

EXPLORING THE NARDOO



CLASSROOM EDITION

for Australian Schools

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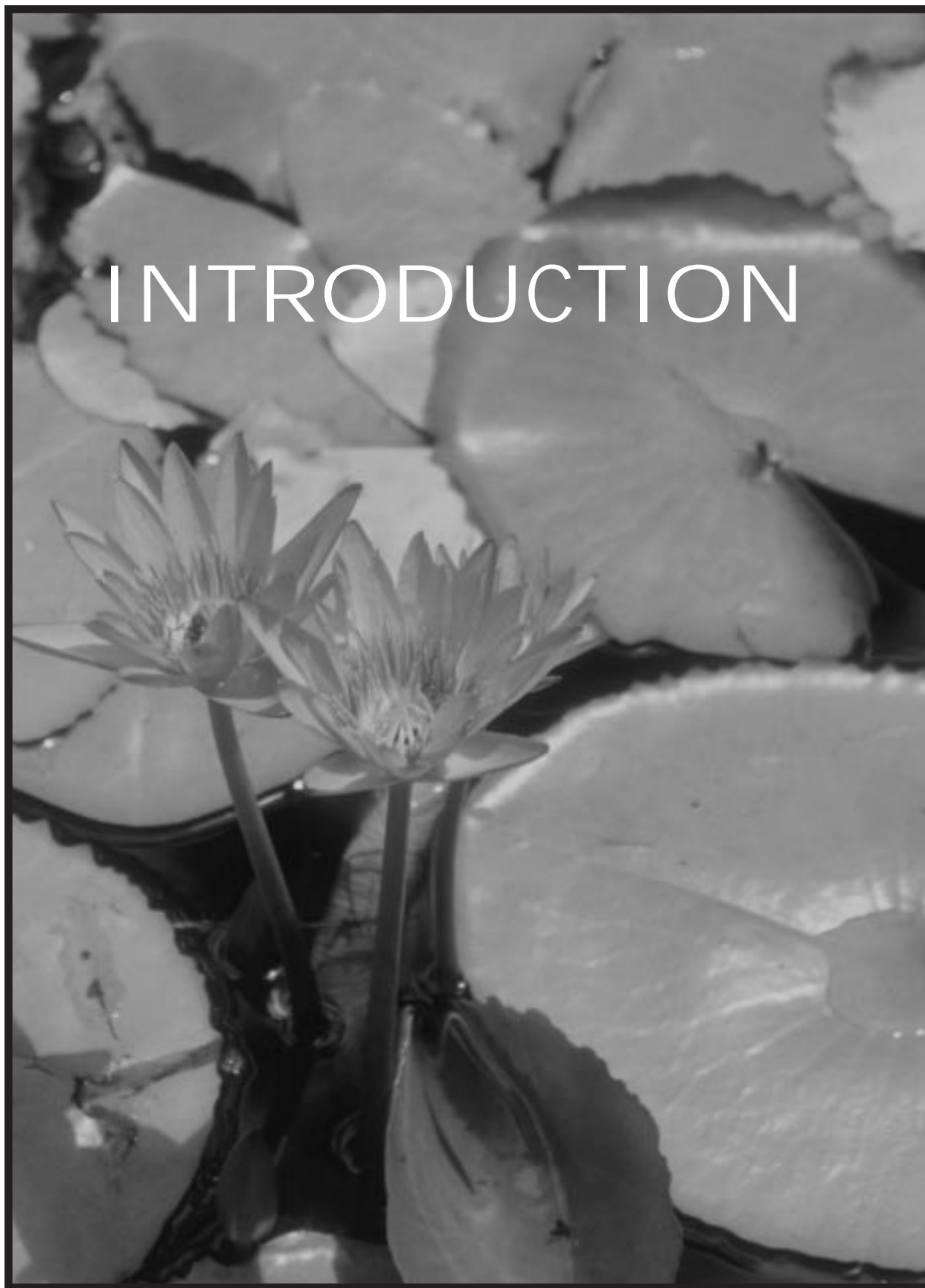
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INTRODUCTION



INTRODUCTION



The Exploring the Nardoo Classroom Edition can be used in many ways, from independent research to cooperative group learning. Exploring the Nardoo CD-ROM and the Classroom Edition will help you and your students to discover some of the major and minor causes of pollution of our water resources no matter where you live. You will also discover the effects of flooding, the need for water management and conservation, and industrial developments on the river as well as the effects on the plants and wildlife that are dependent upon the river.

The Exploring the Nardoo CD-ROM is an interactive multimedia package that takes you through the four geographical regions of the Nardoo River as well as allowing you to travel through time over a period of sixty years. The CD contains newspaper, radio and television reports about the river and its development over sixty years. Students use the Personal Digital Assistant (PDA) to investigate a problem associated with the river's development. The PDA allows them to save information, record water quality tests, and then present their work using a multimedia format.

The Exploring the Nardoo package helps students make connections between the development of the river and changes in plant and wildlife. Students also investigate the chemical and physical changes the river has undergone as human development of the river resources has taken place. Students begin to see how changes in one location can have an impact on the environment in a location far from the source of the change. Through the investigations on the CD-ROM and the lessons contained in the Classroom Edition students learn that very few issues are clear cut. For example: farming is a way of life and survival to many people along the Nardoo river, yet farm runoff has a negative impact on the river's ecology. Wrestling with these tough issues helps students learn how to solve problems in a multidimensional manner. The river investigations also teach students how to perform measurements on the river, interpret data, and develop their own informed opinions and back them up with research. Exploring the Nardoo is the first truly interactive real life software package that requires students to think and solve complex problems.



CHEMISTRY

The Exploring the Nardoo CD-ROM contains many tools for the students to measure the chemical composition of the Nardoo River. In the first lesson students learn how the pH scale is used to test water quality. Students then use the pH tool in the personal digital assistant to test the water quality on the Nardoo. Armed with this information students will be able to judge the water quality of the river in different time zones and physical regions of the river. Students will be able to make inferences as to the effects of the different variables on the plant, animal life and the river itself.

PHYSICAL GEOLOGY

This module begins by teaching students how to use instruments that scientists use to determine the physical characteristics of lakes and rivers. The effects and causes of sedimentation, turbidity, and erosion are all discussed in this section of the Classroom Edition. Students learn how to take these measurements in the classroom and then transfer what they have learned to the Nardoo River Valley.

INVESTIGATIONS

The final module of the Classroom Edition provides a means of assessing the students' knowledge of the different aspects covered in the classroom lessons. The investigation lessons are teacher directed so that students get some experience using the CD before being assigned a specific investigation found on the CD. Students save their work as they move through the activity and then use the edit feature to prepare a presentation for their classmates. Students use the presentation viewer to show their work in a clear and intelligible manner. In this way, students are able to support a position and back it up with research.

The Exploring the Nardoo CD-ROM and the Classroom Edition is designed for students in grades 7 through 12. Although the main focus of Exploring the Nardoo is on Ecology and the environment, it can supplement any science curriculum. Features such as the simulator can also be used to demonstrate mathematical concepts related to graphing. The Classroom Edition helps you bring the Nardoo and its vast amount of information into your Biology, Chemistry and Physical Science classroom. The guide provides a jumping off place for teachers and students to learn how to use the tools in the CD and then integrate the Nardoo CD into the existing curriculum. Teachers will find that the CD contains such a wealth of information that it can be used again and again for different grade levels and in different courses.



INTRODUCTION TO THE NARDOO CURRICULUM GUIDE

Welcome to the Exploring the Nardoo CD-ROM Curriculum Guide. The guide was written to help you the teacher integrate the use of the CD-ROM into your daily lesson plans. The lessons provided will give you a place to start using the Nardoo as a teaching and learning tool in the classroom. A team of five secondary school teachers wrote the guide. The teachers have expertise in biology, chemistry and physics. As teachers we have tried to integrate lessons into the guide that you would typically find in a high school science curriculum. Each lesson is designed to take about one class period although some, if done as a laboratory activity, may take a little longer.

The Classroom Edition is divided into five content modules: Guided Tours, Biology, Chemistry, Physical Geology and Investigations.

GUIDED TOURS

The Guided Tours will help teachers and students become familiar with the interactive features of the CD-ROM. In this manner students will get the most out of Exploring the Nardoo by giving them a thorough understanding of the resources available to them on the CD-ROM before they start the investigations. There are many resources on the CD to help with investigations and lessons: a computer, TV reports, radio reports, newspaper reports, a filing cabinet filled with information pertaining to the investigations, a personal digital assistant for note taking and much more. The tours are recommended before starting the investigations so that students will know how to use the tools before they start their reports.

BIOLOGY

The Exploring the Nardoo CD-ROM provides vast amounts of information on the plant and animal life surrounding the Nardoo River. The lessons provided in the Classroom Edition help your students discover the diversity of life and how an ecosystem's community survives. The biology section in this book begins with lessons that you conduct in your classroom to teach students about topics such as biodiversity and food webs. These lessons are then expanded to the CD where students explore these concepts as they relate to the Nardoo River Valley.



ACTIVITY SET 1: CONSTRUCTION OF THE PILLIGA DAM IN THE MERRINGURRA REGION OF THE NARDOO RIVER

LEARNING OBJECTIVES

The students will be able to:

1. Retrieve background information on dams by checking the file cabinet.
2. Scan the dammed area of the Nardoo River (using the viewer tool) to locate the following:
 - a) information on the types of plant, animal, and microbial life along the banks of the dammed area
 - b) radio and news reports relevant to the construction of the Pilliga Dam
 - c) radio and news reports relevant to the condition of the land, water, and life in and around the dam
 - d) information on the wetlands adjacent to the river and the how they may be affected by the dam
 - e) information on changes in the physical characteristics of the river
3. Use the computer data bank to locate additional radio and news reports, newspaper articles, editorials, etc. on the dam and its effects.
4. Make accurate measurements of physical, chemical, and biological parameters along the dammed area of the river.
5. Compare the physical, chemical, and biological parameters along the dammed river with those from Zone 2 in the same region (Merringurra).
6. Create graphs, maps, articles, and other formats for the purpose of presenting their research to the class.
7. Use the Simulator in the Water Research Center to demonstrate how water can be conserved in your home and yard.



GOALS

Students will be able to:

1. Answer the following questions:
 - a) What are the advantages of constructing a dam in the Murrumbidgee Region of the Nardoo River valley?
 - b) How will the dam impact on the physical structure of the river in this area?
 - c) Will there be any noticeable changes in the plant and animal life?
 - d) Could the presence of Pilliga Dam increase the frequency of algal blooms in the river? What are the causes and effects of algal blooms?
 - e) How will the people downstream cope with reduced or restricted water flow?
 - f) What effect will the dam have upon the wetland areas of the catchment and what are the characteristics and importance of wetlands?
2. Create effective presentations that answer each of these questions through the use of graphs, maps, media clips, articles, drawings, etc.
3. Development of an understanding of how rivers are developed and how these changes affect the health of a river and its inhabitants.

SKILLS

1. Students will use all available resources from the Exploring the Nardoo CD-ROM to locate specific information on dams and their effects.
2. Students will write their notes within the program itself and use the text tablet to edit their notes.
3. Students will use the various genres available in the presentation module to formulate their articles.
4. Students will take measurements along the river.
5. Students will analyze physical, chemical, and biological data and create graphs, models, maps, drawings, etc. to show their results.
6. Students will read and listen to any media available on the dam and its effects and draw logical conclusions.
7. Students will use the viewer tool to locate information along the river.



INTRODUCTION

Pilliga Dam has been constructed in the Murrumbidgee Region of the Nardoo River. At the time of development, environmental groups and others were concerned about the effects that the dam may have on the physical and chemical environment, wildlife, and the society and economy of the Nardoo River valley. These factors should be taken into consideration. There is much information available in this program that centers around this investigation. Students and teachers will tap into some of it in order to gain an understanding of the many issues that are involved.

It is important to gather information and opinions from a wide variety of sources. These would include people who live and work along the river and those whose livelihoods depend upon the businesses developed along the river. Those who have studied the biological, physical, and chemical characteristics of rivers are also a great source of information, as are environmental groups. Also, much data is stored in this program that can be analyzed. This will help students and teachers to draw logical conclusions about the effects of a dam upon a river environment.

***NOTE:** Each of the following lessons will have as its Learning Objectives all or some of the objectives listed above and will encourage some of the skills listed above. Also, there is an extensive presentation on note-taking in the Presentation Guide in the Water Research Center. Students should read through this and familiarize themselves with how to take notes effectively and add items such as video clips to their notes. Students should also access the file cabinet for any information on dams prior to beginning their activity. This will familiarize them with the use of the file cabinet and allow them to make a note of the names of files and articles which may be of use later.



ACTIVITY 1-1: PILLIGA DAM

GOAL

1. Students will answer the question: What impacts will constructing a dam have in the Murrumbidgee Region of the Nardoo River?
2. Students will write an article in the explanation format stating their findings.

INTRODUCTION

A dam has been constructed in the Murrumbidgee Region of the Nardoo River. Some people have protested the effects that the dam would have upon the river and its inhabitants. Your task is to locate as much information as possible which shows the benefits of building a dam; the benefits to living things and to the economy of the region. After putting this information in the notes within the program, you will then write an objective article reporting your findings.

PROCEDURE

1. To familiarize yourself with dam construction, open the File Cabinet and locate any information that has to do with dams. Helpful key terms are: Pilliga dam, Pilliga Crossing, dam, drought, river management, floods, and river regulation. Read and place this information in the notes on your Personal Digital Assistant (PDA).
2. Click on the investigation DAMS from the Investigations Board in the Water Research Center (WRC) and listen to the introduction of the investigation. Use the viewer tool in the PDA to scan the Pilliga Dam area of the river. Start upstream of the dam (at the top of the screen) and slowly move the viewer across and down the river. Also, scan the banks of the river. Locate plants, animals, and any news and radio reports. Look through each of these. Find information that somehow supports construction of the dam. Locate reasons why a dam would be an advantage to those who live and work around it. Enter this information into the notes on your PDA. You must use at least three specific sources. The names of these sources should be entered into your notes.
3. Continue scanning across and down the river looking for any information that would support construction of the dam until you have reached the bottom-most area of the screen. Enter all information into your notes.