that the program understands is also limited to the terms that can be found in the Vocabulary file.

The computer may still not understand all combinations of all the words in its vocabulary. The word combinations must make logical sense and must be related to the program. For example, "build electric engines" is correct grammatically, but it will not be recognized by the computer since the action is not considered to be related to the problem of pollution.

8. What happens if I get fired?

You have two choices. You may restart the simulation or, if you have previously saved a session, you may restore that session. Either way, you should ask yourself which actions you took, or didn't take, that led to your firing. Try to improve your sequence of actions on your second try.

Do not be disheartened. Pollution is a difficult problem. Many people have tried to solve its complexities, have spent huge sums of money, and have failed. Practice and experience will improve your chances of solving Misery's problems.

9. Is there a special sequence of actions necessary to defeat pollution, or a strategy that is most effective?

Some action sequences will be better than others, but the sequence will often be determined by events and by the need for additional funds. There is, however, one strategy which seems better than most: start by fighting land pollution. It will cost you the least amount of money—some actions will even earn you money—and will have the greatest effect on the general environment. Try to keep tax increases at a minimum.

Student Worksheet

Name _____ Date _____

Directions: Answer the following questions on a separate piece of paper.

1. List the three main types of pollution, giving at least three sources (e.g. cars, oil refinery) for each type.
2. Use your own words to define pollution.
3. Which factors contributed to the rapid increase of pollution problems during the 1800's and 1900's?
4. Identify three sources of air pollution in your community. What effect can air pollution have on your environment and your health?
5. Name four pollutants emitted into the air from the burning of fossil fuels. What pollution problems do they cause? What effect do they have on the environment?
6. What are some methods of reducing or eliminating air pollution?
7. List as many sources of land pollution as you can. What effects does each have on the soil?
8. Explain how polluted soil can pollute air or water.
9. What is the difference between recycling, reusing, and reducing as methods of land pollution control? What items can be recycled... reduced... reused?
10. What is eutrophication? Explain its causes and effects.
11. Why is there no standard definition of water pollution? Should there be a standard definition of water pollution? Explain.
12. Discuss several methods of reducing or eliminating water pollution. Which method do you think is best in terms of cost, long-term effects, and effects on other parts of the environment?
13. Pollution control methods often fail because they treat only one aspect of the pollution or only one affected area. Other methods fail because, while cleaning up one type of pollution, they create a second. Give examples of pollution control methods that suffer from these problems.
14. What are the three "Rs" of pollution control? What type of pollution problem is affected most by each method of pollution control?

Glossary

acid rain: rain containing acids. Sulphur dioxides and nitrogen oxides from the burning of fossil fuels mix with moisture in the air to form acids. Acid rain can travel long distances and have a negative effect on fish, forests, and soil.

catalytic converter: a device attached to a car's exhaust system which uses heat and chemicals to reduce harmful emissions

compress: to press into a smaller space; to compact

emissions: gaseous, liquid or solid material emitted, or released, into the atmosphere

eutrophication: the aging process of a lake. Algae, stimulated by sewage, pulp and paper wastes, or fertilizers, grows and then dies quickly using up all the oxygen in a lake or pond, thus killing the fish and plant life.

food chain: a sequence of organisms, each of which feeds on the previous one

greenhouse effect: an increase in temperature of the earth's atmosphere resulting from excess carbon dioxide released by the burning of fossil fuels. Carbon dioxide acts like a greenhouse, trapping heat and raising the temperature of the atmosphere.

landfill: a form of garbage dump where layers of garbage are interspersed with layers of soil to produce an area that is reused as a parking lot, park, etc.

lime: 1) to add lime as a treatment, 2) a white powder made from limestone

organic: made up of plant or animal material

pollutant: any substance that makes the air, water, or land less useful; something that pollutes the environment

pollution: any unwanted change, either physical, chemical or biological, in the air, water, or land; something which is harmful to the life, health or activities of living things

recycle: to separate and process waste so that it can be reused

refinery: a factory where oil and other crude materials are purified

scrubber: a sophisticated device installed in smokestacks, which reduces the amount of pollution, particularly sulphur dioxide, that enters the air

smog: a combination of smoke and fog. However, this term is now used to refer to any accumulation of smoke and pollutants in the air.

special wastes: wastes requiring special disposal techniques, particularly the wastes from nuclear power and plants using dangerous chemicals

waste: any item, usually leftover, which has no obvious use

Pollution Control

Test

Name _____ Date _____

Directions: Read each question carefully and then study each of the possible answers. Circle the letter beside the best possible answer.

1. Which pollution problem occurs when organic substances such as fertilizer are poured into a lake?
 - a. acid rain
 - b. alkali lakes
 - c. ozone
 - d. eutrophication
2. Which pollution control method for land pollution consists of separation and processing?
 - a. recycling
 - b. reusing
 - c. reducing
 - d. recovering
3. Which of the following forms of pollution usually pollutes an area far from its source?
 - a. smog
 - b. acid rain
 - c. eutrophication
 - d. all of the above
4. What are pesticides, oils, chemicals, and acids?
 - a. effluents
 - b. degradable wastes
 - c. special wastes
 - d. solid wastes
5. Which pollution problem is caused by carbon dioxide emitted during the industrial burning of fossil fuels?
 - a. acid rain
 - b. smog
 - c. greenhouse effect
 - d. ozone
6. Which of the following pollutants is used by farmers to kill insects?
 - a. heat
 - b. herbicides
 - c. sediments
 - d. pesticides
7. Which is the main cause of air pollution?
 - a. agricultural slash burning
 - b. cigarette smoking
 - c. the use of solar power
 - d. the burning of fossil fuels

Pollution Control

Test, page 3

15. What is the main reason that some pollutants become deadly when they pass through the food chain?
 - a. they enter the water supply
 - b. they become more concentrated
 - c. they change form inside the body
 - d. they react with oxygen

16. What are treatment plants used for?
 - a. to make wastes less harmful
 - b. to recycle wastes
 - c. to store special wastes
 - d. to reduce urban runoff

17. Which of the following is NOT an effect of air pollution?
 - a. erodes paint and fabric
 - b. causes breathing problems
 - c. causes urban runoff
 - d. eats away metal

18. When is water considered to be polluted?
 - a. when it can't be used for its intended purpose
 - b. when it is undrinkable
 - c. when it smells bad
 - d. when it is covered with pink scum

19. Which of the following is a reason for the development of pollution problems?
 - a. the growth of cities
 - b. an increase in population
 - c. the growth of industry
 - d. all of the above

20. Which of the following pollutants is also an important element of the environment?
 - a. carbon dioxide
 - b. carbon monoxide
 - c. chlorofluorocarbons
 - d. sulfuric acid

21. Why is it sometimes difficult to say whether water is polluted?
 - a. people differ in their opinions
 - b. it depends on what the intended use is
 - c. it may be difficult to see the effects of a pollutant
 - d. all of the above

22. Which is the main cause of land pollution?
 - a. groundwater pollution
 - b. improper disposal of garbage
 - c. chemicals from air pollution
 - d. oil spills

23. Which of the following breaks down the fastest in a land fill?
- an aluminum can
 - a plastic bag
 - a glass bottle
 - a paper bag
24. Why are pollution control methods often neglected?
- lack of time and money
 - effective pollution control methods don't exist
 - industries don't realize how much pollution they're emitting
 - general laziness
25. Water is able to purify itself to some degree through which process?
- dilution
 - treatment
 - eutrophication
 - erosion
26. What is happening to a lake when algae in it begin growing and dying quickly?
- eutrophication
 - oxidation
 - detoxification
 - contamination
27. Which of the following pollutants comes mainly from the domestic waste stream?
- sulphur dioxide
 - radiation
 - sewage
 - all of the above
28. Which of the following is the major cause of pollution?
- natural disasters
 - radiation from the earth's core
 - chemical emissions from factories
 - man's activities
29. Which of the following is probably the best solution to most air pollution problems?
- burn less fossil fuel
 - burn cleaner fuel
 - install pollution control devices
 - all of the above
30. Which of the following is LEAST likely to lead to erosion?
- mining
 - forestry
 - agriculture
 - factories

22. Which of the following is NOT a source of air pollution?



- a. an aluminum can
- b. a plastic bag
- c. a glass bottle
- d. a power pole

23. Why are pollution control methods often neglected?

- a. lack of time and money
- b. effective pollution control methods are difficult
- c. industries don't realize how much pollution they are emitting
- d. general laziness

24. Water is able to dilute itself to some degree through which process?

- a. diffusion
- b. treatment
- c. eutrophication
- d. erosion

25. Which is happening to a lake when significant oxygen is being used up?

- a. eutrophication
- b. oxidation
- c. deoxygenation
- d. deoxygenation

26. Which of the following pollutants comes mainly from the domestic waste stream?

- a. organic solids
- b. radiation
- c. sewage
- d. all of the above

27. Which of the following is the major cause of acid rain?

- a. industrial factories
- b. radiation from the earth's core
- c. chemical emissions from factories
- d. rain's activities

28. Which of the following is probably the best solution to most air pollution problems?

- a. burn less fossil fuel
- b. burn cleaner fuel
- c. install better control devices
- d. all of the above

29. Which of the following is LEAST likely to lead to erosion?

- a. forestry
- b. forestry
- c. agriculture
- d. factories

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