

INTRODUCTION

Overview

Environmental Pathways—Youth Investigating Pollution Issues in Illinois builds on the “Air, Land, and Water” program developed by the Illinois Environmental Protection Agency (IEPA). Although they share a common heritage, this is not simply an updated edition of that earlier work. This curriculum represents a comprehensive approach to environmental education and to teaching about pollution issues. It draws from 30 years of experience by the IEPA, as well as the collected experience of national educators who have established standards for environmental education.

The intent of this material is to develop critical thinking skills which will enable students to understand and make independent decisions regarding both current and future environmental issues. *Environmental Pathways* was developed to help provide students with the information and skills they will need throughout their lives to address pollution issues.

The first step on this pathway is building students’ awareness of pollution around them: what it is, where it can be found, what forms it takes. The next step involves developing students’ investigatory skills and deepening their understanding of how pollution can affect them. In order for students to respond effectively to pollution problems, they must understand them. This is the focus of the third step. Finally, the students need to develop an understanding of what can be done about pollution issues and how they can have an impact on these issues. The intent is not to have students learn a set of facts about pollution, or to familiarize them with a single set of remedies, but to enable them to think and develop solutions on their own which may impact their local areas.

This packet attempts to integrate pollution studies in two related but separate ways. The first is to develop an awareness of pollution across disciplinary lines. Pollution is looked at and studied using science, mathematics, art, language arts, social studies, and technology. The second is to encourage schools to integrate and to utilize the community in the curriculum. Both are based on the recognition that pollution is best taught by making use of real-world situations to develop critical and creative thinking skills, citizenship skills, and informed decision making.



Who Should Use This Book

This book has been designed to be of value to the widest possible audience. The lessons are targeted for students at the fifth and sixth grade levels. However, the materials are not limited to those who teach this age group in formal settings. We have tried to provide enough variety so that non-formal educators, such as naturalists, interpreters, Scouts and club sponsors, can also benefit.

It should be noted that this is not simply a collection of science activities. Issues regarding the environment are not simply science issues. Education about these topics spreads

across disciplines, and one can and should approach them from a variety of standpoints.

How to Use This Book

Environmental Pathways is divided into four sections. Each section begins with an overview of the themes and concepts to be taught, and provides general background information. The first page of each activity is highlighted with a sidebar, which spells out:

- the subject(s) involved in the activity;
- the skills utilized by the students;
- how the activity is connected to the conceptual framework (described below);
- the objectives of the activity;
- how it connects to Illinois Learning Standards;
- important vocabulary words;
- setting;
- materials required; and
- the time involved.

Every activity begins with an overview along with more specific background information. Instructions for the preparation and procedure are given, as are suggestions for assessment. Throughout the book, important vocabulary words are printed in **bold type** the first time they appear in an activity.

The resources section provides lists of helpful print information or websites. Ideas for extensions have been provided for each activity. Generally, there will be four extensions, involving: the outdoors, technology, multidisciplinary approaches and community connections. If the activity itself is strongly rooted in one of these areas—for example, if an activity involves community-based investigations, or requires significant outdoor activity—then there will not be a specific extension for that area.

The activities contained in *Environmental Pathways* do not constitute a curriculum. However, they have been selected, designed and arranged according to a conceptual

framework. This framework allows knowledge and understanding to build from the basic and general to the more specific and precise. Educators can select activities from throughout the book to develop or enhance a curriculum to meet the particular needs of their students.

The conceptual framework on which these activities were built recognizes three main types of pollution: air, land, and water. Within these three, there are several subtopics which are discussed, such as global climate change and nonpoint source pollution. Although these three are not the only types of pollution that affect Illinois (radiation and noise pollution are two others), they do form the backbone of the conceptual framework, and are the most important for students of this age group to understand.

The structure of the framework can be seen in the naming of the four sections. Section 1, “What is Pollution?” introduces students to the terms and kinds of pollution commonly encountered today. Section 2, “Why is Pollution an Environmental Issue?” discusses why people are concerned about pollution and why the solutions to it are sometimes controversial. The focus becomes local in Section 3, “What Kinds of Pollution Issues Affect Illinois?” The activities in this section discuss pollution issues that may be found elsewhere, but which are known to affect Illinois communities. Finally, Section 4, “What Can We Do About Illinois Pollution?” offers activities in which students can develop their own ideas about how to solve these problems. The intent throughout is to provide students with information and with tools to analyze that information, so that they can make educated decisions for themselves, rather than being told what the correct responses to these issues should be.

It should be noted that there are graphics assigned to each section of the guide to help make the divisions clearer to the user. These

graphics can be found in the page footer.



The symbol for Section 1 is a question mark (for inquiring and increasing awareness);



the symbol for Section 2 is a globe (for effects of pollution on systems);



the symbol for Section 3 is a magnifying glass (for looking locally);



and the symbol for Section 4 is a map of Illinois (for acting locally).

The appendices include resource materials that teachers may find beneficial. The contents include:

- a glossary of all **bolded** vocabulary words
- the full conceptual framework for the collection

- charts which cross-reference the activities by subject, skill and objective correlations with the Illinois State Learning Standards and the North American Association for Environmental Education’s Guidelines for Learning
- a full bibliography
- an order form for all IEPA documents mentioned in this document
- a feedback form to be used in the development of future editions.

Support

The IEPA hopes you have great success in using *Environmental Pathways— Youth Investigating Pollution Issues in Illinois*. If you have questions regarding this packet or about the IEPA education program contact: Kristi Morris-Richards, Education and Outreach Coordinator, at 217-558-7198 or e-mail her at kristi.morris-richards@epa.state.il.us.

Sample Page

Skills a student will use or develop in this activity.

Identifies **concepts** as they relate to the conceptual framework beginning on page 124.

Objectives - Identifies what the students will learn when they complete this activity.

State Standards - Identifies the Illinois Learning Standards that are addressed by this activity, not necessarily the extensions.

Vocabulary - Lists words that may be unfamiliar to the student or teacher.

Setting - Where the activity takes place.

Materials - Lists any special materials the activity may require.

Time - Indicates class time students need to complete the activity.

Subject - Listed are the core subject areas that relate to this activity.

“Drawing Out” Pollution

Subject: Art
Science

Skills:

- Observing
- Comparing/Contrasting
- Organizing
- Researching

Concepts: 1. A-E

Objectives: Students will:
1) identify forms of pollution and describe the effects that various pollutants can have on people, wildlife and plants.
2) describe relationships between various forms of pollution and human actions.

State Standards:
Science: 11.A.2 b, c, d, e
Social Science: 17.C.2 c
Physical Dev. & Health: 22.C.3 a

Vocabulary:

- pollutant
- pollution

Setting: Indoor and Outdoor

Materials:

- blackboard and chalk
- clipboards
- poster board or butcher paper
- crayons, markers, pencils
- tape

Time: one or two class periods

Activity Overview
In this activity students share what they know about pollution, identify pollution in their community and expand their understanding of different types of pollution.

Background
Although not all pollution is visible, most of us are not far from an example of a possible **pollutant** or the effects of **pollution**. It can be as obvious as a billowing smokestack, or as subtle as a plot of ground where no plants have grown for a long time.

Below are some ideas of what you might have students look for if they were searching for sources of pollutants:

- Evidence of fossil fuels being burned (smoke from vehicle exhaust or smokestacks)
- Solid waste that is not properly disposed of (litter, oil, tires, appliances)
- Signs that toxins or dangerous chemicals are being used (treated lawn signs, crop dusters)
- Discharge through pipes in watersheds into streams, lakes, ponds, rivers

If actual sources of pollution are difficult to identify, consider having students look for animals or things that may have been affected by pollution and work backward to determine the cause, such as:

- Unusual number of dead plants or animals
- Statues or buildings that appear excessively dirty or corroded
- Signs that toxins or chemicals have been released in the area (odd smells)
- Oil slicks on the surface of a body of water

Preparation

1. Review vocabulary and background information on “What is Pollution,” pages 5-8.
2. Scout the proposed path for the student walk either on school grounds or within the community. Try to plan a route that will allow students to find examples of pollution. It might be helpful to arrange for the assistance of other adults who are aware of objectives of this activity.

? 1—What is Pollution?
10 Environmental Pathways