BGGS Overview

BGGS is the *Britannica Global Geography System*, a modular electronic learning system which combines the latest pedagogical approach to geography learning with interactive multi-media materials enabling students and teachers to immerse themselves in exciting geographic investigations. BGGS is made up of the following components:

- *Geographic Inquiry into Global Issues* (GIGI) Student DataBooks
- Teacher's Guides with Overhead Transparencies in a three-ring binder
- Laminated Mini-Atlases to accompany each module
- BGGS CD-ROM with User's Manual
- 3 BGGS Videodiscs with Barcode Guides
- 3 thematic posters

This section of your Teacher's Guide will examine each component and demonstrate how the components work together to facilitate some very exciting geography learning for you and your students!

I. GIGI

Geographic Inquiry into Global Issues (GIGI) is the foundation of the BGGS. GIGI is a series of modules developed at the Center for Geographic Education at the University of Colorado at Boulder. The modules are independent of one another and can be presented in any order.

They use an inquiry approach and are organized around ten world regions:

- South Asia
- Southeast Asia
- Japan
- Former Soviet Union
- East Asia
- Australia/New Zealand/Pacific
- North Africa/Southwest Asia
- Africa-South of the Sahara
- Latin America
- Europe

Each GIGI module is centered around a particular question, such as "Why are people in the world hungry?" and "Is freedom of movement a basic human right?" The lead question is explored in one region of the world, then, in most modules, in a second region, before being investigated in North America.

The modules can be used in geography classes, or selected modules can be used in other courses, such as Earth Science, Global Studies, or Economics. Twelve modules constitute ample material for a full year's geography course. Each module is accompanied by sets of laminated mini-atlases which students can write on with dry-erase markers (provided by the teacher), then wipe clean to be re-used by the next class. This activity works well with cooperative groups of students.

Each module comprises a Teacher's Guide in a three-ring binder which includes Handouts and Activity masters for duplication and Overhead Transparencies; twenty-five Student DataBooks (additional Student DataBooks available) and the Mini-Atlases all packaged in a sturdy box suitable for storage when the class moves on to the next module. Since the Student DataBooks are soft-covered three-hole punched, non-consumable books, we recommend that each student have a binder to protect them. BGGS binders are available from Britannica, or you might ask each student to obtain one at the beginning of the course to keep the books in good condition for the next group of students that will use them. As the class completes a module, you can collect the Student DataBooks, place them in their storage box, and distribute the next module's DataBook to be placed in the student's binder.

GIGI print materials are organized in a unique fashion. The Teacher's Guide explains procedures to use in presenting the material found in the GIGI Student DataBook. Miniature layouts of student pages show the teacher how many pages of student material correspond with a given Teacher's Guide page. The Teacher's Guide includes Activities and Handouts to be copied and passed out to the class and Overhead Transparencies to enhance each lesson. All of a module's Activities, Handouts, and Overheads are located behind the third tab divider in each Teacher's Guide.

The teacher needs to become familiar in advance with both Teacher and Student material in order to effectively engage the class in meaningful geographic inquiries. There is a comprehensive "Memo to the Teacher from the GIGI Staff" in each Teacher's Guide which explains in detail the goals and principles behind the inquiry approach to geography learning.

The electronic components of the *Britannica Global Geography System* further empower students and teachers alike to engage in meaningful investigations. They are explained in detail in the following section.

II. BGGS CD-ROM
The **BGGS CD-ROM** is a resource manager and reference tool designed to help both teachers and students get maximum impact from the *Britannica Global Geography System.* This CD-ROM contains the text of the GIGI Student DataBooks in both Spanish and English, as well as Britannica's innovative geography reference program Geopedia™ all on a single disk. Here are some of the ways you and your class can use this software:

* When preparing to teach a module, you can access the GIGI Student DataBook on the CD to find which other elements of the BGGS are keyed to that lesson. For example, if you are teaching Lesson 3 in the Population and Resources module (What is overpopulation and how is it distributed?), accessing that lesson on the CD-ROM will reveal that there is one clip on the *Economic Development* videodisc called "Population/Wealth Correlation." With this information, you can plan when to reserve your department's videodisc player to preview the clip and show it to your class.

Furthermore, you will discover that there is one GIGI mini-atlas activity related to this lesson, five articles in the Geopedia database, ten entries in

Geopedia's World Data, five maps in the Geopedia Atlas, and five learning activities in the Geopedia BrainTeasers. You may want to assign each student or small group of students a research project using these extra resources to be done over the course of the module, or you can create a set of questions which the students must complete using the information found in Geopedia.

These activities can serve as a performance-based assessment of what students have learned in studying each module.

Since many schools have a limited number of computers with CD-ROM drives available, you may wish to devise a rotating schedule or sign-up system to ensure that each student has a chance to get at the BGGS CD-ROM. If it takes 15 class periods for a class of twenty-five students to do one module, students working in pairs can each have one turn at the computer if they schedule their time at the outset of the module. Using the CD-ROM's resource managing capability, you will have a very good sense of what resources you have at your disposal and how to make the most of them.

- All GIGI lessons are indexed by word and by key topic. If your class is studying food shortages in the Hunger module, you can key in the word hunger, and immediately learn where else in the GIGI modules this word or key topic appears. You can go directly to those occurrences in the text. You will also be directed to appropriate Geopedia references and Brain Teaser activities. Figures, Maps and Tables from GIGI print modules do not appear in the CD-ROM. However, the caption describing each of them is part of the online text.

- If Spanish is the primary language of your students, GIGI lessons can be accessed and printed out in Spanish from the BGGS CD-ROM. The BGGS Videodiscs have a Spanish soundtrack as well.

III. BGGS Videodiscs
More than ever before, today's students are visual learners. The GIGI modules explore issues and regions of the world with which many students are unfamiliar. With this in mind, we have produced three videodiscs, one to correspond to each of three major strands we have identified in GIGI: *Earth's Environment and Society; Economic Development;* and *Global Political and Cultural Change.*

These videodiscs, with English and Spanish soundtracks, can take you and your class to the parts of the world you are investigating with the wave of a barcode wand. Your class will hear how Amazon native peoples feel about the exploitation of the tropical rain forests where they live, witness the eruption of a volcano, and see first-hand the environmental disasters human beings have brought about.

The Barcode Guide which accompanies each disc enables you to access with a light pen or barcode reader, segments which pertain to the lesson being investigated. The Guide includes barcodes in both English and Spanish. Teachers can use the segments to enrich lessons, and students can make use of segments to enhance a report or group presentation.

There is a full-color poster to accompany each videodisc cluster which engages the students by asking "How do these images connect to you?" The posters can provide a colorful springboard for classroom discussion.

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BRITANNICA GLOBAL GEOGRAPHY SYSTEM

GIGI

Geographic Inquiry into Global Issues

Infant and Child Mortality

Program Developers
A. David Hill, James M. Dunn, and Phil Klein

TEACHER'S GUIDE

Regional Case Study
Africa—South of the Sahara

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Contents

Memo to the Teacher from the GIGI Staff

You have in your hands the GIGI Teacher's Guide. Teaching with GIGI is a departure from teaching with a conventional textbook. By taking the time to study this memo—about 30 minutes—you will gain a good understanding of the kind of teaching that's needed to be successful with GIGI. We hope you have a rewarding and enjoyable experience!

Goals

The three major goals of *Geographic Inquiry into Global Issues* (GIGI) are to help you teach your students the following:

1. Responsible citizenship
2. Geographic knowledge, skills, and perspectives
3. Critical and reflective thinking

We believe you can accomplish these goals as well as others by teaching real-world issues. GIGI presents these issues with an inquiry approach, using the information, concepts, skills, and perspectives of geography.

GIGI and the Britannica Global Geography System

GIGI offers you two instructional modules for each of ten world regions (Figure 1 on pages vi and vii). There is no necessary sequence of modules; each one is independent, so you can use them in any order you wish or put together smaller clusters of modules to fit your needs. A leading question frames the issue of each module, and student inquiry proceeds through a sequence of lessons, each of which requires one or more daily periods of class time.

Color photographs at the beginning and end of each Student DataBook graphically illustrate the topic under inquiry.

Modules typically begin with a broad introduction to the global issue. Then, a major case study of three to four lessons examines the issue in a real place within the selected world region. Students also explore, usually in a single lesson, a comparative case study in a *different* region, which gives a variant of the issue and a sense of its global nature. Modules also bring the students "back home" to focus on the issue as it may appear in the United States or Canada. We do this because although North America is not one of the 10 GIGI

regions, frequent comparisons to North America throughout each module achieve additional instruction on this "home region."

Each GIGI module requires from two to three weeks of teaching time (10 to 15 class periods of 50 minutes) and contains a Student DataBook, Teacher's Guide, and Mini-Atlas. These GIGI print materials are at the heart of the Britannica Global Geography System (BGGS), which extends and enhances the inquiry approach to real-world issues with a CD-ROM and three videodiscs.

The BGGS CD-ROM puts the text of the GIGI Student DataBooks on line in both English and Spanish, then enables both teacher and students to search the text by lesson, key topic, or word to find the resources in the system that will enhance each. Geopedia™, Britannica's multimedia geography program, is provided in the CD-ROM for follow-up research. It features an atlas with more than 1,000 new maps, an encyclopedia with more than 1,200 geography-related articles, statistical information on every country from Britannica World Data Annual, a chartmaker for creating charts and graphs, a selection of video clips exploring cities and regions, and an electronic notepad allowing teachers and students to clip and edit text right on the screen.

Three videodiscs, designed to electronically transport students to the regions of the world where GIGI case studies are focused, are another part of the BGGS. The discs emphasize three major strands of the GIGI investigations: *Earth's Environment and Society, Economic Development,* and *Global Political and Cultural Change.* Each videodisc has two soundtracks, English and Spanish, and is accompanied by a Barcode Guide that enables teachers and students to access the segments that accompany the GIGI lesson with a wave of the barcode reader. A poster accompanies each videodisc to reinforce the connnections between your students and the issue being studied.

A full explanation of the Britannica Global Geography System components and how they work together is located in the BGGS overview in the front section of this Teacher's Guide.

Geographic Inquiry into Global Issues (GIGI)
Issues, Leading Questions, and Case Study Locations

South Asia	**Population and Resources**	**Religious Conflict***
	How does population growth affect resource availability? Bangladesh (Haiti)	*Where do religious differences contribute to conflict?* Kashmir (Northern Ireland)
Southeast Asia	**Sustainable Agriculture**	**Human Rights**
	How can the world achieve sustainable agriculture? Malaysia (Cameroon, Western United States)	*How is freedom of movement a basic human right?* Cambodia (Cuba, United States)
Japan	**Global Economy***	**Natural Hazards**
	How does trade shape the global economy? Japan (Colombia, United States)	*Why do the effects of natural hazards vary from place to place?* Japan (Bangladesh, United States)
Former Soviet Union	**Diversity and Nationalism***	**Environmental Pollution**
	How do nations cope with cultural diversity? Commonwealth of Independent States (Brazil, United States)	*What are the effects of severe environmental pollution?* Aral Sea (Madagascar, United States)
East Asia	**Population Growth***	**Political Change**
	How is population growth to be managed? China (United States)	*How does political change affect peoples and places?* Hong Kong (South Korea, Taiwan, Singapore, Canada)

* Under development

Figure 1   Matrix showing GIGI modules. Geographic issues are in bold and leading questions are in italics. Major case study locations are followed by comparison examples in parentheses.

Geographic Inquiry into Global Issues (GIGI)
Issues, Leading Questions, and Case Study Locations

**Australia/
New Zealand/
Pacific**

Global Climate Change

What could happen if global warming occurs?
Australia and New Zealand
(Developing Countries,
    U.S. Gulf Coast)

Interdependence*

What are the causes and effects of global interdependence?
Australia
(Falkland Islands, United States)

**North Africa/
Southwest Asia**

Oil and Society*

How have oil riches changed nations?
Saudi Arabia
(Venezuela, Alaska)

Hunger

Why are people hungry?
Sudan
(India, Canada)

**Africa—south
of the Sahara**

Building New Nations*

How are nation-states built?
Nigeria
(South Africa, Canada)

Infant and Child Mortality

Why do so many children suffer from poor health?
Central Africa
(United States)

Latin America

Urban Growth

What are the causes and effects of rapid urbanization and urban growth?
Mexico
(United States)

Development

How does development affect peoples and places?
Amazonia
(Eastern Europe, U.S. Tennessee Valley)

Europe

Regional Integration*

What are the advantages of and barriers to regional integration?
Europe
(United States, Mexico, Canada)

Waste Management

Why is waste management both a local and global concern?
Western Europe
(Japan, United States)

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* Under development

Figure 1   (continued)

The **Student DataBook** contains the following features:
- Memo to the Student from the GIGI Staff
- An overview of the key questions and places explored in the module
- Lesson objectives
- Data presented in a variety of forms, including text, maps, graphs, tables, photographs, and cartoons
- Questions
- Glossary
- References

Students are not expected to learn the GIGI curriculum through the Student DataBook alone. Rather, they derive meaning from the DataBook when you use the Teacher's Guide to work through the curriculum with them. You may want to explain this process to students. Point out that you will be directing them to carry out various activities that are not specified in their text but are important in the sequence of learning.

Prior to teaching the first lesson, be sure students read the "Memo to the Student from the GIGI Staff" and the two-page overview, which gives the module's objectives in question form. Point out the Glossary and encourage its use as you work through the module, noting that glossary words are listed at the beginning of each lesson. So that students will know what they are expected to learn, they need to read carefully and understand the objectives listed at the beginning of each lesson.

This **Teacher's Guide** contains the following sections:
- Preparing to Teach This Module, a synopsis of the module's leading question, themes, and activities
- Module Objectives
- Number of Days Required to Teach the Module
- Suggestions for Teacher Reading ✓
- Extension Activities and Resources ✓

Most lessons include the following sections:
- Time Required
- Materials Needed
- Glossary Words
- Getting Started (suggested anticipatory sets)
- Procedures (for group and individual work)
- Modifications for older or younger students (in a different type face, printed in color)
- Questions and Answers (shown in tinted boxes)
- For Further Inquiry (suggestions for extensions and/or assessments)

- Masters of Overhead Transparencies and Activity masters and keys (located at the back of the Teacher's Guide)

Each module has its own accompanying **Mini-Atlas,** which provides four-color maps designed especially for use with that module. The Teacher's Guide explains how to use these maps. No additional atlases are required to teach the module, but large wall maps are highly recommended for your classroom. In addition to the maps in the Mini-Atlas, you will find numerous maps in the Student DataBook.

Intended Grade Levels

We believe GIGI enables you to probe global issues in various degrees of depth. This allows for the modules' use both over several grade levels (7–12) and over varying lengths of time at a grade level. The Teacher's Guides suggest alternatives for modifying instruction for different grade levels where appropriate. The reading level varies within each module: The Student DataBooks are approximately at grade 9 level, but some extracts from other sources are more challenging. These extracts are important because they show students that many people have contributed to the data, but younger students may need more time and help to understand them. The Teacher's Guides also include extension activities and resources that can maximize the grade-level flexibility of each module. Using the visuals included in the BGGS videodiscs and the activities built into the CD-ROM, you can further tailor instruction to your students. Obviously, you will determine whether particular lessons suit your students' abilities. When a range of required teaching time is given for a module, for example, 10 to 12 days, the greater amount of time should be planned for younger students. If you believe a lesson might be too difficult for your students, eliminate or simplify it. Rarely will the elimination of a lesson render a module ineffective. On the other hand, try to utilize the suggested extensions if the lesson does not adequately challenge your students.

Issues-Based Geographic Inquiry

In order to foster active learning and higher-level thinking, GIGI stresses issues-based geographic inquiry. Inquiry is essentially the method of science and of good detective work: It poses questions and proposes answers about the real world and it tests its answers with real data. Students do this with GIGI. Because this approach may be different from what students are familiar with, you may wish to pre-

pare them by describing the process and its connection to the real world. Also, their reading and discussion of the "Memo to the Student from the GIGI Staff" will help them understand the inquiry approach. GIGI is based on Frances Slater's inquiry activity planning model (1993). To reach GIGI's goals, your students study specific global issues by pursuing answers to geographic questions (Figure 2). They answer these questions by analyzing and evaluating data, using geographic methods and skills. This "doing geography" approach leads to significant outcomes in knowledge, skills, and perspectives. The progression from questions to generalizations "is crucial as a structure for activity planning and as a strategy for developing meaning and understanding. Meaning and understanding define the process of tying little factual knots of information into bigger general knots so that geography begins to make sense, not as a heap of isolated facts but as a network of *ideas and procedures*" (Slater 1993, page 60).

In truly free inquiry, students work independently, but with GIGI posing questions and providing data, you and your students explore the issues together. This approach supports and encourages your students in learning geography.

By using issues-based inquiry, you promote the development of a critical perspective in your students. They learn the habits of critical and reflective thinking. Multiple and opposing positions are inherent
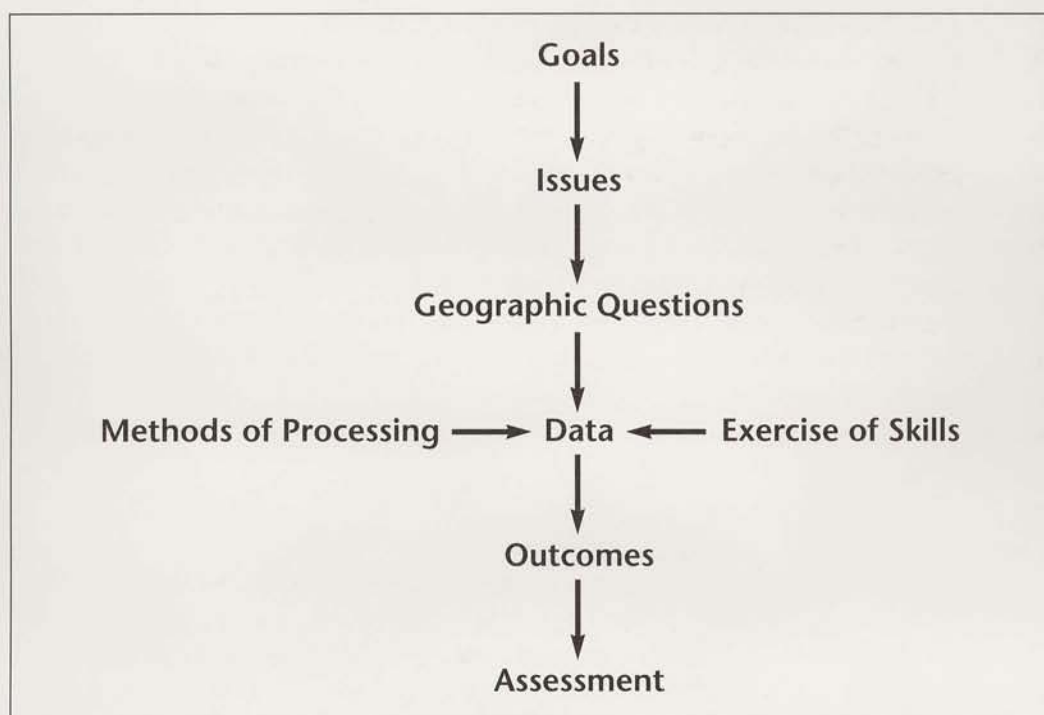

Figure 2   GIGI's model for issues-based geographic inquiry (after Slater 1993).

in these issues. Facts can be used to support different points of view. This is the context in which the habits of the critical perspective can develop, and *interpretation* is the key activity. With GIGI you foster these habits and abilities as you help your students interpret data guided by hypotheses, propositions, arguments, or questions.

An essential element of data-based, issues-oriented inquiry is to challenge your students by giving them opportunities to

- raise new questions,
- question the quality of the data,
- seek more useful or current data,
- articulate relationships they perceive,
- explain their processes of investigation, and
- defend their positions, decisions, and solutions.

Why These Issues Were Chosen

In planning GIGI, we sought timeless issues that are truly global in scope and that are of special concern to geographers. In this way, GIGI fosters what the National Geography Standards calls "the geographically informed person" needed by modern global citizenry (Geography Education Standards Project 1994).

The major case study, chosen to give solid grounding to the issue, is focused on a region where the issue is clearly expressed. The secondary case studies, based in other regions including the United States and Canada, show the *global* scope of the issue.

It is important to stress that, although GIGI contains a wide selection of case studies in all major regions (Figure 1) as well as frequent references to the global distribution of many geographic phenomena, GIGI is not a traditional regional geography. It does not attempt to provide basic geographic information for each region, such as one finds in traditional regional geography textbooks. In teaching a GIGI module, it is important to keep the emphasis on the issue and not get distracted with extraneous regional information.

Role of Questions

Each GIGI module is divided into six to eight lessons, each titled by a question; subquestions head individual sections of the lessons. Questions guide inquiry in order to merge the process of investigation with the drawing of conclusions. Directly linking questions and answers helps achieve an intellectually satisfying understanding of a problem (Slater 1993). When students are asked to learn only conclusions without learning how they are drawn, we perpetuate the tradition of an answer-centered education bereft of higher-level thinking. Therefore, it is important that students understand they are not

always expected to answer the questions when they first appear, but rather to keep them in mind as guides when they are reading or discussing.

GIGI asks both convergent and divergent questions, trying to reach a balance between the two. Supplement the questions in GIGI by asking your students many more of the types of questions suggested by Slater (1993). These are questions that encourage

- recall,
- classification and ordering,
- the use of data to draw conclusions,
- awareness of the limitations of data or of evaluation of data, and
- awareness of the processes of reasoning used.

According to the National Geography Standards, the "geographically informed person applies a comprehensive spatial view of the world to life situations" (Geography Education Standards Project 1994). In order to foster such a view of the world, GIGI asks *geographic* questions that ask where things are and why. By asking such geographic questions and by having students learn to ask them, you will reinforce GIGI's approach. A good question to begin with is: Where is this issue located? Then proceed to questions such as the following:

- Why does it take place there?
- How and why does this issue affect the people in this place?
- In what other places do people confront this issue?
- How and why are these places related?
- What alternatives do people have to improve their situation, and which alternatives do you recommend?

Fundamental Themes of Geography

In recent years, many geography teachers have learned that the five "fundamental themes" (Joint Committee on Geographic Education 1984) help them ask geographic questions. The theme of **Location** asks where things are and why things are located where they are. **Place** is the theme that inquires into human and physical characteristics of locations. **Human-Environment Interaction** examines how and why humans both adapt to and modify their environments as well as the consequences of these actions. **Movement** investigates not only how and why places are connected but also what is the significance of those interactions. The theme of **Region** seeks to identify and explain similarities and differences among areas and how and why these form and change. An extended explanation of the themes and their concepts, interrelationships, and applications is

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given in Hill and McCormick (1989). The themes are useful because they encourage the kinds of questions required to help students develop the geographic perspective.

Importance of Local Examples

GIGI is a world geography, but it shows that issues work at various geographic scales—personal, local, regional, national, and global. Because it is sometimes difficult for younger students to identify with faraway places, success with GIGI in part depends upon the ability of both you and your students to relate the issues to examples in your local community. We strongly recommend that you refer in class to local examples of the issue being investigated. Just as important, we encourage you to have your students conduct local field studies related to this issue whenever possible. Issues having important geographic dimensions abound in every community (see the Extension Activities and Resources section at the end of this Teacher's Guide for examples). Peak educational experiences often come when students see things in the field that relate to their classroom studies. We discuss other reasons for local involvement in the next section.

Familiar people can be as important as familiar places in motivating students. The quality of personal engagement is at the crux of successful instruction. Using the BGGS videodisc segments that accompany most GIGI lessons is a powerful way to help your students find relevance by identifying the GIGI issues with real people. Similarly, you can connect GIGI issues to everyday life at a human scale, especially at the students' own age levels, by using current newspaper accounts or magazines that address the student's perspective.

As you gain familiarity with teaching local examples, as you develop field exercises for your students, and as you learn how to put a human face on these materials, you will begin to customize the GIGI modules to fit your particular environment. Our trial teachers reported that the more they taught GIGI modules, the more comfortable they became in adapting them to fit their needs.

Fostering Optimistic and Constructive Perspectives

The seriousness and complexity of the global issues studied in GIGI can overwhelm students unless you take care to foster optimistic and constructive perspectives toward issues. "Gloom and doom" needs to be balanced with examples of success and prospects for positive change. It is important to help your students develop a

sense of personal efficacy, an attitude that their actions can make a difference in solving global problems. The maxim, "Think Globally, Act Locally," speaks to the need to help students organize and conduct constructive actions that address local variants of the issues they are studying. As we noted earlier, student involvement in local projects enriches their educational experience. There is also good evidence that it actually produces an optimistic feeling—that their actions *can* make a difference—to help them deal with the often difficult and sometimes depressing world issues. GIGI modules often include lessons and activities to show possibilities for positive action.

Certain perspectives foster student optimism and constructive behavior. Geography students, especially, should learn to respect other peoples and lands, and they should come to cherish environmental unity and natural diversity. They should also learn to be skeptical about simplistic explanations, such as the theory that attempts to explain human characteristics and actions in terms of the physical environment alone, which geographers call "environmental determinism." Most important, optimistic and constructive perspectives accompany the development of empathy, tolerance, and open-mindedness. These traits are fostered by avoiding sexist and racist language, discouraging ethnocentricity, and challenging stereotypes, simplistic solutions, and basic assumptions.

References to Data

Unlike most textbooks, GIGI attributes its sources of data with in-text citations and full reference lists, which is another way of encouraging the critical perspective. In the Student DataBook, material that has been extracted from original sources is indented and printed in a different typeface. Long extracts are highlighted with background color. Use of these sources helps your students learn that real people construct ideas and data and that their concepts and information are not immutable. Instead, they often change through the critiques and interpretations of various people. By using these scholarly conventions, we intend to encourage your students to appreciate the tentativeness of knowledge and to value scholarship and academic integrity.

Updating

Real data quickly become obsolete. GIGI addresses this fact by discussing historical trends of data and by stressing concepts. You should reinforce this bias for concepts and also freely acknowledge the datedness of information by explaining why it is still used (for example, the lags between research and writing and publication and

use; the lack of more recent data). Whenever possible, guide students to update materials. Britannica's Geopedia, on the BGGS CD-ROM, contains data based on Encyclopædia Britannica's World Data Annual, which is also available in print form. Have students use these sources to supplement and update GIGI data.

Assessing Learning

Evaluation of student achievements with GIGI can be focused on two broad areas. The first is the developing ability of students to undertake geographic inquiry. The second is the acquisition of knowledge and perspectives about the module issue.

The ability of students to undertake inquiry in geography can be related to the primary questions that guide geographical study. They are noted earlier in this memo. As students work through the module, they are likely to become increasingly adept at asking and answering geographic questions. Seek to extend your students' competence in several clusters of skills that facilitate geographic inquiry. These clusters include the following:

- Identifying problems and issues. This may be done through observation, asking questions, brainstorming, reading, and in other ways.
- Inquiring into the problems and issues in many ways such as through map reading and interpretation, making surveys, and using results of surveys done by others.
- Making decisions and taking action, for example, through reviewing alternatives, establishing priorities and criteria, and communicating cooperatively with people in other ways.
- Reflecting at all stages of the process of inquiry, especially through careful consideration of diverse sources of evidence.

Students will acquire knowledge of the module issue as they make their inquiries. This knowledge can be tested and graded. Assessments may be based on the following:

- Knowledge and skills shown by work on Activities included in this Teacher's Guide and on questions in the Student DataBook.
- Observations of student participation in groups and in class discussions.

Specific assessment ideas are given at the end of some lessons in the section called For Further Inquiry. In addition, the Teacher's Guide ends with Extension Activities and Resources. Some of these extension activities can serve as authentic assessments.

Potential Uses

In addition to the flexibility offered by the free-standing nature of the modules, GIGI has a number of other characteristics that encourage widespread use. Modules can be extended and enhanced with the BGGS CD-ROM, videodiscs, and posters. Because GIGI's issues-based approach integrates several topics (for example, population, economic, political, physical, and cultural geography) in a single module, the modules are not conducive to using an approach in which topics are taught separately. On the other hand, GIGI may be used with a world regional approach because there are modules for each of 10 world regions. A year-long world geography or global studies course will have more than enough material by using 12 modules. Five to seven modules may constitute a one-semester, issues-based geography course covering several regions. You can define clusters of modules for your own curricular purposes. We have identified three clusters for interdisciplinary studies within the Britannica Global Geography System, each comprising six or seven GIGI modules. They are *Earth's Environment and Society, Economic Development,* and *Global Political and Cultural Change.* BGGS includes a videodisc and poster for each cluster. These strand packages could well be used in Social and Environmental Studies, Earth Science, Global Studies, and Area Studies classes. Activities in the modules also support math, language arts, and arts curricula.

GIGI encourages and facilitates the development of a variety of geographic skills that transfer widely into the natural and social sciences. Among these are skills of asking geographic questions and developing and testing geographic generalizations. These require other GIGI skills including examining and making a variety of maps; analyzing photographs; constructing and interpreting graphs and tables of spatial data; and collecting, interpreting, and presenting geographic information.

Finally, GIGI promotes a wide variety of linguistic, numeric, oral, creative, and social skills as well as geographic skills. In particular, GIGI emphasizes cooperative learning. We believe that one of the great strengths of the GIGI modules is that they give students practice in both group and individual problem solving. As students become more familiar with the global issues, they learn that finding solutions to world problems requires people to work together cooperatively.

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Joint Committee on Geographic Education. 1984. *Guidelines for Geographic Education: Elementary and Secondary Schools.* Washington, DC: Association of American Geographers and National Council for Geographic Education.

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PREPARING TO TEACH THIS MODULE

Infant and Child Mortality

Why do so many children suffer from poor health?

Raising awareness about infant and child mortality is the first step toward solving this global tragedy. Geographers have tried to learn where this problem is most severe and why infant and child mortality does not occur evenly throughout the world. Students may be surprised to consider data that depicts high infant and child mortality as an environmental issue.

This module helps students appreciate the fundamental themes of geography in several important ways. Analysis of socioeconomic data showing similarities among the countries of Central Africa, as well as their differences from more developed countries, exemplifies the theme of *Region.* The theme of *Place,* specifically with respect to the social characteristics of place, underlies the reading about daily life in Nigeria. The theme *Human-Environment Interaction* is also essential in any discussion of disease and malnutrition in Central Africa.

Lesson 1 analyzes the world distribution of the highest rates of infant and child mortality, so that students recognize the geographic concentration of this problem in Central Africa. In the second lesson, students work with a variety of tabular data to investigate what other socioeconomic conditions are associated with high rates of infant and child mortality. This lesson compels students to determine what other variables are associated with the high infant and child mortality regions of Central Africa. This activity introduces students to thinking about causation and correlation. When students see which socioeconomic variables occur in close association in the countries with the highest mortality rates, they can begin to identify the roots or causes of the problem.

Lesson 3 approaches the issue from a different perspective. Students will read about a typical (albeit hypothetical) day in the life of a teenage girl in Nigeria, to put a human face on the statistics. In Lesson 4, students assume the roles of various leaders of the world's

more developed nations and simulate a "Summit Conference on Africa's Children." Students must decide how to allocate resources to address the issue. Lesson 5 provides a comparison to infants and children growing up in U.S. cities, showing that mortality rates can also be very high in places having socioeconomic disadvantages, even within richer countries. The module closes by giving students data showing the steady improvement of infant and child mortality rates, and a chance to propose new solutions.

Using the BGGS CD-ROM can simplify lesson planning by making it easy to access the resources the system provides for each lesson. It shows exactly which Geopedia™ data and learning activities can be used in long-range and short-term assignments, and which videodisc clips will provide visual reinforcement for each GIGI lesson. The CD-ROM can also show you ways in which a lesson in one module relates to a lesson in another module. And it indicates where to find every reference in GIGI, Geopedia™, the Mini-Atlas maps, and the videodiscs to any key topic—for example, "tsunami" or "Bangladesh." The students will also be able to use the BGGS CD-ROM for further research and short-term or long-term range assignments. The BGGS multimedia components and their uses are explained fully in the tabbed BGGS section in the front of this Teacher's Guide.

The following are general modifications recommended for younger students:
- Plan for fifteen days because the activities will require more teacher explanation and support.
- Provide directions for homework assignments and monitor students' understanding and progress.
- Prior to assigning written activities requiring students to draw conclusions and summarize their findings, ask guiding questions and develop a sample outline on the chalkboard.

Number of Days Required to Teach *Infant and Child Mortality*

Ten to fourteen 50-minute class periods

Suggestions for Teacher Reading

The Children's Defense Fund. 1989. *A Vision for America's Future—An Agenda for the 1990s: A Children's Defense Budget*. Washington, DC: The Children's Defense Fund.

Greenberg, Michael R., editor. 1987. *Public Health and the Environment: The U.S. Experiences*. New York: Guilford Press.

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United Nations Children's Fund. 1990. *The State of the World's Children.* New York: Oxford University Press.

World Bank. 1992. *World Development Report.* Washington, DC: The World Bank.

World Bank. 1989. *Investing in Children—The Economics of Education.* Washington, DC: The World Bank.

Where is infant and child mortality most serious?

Time Required

One to two 50-minute class periods

Materials Needed

Copies of Activity 1 for each pair of students
Colored pencils
Several sheets of butcher paper
Mini-Atlas map 1

G Glossary Words

child mortality rate (CMR)

crude death rate (CDR)

infant mortality rate (IMR)

Getting Started

- Before beginning Lesson 1, open with a discussion to give students a sense of the significance of the issue of infant and child mortality. Begin with a statement along these lines: "We're going to study a problem that will claim 100 million lives in the 1990s, but there will be virtually no news coverage, no public outcry, and no demand for action. Do you have any idea what this problem might be?" [One hundred million children under five years old in the world will die from illness and malnutrition during this decade. The illnesses that will lead to these deaths are relatively easy and inexpensive to prevent and treat. Most of these deaths are unnecessary, but there isn't much being done about the problem.]

- Have students read the Memo to the Student and the overview on pages 2–3 in the Student DataBook prior to beginning the module. Also make students aware that there is a Glossary in the back of their DataBooks.

4

Geographic Inquiry into Global Issues

Lesson 1

Where is infant and child mortality most serious?

Objectives

In this lesson, you will

- Explain the difference between the terms *infant mortality* and *child mortality*.
- Identify regions with the most severe problems of infant and child mortality.
- Speculate why this problem is worse in certain places.

Glossary Words

child mortality rate (CMR)
crude death rate (CDR)
infant mortality rate (IMR)

What is the issue of infant and child mortality?

Every week around the world, 40,000 infants and children under the age of five die. In fact, one in every three deaths in the world is of a child under the age of five (UNICEF 1990).

It is possible to calculate the rates of infant mortality and child mortality for every country. The infant mortality rate (IMR) refers to the number of infants under the age of one who die each year for each 1,000 live births. The child mortality rate (CMR) is the number of children below the age of five who die each year for each 1,000 live births. Thus, an IMR of 100 means that one out of every ten babies dies within its first year of life.

Procedures

What is the issue of infant and child mortality? (pages 4–5)

A. Have students read the text on page 4. The reading differentiates between infant mortality and child mortality. For now, the reading prepares students to work on the activity in Procedure B. The difference between the terms is explored in more depth in Procedure E.

Which regions have the highest infant mortality rates? (pages 5–7)

B. Divide the class into pairs. Table 1 gives students data to create a map of rates of infant mortality. Distribute copies of **Activity 1** to each pair. Have **Mini-Atlas map 1** (world political map) available to help students locate the countries and regions in Table 1. Have pairs shade each region according to the information in Table 1. They'll need to decide how to shade the regions in order to distinguish the four categories of infant mortality given on Activity 1. See *Key for Activity 1*.

> Younger students may need more guidance here. The general rule for these types of maps (known as choropleth or area-value maps) is that darker shades are used for higher values.

C. Completing Activity 1 helps students see why the focus of the module is on Central Africa. When students have finished their maps, display them and ask them to identify the benefits of having this information on a map instead of in tabular form. [Geographic concentration of the problem into general "regions" stands out on a map.]

D. Have students respond to Questions 1–3 on page 6.

5

Infant and Child Mortality   5

Life is much more dangerous for infants and children than for the rest of the world population. For example, the crude death rate (CDR), which gives the total deaths in a given year per 1,000 population, is always much lower than the IMR or CMR.

The infant mortality rate is widely regarded as the single best indicator of the quality of life in a society. The lower the infant mortality rate, it is held, the better the general health and social environment (Hale 1990, page 2).

Which regions have the highest infant mortality rates?

As Table 1 below shows, the rates of infant mortality are not the same for every country around the world.

Table 1 Infant mortality rates by world region, 1992 (number of babies under one year old who die each year, per 1,000 live births)

Western Africa	111
Eastern Africa	110
Middle Africa	97
Southern Asia	95
Northern Africa	72
Western Asia	63
Southeast Asia	61
Southern Africa	57
South America	56
Mexico/Central America	50
Former Soviet Union	39
Eastern Asia	34
Europe	11
United States	9
Australia/New Zealand	8
Canada	7
Japan	5

Average of less-developed regions = 75
Average of more-developed regions = 18
World average = 68

Source: Population Reference Bureau 1992.

6

Geographic Inquiry into Global Issues   6

1. Which world regions have the highest rates of infant mortality?
2. Which world regions have the lowest rates of infant mortality?
3. What do the regions with high infant mortality have in common? What do the regions with low infant mortality have in common?

Figure 1 below shows the relationship between infant mortality rates (Table 1) and child mortality rates. In the figure, the rates of infant mortality and child mortality are compared for 40 selected countries from around the world. Each dot on the figure represents one country. For example, the dot marked X represents India. The infant mortality rate of India is 98 and its child mortality rate is 149. The dot marks the intersection of these coordinates on the graph.

Figure 1 Comparison of infant mortality rates and child mortality rates for 40 selected countries.

Source: UNICEF 1990.

1. Which world regions have the highest rates of infant mortality?

   - Regions with the highest rates include Western, Middle, and Central Africa and Southern Asia. This question reflects the heart of the lesson. Central Africa—from about 20°N to 20°S latitude—has the most severe problem.

2. Which world regions have the lowest rates of infant mortality?

   - Regions with the lowest rates include the United States, Canada, Australia, and Europe.

3. What do the regions with high infant mortality have in common? What do the regions with low infant mortality have in common?

   - The key difference is in the level of economic development. Regions with high infant mortality rates are among the world's poorest, while those regions with low rates are among the wealthiest.

If younger students are not familiar with the world pattern of development, this question may be skipped, because Lesson 2 will get at the reason for high infant mortality rates in Central Africa.

E. The module distinguishes between the terms *infant mortality* and *child mortality*. Ask students to explain the difference and why this distinction might be important to people studying this problem. [*Infant mortality* means children under one year of age who die; *child mortality* means children under five years of age who die. Understanding the causes of the medical problems and designing treatments for the diseases or conditions that cause the deaths could depend on the age of the child.]

Figure 1 on page 6 emphasizes that countries with high infant mortality also tend to have high child mortality. If necessary, help students learn to read this graph. Discuss Questions 4–7 or have students answer these in their pairs.

7

Infant and Child Mortality 7

4. What is the relationship between infant mortality rate and child mortality rate?

5. If you knew that a country had an infant mortality rate of 150, what would you expect its child mortality rate to be?

6. Which regions would most likely have high rates of child mortality? Which regions probably have low rates of child mortality?

7. What reasons can you think of to account for the regional differences in infant and child mortality?

Of the 15 countries with the highest rates of infant and child mortality in the world, 14 are found in Western, Eastern, and Middle Africa. (Afghanistan is the other one.) To simplify discussion, this module will refer to these areas together as *Central Africa*.

UNICEF estimates that during the decade of the 1990s, 100 million children under the age of five will die from illness and malnutrition. Of these, 70 percent will be from Central Africa (UNICEF 1984).

But this problem is not hopeless. Most of these 70 million children could be saved, because the illnesses are readily preventable. Thousands will die from dehydration caused by diarrhea, which can be prevented for as little as $1.50 per child for rehydration treatment. Pneumonia, which can be treated with low-cost antibiotics, kills thousands more. Overall, the United Nations estimates that 200,000 children in Central Africa die *every week* from causes that can be prevented.

Questions and Answers for page 7

4. What is the relationship between infant mortality rate and child mortality rate?

   - This is a direct relationship: both increase together. Countries with high infant mortality also have high child mortality rates.

5. If you knew that a country had an infant mortality rate of 150, what would you expect its child mortality rate to be?

   - From the graph, the child mortality rate would be about 225.

6. Which regions would most likely have high rates of child mortality? Which regions probably have low rates of child mortality?

   - Regions that have high infant mortality (Table 1) will have high child mortality—which is the point of including Figure 1. The world's more developed regions have lower child mortality rates.

7. What reasons can you think of to account for the regional differences in infant and child mortality?

   - This question is a lead-in to Lesson 2. Ask the students to hypothesize why the infant and child mortality problems are so much more severe in Central Africa. Record their speculations on butcher paper and hang these in the class for later reference. Students will collect information to test their hypotheses in the next lesson.

For Further Inquiry

The module groups the regions of Middle, Western, and Eastern Africa, as defined by the Population Reference Bureau (1992), into "Central Africa." Discuss why the northern and southern parts of Africa do not fit into this regional breakdown. [Northern Africa is predominantly Arabic, and Southern Africa is dominated, in terms of population, by the Republic of South Africa, which has a greater level of economic development than other countries in Subsaharan Africa.]

Older students can do more with describing the similarities and differences between regions with high and low infant mortality. Challenge students to generate a list of factors that the regions of Central Africa and Southern Asia share.

Why do countries in Central Africa have high rates of infant and child mortality?

Time Required

Three to four 50-minute class periods

Materials Needed

Transparency of Overhead 1
Transparency of Overhead 2
Copies of Activity 2 for each group of students
Colored pencils
Mini-Atlas maps 2 and 3

G Glossary Words

child mortality rate (CMR)
gross national product (GNP)
infant mortality rate (IMR)
literacy

8

8   *Geographic Inquiry into Global Issues*

Lesson 2

Why do countries in Central Africa have high rates of infant and child mortality?

Objectives

In this lesson, you will

• Explain how economic, educational, nutrition, and health factors relate to infant and child mortality in Central Africa.

• Formulate hypotheses regarding the causes of infant and child mortality.

• Compare patterns on maps to investigate reasons for infant and child mortality.

Glossary Words

child mortality rate (CMR)
gross national product (GNP)
infant mortality rate (IMR)
literacy

In Lesson 1, you saw that the countries of Central Africa (Figure 2 on page 9) have some of the world's highest rates of infant and child mortality. Figure 3 (on page 10) shows the rates of infant mortality for all of the countries in this region.

Geographers are concerned with why phenomena occur where they do. In this case, a geographer would want to know *why* rates of infant and child mortality are so high in this particular world region.

What reasons can you think of that would explain why this region has such a severe infant and child mortality problem?

9

Infant and Child Mortality   9

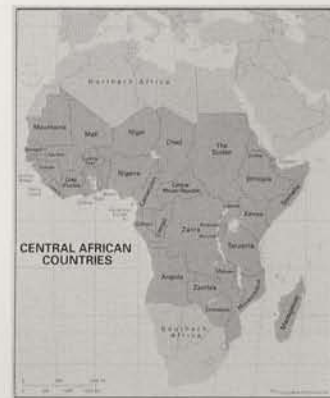**CENTRAL AFRICAN COUNTRIES**

Figure 2   Countries of Central Africa (including the regions of Western, Middle, and Eastern Africa from Table 1).

Geographers define regions for purposes of study. For this study, Central Africa (Figure 2 above) is defined as the combination of three regions for which the Population Reference Bureau (1992) has summarized its data.

Getting Started

Write the word *cause* on the chalkboard. Ask your class what it means when we say something caused something else to happen. You might offer a few everyday examples of causal relations. Then, explain that as geographers, students are going to see if they can determine what causes high infant and child mortality in Central Africa. Have the class brainstorm a list of what information would help them to test their hypotheses about the causes of infant mortality. They may well come up with some of the data tables used in this lesson.

Procedures

A. Read the introductory text on page 8 with the class. Review the hypotheses for the causes of high infant and child mortality that the class came up with in Lesson 1. Use **Overhead 1**, which is a copy of Figure 2 on page 9 in the Student DataBook, and **Mini-Atlas maps 2** and 3 to help students become familiar with the region of Central Africa.

B. Spend a few minutes discussing the question in italic type on page 11: "How well do the map patterns of economic development, education, medical care, nutrition, and safe drinking water match the map pattern of infant mortality?" Students will not be able to answer this question until they have completed **Activity 2**, but first discuss why geographers look for patterns on maps to help understand global issues. The important point to note here is that there are some variations between countries in terms of the severity of the problem. In Lesson 1, the countries of Central Africa were grouped together into one region, which was classified as having high infant mortality. Figure 3 shows that some countries have it worse than others. Ask students to speculate what a map showing child mortality would look like. [From the relationship shown in Figure 1, both maps would look about the same.]

Note: Caution students to note that even countries with the lowest classification of infant mortality on Figure 3 (that is, 61–90 per 1,000) still have a *much* higher rate than that found in more developed regions. Have students refer back to Table 1 if necessary to emphasize this point.

C. Go over the material on pages 14–19 with the class. Explain that students will be finding out why the infant and child mortality problems are found where they are. They will find out what other conditions are also found in these countries and see if other variables could explain the mortality problems. This process tests the hypotheses made at the end of Lesson 1. The central idea of this lesson is that students will discover some spatial correlations between socioeconomic variables (Tables 2–7) and rates of infant and, therefore, child mortality (Figure 3 on page 10).

The relationship illustrated in Figures 4 and 5 (pages 12–13) will help students understand the concept of spatial correlation between different variables. Although it is not a perfect relationship, it is generally true that states with higher per capita income (e.g., the Northeast and Pacific states) have better housing quality. (Note that for housing quality, data do not account for the great variation within states.) Challenge the class to think of some other likely spatial correlations (for example, the number of rock concerts per year and number of people under age 21).

Younger students may be confused by less-than-perfect correlations in this lesson, but it is important for them to recognize that they can still generalize about broad spatial patterns.

D. Utilize a jigsaw cooperative learning format to accomplish the teamwork for the following procedure:

a. Divide the class into base teams of four or five. Balance the teams with regard to ability and social skills.

Figure 4   Quality of housing in the contiguous United States.

Source: Bennett and Hayes 1992.

Figure 5   Average per person income by state for the contiguous United States.

Source: Information Please Almanac 1992.

b. Assign Tables 2–7 on pages 14–19 so that one individual in each group has the information related to economic development (Table 2); another individual in each group receives the education data (Table 3); still another receives the medical care data (Tables 4 and 5); and the last person receives the nutrition and sanitation information (Tables 6 and 7). If you decide to create five-person teams, split Tables 4 and 5 so that you have two individuals in each group focusing on medical information.

c. Members of base teams are responsible for explaining to other students on their team what their table means and how closely these data correspond spatially to the distributions of infant mortality shown in Figure 3. Students will explain these relationships in their expert groups (see next step). Keep students in base teams only long enough to clarify who is responsible for which data. Be sure all students in the base teams understand their responsibilities to the team.

d. Next, reassign students to form four to six expert groups. One expert group consists of all the students with economic data (Table 2). A second expert group comprises those students with the education data (Table 3). A third expert group involves the students who are specialists in the medical care data (Tables 4 and 5). The remainder of the students, with the nutrition and sanitation information (Tables 6 and 7), form the final expert group. Or, you can set up one expert group for each of the six tables.

e. Once in their expert groups students have several tasks to perform. Use **Overhead 2** to summarize these tasks for the expert groups. Students will probably need to spend about one full class period in their expert groups.

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Table 2 Gross national product per person in Central Africa, 1990

Country	GNP per person (U.S. $)
Angola	470
Benin	360
Burkina Faso	330
Burundi	210
Cameroon	940
Central African Republic	390
Chad	190
Congo	1,010
Cote d'Ivoire	730
Ethiopia	120
Gabon	3,220
Gambia	260
Ghana	390
Guinea	480
Guinea-Bissau	180
Kenya	370
Liberia	450
Madagascar	230
Malawi	200
Mali	270
Mauritania	500
Mozambique	80
Niger	310
Nigeria	370
Rwanda	310
Senegal	710
Sierra Leone	240
Somalia	150
Sudan	330
Tanzania	120
Togo	410
Uganda	220
Zaire	230
Zambia	420
Zimbabwe	640
For comparison	
United States	21,700
Japan	25,430
France	19,480
Sweden	23,860

Source: Population Reference Bureau 1992.

Infant and Child Mortality **15**

Table 3 Adult literacy rate in Central Africa

Country	Adult literacy rate % Male	% Female
Angola	49	33
Benin	37	16
Burkina Faso	21	6
Burundi	61	28
Cameroon	68	45
Central African Republic	53	29
Chad	40	11
Congo	71	55
Cote d'Ivoire	53	31
Ethiopia	—	—
Gabon	70	53
Gambia	36	15
Ghana	64	43
Guinea	40	17
Guinea-Bissau	46	17
Kenya	70	49
Liberia	47	23
Madagascar	74	62
Malawi	52	31
Mali	23	11
Mauritania	—	—
Mozambique	55	22
Niger	19	9
Nigeria	—	—
Rwanda	65	33
Senegal	37	19
Sierra Leone	38	21
Somalia	18	6
Sudan	33	14
Tanzania	93	88
Togo	53	28
Uganda	70	45
Zaire	79	45
Zambia	84	67
Zimbabwe	81	67
For comparison		
United States	92	90
Japan	99	99
France	96	94
Sweden	99	99

Note: — No data available.
Source: United Nations Children's Fund 1990, pages 86–87.

Task 1 (10 minutes): Students discuss what each table really means by deciding how each variable contributes to infant and child mortality. The "For comparison" information at the bottom of each table may help students interpret the data. The countries in the "For comparison" sections all have low infant and child mortality rates. Each table shows how the socioeconomic variable contrasts in places with both high and low infant mortality.

Have students consider whether a high number for some variable is a good or a bad thing for a country. Suggested relationships between each variable and infant mortality are given below.

Table 2—GNP per person is the most common measure of a country's economic development or wealth; it is akin to income per person. Countries with low GNP per person (poorer) have higher infant mortality than richer countries.

Table 3—Literacy rates are much lower in countries with high infant and child mortality. Students in this group need to consider why it matters if female literacy rates are especially low.

Table 4—Number of people per physician is a common way to show the availability of health care. In countries with a high ratio of people to doctors, medical care is scarce, and infant mortality rates are higher.

Table 5—Although the differences in immunization rates between countries with high and low infant mortality aren't as clear as one might expect, a higher percentage of immunized children reduces preventable child deaths.

Table 6—Children that do not receive adequate nutrition are more susceptible to disease. Children in countries with low infant mortality rates receive more than their daily average calorie requirements.

Table 7—Countries with unsanitary drinking water tend to have much greater rates of infant and child mortality than countries with safe drinking water, because many diseases are water-borne.

Task 2 (25 minutes): Using their assigned data, expert groups will list the 15 to 20 countries in Central Africa with the most severe problem for the variable they are evaluating. Distribute copies of Activity 2 to each group. Have groups map their variable by shading in each of the 15 to 20

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16   *Geographic Inquiry into Global Issues*

Table 4   Number of people per physician in Central Africa, 1984

Country	People per physician
Angola	17,790
Benin	15,940
Burkina Faso	57,220
Burundi	21,120
Cameroon	—
Central African Republic	23,530
Chad	38,360
Congo	8,320
Cote d'Ivoire	—
Ethiopia	78,970
Gabon	2,790
Gambia	—
Ghana	14,890
Guinea	46,420
Guinea-Bissau	—
Kenya	9,970
Liberia	9,340
Madagascar	9,780
Malawi	11,330
Mali	25,390
Mauritania	12,120
Mozambique	37,960
Niger	39,730
Nigeria	7,990
Rwanda	34,680
Senegal	13,060
Sierra Leone	13,630
Somalia	16,080
Sudan	10,100
Tanzania	26,200
Togo	8,700
Uganda	21,900
Zaire	13,540
Zambia	7,150
Zimbabwe	6,700
For comparison	
United States	470
Japan	660
France	320
Sweden	390

Note: — = No data available.

Source: UNICEF 1990, pages 86–87; World Bank 1992.

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Table 5   Percentage of one-year-old children immunized against DPT* and polio in Central Africa, 1987–1988

Country	Percentage of children DPT	Polio
Angola	12	13
Benin	30	30
Burkina Faso	30	30
Burundi	54	54
Cameroon	45	43
Central African Republic	24	24
Chad	14	14
Congo	71	71
Cote d'Ivoire	32	32
Ethiopia	16	16
Gabon	68	68
Gambia	—	—
Ghana	33	33
Guinea	16	15
Guinea-Bissau	—	—
Kenya	74	75
Liberia	28	28
Madagascar	40	38
Malawi	82	80
Mali	18	18
Mauritania	28	28
Mozambique	38	38
Niger	16	16
Nigeria	58	57
Rwanda	80	78
Senegal	47	47
Sierra Leone	25	26
Somalia	25	25
Sudan	53	53
Tanzania	81	81
Togo	62	60
Uganda	40	41
Zaire	41	41
Zambia	83	81
Zimbabwe	79	79
For comparison		
United States	37	82
Japan	83	73
France	96	41
Sweden	99	93

Notes: — = No data available; *DPT = diphtheria, pertussis (whooping cough), and tetanus.

Source: United Nations Children's Fund 1990, pages 86–87.

countries in a dark color on **Activity 2.** Remind groups to title their map and include a clear legend. Expert groups working with two tables need to make two maps, one for the data from each table.

Groups will have some decisions to make. Each table lists the data for 35 countries, so groups have to decide how many nations to include on their list of the 15 to 20 with the most severe problem. They should not choose more than 20 nations or less than 15, but it is up to them to decide within that range. Groups may decide to include a 16th because it is one among those with the higher rates of infant mortality (Figure 3). Or they may need to include 17 countries because the values are so close that it is difficult to decide on a cut-off point.

Task 3 (15 minutes): Expert groups will decide how well the spatial pattern they mapped on Activity 2 matches the spatial patterns of infant mortality shown on Figure 3. Have the group discuss and seek consensus on this question: Do they suspect that their variable (e.g., lack of education

or inadequate calories) represents a contributing cause to the problem of infant and child mortality? Again, the idea is if the countries with the highest rates of infant mortality also are considered to have the worst problem as determined in Task 2, then it is reasonable to conclude that the two conditions are related.

To prepare for Procedure E, collect the completed Activity 2 maps. Make six copies of each map (i.e., one for each base team) so that base teams can examine the spatial distribution of the data from Tables 2–7.

E. Have students return to their original base teams. Distribute one copy of the six Activity 2 maps to each base team. In the base teams, the representatives from each expert group explain their results to the other members of the base team.

Have students compare the spatial distributions for each variable to the map of high infant mortality in Figure 3. Have base teams discuss which distribution most closely

---

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Table 6   Nutrition in Central Africa (measured as calories consumed)

Country	Calories per person (% of daily requirement)
Angola	82
Benin	96
Burkina Faso	86
Burundi	97
Cameroon	88
Central African Republic	86
Chad	69
Congo	117
Cote d'Ivoire	110
Ethiopia	71
Gabon	107
Ghana	76
Gambia	—
Guinea	77
Guinea-Bissau	—
Kenya	92
Liberia	102
Madagascar	106
Malawi	102
Mali	86
Mauritania	92
Mozambique	69
Niger	100
Nigeria	90
Rwanda	81
Senegal	99
Sierra Leone	81
Somalia	—
Sudan	88
Tanzania	96
Togo	97
Uganda	93
Zaire	98
Zambia	92
Zimbabwe	89
for comparison	
United States	138
Japan	122
France	130
Sweden	113

Note: — = No data available.

Source: United Nations Children's Fund 1990, pages 86–87.

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Table 7   Percentage of population with access to safe drinking water in Central Africa, 1985–1987

Country	Percentage of population
Angola	33
Benin	52
Burkina Faso	67
Burundi	26
Cameroon	33
Central African Republic	—
Chad	—
Congo	21
Cote d'Ivoire	19
Gabon	92
Gambia	59
Ghana	56
Guinea	19
Guinea-Bissau	25
Ethiopia	16
Kenya	30
Liberia	55
Madagascar	32
Malawi	56
Mali	17
Mauritania	—
Mozambique	16
Niger	47
Nigeria	46
Rwanda	50
Senegal	53
Sierra Leone	25
Somalia	34
Sudan	21
Tanzania	33
Togo	55
Uganda	20
Zaire	33
Zambia	59
Zimbabwe	—
for comparison	
United States	100
Japan	100
France	100
Sweden	100

Note: — = No data available.

Source: United Nations Children's Fund 1990, pages 80–81.

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appears to match that of infant mortality. As a conclusion, have each base team prepare a short report describing which socioeconomic variables seem to explain high infant (and child) mortality rates. Have base teams select a reporter to present the conclusions to the class.

F. Bring the class back together as a whole and draw out what the students have learned, with questions such as the following:

- What did you learn from this lesson? Did you learn anything about infant mortality?

- If you were going to try to solve these child mortality problems, where do you think you would start? (Students will get an opportunity to follow up on this in Lesson 4.)

- What did you learn about how geographers use the spatial perspective to solve real-life problems?

- How well did you work together as a group? Did you listen to each other? Did anyone dominate, or did anyone not do their part?

G. Post the completed Activity 2 maps around the room. Students will refer back to these during Lesson 4.

For Further Inquiry

Have students use library resources to investigate socioeconomic conditions in more detail for specific countries either within Central Africa or in other regions, especially those that may be in the news. For example, news coverage of Somalia provided much new information about the health, education, and sanitation conditions in that country.

Lesson 3

What is life like for an African teenager?

⏲ Time Required

One 50-minute class period

✎ Materials Needed

Mini-Atlas map 4

Ⓖ Glossary Words

catarrh	lorry
child mortality rate (CMR)	night soil
fluke	queue
infant mortality rate (IMR)	tributary
juju	

Procedures

A. To add a human side to the infant and child mortality issue that tables alone cannot reveal, students will read in this lesson about a 16-year-old student in Nigeria. The main character, Efiong Etuk, observes and reflects on the health issues in her family and in her village. Through a letter from her brother studying in the United States, students will see the different sorts of health concerns in the more affluent United States. Although the story and the letter are fictional, they are representative of living conditions in much of Central Africa.

Have students read "Efiong's Day." Pass around **Mini-Atlas map 4** to allow students to find the places mentioned in the Student DataBook on pages 20–22. Below is a pronunciation guide to help with the names.

Efiong Etuk	EH-fee-anhg AY-took
Abak	AY-back
Udoh	OO-doe
Akpan	ACK-pan
Ime	EYE-may
Uyo	OO-yo

B. Hold a class discussion about Questions 1–3 on page 25.

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Nigerian women make purchases from their local market.

fruit, cassava, and a small piece of meat, which had lain uncovered except for the flies that fill the market each day.

Efiong's village does not have electricity and no one is sufficiently wealthy to have a kerosene refrigerator. Perishable food is kept in a large earthen pot in each hut and a heavy piece of wet cloth is kept on it to help lower the temperature inside through evaporation. She knows from her brother Akpan that in the United States perishable food is often sold refrigerated and wrapped in plastic.

Efiong would like to have taken Ime with her to the market, but Ime has been too sick. It troubles Efiong that her baby sister has had catarrh and fever for so much of her short life. Efiong's mother has taken Ime to the village medicine man for juju treatments, but his magic has not been good and Ime grows listless and weaker. It is not her place to question her mother in these matters, but Efiong wonders if it would be worth the 28-mile trip in the lorry to the town of Uyo to get European medicine for Ime at the government dispensary.

Later in the day, Efiong walked to the post office to see if there was a letter from her brother, Akpan. As she waited impatiently in the queue of the post office, she thought of Akpan, a university student in the faraway United States. Maybe there would be a letter from him today. He had always been so quick to learn. The missionaries who ran the school in Abak had worked hard to find a way for him to attend the university in Washington, D.C. Akpan's letter is there. It is reprinted as follows:

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Dear family:

When I last wrote, I described for you my first impressions of America and this capital city where I live. As time goes by I have the opportunity to become more familiar with life here and to understand more of what I experience. As you would expect, there are many aspects of life in the city that I like and others I do not like. Washington is a fearsome, wondrous, busy city. It has towering buildings and much traffic that runs night and day, so one cannot easily sleep. There are shops and stores with everything imaginable to buy. The air is sometimes dirty and hard to breathe. There are masses of white-skinned people, which has taken some getting used to, and masses of black-skinned people as well.

What I like most is the opportunity to study at Howard University. It is a fine school and my courses are excellent. The library is larger than I could have imagined! I spend much time studying, yet I am also making new friends. I have been invited to many social gatherings where I have the opportunity to meet both Americans and students from other countries.

I have gone to see many monuments and have visited the White House and the Capitol Building. I am astonished by how many musical performances and films are available both at the university and in the city. And bookstores are everywhere! My new friends have also introduced me to restaurants that serve food from many different parts of the world. Although I cannot afford to eat in restaurants often, it is a special delight and I save my money so that I am able to try new dishes. Still, I miss Nigerian food with all of its spiciness.

As there are exciting aspects to life in a big city that I could not have imagined, so

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1. How does the story of "Efiong's Day" provide additional clues about why infant and child mortality rates are so high in Central Africa?

   • Several clues to this problem are in the story, including:

   The young age at which women begin bearing children.

   The lack of "birth spacing." Because family planning is not widely practiced, many African women, such as Efiong's mother, have many children in close succession. This may negatively affect the mother's health and often yields underweight babies.

   The scarcity of medical services, good sanitation, and even electricity, which allow for health-improving opportunities such as refrigeration.

   The presence of fevers such as malaria, liver flukes that cause schistosomiasis, and other parasites. These serious health problems are more common in tropical Africa than in temperate climates.

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too are there problems that I would never h a v e expected. My one-room flat is in a black neighborhood near the university. On my way to campus I walk past many people who seem to live on the streets. They appear to have no way to receive money except by asking for it from strangers who walk by. Although many people beg in Nigeria and we believe it is important to be giving, I did not expect to see begging in such a wealthy country. These people seem to have no families and I wonder what will become of them when summer passes and the snow falls. While I see more men than women, I do sometimes see even children who are living on the streets.

Even more disturbing is the violence in the city. Many young men are part of gangs who have guns, which they use to shoot each other! Other times the violence is related to other crimes, especially the buying and selling of drugs. I don't understand why a country that has so much wealth has so many people who seem to take no care for life. I have learned how to use public transportation so that I do not have to walk through my neighborhood after dark. How strange it seems to me to be fearful of others!

My studies go well but I miss many things from my own village. I miss the clean and warm gentle breezes. If only to smell the crimson blossoms of the hibiscus in our compound and to eat gari stew again. I yearn for a slower pace of life and for a contentment that I see lacking here. Yet I am grateful to be able to study and learn at such a wonderful place of learning. I remain,

Your faithful son and loving brother,

Akpan

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Villagers carry water home from the communal well.

1. How does the story of "Efiong's Day" provide additional clues about why infant and child mortality rates are so high in Central Africa?

2. How do the health and safety conditions in Efiong's village compare to those in Washington, D.C. (as described in Akpan's letter)?

3. How might Efiong's education help her to improve the health conditions of her village?

1. How does the story of "Efiong's Day" provide additional clues about why infant and child mortality rates are so high in Central Africa?

   - Several clues to this problem are in the story, including:

     The young age at which women begin bearing children.

     The lack of "birth spacing." Because family planning is not widely practiced, many African women, such as Efiong's mother, have many children in close succession. This may negatively affect the mother's health and often yields underweight babies.

     The scarcity of medical services, good sanitation, and even electricity, which allow for health-improving opportunities such as refrigeration.

     The presence of fevers such as malaria, liver flukes that cause schistosomiasis, and other parasites. These serious health problems are more common in tropical Africa than in temperate climates.

24

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Even more disturbing is the violence in the city. Many young men are part of gangs who have guns, which they use to shoot each other! Other times the violence is related to other crimes, especially the buying and selling of drugs. I don't understand why a country that has so much wealth has so many people who seem to take no care for life. I have learned how to use public transportation so that I do not have to walk through my neighborhood after dark. How strange it seems to me to be fearful of others!

My studies go well but I miss many things from my own village. I miss the clean and warm gentle breezes. If only to smell the crimson blossoms of the hibiscus in our compound and to eat gari stew again. I yearn for a slower pace of life and for a contentment that I see lacking here. Yet I am grateful to be able to study and learn at such a wonderful place of learning. I remain,

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Akpan

25

Villagers carry water home from the communal well.

1. How does the story of "Efiong's Day" provide additional clues about why infant and child mortality rates are so high in Central Africa?

2. How do the health and safety conditions in Efiong's village compare to those in Washington, D.C. (as described in Akpan's letter)?

3. How might Efiong's education help her to improve the health conditions of her village?

2. How do the health and safety conditions in Efiong's village compare to those in Washington, D.C. (as described in Akpan's letter)?

   • Students might have the preconception that a modern U.S. city would have all the advantages in regard to health conditions. Akpan, however, reminds students that U.S. cities have serious poverty problems too. As the students will discover in Lesson 5, infant and child mortality rates in poorer sections of Washington, D.C., are nearly as high as for some places in the developing world.

3. How might Efiong's education help her to improve the health conditions of her village?

   • From school, Efiong has learned how poor sanitation leads to health problems. Encourage speculation on this question about the kinds of educational programs that would alleviate the problem of high infant and child mortality. Students will work with this idea further in Lesson 4.

For Further Inquiry

Invite speakers familiar with living conditions in Central Africa or other developing areas to come to class and discuss the health problems of African children. These could include people from Africa (perhaps students at a nearby university) or people who work with relief agencies in Africa (e.g., the Peace Corps or Catholic Relief Services).

How can Africa's children be helped?

Time Required

Three 50-minute class periods

Materials Needed

Butcher paper
Copies of Activity 2 for each group of students
Copies of Activity 3 (three pages each) for
    each group of students
Several hand calculators
Poker chips or crackers (optional)
Blank transparencies

G Glossary Words

child mortality rate (CMR)

gross national product (GNP)

infant mortality rate (IMR)

literacy

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How can Africa's children be helped?

Objectives

In this lesson, you will

• Describe how much money developed countries spend on foreign aid as a percentage of their overall economy.

• List different ways foreign aid could be effectively spent to reduce infant and child mortality.

• Explain how these approaches would help reduce infant and child mortality rates.

• Consider where health facilities should be located.

Glossary Words

child mortality rate (CMR)
gross national product (GNP)
infant mortality rate (IMR)
literacy

What programs would help African children?

"Our national character can be measured by how we care for our children."

—George Bush, U.S. President (1989–1993)

Source: UNICEF 1990, page 5.

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1. Do you think the quote from former President Bush refers only to children in the United States? Or does the United States have some responsibility to care for children in Central Africa and other places?

2. Do you think a summit conference of the world's leaders could improve the lives of African children?

3. As a leader at this conference, what would you like to see on the agenda?

4. How would you justify spending some of the U.S. budget to help the children of Central Africa and elsewhere?

Foreign aid might help these children.

Getting Started

Announce that the class will act as leaders of the world's developed countries in a summit conference to deal with the problems of infant and child mortality in Africa. Mock up a news bulletin with this announcement and post it on the board. Include a headline with a question along these lines: "How will world leaders save the 70 million African children who are at risk during this decade?"

students for their opinions on Question 1 on page 27. Continue the opening discussion using Questions 2 and 3. These questions lead into the simulated summit conference activity in this lesson. In the simulation, students will decide, in their roles as world leaders, how much money to spend to help African children. Use Question 4 to get students thinking about the tradeoffs involved in using foreign aid for altruistic purposes. For example, students may reconsider their opinions if you point out that such aid involves spending tax dollars.

Procedures

What programs would help African children? (pages 26–29)

A. Have students read the quote from George Bush on page 26 and discuss its meaning. Ask

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Total Money Spent (in billions of U.S. dollars)

Money Spent as a Percentage of GNP

Figure 6   Official development assistance (foreign aid) of 15 developed countries, 1990. Graph on left shows total amount of money spent; graph on right converts this amount to a percentage of the country's total GNP.

Source: World Bank 1992.

Relative to its total economy, the United States spent about 1/5 of 1 percent of its GNP on foreign aid in 1990 (Figure 6 above). By contrast, Finland gave three times as much as that, and Norway gave

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5. According to Figure 6, which country spends the most on foreign aid? How much does it spend?

6. If you measure foreign aid as a percentage of a country's gross national product (GNP), how does the United States rank in Figure 6?

7. If the United States contributed as much of a percentage of its GNP to foreign aid as Norway, how many more billions of dollars would the United States spend?

nearly six times as much. For comparison, the people of the United States spend three times as much each year on cigarettes and five times as much on alcohol as the U.S. government does on foreign aid.

A "Summit Conference on Africa's Children"

In this lesson, you will take the roles of leaders of the world's seven largest developed countries. As world leaders, you will take part in a "Summit Conference on Africa's Children." The goal of this conference is to find the best solutions to the problem of high infant and child mortality in Central Africa.

Each of the seven countries taking part in this summit conference has a limited amount of money that it can spend to help African children. Table 8 on page 30 shows the amount of money available from each country. The amount available is about 25 percent of the 1990 foreign aid budget shown in Figure 6 on page 28. (For purposes of this lesson, imagine that the other 75 percent of the foreign aid budget is used for other purposes.)

Table 8 also shows the total defense budget of these seven countries. For many countries, defense is the single largest expense. As the leader of these countries, you may choose to reduce your defense budget by 1 percent and spend this additional money on foreign aid. Keep in mind, however, that doing so may weaken your country's military.

Questions and Answers for page 27

1. Do you think the quote from former President Bush refers only to children in the United States? Or does the United States have some responsibility to care for children in Central Africa and other places?

   • Answers will vary.

2. Do you think a summit conference of the world's leaders could improve the lives of African children?

   • Answers will vary.

3. As a leader at this conference, what would you like to see on the agenda?

   • Answers will vary.

4. How would you justify spending some of the U.S. budget to help the children of Central Africa and elsewhere?

   • Answers will vary.

B. Use Figure 6 and the text on pages 28 and 29 to put the idea of foreign aid into some perspective. This lesson assumes that it is proper for richer, industrialized countries to lend some assistance to less-developed countries. Poll your class to see if they agree with this. Then ask if they think that the United States is contributing as much as it should to foreign development assistance.

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Table 8   Foreign aid and defense budgets of seven developed countries, 1990 (millions of U.S. dollars)

	Total foreign aid budget	Aid available for Central Africa	Defense budget
United States	11,400	2,900	277,000
Canada	2,500	600	9,800
France	9,400	2,400	36,500
Germany	6,300	1,600	36,900
Italy	3,400	900	19,000
Japan	9,160	2,300	30,300
United Kingdom	2,600	700	32,700

Sources: World Bank 1992; SIPRI 1992.

If no changes are made to defense budgets, the total money available from these seven countries to help African children (for purposes of this simulated conference) is $11.4 billion (equals $11,400 million). The amount of money could increase if money is shifted from defense budgets.

There are many possible ways to spend this money—various programs to help reduce the rate of infant and child mortality. As delegates to this conference, your job is to figure out the best way to spend the money available so that it helps the most children. You will decide what is best to save the lives of the 70 million children in Africa who are at risk during this decade.

The information beginning below and continuing through page 33 details the various programs on which you can choose to spend this money. Three general categories of programs are presented: *Education, Health Care,* and *Sanitation.* For each program, a brief summary is given to explain why it would help reduce infant and child mortality. Table 9 on page 33 then lists how much each program would cost to help the region of Central Africa.

Education programs

• *Radio and TV information:* Regular shows are needed to get nutrition and hygiene information out to the people (Sivard 1989). For example, each year 500,000 African mothers die in pregnancy and childbirth. Many such deaths could be prevented if parents knew about safe pregnancy practices.

Questions and Answers for page 29

5. According to Figure 6, which country spends the most on foreign aid? How much does it spend?

   • The United States ranks first in actual dollars spent (as of 1990), at about $11.5 billion.

6. If you measure foreign aid as a percentage of a country's gross national product (GNP), how does the United States rank in Figure 6?

   • Relative to other developed countries, the United States contributed the smallest proportion of its GNP to foreign aid. (Data for 1992 would show that, in fact, Japan now outspends the United States in terms of actual dollars as well.)

7. If the United States contributed as much of a percentage of its GNP to foreign aid as Norway does, how many more billions of dollars would the United States spend?

   • Norway contributes about six times as great a percentage of its GNP to foreign aid. If the United States contributed proportionately as much as Norway, this would be about $69 billion more (11.5 x 6).

A "Summit Conference on Africa's Children" (pages 29–33)

C. For the rest of this lesson, students will act as leaders of the seven most prosperous countries of the world, who are participating in a "Summit Conference on Africa's Children." The objective is to suggest solutions to the infant and child mortality problem in Central Africa.

   The Student DataBook provides delegates with the costs of various education, health care, and sanitation programs. Delegates are allotted budgets representing 25 percent of their country's foreign aid budget (the remainder being committed to foreign aid outside Africa) (Table 8 on page 30). The table also includes data on each country's defense budget—money that could also be applied to the problem, if students choose to do so. Students target the foreign aid and defense budgets to the programs they believe will contribute most effectively.

   Divide the class into groups of seven students each. Each group represents the heads of state from seven of the most developed countries in the world, namely, those shown in Table 8: the United States, Canada, France, Germany, Italy, Japan, and the United Kingdom. If your class is not divisible by seven, double students up on the roles of the leaders of the United States, Japan, or France. Distribute copies of **Activity 3** to each group. Note that this Activity is three pages long.

D. Each student in the group, acting as head of his or her country, can choose whether or not to reallocate 1 percent of their defense budget to help African children. Step I on Activity 3 takes students through this step. After students have made this decision, the group's Activity sheet will show their budget available for foreign aid to Central Africa, pooling the resources of the seven countries. Advise students to be prepared to defend their decisions.

   For younger students, skip this step and simply use the figures for "Aid available for Central Africa" as shown in Table 8 on page 30. With no increase from defense budgets, the total budget available for the simulation is $11,400 million ($11.4 billion).

E. Have groups read the descriptions of the nine aid programs on pages 30–32 of the Student DataBook (Education, Health care, and Sanitation). Table 9 on page 33 gives the

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approximate costs of each program in millions of U.S. dollars.

Groups must decide how to spend their pooled foreign aid budget. Step II on **Activity 3** takes students through the process. Allow students to discover that even if they added defense money to foreign aid, they still do not have enough money in the budget to pay for all the programs. Groups must choose which programs they think are most important. Groups may opt to fully fund some programs, or they can partially fund all of them. Activity 3 provides examples of how they can do this. Step III asks students to defend their choices.

You can modify the simulation by changing the allocation of foreign aid to Central Africa from 25 percent (as given in Table 8 and Activity 3) or by increasing the contribution from defense budgets. Note, however, that if you increase the available money significantly, it removes the dilemma of not having adequate funds, which is the basis for the decision making in the simulation.

Important: Have a few hand calculators available to help with the arithmetic. If you think the arithmetic is too involved for your class, an alternative approach is to distribute poker chips or crackers to each group. Let each chip or cracker represent $100 million (that's quite a poker game!), so that with a budget of $11,400 million (11.4 billion), each group would start with 114 chips. They could then set aside the number of chips for each program according to its cost. For example, "Radio and TV information" would cost four chips (rounding off the fraction to the nearest 100 million, the "nearest chip"), and "Training physicians" would cost 71 chips.

Older students may wonder how the data in Table 9 were calculated. This is explained at the end of this *Procedures* section, if you wish to discuss or update these data.

F. The last decision the groups make is to identify *which* countries in Central Africa should receive the most assistance. Have groups refer to their Activity 2 maps (posted on the wall after Lesson 2) to recall which countries have the most severe problems. Groups then list six countries that get the most help and defend these choices (Step IV on Activity 3).

G. Have groups record their decisions about which programs to fund and which countries

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- *Basic elementary education:* Basic literacy can be achieved inexpensively if parents put up simple classrooms and use members of the community as teachers. There is a strong relationship between literacy and child mortality. For example, in countries where the female literacy rate is below 20 percent, the average child mortality rate is 235 per 1,000. But where the female literacy rate is over 80 percent, the child mortality rate is only 29 per 1,000 (Sivard 1989). Once educated, children can introduce new ideas about health to their families. This is being encouraged in Uganda, for instance (UNICEF 1990).

- *Adult education:* The adult literacy rate has improved dramatically in developing countries through the efforts of volunteer teachers. The ability to read and write increases the adult's chances to earn a living wage. However, most of the countries in Central Africa have less than a 40 percent adult literacy rate. The rates for women are especially low.

Health care programs

- *Training community health workers:* Community health workers are not physicians, but instead help in the villages and countryside with basic health care programs. It is estimated that more than 250,000 community health workers are needed in Central Africa (UNICEF 1990).

- *Training physicians:* Also needed are fully trained doctors and nurses. For example, in the United States, the ratio of people to doctors is about 470 to 1; in France there is a doctor for every 320 people. In Ethiopia, on the other hand, there is only one doctor for every 79,000 people. For ratios in other Central African countries, see Table 4 on page 16, in Lesson 2.

- *Vaccinations:* Funds are needed to fully immunize each child against the most deadly childhood diseases. In Pakistan, for example, more than 100,000 infant deaths each year have been prevented by raising the percentage of fully immunized children from 5 percent to 75 percent (UNICEF 1990).

- *Essential vitamins and drugs:* There are 30 essential vitamin supplements and drugs, including oral rehydration salts, which are used in Oral Rehydration Treatment (ORT) to treat diarrhea. The UN estimates that 600,000 children could be saved in Central Africa each year if all children received ORT alone. Another 800,000 could be saved each year if treatments were available to prevent tetanus (UNICEF 1988).

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32   Geographic Inquiry into Global Issues

Sanitation programs

- *Access to safe water:* Sixty percent of all the people in Central Africa do not have a safe drinking water supply (UNICEF 1990). Eighty percent of all the diseases that kill children in Africa come from impure water.

- *Safe sewage systems:* Eighty-five percent of rural people in developing countries lack safe, sanitary sewage systems (UNICEF 1989). Many infant and child diseases are related to poor sanitation conditions.

Advice from a health-care worker.

to help on a blank transparency or butcher paper. After groups have completed this step, have each group present and defend its choices to the whole class.

H. Bring closure to the summit conference with a discussion about the groups' approaches to the problem, using questions such as these:

a. From all the programs listed, which seems to offer the best chance to genuinely reduce the infant and child mortality problem in Africa?

b. Would the programs that you recommended be more of a short-term fix or a long-term solution? Why?

c. Which specific African countries did you target and why?

d. Should there have been delegates from the African countries present at such a summit? How might the decision-making process differ if there had been representatives from each of the 35 Central African countries?

e. Did you find that the resources from your current foreign aid budget were adequate, or did you tap your defense budget? How did the amount of your defense budget compare to the amount of your foreign aid budget?

Where should major health facilities be located in Central Africa? (page 33)

I. If you have time available, focus class discussion on the questions given on page 33, asking students to defend their opinions. Provide groups of students copies of the map of Africa (**Activity 2**) and have them display where (and why) they would site the facilities.

Background Note

How Costs in Table 9 Were Estimated

Below is a description of how the costs figures in Table 9 were calculated for each of the nine programs. Much of these are rough estimates only. Use this information at your discretion.

Radio and TV information. UNICEF estimates that broadcasting such programming would cost about $10 million per

country per year. As there are 35 separate countries in Central Africa, that gives a total of $350 million per year.

Basic elementary education. According to UNICEF (1990), approximately 52.5 million children in Central Africa are not enrolled in elementary school. It would cost about $15 per child per year to get them in school, which gives a total of nearly $800 million per year.

Adult education. According to the Population Reference Bureau (1992) data, the adult population (16 years and over) of Central Africa is about 247.8 million. UNICEF (1990) estimates that the cost to educate an adult is about $30 per year per person. This gives a total of approximately $7,425 million per year.

Training community health workers. UNICEF estimates that 250,000 health workers are needed in Central Africa. Training costs $500 per worker, for a total of $125 million per year.

Training physicians. Taking the "People per physician" data from Table 4 on page 16 in the Student DataBook and the population of each country according to Population Reference Bureau (1992) data, we estimate that there are now about 33,000 doctors in Central Africa. To achieve a ratio of persons to physicians of 3,000 (which according to the World Bank [1992] is the average for lower-middle income countries elsewhere in the world), would require a total of 188,500 physicians in Central Africa. According to UNICEF, it costs $60,000 to train a physician, so the total cost is about $7,100 million. (To train enough physicians to bring the ratio to the same as that in the developed world—about 500 people per doctor—would cost in excess of $53,000 million.)

Vaccinations. From Population Reference Bureau data (1992), there are about 212.2 million children under age 15 in Central Africa. At a cost of $10 per child (UNICEF estimate), the total cost is $2,125 million.

Essential vitamins and drugs. At fifty cents per child (UNICEF estimate) for 212.2 million children, the total cost of providing the necessary vitamins and drugs is about $100 million.

Access to safe water. The total population of Central Africa is 460 million (Population Reference Bureau 1992). Sixty percent lack safe water supplies (according to UNICEF). At an annual cost of $5 per person, it means a total of about $1,375 million is needed.

Safe sewage systems. Eighty-five percent of the region's 460 million people lack safe sanitation facilities, according to UNICEF. At an annual cost of $5 per person, the total cost is about $1,950 million.

For Further Inquiry

One aim of this module is that students develop empathy for people who are in difficult situations in other parts of the world. Students may want to do something to help bring relief to these people. What follows are some ideas for brainstorming possible outlets for class involvement.

a. Write these quotes on the chalkboard to get the class thinking about an important idea: Teaching is often meaningless unless it leads us to do something with what we have learned.

The great end of life is not knowledge, but action.

Thomas Huxley

It's not what you know that counts; it's what you do with what you know.

Anonymous

b. The class could hold a fundraiser and donate the proceeds to organizations that are concerned with African relief (see list on this page). There are many possibilities for fund-raising events: recycling for profit; garage sales; charging admission for a class dance or school talent show; auctions; car washes; etc.

c. Contact a radio or TV station in the area and ask for a time when the class could put on a presentation about child mortality in Africa or present a guest editorial to raise public awareness.

d. Contact the U.S. State Department to find out what they are planning to do about solving this problem. The address:

U.S. Department of State
2201 C Street, NW
Washington, DC 20520
Phone: (202) 647-4000

e. Consider "adopting" and supporting a needy African child. For less than $20 per month, your class can provide for the needs of and have personal contact with a child in the world region they have been studying. Contact either of the following organizations:

Bread for the World
802 Rhode Island Ave., NE
Washington, DC 20018

World Vision
919 W. Huntington Dr.
Monrovia, CA 91016
Phone: (818) 357-7979

33

Infant and Child Mortality 33

Table 9   Estimated yearly costs of implementing education, health care, and sanitation programs for all countries in the Central African region

Program	Annual cost (millions of U.S. dollars)
Education	
Radio and TV information	350
Basic elementary education	800
Adult education	7,425
Health care	
Training community health workers	125
Training physicians	7,100
Vaccinations	2,125
Essential vitamins and drugs	100
Sanitation	
Access to safe water	1,375
Safe sewage systems	1,950

Sources: UNICEF 1990; Population Reference Bureau 1992; World Bank 1992.

Where should major health facilities be located in Central Africa?

Imagine that the United Nations has determined that three major health facilities are to be built in Central Africa to help improve the medical care for infants and children. These facilities could include, for example, a major research hospital, a training center for health workers, and a research center for improving sanitation systems.
Where in Central Africa should such facilities be located? Here are some things to consider:

* Should the facilities be located in the countries with the worst infant and child mortality problems?
* Should the facilities be located in countries with the most people and, therefore, the most children at risk?
* Should the facilities be in countries that are centrally located?

What other factors should be considered in locating such facilities?

Why is infant and child mortality a problem in the United States?

⏱ Time Required

One or two 50-minute class periods

🔧 Materials Needed

Informational posters about health awareness
Butcher paper or poster board
Poster-making materials

G Glossary Words

child mortality rate (CMR)

infant mortality rate (IMR)

Getting Started

This lesson shifts the focus from Central Africa to the United States. Ask the class for their preconceptions of the infant and child mortality problem in the United States. At this point, accept any and all speculations. Two questions can start this brief discussion: (1) How do you think the infant and child mortality problem differs in the United States from what you learned about Central Africa? (2) Where would you expect the problem to be the most severe in the United States?

Procedures

How does U.S. infant and child mortality compare with that of other developed nations? (pages 34–37)

A. Ask students to pair up with a partner and look at Figures 7 and 8 and Table 10 on pages 35–37. Their task is to compare the infant and child mortality rates for Washington, D.C., to those in the United States as a whole and in Central Africa. Students also speculate about the reasons for the differences they observe. Have each pair of students write answers to Questions 1–4. After students have finished, write their speculations on the board and have the class evaluate them.

1. Why do you think the United States has lower IMR and CMR than Central Africa?

   • Students may guess that the rates are lower because there is a better supply of health care, clean water, and food in the United States. Other reasons from earlier lessons that can be mentioned here are better educational programs and higher incomes per capita. If students use location or climate as a reason, challenge them to defend this notion—it is a common but incorrect assumption. Economic and social conditions are the root of infant mortality problems, not the physical environment.

2. Do you think the causes of infant and child mortality in the United States are different than the causes in Central Africa? Why? What might these differences be?

   • The causes themselves aren't really different, it's just that the proportion of the population at risk from these causes varies between the two places. In the United States, minority groups suffer more than the majority (Figure 8). Students can speculate why IMR among African Americans is higher (e.g., poorer health care in inner-city areas, lower incomes, poorer prenatal care and nutrition). Students may also fairly point out that violence is a cause of death among minority youth in the United States (although this may not be significant for children under age 5).

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3. Why do you think Washington, D.C., has higher IMR and CMR than the United States as a whole?

- Students may guess that there is a higher incidence of poverty in Washington, D.C., along with the issues noted in Question 2. Because Washington, D.C., is almost 70 percent black, the differential between the two graphs on the left side of Figure 8 is not as great as it would have been had the data been for "White children" instead of "All children."

4. Why do you think the United States has an IMR that is higher than most other developed nations? Be prepared to offer two reasons to the class.

- This question, based on Table 10, is answered later in the Student DataBook on page 39, but for now, allow students to speculate.

Figure 8   Infant and child mortality rates in Washington, D.C., by race (left graph) and infant mortality rates in the United States as a whole, by race (right graph).

Note: Washington, D.C. is 66 percent black.

Sources: U.S. Department of Health and Human Services 1990–1991; Hale 1990; Information Please Almanac 1992.

Table 10   Infant mortality rates, selected developed nations, 1987

Rank	Country	IMR per 1,000
1	Japan	5.0
2	Sweden	5.7
3	Finland	6.2
4	Switzerland	6.8
5	Canada	7.3
6	Ireland	7.4
7	France	7.6
8	Netherlands	7.6
9	Denmark	8.1
10	West Germany	8.3
11	Norway	8.4
12	East Germany	8.5
—	U.S. whites	8.6
13	Australia	8.7
14	Spain	9.0
15	United Kingdom	9.1
16	Luxembourg	9.4
17	Belgium	9.7
18	Austria	9.9
19	New Zealand	10.0
20	Italy	10.1
21	United States	10.1
22	Greece	12.6
23	Portugal	14.2
24	Bulgaria	14.7
25	Czechoslovakia	16.1
26	Hungary	17.4
27	Poland	17.5
—	U.S. blacks	17.9

Source: Hale 1990.

Why do infants die in the United States? (pages 38–39)

B. Divide students into groups of 3 or 4. Have each group read the text on page 38, which points out that 90 percent of infant deaths in the United States are caused by four reasons. Have groups design and create informational posters that aim to increase public awareness of these problems. Before beginning, ask the class to describe what qualities an effective poster would have (e.g., strong visuals, simple but powerful wording, and so on). Bring in some posters (e.g., on drug or AIDS awareness) as examples; usually county health clinics have useful posters. Distribute butcher paper and poster-making materials to each group. After groups have finished, post the art and have the class critique each effort. Consider submitting the best posters to your community for publication.

C. Have the groups proceed reading the text on page 39 and answer Questions 5–8. Students are asked to compare their speculations from Question 4 to the reasons given in the text.

38

Why do infants die in the United States?

This is not an easy question to answer because there are so many causes of infant death in the United States. The following categories of causes accounted for over 90 percent of deaths (Hale 1990):

- Inherited traits
- Sudden Infant Death Syndrome (SIDS), which is a breathing problem recognized and defined only recently
- Causes arising in the perinatal period (after the twenty-eighth week of pregnancy through the seventh day after birth), such as complications of labor and delivery
- Preventable causes such as infectious diseases and accidents

The causes in the last two categories accounted for nearly 60 percent of infant deaths in 1987.

As shown on Table 10 on page 37, 19 developed nations had infant death rates lower than that of the United States in 1987. In fact, the relative position of the United States had declined over the previous two decades: The United States ranked fifteenth in infant mortality in 1968 (Hale 1990). In Question 4 on page 35, you were asked to suggest two reasons for this situation. Now compare your explanations with the ones given on page 39.

Unlike other developed countries, the United States does not guarantee health care to pregnant women and their children.

39

It is not fully known why the United States, the richest nation in the world, should lag behind so many other developed nations in saving the lives of its babies. One frequently suggested reason is that those other developed countries have more available and accessible health services. (Unlike all other developed countries, the United States does not guarantee pregnant women and their children access to health care.) Another explanation is that other developed nations have fewer racial and ethnic minority populations than does the United States. Yet another reason given is that in the other developed nations, national income is more evenly distributed among the populations (Hale 1990).

5. Why might race and ethnicity help to explain the relatively low ranking of the United States among other developed nations regarding IMR?

6. What data would you need to check the validity of the three reasons given above for why the United States has such a high infant mortality rate compared to other developed nations?

Study Figures 7 and 8 and Table 10 again, looking for clues for two risk factors that can be used to predict differences in rates of infant mortality in the United States. In other words, what would you look for to help you predict infant mortality rates?

7. What two risk factors did you identify from Figures 7 and 8 and Table 10? What were the clues you found for these factors?

8. What three approaches do you think the United States could take to reduce its rate of infant mortality? What are the advantages and disadvantages of those approaches?

5. Why might race and ethnicity help to explain the relatively low ranking of the United States among other developed nations regarding IMR?

   - Because infant mortality is related to economic and social conditions, groups with lower income levels or living in areas with poor health care would be at greater risk. Racial and ethnic minorities (e.g., African Americans, Hispanics, and Native Americans) in the United States generally have these problems, and their rates of infant mortality are higher than the rates for whites in the United States. Other developed nations historically have not had the wide range of incomes and living conditions found in the United States.

6. What data would you need to check the validity of the three reasons given (on page 39) for why the United States has such a high infant mortality rate compared to other developed nations?

   - Three reasons given are accessible health care, racial and ethnic diversity, and unevenly distributed income. To check these, one would need data on persons per physician, racial and ethnic profiles, and income per capita broken down by region and ethnic group.

   If this high-level question is too hard for younger students, have them simply list the three reasons given in the text.

7. What two risk factors did you identify from Figures 7 and 8 and Table 10? What were the clues you found for these factors?

   - This is open to discussion, but it is clear from Figure 8 that a big difference between races exists in infant and child mortality rates. In the United States as a whole, infant mortality among blacks is about twice as high as it is for whites. It is reasonable to say blacks are at greater risk in the United States. Also, notice that the IMR for Washington, D.C., is much higher than for the United States as a whole (Figure 8). So you could say that place of residence is another predictor.
     Here is additional information you can share with students if you wish: Infant mortality rates are highest in the core poverty zones of large cities and in very poor rural areas, especially in the South. The two U.S. cities having the highest rates are Washington, D.C., and Detroit. Rates for states also vary widely. For example, in 1987, the IMR ranged from a low of 7.2 in Massachusetts to a high of 12.7 in South Carolina and Georgia (Hale 1990).

8. What three approaches do you think the United States could take to reduce its rate of infant mortality? What are the advantages and disadvantages of those approaches?

   - Accept any reasonable answers here. Students can draw from the programs described in Lesson 4 for Central Africa. Educational programs, health care, and sanitation are three broad categories discussed earlier; they are just as appropriate for the United States.

For Further Inquiry

- Have students find the rates of infant and child mortality for their city, state, or region. They can compare their community with national rates, using the socioeconomic data as shown in the tables in Lesson 2 (literacy, health care, and so on).

- Have interested students contact politicians (e.g., their representatives, senators, or the President) if they have opinions about government policies toward infant and child mortality. Addresses for each district's Congresspeople are generally available from the local newspaper. Here is the President's address: The President of the United States, White House Office, 1600 Pennsylvania Ave., Washington, DC 20500. Phone: (202) 456-1414.

- This idea extends the poster activity from Procedure B. Have students contact community health officials to find out the major reasons for infant and child mortality in their own community. These may differ from the national data in the Student DataBook.

How have infant and child mortality rates improved?

Time Required

One or two 50-minutes class periods

Materials Needed

Copies of Activity 4 for each group of students
Transparency of Overhead 3
Copies of Activity 5 for all students

G Glossary Words

child mortality rate (CMR)

fertility rate

infant mortality rate (IMR)

Procedures

Why is there reason for optimism about infant and child mortality? (pages 40–43)

A. Have students split into groups and study Figures 9 and 10 to answer Questions 1–4 on pages 41 and 43. Question 5 is included in the next procedure.

40

Questions and Answers for pages 41 and 43

1. How would you describe the trends, decade by decade since 1940, of the IMR in the United States? Why?

   - The IMR for African Americans decreased a lot from 1940 to 1950, then leveled off until 1965. Since then, it has steadily dropped, although it is still higher than the national average. The rates for whites have declined steadily each decade since 1940.

2. On what problem would you particularly concentrate in order to further reduce the IMR in the United States? Why?

   - One would need to address the issue of poverty in all of its dimensions in order to reduce the IMR further.

3. How would you describe the differences in the three variables in Figure 10 for low-, middle-, and high-income countries?

   - Life expectancy is greater in high-income countries than in low-income countries, although the numbers have increased for each since 1965.

41

Infant and Child Mortality   41

Figure 9   Infant mortality rates, United States, 1940–1987.

Source: Hale 1990.

1. How would you describe the trends, decade by decade since 1940, of the IMR in the United States? Why?
2. On what problem would you particularly concentrate in order to further reduce the IMR in the United States? Why?

42

42   Geographic Inquiry into Global Issues

People now live much longer than they did in the past. In fact, life expectancy (the average number of years people in a given population can expect to live) throughout the world has shown great gains in the past few decades. An important reason that life expectancy has increased is because infant mortality has decreased. During the same period, the total fertility rate (the average number of children born to a woman in a given population) has dropped (Figure 10 below).

Total Fertility (births per woman)   Life Expectancy (years)   Infant Mortality (deaths per 1,000 live births)

- - - Low-income countries / Low-income countries
—— Middle-income countries / Middle-income countries
—— High-income countries / High-income countries

Figure 10   Trends in fertility, infant mortality, and life expectancy.

Source: World Bank 1992.

4. What is the trend for these variables since 1965? How would you describe the trends for each income level?

   - The trend is similar for each group, showing steady decreases in total fertility and infant mortality, and a steady increase in life expectancy.

5. What kind of relationship do you think exists between the IMR and the fertility rate? Why do you think the fertility rate has decreased?

   - As infant mortality decreases, the number of children born per woman also decreases. Students may speculate that families don't need as many children born if a higher proportion of them are surviving infancy.

B. In Question 5 on page 43, the first part of the question asks students to describe a relationship between two variables. **Activity 4** has them create a scatter diagram to show how well these two variables correlate. The *Key for Activity 4* shows a strong relationship. Geographers use one variable to predict another when a strong relationship is identified. Students may correctly point out that more data points are needed to confirm a relationship before using one as a proxy for the other.

Younger students may need extra time and help with Activity 4.

43

Infant and Child Mortality   43

3. How would you describe the differences in the three variables in Figure 10 for low-, middle-, and high-income countries?

4. What is the trend for these variables since 1965? How would you describe the trends for each income level?

5. What kind of relationship do you think exists between the IMR and the fertility rate? Why do you think the fertility rate has decreased?

From Figure 10 on page 42 you learned that the IMR has declined and that the rate varies depending upon the wealth of the country. Figure 11 on page 44 shows the trends according to major world regions.

Life expectancy has shown great gains in the past few decades.

44   Geographic Inquiry into Global Issues
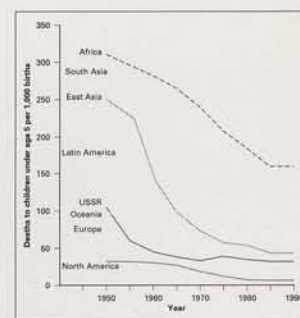
Child mortality rates in major world regions, 1950–1990.

Source: Mosley and Cowley 1991.

6. How would you describe the regional trends, decade by decade, since 1950?

How has the improvement of infant and child mortality varied regionally? (pages 43–44)

C. Have groups study **Overhead 3** to classify the regions in Figure 11 as developing or developed. If students are unfamiliar with these terms, they can classify simply on the basis of whether the region has greater or less than the world average per capita GNP. Note that although the data are only for CMR, students can recall that IMR is correlated to CMR (Figure 1 on page 6).

Question and Answer for page 44

6. How would you describe the regional trends, decade by decade, since 1950?

   - Child mortality rates have dropped for all regions (with East Asia showing the greatest drop). Developing regions (Africa, South Asia, Latin America, and East Asia) have had relatively faster declines, but in all cases their child mortality rates remain higher than developed regions.

45

Infant and Child Mortality   45

How can infant and child mortality be reduced further?

It is estimated that developing countries in 1990 had 88 percent of all births and 98 percent of all deaths of children under age 5. Most important, 95 percent of the estimated 14.5 million infant and child deaths in developing countries in 1990 were preventable (Mosley and Cowley 1991).

In the developing world, the single greatest cause of death among children is disease related to diarrhea. Cases of diarrhea can be significantly reduced by providing improved water supply and sanitation facilities (Table 11 on page 46). If all people had adequate water and sanitation facilities, about 2 million fewer children would die from diarrhea each year (Briscoe 1993).

A Kurdish family buries their six-day-old child.

46

46   Geographic Inquiry into Global Issues

Table 11   Effects of improved water supply and sanitation on diarrheal diseases

Conditions	Percentage reduction in cases of diarrhea
Improved water quality	16
Improved water availability	25
Improved water quality and availability	37
Improved sanitation	22

Source: Briscoe 1993.

7. How do you interpret the fact that 95 percent of children's deaths in developing countries in 1990 were preventable? Do you view this fact negatively or positively or both? Why?

8. In addition to improved water and sanitation, what other ways can you think of to reduce infant and child mortality in developing countries?

9. How might you and your classmates contribute to the reduction of infant and child mortality in your community? How might you contribute to the reduction in the developing world?

How can infant and child mortality be reduced further? (pages 45–46)

D. Break out of groups and have the students read the text and discuss their reactions to

Questions 7–9. Distribute copies of **Activity 5** to each student and have them draw from what they have learned so far to generate ideas for reducing infant and child mortality.

Questions and Answers for page 46

7. How do you interpret the fact that 95 percent of children's deaths in developing countries in 1990 were preventable? Do you view this fact negatively or positively or both? Why?

   • There is hope in the fact that 95 percent of children's deaths are preventable because many lives would be saved if more attention and resources were devoted to the problems that cause these deaths. This is a more effective solution for saving lives than focusing on currently incurable illnesses.

8. In addition to improved water and sanitation, what other ways can you think of to reduce infant and child mortality in developing countries?

   • Prenatal care for mothers, inoculation campaigns for children, and other medical care are some of the other ways to reduce infant and child mortality.

9. How might you and your classmates contribute to the reduction of infant and child mortality in your community? How might you contribute to the reduction in the developing world?

   • Students may devote their time as volunteers in local health centers and may contribute funds to local health service organizations. They could also contribute to international relief agencies such as the Red Cross and Save the Children Fund.

Extension Activities and Resources

1. **Related GIGI Modules**
    *   Basic human rights to food and health are investigated in the modules *Human Rights* and *Hunger,* respectively. *Human Rights* is set in Cambodia, but it includes a review of universal rights declared by the United Nations, and gives students a chance to appreciate the declaration. *Hunger* offers a case study of Sudan, with comparisons to Canada and India. Both of these modules offer hope for finding solutions to issues related to infant and child mortality.

    *   Efiong's Nigeria certainly has serious problems with health and nutrition, but it is far from being the most severely affected country in Central Africa. Nigeria has minerals (particularly oil) and other resources that it can sell to provide goods and services its population needs. For lessons on the problems associated with Nigeria's development, see the GIGI module *Building New Nations.*

2. **Britannica Global Geography System (BGGS)**
    BGGS provides myriad extension activities to enhance each GIGI module. For a complete description of the BGGS CD-ROM and videodiscs and how they work with the GIGI print modules, please read the BGGS Overview in the tabbed section at the beginning of this Teacher's Guide.

3. **Related Videos**
    *   EBEC's "Africa" (a series of four videos) and "Washington, DC" explore the issues and regions studied in *Infant and Child Mortality.*

        For information, or to place an order, call toll-free, 1-800-554-9862.

    *   Other related videos include: "Africa—South of the Sahara" (*Global Geography* series, Agency for Instructional Technology)

Rates of Infant Mortality by World Region, 1992

ACTIVITY 1
INFANT MORTALITY RATE BY WORLD REGION, 1992

Japan

Australia/
New Zealand

Southeast
Asia

Eastern
Asia

Southern
Asia

Former
Soviet Union

Western
Asia

Eastern
Africa

Europe

Northern
Africa

Middle
Africa

Western
Africa

Southern
Africa

Antarctica

Canada

United
States

U.S.A.

Mexico/
Central
America

South
America

0   1000   2000   3000   4000 mi
0   2000   4000   6000 km

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Key

Death's per 1,000 Live Births

24 and under

25 - 49

50 - 74

75 and over
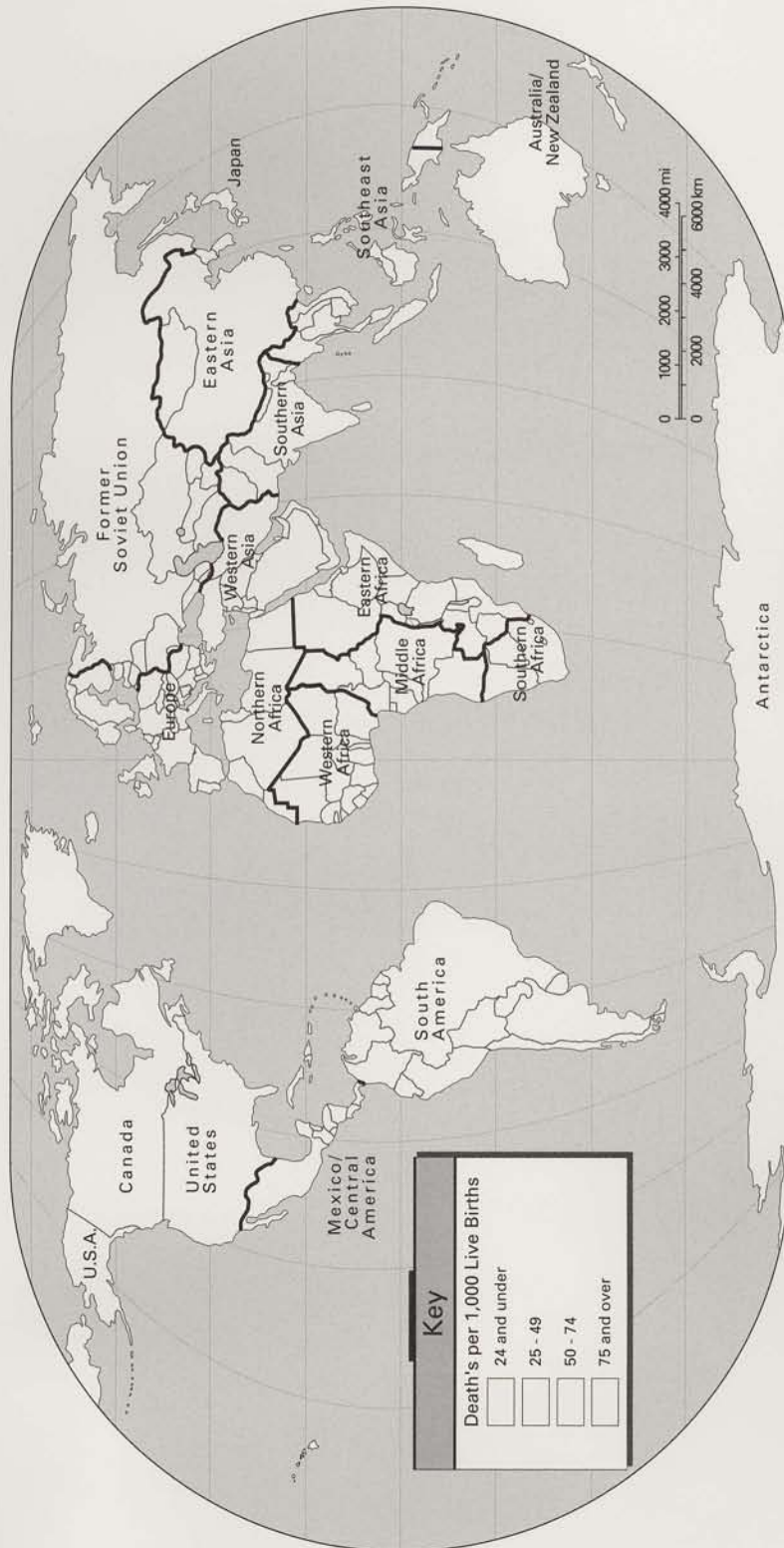
Rates of Infant Mortality by World Region, 1992

KEY TO ACTIVITY 1
INFANT MORTALITY RATE BY WORLD REGION, 1992

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Japan

Australia/
New Zealand

Southeast
Asia

Eastern
Asia

Former
Soviet Union

Southern
Asia

Western
Asia

Eastern
Africa

Middle
Africa

Southern
Africa

Europe

Northern
Africa

Western
Africa

Antarctica

Canada

United
States

U.S.A.

Mexico/
Central
America

South
America

4000 mi
6000 km

0   1000   2000   3000
0   2000   4000

Key

Deaths per 1,000 Live Births

24 and under

25 - 49

50 - 74

75 and over

Countries of Central Africa, Figure 2

**OVERHEAD 1
CENTRAL AFRICAN COUNTRIES**

Northern Africa

Mauritania
Mali
Niger
Chad
The Sudan
Senegal
Gambia
Eritrea
Djibouti
Burkina Faso
Guinea
Nigeria
Guinea-Bissau
Cote d'Ivoire
Cameroon
Central African Republic
Ethiopia
Sierra Leone
Liberia
Benin
Togo
Ghana
Equatorial Guinea
Somalia
Gabon
Congo
Zaire
Uganda
Kenya
Rwanda
Burundi
Tanzania
Angola
Malawi
Zambia
Mozambique
Zimbabwe
Madagascar
Southern Africa

| 0 | 500 | 1000 mi |
| 0 | 500 | 1000 | 1500 km |

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Outline Map of Africa

ACTIVITY 2
OUTLINE MAP OF AFRICA

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Expert Group Tasks

Task 1 (10 minutes)

Discuss what each table really means. Decide how each variable contributes to infant and child mortality.

Task 2 (25 minutes)

Using your assigned table, list the 15 to 20 countries in Central Africa with the most severe problem for the variable you are evaluating. Use the outline map of Africa (Activity 2) to map these countries by shading in each of the 15 to 20 in a dark color.

Task 3 (15 minutes)

Decide how well the spatial pattern you mapped matches the spatial pattern of infant mortality shown in Figure 3.

GIGI

Infant and Child Mortality

Lesson 4

Summit Conference on Africa's Children

I. The second column below shows the aid available for Central Africa from each of the seven countries in this summit conference. This is about 25 percent of your total nonmilitary foreign aid budget. The third column represents about 1 percent of each country's defense budget. You can add this money to the second column to increase the aid for Central Africa. Be prepared to defend this choice. (All figures are in millions of U.S. dollars.)

Country	Aid available for Central Africa	One percent of defense budget	Increased aid for Central Africa (option)
United States	$2,900	$2,800	$ _____
Canada	600	100	_____
France	2,400	400	_____
Germany	1,600	400	_____
Italy	900	200	_____
Japan	2,300	300	_____
United Kingdom	700	300	_____
Total available	**$11,400**		Increased total $ _____

This is the total amount of money your group has to spend. The next step is to figure out which programs to spend it on. Read pages 30–32 in the Student DataBook for a description of the nine programs available in the categories for Education, Health care, and Sanitation.

II. For each of the nine programs below, decide how much of your total budget you want to spend. The total cost of each program is given in the second column. You cannot spend more than you collected in Step I.

Important: You do not have to buy the entire program. You can spend some portion of the total cost. Fill in the appropriate spaces on the table to show your choices. (Amounts are in millions of U.S. dollars.)

Example 1. If you want to buy the full cost of the program:

Program	Annual cost	Portion to buy	Amount spent
Vitamins/drugs	$100 (million)	100%	$100 (million)

Example 2. If you want to buy less than the full cost, decide what percentage you want. In the example, half the total program is bought. This means only half the children can be given the needed vitamins and drugs.

Program	Annual cost	Portion to buy	Amount spent
Vitamins/drugs	$100 (million)	50%	$50 (million)

Program	Annual cost (millions)	Portion to buy	Amount spent (millions)
Radio and TV information	$ 350	_____ %	$ _____
Elementary education	800	_____	_____
Adult education	7,425	_____	_____
Training health workers	125	_____	_____
Training physicians	7,100	_____	_____
Vaccinations	2,125	_____	_____
Essential vitamins/drugs	100	_____	_____
Access to safe water	1,375	_____	_____
Safe sewage systems	1,950	_____	_____
		Total spent	$ _____

III. Explain why you chose to include certain programs and why you chose to leave out other programs.

_____

_____

_____

_____

_____

_____

_____

IV. In order to make a real impact on the problems of infant and child mortality, which Central African countries should receive the most assistance? (You may want to refer back to Tables 2–7 in Lesson 2 and the maps you made.)

Six Countries to Receive Most Assistance

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Why did your group choose these specific countries?

_____

_____

_____

_____

_____

_____

Relationship Between IMR and the Fertility Rate

Fertility (births per woman) vs. Infant Mortality (deaths per 1,000 live births). The y-axis (Fertility) ranges from 2 to 7. The x-axis (Infant Mortality) ranges from 130 down to 60.
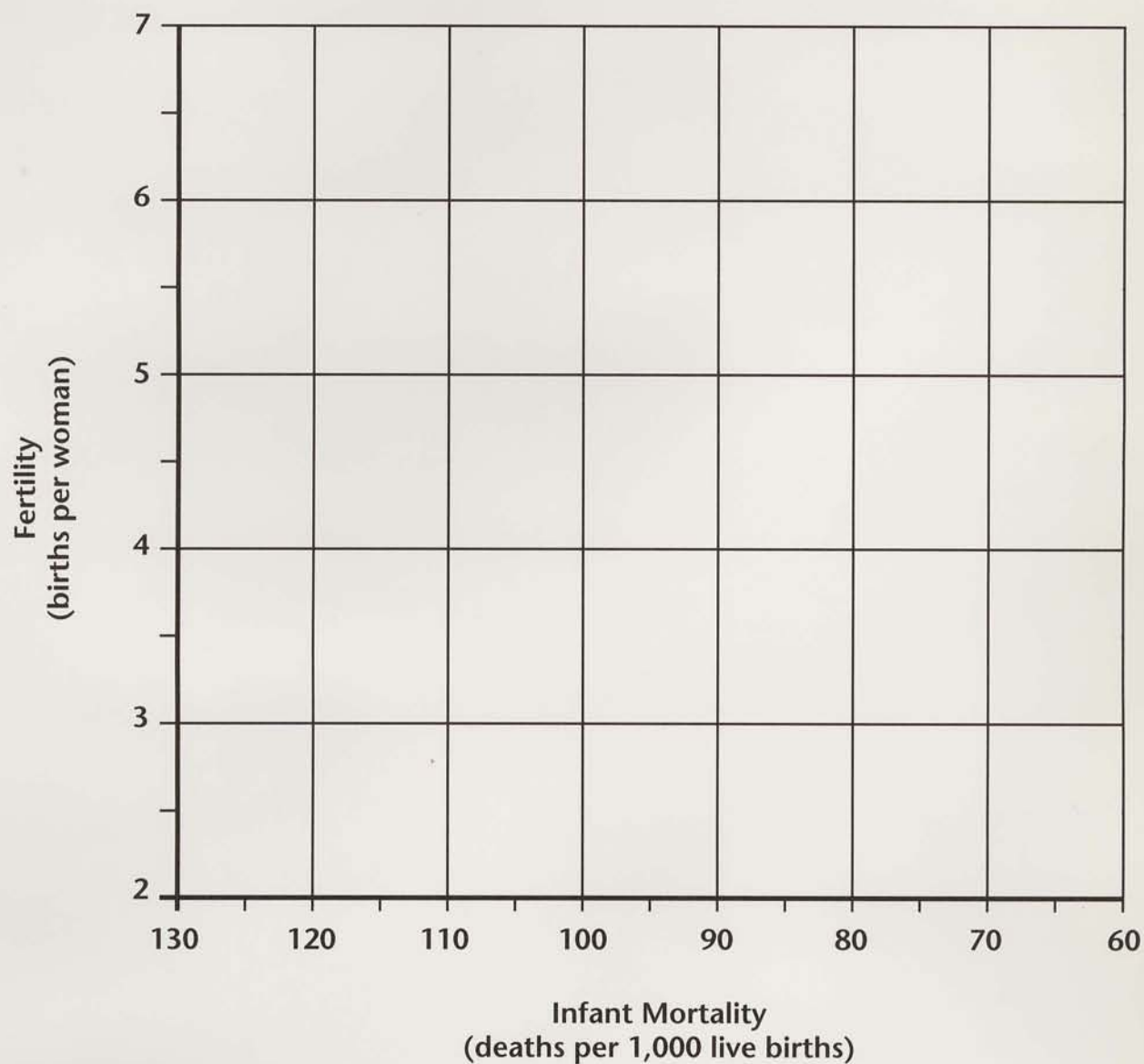
Use Figure 10 to plot the values for Fertility and Infant Mortality for the years 1965, 1975, and 1990. Then draw a straight line that comes as close as possible to all three points.

Relationship Between IMR and the Fertility Rate

Fertility (births per woman) vs. Infant Mortality (deaths per 1,000 live births)

Activity 5 •••

✎Name _____

GIGI
Infant and Child Mortality
Lesson 6
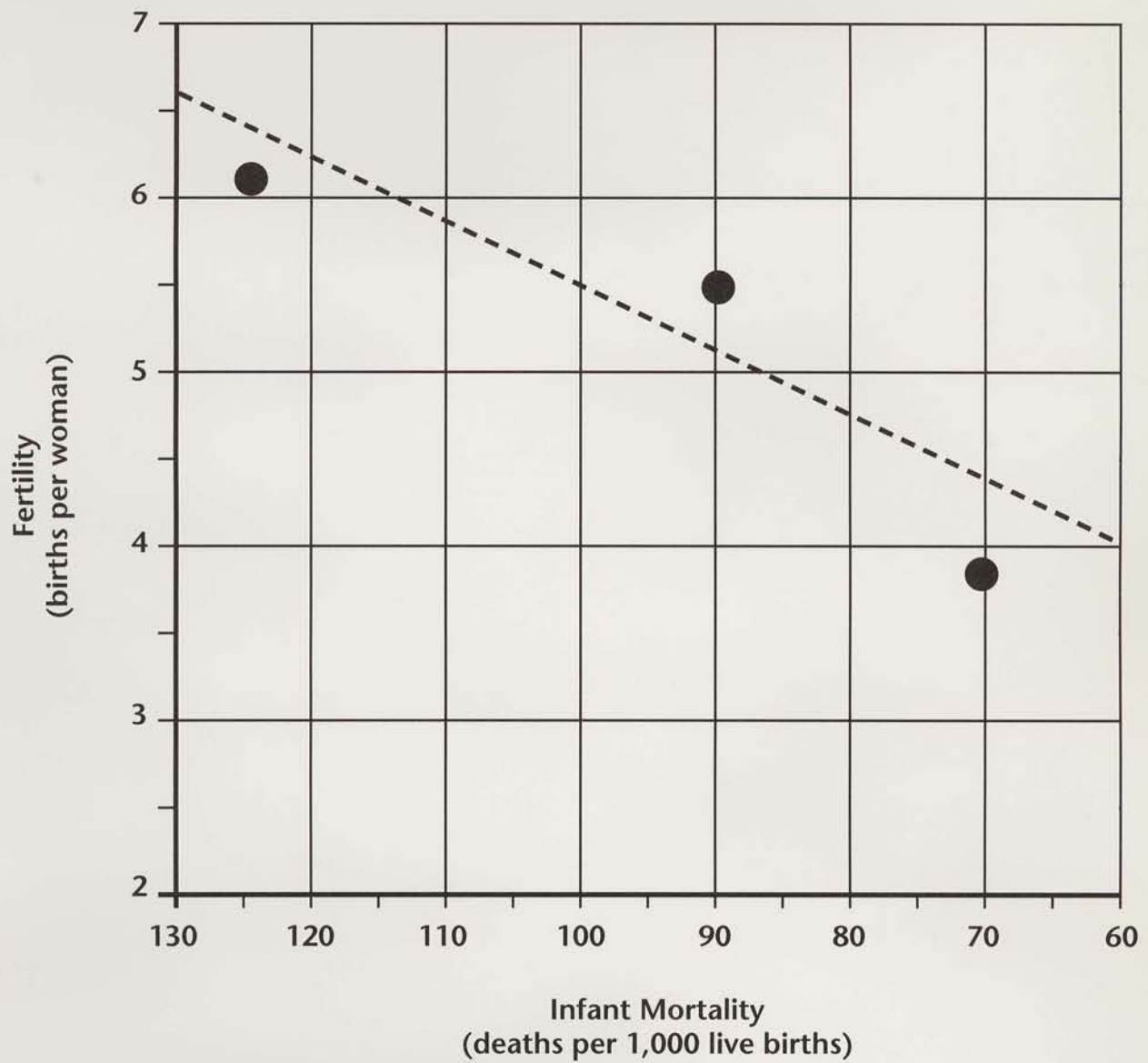
Causes of Death to Children Under Five

Causes of Death to Children Under Age Five in Developing Countries Around 1950 (total of 14.6 million deaths)

Others

Injuries

Diarrhea

Perinatal causes

Other parasitic diseases

Malaria

Respiratory infections

Immunizeable diseases
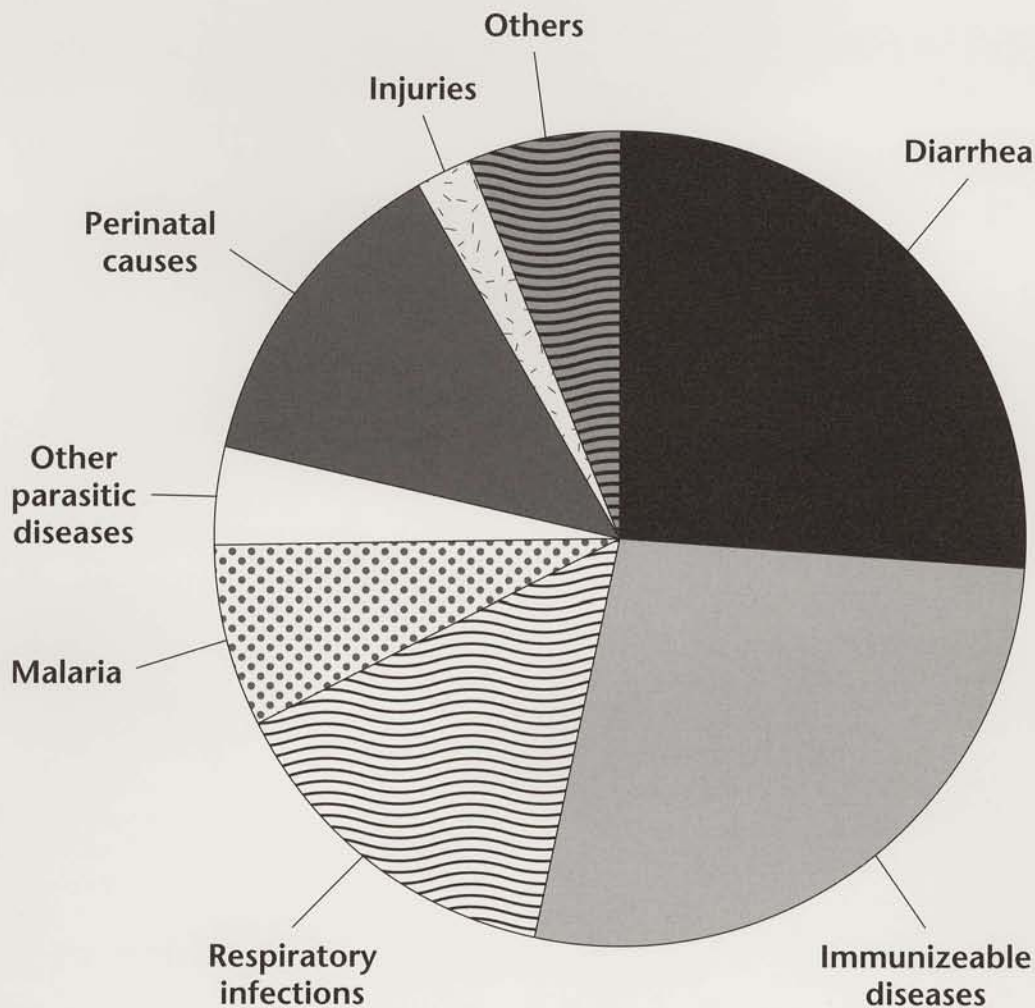
Identify the four major causes of death to children under five years of age and suggest ways to reduce the number of children who would die from them.

Major Cause   **Suggested Solution**

1. _____

2. _____

3. _____

4. _____

Source: Mosley and Cowley 1991.

**Per Capita Gross National Product by World Region
(in U.S. dollars, 1991)**

Africa	600
East Asia	3,070
Europe	15,780
Former USSR	2,680
Latin America	2,360
North America	22,430
Oceania	12,830
South Asia	430
World Average	4,180

Source: Population Reference Bureau 1993.

BRITANNICA GLOBAL GEOGRAPHY SYSTEM

GIGI

Geographic Inquiry into Global Issues

Infant and Child Mortality

Program Developers
A. David Hill, James M. Dunn, and Phil Klein

Regional Case Study
Africa—South of the Sahara

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GIGI National
Field Trial Locations

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Lithonia, GA
Marietta, GA
Beckemeyer, IL
Red Bud, IL
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Racine, WI
Cheyenne, WY
Worland, WY

Memo to the Student from the GIGI Staff

GIGI stands for *Geographic Inquiry into Global Issues*, which is the name of a series of modules. Each module inquires into a different world issue. We wrote this memo to explain that GIGI is different from most textbooks you have used.

With GIGI, you can have fun learning if you think like a scientist or detective. The main business of both scientists and detectives is puzzle-solving. They use information ("data" to the scientist and "evidence" to the detective) to test their solutions to puzzles. This is what you do with GIGI. GIGI poses many puzzles about important global issues: Each module centers around a major question, each lesson title is a question, and there are many other questions within each lesson. GIGI gives you real data about the world to use in solving these puzzles.

To enjoy and learn from GIGI, you have to take chances by posing questions and answers. Just as scientists and detectives cannot always be sure they have the right answers, you will sometimes be uncertain with GIGI. But that's OK! What's important is that you try hard to come up with answers, even when you're not sure. Many of GIGI's questions don't have clear-cut, correct answers. Instead, they ask for your interpretations or opinions. (Scientists and detectives are expected to do this, too.) You also need to ask your own questions. If you ask a good question in class, that can sometimes be more helpful to you and your classmates than giving an answer.

The data you will examine come in many forms: maps, graphs, tables, photos, cartoons, and written text (including quotations). Many of these come from other sources. Unlike most textbooks, but typical of articles in scientific journals, GIGI gives its sources of data with in-text references and full reference lists. Where an idea or piece of information appears in GIGI, its author and year of publication are given in parentheses, for example: (Gregory 1990). If the material used is quoted directly, page numbers are also included, for example: (Gregory 1990, pages 3–5). At the end of the module you'll find a list of references, alphabetized by authors' last names, with complete publication information for the sources used.

To help you understand the problems, GIGI uses "case studies." These are examples of the global issue that are found in real places. "Major case studies" detail the issue in a selected world region. You will also find one or two shorter case studies that show variations of the issue in other regions.

We hope your geographic inquiries are fun and worthwhile!

Infant and Child Mortality

Why do so many children suffer from poor health?

- Why do so many babies and young children in the world die?
- In which world regions are infants and children most at risk?
- Why is infant and child mortality higher in some places within the United States than in others?

In this module, you will study one of the most serious problems facing our world. By some estimates, as many as 70 million children around the world will perish by the year 2000. Many of these will be in Central Africa, and you will study in depth the causes of infant and child mortality in that region. But infant and child mortality is a problem in the United States as well. After learning about the problem, you will participate in a "summit conference" and suggest what you think should be done to reduce infant and child mortality.

UNITED STATES
Case Study #2

Infant and child mortality
in U.S. cities

GLOBAL SETTING

How infant and child
mortality is being
reduced

CENTRAL AFRICA
Major Case Study

Reasons for high infant
and child mortality,
programs to reduce rates
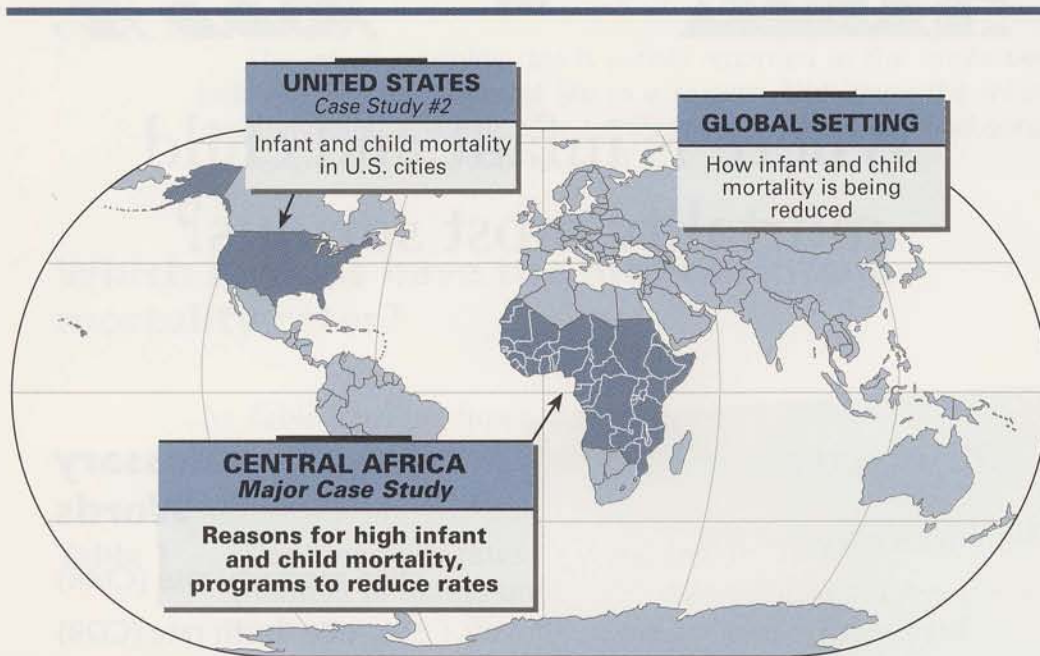
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Questions You Will Consider in This Module

- Why is infant and child mortality higher in developing countries than it is in developed countries?

- What information is needed to speculate about the causes of high rates of infant and child mortality?

- What do places with high infant and child mortality have in common?

- What are the health and social conditions for a teenager in Africa?

- What kind of program do you think might reduce rates of infant and child mortality?

- How does the health and nutrition situation in a U.S. city compare to that of Central Africa?

- Why is there cause for optimism about reducing infant and child mortality?

Lesson 1

Where is infant and child mortality most serious?

Objectives

In this lesson, you will

- Explain the difference between the terms *infant mortality* and *child mortality*.

- Identify regions with the most severe problems of infant and child mortality.

- Speculate why this problem is worse in certain places.

Glossary Words

child mortality rate (CMR)

crude death rate (CDR)

infant mortality rate (IMR)

What is the issue of infant and child mortality?

Every week around the world, 40,000 infants and children under the age of five die. In fact, one in every three deaths in the world is of a child under the age of five (UNICEF 1990).

It is possible to calculate the rates of infant mortality and child mortality for every country. The infant mortality rate (IMR) refers to the number of infants under the age of one who die each year for each 1,000 live births. The child mortality rate (CMR) is the number of children below the age of five who die each year for each 1,000 live births. Thus, an IMR of 100 means that one out of every ten babies dies within its first year of life.

Life is much more dangerous for infants and children than for the rest of the world population. For example, the crude death rate (CDR), which gives the total deaths in a given year per 1,000 population, is always much lower than the IMR or CMR.

The infant mortality rate is widely regarded as the single best indicator of the quality of life in a society. The lower the infant mortality rate, it is held, the better the general health and social environment (Hale 1990, page 2).

Which regions have the highest infant mortality rates?

As Table 1 below shows, the rates of infant mortality are not the same for every country around the world.

Table 1 Infant mortality rates by world region, 1992 (number of babies under one year old who die each year, per 1,000 live births)

Western Africa	111
Eastern Africa	110
Middle Africa	97
Southern Asia	95
Northern Africa	72
Western Asia	63
Southeast Asia	61
Southern Africa	57
South America	56
Mexico/Central America	50
Former Soviet Union	39
Eastern Asia	34
Europe	11
United States	9
Australia/New Zealand	8
Canada	7
Japan	5

Average of less-developed regions = 75

Average of more-developed regions = 18

World average = 68

Source: Population Reference Bureau 1992.

1. Which world regions have the highest rates of infant mortality?

2. Which world regions have the lowest rates of infant mortality?

3. What do the regions with high infant mortality have in common? What do the regions with low infant mortality have in common?

Figure 1 below shows the relationship between infant mortality rates (Table 1) and child mortality rates. In the figure, the rates of infant mortality and child mortality are compared for 40 selected countries from around the world. Each dot on the figure represents one country. For example, the dot marked X represents India. The infant mortality rate of India is 98 and its child mortality rate is 149. The dot marks the intersection of these coordinates on the graph.

Figure 1   Comparison of infant mortality rates and child mortality rates for 40 selected countries.

Source: UNICEF 1990.

4. What is the relationship between infant mortality rate and child mortality rate?

5. If you knew that a country had an infant mortality rate of 150, what would you expect its child mortality rate to be?

6. Which regions would most likely have high rates of child mortality? Which regions probably have low rates of child mortality?

7. What reasons can you think of to account for the regional differences in infant and child mortality?

Of the 15 countries with the highest rates of infant and child mortality in the world, 14 are found in Western, Eastern, and Middle Africa. (Afghanistan is the other one.) To simplify discussion, this module will refer to these areas together as *Central Africa*.

UNICEF estimates that during the decade of the 1990s, 100 million children under the age of five will die from illness and malnutrition. Of these, 70 percent will be from Central Africa (UNICEF 1984).

But this problem is not hopeless. Most of these 70 million children could be saved, because the illnesses are readily preventable. Thousands will die from dehydration caused by diarrhea, which can be prevented for as little as $1.50 per child for rehydration treatment. Pneumonia, which can be treated with low-cost antibiotics, kills thousands more. Overall, the United Nations estimates that 200,000 children in Central Africa die *every week* from causes that can be prevented.

Why do countries in Central Africa have high rates of infant and child mortality?

Objectives

In this lesson, you will

- Explain how economic, educational, nutrition, and health factors relate to infant and child mortality in Central Africa.

- Formulate hypotheses regarding the causes of infant and child mortality.

- Compare patterns on maps to investigate reasons for infant and child mortality.

Glossary Words

child mortality rate (CMR)

gross national product (GNP)

infant mortality rate (IMR)

literacy

In Lesson 1, you saw that the countries of Central Africa (Figure 2 on page 9) have some of the world's highest rates of infant and child mortality. Figure 3 (on page 10) shows the rates of infant mortality for all of the countries in this region.

Geographers are concerned with why phenomena occur where they do. In this case, a geographer would want to know *why* rates of infant and child mortality are so high in this particular world region.

What reasons can you think of that would explain why this region has such a severe infant and child mortality problem?

Figure 2   Countries of Central Africa (including the regions of Western, Middle, and Eastern Africa from Table 1).

Geographers define regions for purposes of study. For this study, Central Africa (Figure 2 above) is defined as the combination of three regions for which the Population Reference Bureau (1992) has summarized its data.

INFANT MORTALITY
IN CENTRAL AFRICA

Infant Mortality Rates

61-90 per 1000 births

91-129 per 1000 births

130-155 per 1000 births

Northern Africa

Mauritania
Mali
Niger
Chad
The Sudan
Senegal
Gambia
Burkina Faso
Guinea
Guinea-Bissau
Cote d'Ivoire
Sierra Leone
Liberia
Benin
Togo
Ghana
Equatorial Guinea
Nigeria
Cameroon
Central African Republic
Eritrea
Djibouti
Ethiopia
Somalia
Gabon
Congo
Zaire
Rwanda
Burundi
Uganda
Kenya
Tanzania
Angola
Zambia
Malawi
Mozambique
Madagascar
Zimbabwe
Southern Africa

0   500   1000 mi
0   500   1000   1500 km

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Figure 3   Rates of infant mortality for countries in Central Africa.

Source: Population Reference Bureau 1992.

If you wanted to figure out why the infant and child mortality rates are especially high in Central Africa, what kinds of information would you need to look at? In other words, what data would help you test your hypotheses about the causes for the high infant and child mortality rates in Central Africa?

In this lesson, several tables of data are presented that may help you decide what the reasons are for these high mortality rates. For each of 35 countries in Central Africa, data are presented for the following:

- economic development (Table 2 on page 14),
- education (Table 3 on page 15),
- medical care (Tables 4 and 5 on pages 16–17),
- nutrition (Table 6 on page 18), and
- safe drinking water (Table 7 on page 19).

Your task will be to map the data from these tables and to look for patterns in the data. As you examine these tables, consider this question:

How well do the map patterns of economic development, education, medical care, nutrition, and safe drinking water match the map pattern of infant mortality (Figure 3 on page 10)?

Geographers often use maps to look for relationships between different kinds of information. For example, compare Figure 4 on page 12, which classifies the quality of housing in the contiguous United States and Figure 5 on page 13, which summarizes the average income per person in each state.

What similarities do you see in the map patterns? From these maps, do you think it is reasonable to speculate that states where people earn more money tend to have better housing?

Now, use this kind of reasoning to compare the map patterns between Figure 3 (infant mortality rates in Central Africa) and the maps you make from Tables 2–7.
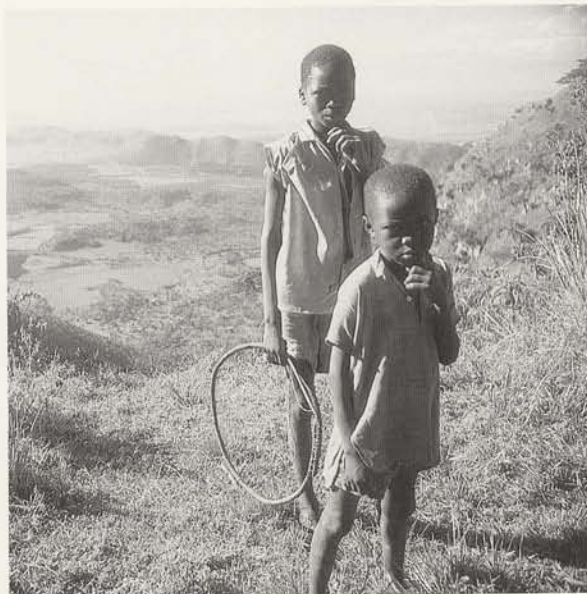
200,000 African children die every week from preventable causes.

U.S. HOUSING

Housing Quality
by State, 1987

Poor or Fair Housing
Good Housing
Best Housing

Figure 4   Quality of housing in the contiguous United States.

Source: Bennett and Hayes 1992.

U.S. INCOME

Per Person Income by State, 1990

- Low Income
- Medium Income
- High Income

Figure 5   Average per person income by state for the contiguous United States.

Table 2   Gross national product per person in Central Africa, 1990

Country	GNP per person (U.S. $)
Angola	470
Benin	360
Burkina Faso	330
Burundi	210
Cameroon	940
Central African Republic	390
Chad	190
Congo	1,010
Cote d'Ivoire	730
Ethiopia	120
Gabon	3,220
Gambia	260
Ghana	390
Guinea	480
Guinea-Bissau	180
Kenya	370
Liberia	450
Madagascar	230
Malawi	200
Mali	270
Mauritania	500
Mozambique	80
Niger	310
Nigeria	370
Rwanda	310
Senegal	710
Sierra Leone	240
Somalia	150
Sudan	330
Tanzania	120
Togo	410
Uganda	220
Zaire	230
Zambia	420
Zimbabwe	640
For comparison	
United States	21,700
Japan	25,430
France	19,480
Sweden	23,860

Source: Population Reference Bureau 1992.

Table 3   Adult literacy rate in Central Africa

Country	Adult literacy rate % Male	% Female
Angola	49	33
Benin	37	16
Burkina Faso	21	6
Burundi	43	26
Cameroon	68	45
Central African Republic	53	29
Chad	40	11
Congo	71	55
Cote d'Ivoire	53	31
Ethiopia	—	—
Gabon	70	53
Gambia	36	15
Ghana	64	43
Guinea	40	17
Guinea-Bissau	46	17
Kenya	70	49
Liberia	47	23
Madagascar	74	62
Malawi	52	31
Mali	23	11
Mauritania	—	—
Mozambique	55	22
Niger	19	9
Nigeria	—	—
Rwanda	61	33
Senegal	37	19
Sierra Leone	38	21
Somalia	18	6
Sudan	33	14
Tanzania	93	88
Togo	53	28
Uganda	70	45
Zaire	79	45
Zambia	84	67
Zimbabwe	81	67
For comparison		
United States	92	90
Japan	99	99
France	96	94
Sweden	99	99

Note: — = No data available.

Source: United Nations Children's Fund 1990, pages 86–87.

Table 4   Number of people per physician in Central Africa, 1984

Country	People per physician
Angola	17,790
Benin	15,940
Burkina Faso	57,220
Burundi	21,120
Cameroon	—
Central African Republic	23,530
Chad	38,360
Congo	8,320
Cote d'Ivoire	—
Ethiopia	78,970
Gabon	2,790
Gambia	—
Ghana	14,890
Guinea	46,420
Guinea-Bissau	—
Kenya	9,970
Liberia	9,340
Madagascar	9,780
Malawi	11,330
Mali	25,390
Mauritania	12,120
Mozambique	37,960
Niger	39,730
Nigeria	7,990
Rwanda	34,680
Senegal	13,060
Sierra Leone	13,630
Somalia	16,080
Sudan	10,100
Tanzania	26,200
Togo	8,700
Uganda	21,900
Zaire	13,540
Zambia	7,150
Zimbabwe	6,700
For comparison	
United States	470
Japan	660
France	320
Sweden	390

Note: — = No data available.

Sources: UNICEF 1990, pages 86–87; World Bank 1992.

Table 5   Percentage of one-year-old children immunized against DPT* and polio in Central Africa, 1987–1988

Country	Percentage of children	
	DPT	Polio
Angola	12	13
Benin	30	30
Burkina Faso	30	30
Burundi	54	54
Cameroon	45	43
Central African Republic	24	24
Chad	14	14
Congo	71	71
Cote d'Ivoire	32	32
Ethiopia	16	16
Gabon	68	68
Gambia	—	—
Ghana	33	33
Guinea	16	15
Guinea-Bissau	—	—
Kenya	74	75
Liberia	28	28
Madagascar	40	38
Malawi	82	80
Mali	18	18
Mauritania	28	28
Mozambique	38	38
Niger	16	16
Nigeria	58	57
Rwanda	80	78
Senegal	47	47
Sierra Leone	25	26
Somalia	25	25
Sudan	53	53
Tanzania	81	81
Togo	62	60
Uganda	40	41
Zaire	41	41
Zambia	83	81
Zimbabwe	79	79
For comparison		
United States	37	82
Japan	83	73
France	96	41
Sweden	99	93

Notes: — = No data available; *DPT = diphtheria, pertussis (whooping cough), and tetanus.

Source: United Nations Children's Fund 1990, pages 86–87.

Table 6   Nutrition in Central Africa (measured as calories consumed)

Country	Calories per person (% of daily requirement)
Angola	82
Benin	96
Burkina Faso	86
Burundi	97
Cameroon	88
Central African Republic	86
Chad	69
Congo	117
Cote d'Ivoire	110
Ethiopia	71
Gabon	107
Ghana	76
Gambia	—
Guinea	77
Guinea-Bissau	—
Kenya	92
Liberia	102
Madagascar	106
Malawi	102
Mali	86
Mauritania	92
Mozambique	69
Niger	100
Nigeria	90
Rwanda	81
Senegal	99
Sierra Leone	81
Somalia	—
Sudan	88
Tanzania	96
Togo	97
Uganda	95
Zaire	98
Zambia	92
Zimbabwe	89
For comparison	
United States	138
Japan	122
France	130
Sweden	113

Note: — = No data available.

Source: United Nations Children's Fund 1990, pages 86–87.

Table 7   Percentage of population with access to safe drinking water in Central Africa, 1985–1987

Country	Percentage of population
Angola	33
Benin	52
Burkina Faso	67
Burundi	26
Cameroon	33
Central African Republic	—
Chad	—
Congo	21
Cote d'Ivoire	19
Gabon	92
Gambia	59
Ghana	56
Guinea	19
Guinea-Bissau	21
Ethiopia	16
Kenya	30
Liberia	55
Madagascar	32
Malawi	56
Mali	17
Mauritania	—
Mozambique	16
Niger	47
Nigeria	46
Rwanda	50
Senegal	53
Sierra Leone	25
Somalia	34
Sudan	21
Tanzania	53
Togo	55
Uganda	20
Zaire	33
Zambia	59
Zimbabwe	—
For comparison	
United States	100
Japan	100
France	100
Sweden	100

Note: — = No data available.

Source: United Nations Children's Fund 1990, pages 80–81.

Lesson 3

What is life like for an African teenager?

Objectives

In this lesson, you will

- Describe the problems of health and poverty in Africa from the perspective of a young Nigerian.

- Explain how the living conditions in rural Nigeria relate to the problems of infant and child mortality.

- Compare and contrast the health practices and daily concerns in rural Central Africa with those of a major U.S. city.

Glossary Words

catarrh

child mortality rate (CMR)

fluke

infant mortality rate (IMR)

juju

lorry

night soil

queue

tributary

"Efiong's Day" is a 16-year-old's candid account of life in a rural Nigerian village.

EFIONG'S DAY

Efiong Etuk arrived in the lorry tired after her long trip home from the Nigerian city of Abak, where she attends secondary school. Her own village has only elementary schools, so those wanting more education have to attend a

boarding school in a larger community. At the age of 16, Efiong found that most of her friends from elementary school were already married and starting to have children. Efiong felt somewhat uncomfortable being different, but she came from a family that valued education and supported her desire to become a nurse. In school she was studying science, and this term some of the lessons had dealt with the changes necessary to improve health in her native Nigeria. She felt a new awareness of those good-health practices in her community that were inconsistent with what she was learning in school.
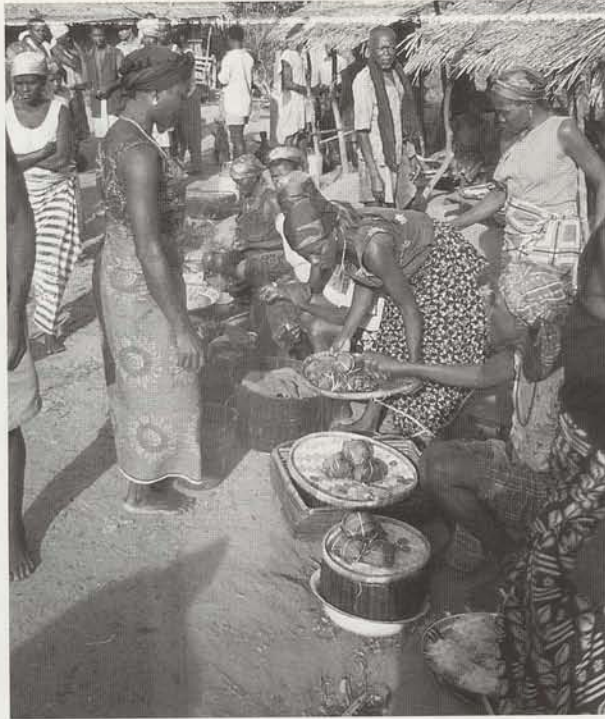
As is typical in her community, Efiong's family is large. Her mother has given birth to a long succession of babies, six of whom still lived. Efiong's oldest brother Akpan is a college student in Washington, D.C. Two younger sisters are married and live in Efiong's village; her younger brother, Udoh, is only seven and still attends the elementary school in the village. Her youngest sister, Ime, is less than a year old, and her mother will bear another child this year.

Like most other families in the village, Efiong's family lives in a one-room hut made from mud-covered sticks with an earthen floor. The roof is cone-shaped and made of palm leaves, which keeps their hut dry when it rains and cool when it's hot. They have little furniture and no toilet, electricity, or running water. Their small hut is a part of a larger compound, which is composed of other huts where Efiong's aunts and uncles and cousins' families also live.

Outside the compound on the village edge are small gardens and farms. Efiong's father is a post office clerk, but the family garden supplies an important part of the family's sustenance and nourishment. The sandy soil has been depleted of its nutrients from many years of use; only the night soil from the family provides fertilizer. It is her mother's job to tend the garden and to raise yams and vegetables and some groundnuts for the family stew and occasionally to trade for essentials in the village market. Efiong has often thought how hard her mother works tilling and sowing, with Ime strapped to her back. She is grateful for the civil service job that her father has, for without that small but steady income, her family would be as desperate as many families in the village.

As soon as Efiong arrives at her family hut from the lorry park, she joins her mother in the work of the household. She works at her chores with a good spirit, for she is delighted to be home for the August break from school, and she knows that her mother will prepare a special meal that evening to welcome her. There is a community well in her village and her mother directs her to go and fill large jugs with water, which she then carries home on her head. Her village is on a tributary of Cross River and she notices men fishing and children splashing and playing near the water's edge. She doesn't understand the danger completely but she knows from school that it is not safe to swim or be in the river waters in this part of Africa. Children or adults can become very sick from a small fluke that lives in those streams.

After carrying home enough water for the family's bathing and cooking needs, she bathes and walks with her brother to the local market in order to buy food. Efiong always enjoys this opportunity to talk with people and to help her mother. In the market are many individual sellers with small stocks of fresh fruits and vegetables, spices, and meats. In addition to food, individuals are selling cloth, household goods, and various assorted items. Sellers spread their goods on mats, and buyers pick and choose what to buy. Negotiating a price for each item is an important part of the social interaction. Efiong purchases eggs, bananas, papaya

Nigerian women make purchases from their local market.

fruit, cassava, and a small piece of meat, which had lain uncovered except for the flies that fill the market each day.

Efiong's village does not have electricity and no one is sufficiently wealthy to have a kerosene refrigerator. Perishable food is kept in a large earthen pot in each hut and a heavy piece of wet cloth is kept on it to help lower the temperature inside through evaporation. She knows from her brother Akpan that in the United States perishable food is often sold refrigerated and wrapped in plastic.

Efiong would like to have taken Ime with her to the market, but Ime has been too sick. It troubles Efiong that her baby sister has had catarrh and fever for so much of her short life. Efiong's mother has taken Ime to the village medicine man for juju treatments, but his magic has not been good and Ime grows listless and weaker. It is not her place to question her mother in these matters, but Efiong wonders if it would be worth the 28-mile trip in the lorry to the town of Uyo to get European medicine for Ime at the government dispensary.

Later in the day, Efiong walked to the post office to see if there was a letter from her brother, Akpan. As she waited impatiently in the queue of the post office, she thought of Akpan, a university student in the faraway United States. Maybe there would be a letter from him today. He had always been so quick to learn. The missionaries who run the school in Abak had worked hard to find a way for him to attend the university in Washington, D.C. Akpan's letter is there. It is reprinted as follows:

Dear family:

When I last wrote, I described for you my first impressions of America and this capital city where I live. As time goes by I have the opportunity to become more familiar with life here and to understand more of what I experience. As you would expect, there are many aspects of life in the city that I like and others I do not like. Washington is a fearsome, wondrous, busy city. It has towering buildings and much traffic that runs night and day, so one cannot easily sleep. There are shops and stores with everything imaginable to buy. The air is sometimes dirty and hard to breathe. There are masses of white-skinned people, which has taken some getting used to, and masses of black-skinned people as well.

What I like most is the opportunity to study at Howard University. It is a fine school and my courses are excellent. The library is larger than I could have imagined! I spend much time studying, yet I am also making new friends. I have been invited to many social gatherings where I have the opportunity to meet both Americans and students from other countries.

I have gone to see many monuments and have visited the White House and the Capitol Building. I am astonished by how many musical performances and films are available both at the university and in the city. And bookstores are everywhere! My new friends have also introduced me to restaurants that serve food from many different parts of the world. Although I cannot afford to eat in restaurants often, it is a special delight and I save my money so that I am able to try new dishes. Still, I miss Nigerian food with all of its spiciness.

As there are exciting aspects to life in a big city that I could not have imagined, so too are there problems that I would never have

expected. My one-room flat is in a black neighborhood near the university. On my way to campus I walk past many people who seem to live on the streets. They appear to have no way to receive money except by asking for it from strangers who walk by. Although many people beg in Nigeria and we believe it is important to be giving, I did not expect to see begging in such a wealthy country. These people seem to have no families and I wonder what will become of them when summer passes and the snow falls. While I see more men than women, I do sometimes see even children who are living on the streets.

Even more disturbing is the violence in the city. Many young men are part of gangs who have guns, which they use to shoot each other! Other times the violence is related to other crimes, especially the buying and selling of drugs. I don't understand why a country that has so much wealth has so many people who seem to take no care for life. I have learned how to use public transportation so that I do not have to walk through my neighborhood after dark. How strange it seems to me to be fearful of others!

My studies go well but I miss many things from my own village. I miss the clean and warm gentle breezes. If only to smell the crimson blossoms of the hibiscus in our compound and to eat gari stew again. I yearn for a slower pace of life and for a contentment that I see lacking here. Yet I am grateful to be able to study and learn at such a wonderful place of learning. I remain,

Your faithful son and loving brother,

Akpan

Villagers carry water home from the communal well.

1. How does the story of "Efiong's Day" provide additional clues about why infant and child mortality rates are so high in Central Africa?

2. How do the health and safety conditions in Efiong's village compare to those in Washington, D.C. (as described in Akpan's letter)?

3. How might Efiong's education help her to improve the health conditions of her village?

Lesson 4

How can Africa's children be helped?

Objectives

In this lesson, you will

- Describe how much money developed countries spend on foreign aid as a percentage of their overall economy.

- List different ways foreign aid could be effectively spent to reduce infant and child mortality.

- Explain how these approaches would help reduce infant and child mortality rates.

- Consider where health facilities should be located.

Glossary Words

child mortality rate (CMR)

gross national product (GNP)

infant mortality rate (IMR)

literacy

What programs would help African children?

"Our national character can be measured by how we care for our children."

—George Bush, U.S. President (1989–1993)

Source: UNICEF 1990, page 5.

1. Do you think the quote from former President Bush refers only to children in the United States? Or does the United States have some responsibility to care for children in Central Africa and other places?

2. Do you think a summit conference of the world's leaders could improve the lives of African children?

3. As a leader at this conference, what would you like to see on the agenda?

4. How would you justify spending some of the U.S. budget to help the children of Central Africa and elsewhere?

Foreign aid might help these children.

Total Money Spent
(in billions of U.S. dollars)

Money Spent as a
Percentage of GNP

Figure 6   Official development assistance (foreign aid) of 15
developed countries, 1990. Graph on left shows total
amount of money spent; graph on right converts this
amount to a percentage of the country's total GNP.

Source: World Bank 1992.

Relative to its total economy, the United States spent about 1/5 of
1 percent of its GNP on foreign aid in 1990 (Figure 6 above). By
contrast, Finland gave three times as much as that, and Norway gave

5. According to Figure 6, which country spends the most on foreign aid? How much does it spend?

6. If you measure foreign aid as a percentage of a country's gross national product (GNP), how does the United States rank in Figure 6?

7. If the United States contributed as much of a percentage of its GNP to foreign aid as Norway, how many more billions of dollars would the United States spend?

nearly six times as much. For comparison, the people of the United States spend three times as much each year on cigarettes and five times as much on alcohol as the U.S. government does on foreign aid.

A "Summit Conference on Africa's Children"

In this lesson, you will take the roles of leaders of the world's seven largest developed countries. As world leaders, you will take part in a "Summit Conference on Africa's Children." The goal of this conference is to find the best solutions to the problem of high infant and child mortality in Central Africa.

Each of the seven countries taking part in this summit conference has a limited amount of money that it can spend to help African children. Table 8 on page 30 shows the amount of money available from each country. The amount available is about 25 percent of the 1990 foreign aid budget shown in Figure 6 on page 28. (For purposes of this lesson, imagine that the other 75 percent of the foreign aid budget is used for other purposes.)

Table 8 also shows the total defense budget of these seven countries. For many countries, defense is the single largest expense. As the leader of these countries, you may choose to reduce your defense budget by 1 percent and spend this additional money on foreign aid. Keep in mind, however, that doing so may weaken your country's military.

Table 8   Foreign aid and defense budgets of seven developed countries, 1990 (millions of U.S. dollars)

	Total foreign aid budget	Aid available for Central Africa	Defense budget
United States	11,400	2,900	277,000
Canada	2,500	600	9,800
France	9,400	2,400	36,500
Germany	6,300	1,600	36,900
Italy	3,400	900	19,000
Japan	9,100	2,300	30,300
United Kingdom	2,600	700	32,700

Sources: World Bank 1992; SIPRI 1992.

If no changes are made to defense budgets, the total money available from these seven countries to help African children (for purposes of this simulated conference) is $11.4 billion (equals $11,400 million). The amount of money could increase if money is shifted from defense budgets.

There are many possible ways to spend this money—various programs to help reduce the rate of infant and child mortality. As delegates to this conference, your job is to figure out the best way to spend the money available so that it helps the most children. You will decide what is best to save the lives of the 70 million children in Africa who are at risk during this decade.

The information beginning below and continuing through page 33 details the various programs on which you can choose to spend this money. Three general categories of programs are presented: *Education, Health Care,* and *Sanitation.* For each program, a brief summary is given to explain why it would help reduce infant and child mortality. Table 9 on page 33 then lists how much each program would cost to help the region of Central Africa.

Education programs

- *Radio and TV information:* Regular shows are needed to get nutrition and hygiene information out to the people (Sivard 1989). For example, each year 500,000 African mothers die in pregnancy and childbirth. Many such deaths could be prevented if parents knew about safe pregnancy practices.

- *Basic elementary education:* Basic literacy can be achieved inexpensively if parents put up simple classrooms and use members of the community as teachers. There is a strong relationship between literacy and child mortality. For example, in countries where the female literacy rate is below 20 percent, the average child mortality rate is 235 per 1,000. But where the female literacy rate is over 80 percent, the child mortality rate is only 29 per 1,000 (Sivard 1989). Once educated, children can introduce new ideas about health to their families. This is being encouraged in Uganda, for instance (UNICEF 1990).

- *Adult education:* The adult literacy rate has improved dramatically in developing countries through the efforts of volunteer teachers. The ability to read and write increases the adult's chances to earn a living wage. However, most of the countries in Central Africa have less than a 40 percent adult literacy rate. The rates for women are especially low.

Health care programs

- *Training community health workers:* Community health workers are not physicians, but instead help in the villages and countryside with basic health care programs. It is estimated that more than 250,000 community health workers are needed in Central Africa (UNICEF 1990).

- *Training physicians:* Also needed are fully trained doctors and nurses. For example, in the United States, the ratio of people to doctors is about 470 to 1; in France there is a doctor for every 320 people. In Ethiopia, on the other hand, there is only one doctor for every 79,000 people. For ratios in other Central African countries, see Table 4 on page 16, in Lesson 2.

- *Vaccinations:* Funds are needed to fully immunize each child against the most deadly childhood diseases. In Pakistan, for example, more than 100,000 infant deaths each year have been prevented by raising the percentage of fully immunized children from 5 percent to 75 percent (UNICEF 1990).

- *Essential vitamins and drugs:* There are 30 essential vitamin supplements and drugs, including oral rehydration salts, which are used in Oral Rehydration Treatment (ORT) to treat diarrhea. The UN estimates that 600,000 children could be saved in Central Africa each year if all children received ORT alone. Another 800,000 could be saved each year if treatments were available to prevent tetanus (UNICEF 1988).

Sanitation programs

- *Access to safe water*: Sixty percent of all the people in Central Africa do not have a safe drinking water supply (UNICEF 1990). Eighty percent of all the diseases that kill children in Africa come from impure water.

- *Safe sewage systems*: Eighty-five percent of rural people in developing countries lack safe, sanitary sewage systems (UNICEF 1989). Many infant and child diseases are related to poor sanitation conditions.

Advice from a health–care worker.

Table 9 Estimated yearly costs of implementing education, health care, and sanitation programs for all countries in the Central African region

Program	Annual cost (millions of U.S. dollars)
Education	
Radio and TV information	350
Basic elementary education	800
Adult education	7,425
Health care	
Training community health workers	125
Training physicians	7,100
Vaccinations	2,125
Essential vitamins and drugs	100
Sanitation	
Access to safe water	1,375
Safe sewage systems	1,950

Sources: UNICEF 1990; Population Reference Bureau 1992; World Bank 1992.

Where should major health facilities be located in Central Africa?

Imagine that the United Nations has determined that three major health facilities are to be built in Central Africa to help improve the medical care for infants and children. These facilities could include, for example, a major research hospital, a training center for health workers, and a research center for improving sanitation systems.

Where in Central Africa should such facilities be located? Here are some things to consider:

- Should the facilities be located in the countries with the worst infant and child mortality problems?

- Should the facilities be located in countries with the most people and, therefore, the most children at risk?

- Should the facilities be in countries that are centrally located?

What other factors should be considered in locating such facilities?

Lesson 5

Why is infant and child mortality a problem in the United States?

Objectives

In this lesson, you will

- Compare and contrast infant and child mortality in the United States with other wealthy nations as well as with Central Africa.

- Examine reasons why infant and child mortality is a problem in the United States.

Glossary Words

child mortality rate (CMR)

infant mortality rate (IMR)

How does U.S. infant and child mortality compare with that of other developed nations?

In Lesson 1, you learned that Central Africa has the highest IMR and CMR of any world region (Table 1 on page 5). Table 1 also showed you that the United States has much lower rates, but not the lowest rates in the world. As you examine Figures 7 and 8 and Table 10 on pages 35–37, speculate about Questions 1–4 on page 35. Don't be afraid to suggest answers, even if you're unsure. Such speculation or hypothesizing is the heart of geographic inquiry. Making a reasonable guess is the first step in finding a reasonable answer.

1. Why do you think the United States has lower IMR and CMR than Central Africa?

2. Do you think the causes of infant and child mortality in the United States are different than the causes in Central Africa? Why? What might these differences be?

3. Why do you think Washington, D.C., has higher IMR and CMR than the United States as a whole?

4. Why do you think the United States has an IMR that is higher than most other developed nations? Be prepared to offer two reasons to the class.
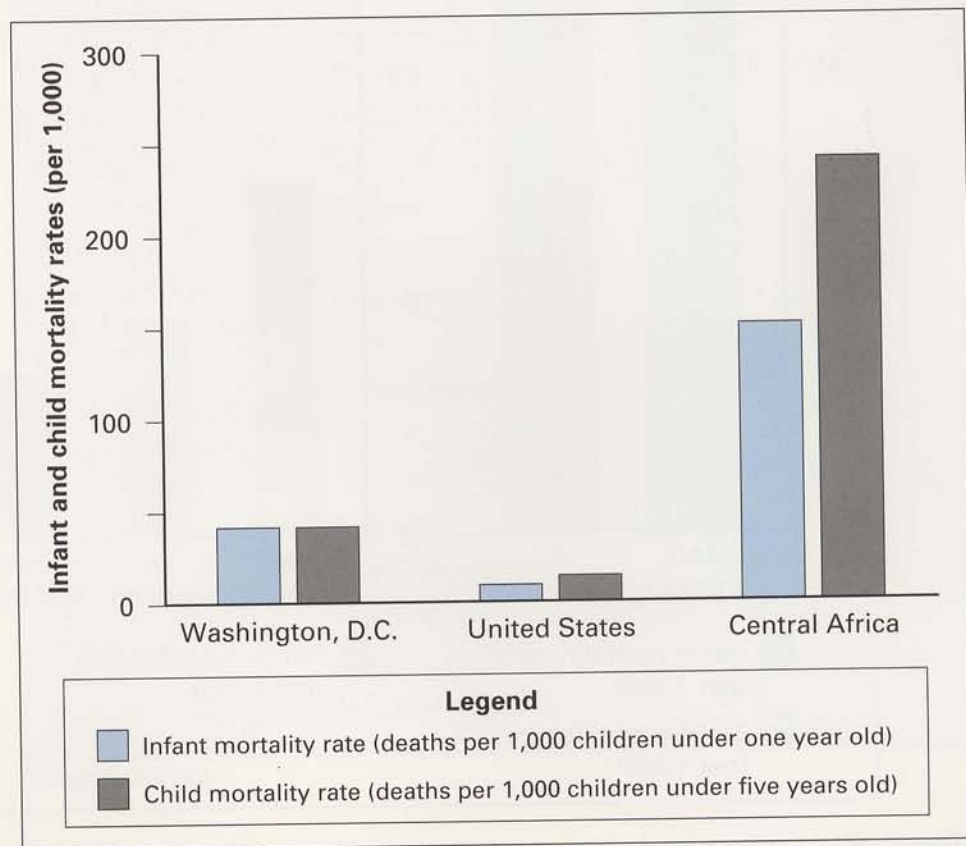

Figure 7　Infant and child mortality rates for Washington, D.C., the United States (as a whole), and Central Africa.

Washington, D.C.

United States as a Whole

Legend (Washington, D.C.):
- Infant mortality rate (per 1,000)
- Child mortality rate (per 1,000)

Legend (United States as a Whole):
- Infant mortality rate (per 1,000)

Categories (Washington, D.C.): Black children, All children

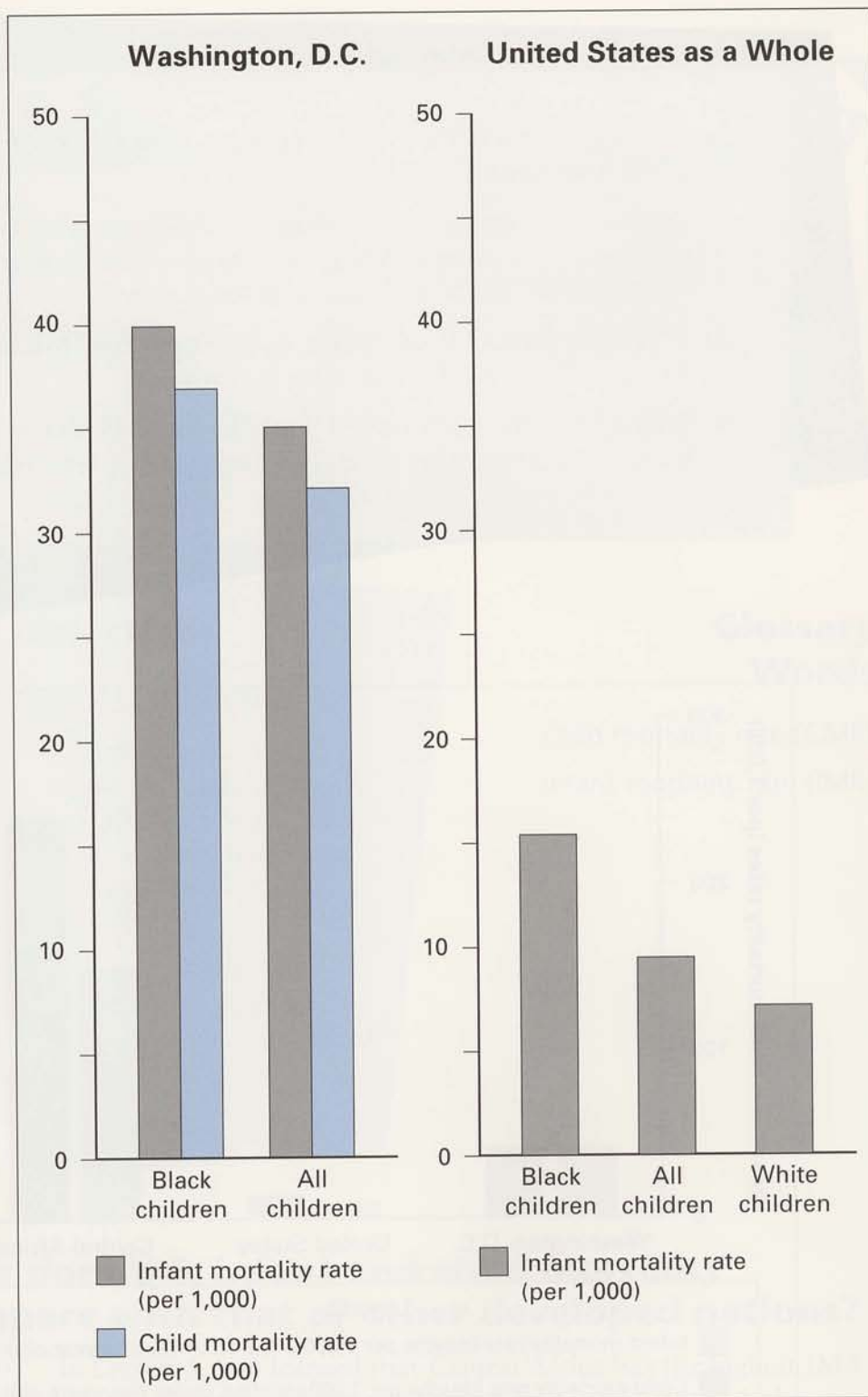Categories (United States as a Whole): Black children, All children, White children

Figure 8   Infant and child mortality rates in Washington, D.C., by race (left graph) and infant mortality rates in the United States as a whole, by race (right graph).

Note: Washington, D.C. is 66 percent black.

Sources: U.S. Department of Health and Human Services 1990–1991; Hale 1990; *Information Please Almanac* 1992.

Table 10　Infant mortality rates, selected developed nations, 1987

Rank	Country	IMR per 1,000
1	Japan	5.0
2	Sweden	5.7
3	Finland	6.2
4	Switzerland	6.8
5	Canada	7.3
6	Ireland	7.4
7	France	7.6
8	Netherlands	7.6
9	Denmark	8.3
10	West Germany	8.3
11	Norway	8.4
12	East Germany	8.5
—	**U.S. whites**	8.6
13	Australia	8.7
14	Spain	9.0
15	United Kingdom	9.1
16	Luxembourg	9.4
17	Belgium	9.7
18	Austria	9.9
19	New Zealand	10.0
20	Italy	10.1
21	**United States**	10.1
22	Greece	12.6
23	Portugal	14.2
24	Bulgaria	14.7
25	Czechoslovakia	16.1
26	Hungary	17.4
27	Poland	17.5
—	**U.S. blacks**	17.9

Source: Hale 1990.

Why do infants die in the United States?

This is not an easy question to answer because there are so many causes of infant death in the United States. The following categories of causes accounted for over 90 percent of deaths (Hale 1990):

- Inherited traits

- Sudden Infant Death Syndrome (SIDS), which is a breathing problem recognized and defined only recently

- Causes arising in the perinatal period (after the twenty-eighth week of pregnancy through the seventh day after birth), such as complications of labor and delivery

- Preventable causes such as infectious diseases and accidents

The causes in the last two categories accounted for nearly 60 percent of infant deaths in 1987.

As shown on Table 10 on page 37, 19 developed nations had infant death rates lower than that of the United States in 1987. In fact, the relative position of the United States had declined over the previous two decades: The United States ranked fifteenth in infant mortality in 1968 (Hale 1990). In Question 4 on page 35, you were asked to suggest two reasons for this situation. Now compare your explanations with the ones given on page 39.

Unlike other developed countries, the United States does not guarantee health care to pregnant women and their children.

It is not fully known why the United States, the richest nation in the world, should lag behind so many other developed nations in saving the lives of its babies. One frequently suggested reason is that those other developed countries have more available and accessible health services. (Unlike all other developed countries, the United States does not guarantee pregnant women and their children access to health care.) Another explanation is that other developed nations have fewer racial and ethnic minority populations than does the United States. Yet another reason given is that in the other developed nations, national income is more evenly distributed among the populations (Hale 1990).

5. Why might race and ethnicity help to explain the relatively low ranking of the United States among other developed nations regarding IMR?

6. What data would you need to check the validity of the three reasons given above for why the United States has such a high infant mortality rate compared to other developed nations?

Study Figures 7 and 8 and Table 10 again, looking for clues for two risk factors that can be used to predict differences in rates of infant mortality in the United States. In other words, what would you look for to help you predict infant mortality rates?

7. What two risk factors did you identify from Figures 7 and 8 and Table 10? What were the clues you found for these factors?

8. What three approaches do you think the United States could take to reduce its rate of infant mortality? What are the advantages and disadvantages of those approaches?

Lesson 6

How have infant and child mortality rates improved?

Objectives

In this lesson, you will

- Examine evidence showing trends of infant and child mortality in the United States and around the world.

- Explain the relationships among life expectancy, infant and child mortality, and total fertility rate.

- Consider some reasons why infant and child mortality is being reduced.

Glossary Words

child mortality rate (CMR)

fertility rate

infant mortality rate (IMR)

Why is there reason for optimism about infant and child mortality?

In Lesson 5, you learned that infant mortality rates in the United States were higher than in most other developed countries. Thus, the problem of infant mortality in the United States demands attention. At the same time, evidence suggests that there is some reason for optimism about solving this problem (Figure 9 on page 41).
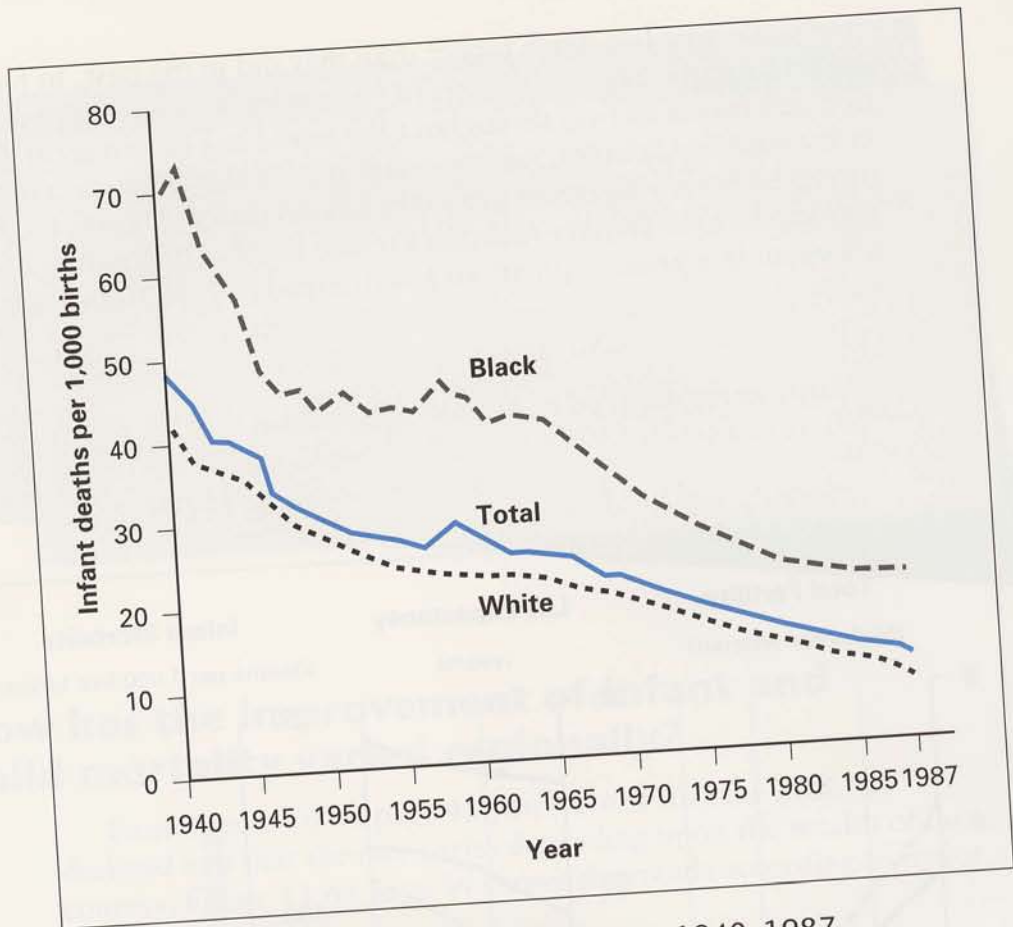
Figure 9   Infant mortality rates, United States, 1940–1987.

Source: Hale 1990.

1. How would you describe the trends, decade by decade since 1940, of the IMR in the United States? Why?

2. On what problem would you particularly concentrate in order to further reduce the IMR in the United States? Why?

People now live much longer than they did in the past. In fact, life expectancy (the average number of years people in a given population can expect to live) throughout the world has shown great gains in the past few decades. An important reason that life expectancy has increased is because infant mortality has decreased. During the same period, the total fertility rate (the average number of children born to a woman in a given population) has dropped (Figure 10 below).
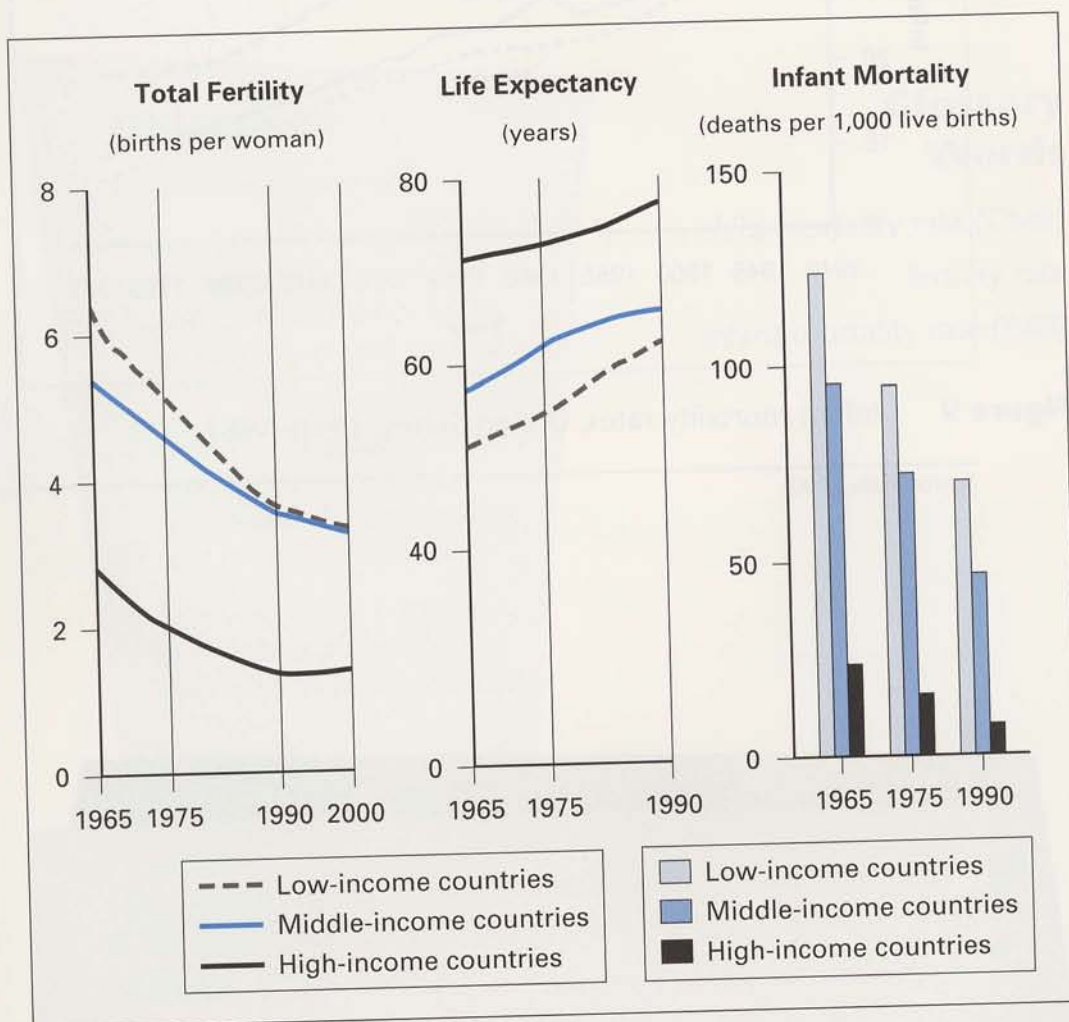

Figure 10   Trends in fertility, infant mortality, and life expectancy.

Source: World Bank 1992.

3. How would you describe the differences in the three variables in Figure 10 for low-, middle-, and high-income countries?

4. What is the trend for these variables since 1965? How would you describe the trends for each income level?

5. What kind of relationship do you think exists between the IMR and the fertility rate? Why do you think the fertility rate has decreased?

How has the improvement of infant and child mortality varied regionally?

From Figure 10 on page 42 you learned that the IMR has declined and that the rate varies depending upon the wealth of the country. Figure 11 on page 44 shows the trends according to major world regions.
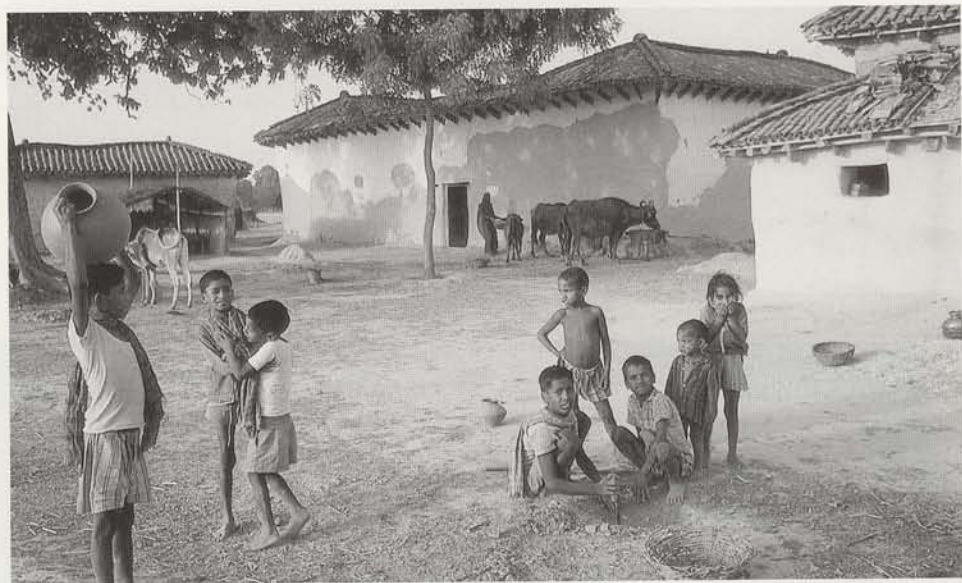
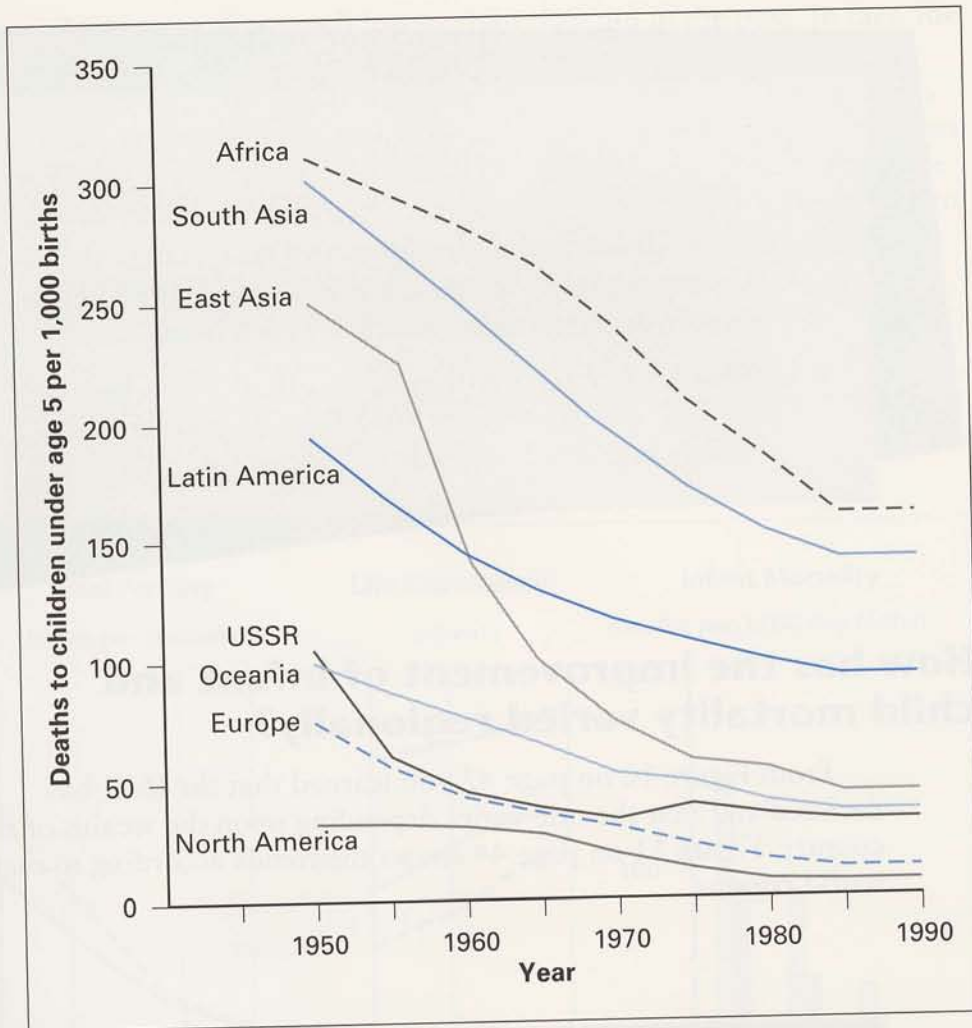Life expectancy has shown great gains in the past few decades.

Figure 11   Child mortality rates in major world regions, 1950–1990.

Source: Mosley and Cowley 1991.

6. How would you describe the regional trends, decade by decade, since 1950?

How can infant and child mortality be reduced further?

It is estimated that developing countries in 1990 had 88 percent of all births and 98 percent of all deaths of children under age 5. Most important, 95 percent of the estimated 14.5 million infant and child deaths in developing countries in 1990 were preventable (Mosley and Cowley 1991).

In the developing world, the single greatest cause of death among children is disease related to diarrhea. Cases of diarrhea can be significantly reduced by providing improved water supply and sanitation facilities (Table 11 on page 46). If all people had adequate water and sanitation facilities, about 2 million fewer children would die from diarrhea each year (Briscoe 1993).

A Kurdish family buries their six-day-old child.

Table 11   Effects of improved water supply and sanitation on diarrheal diseases

Conditions	Percentage reduction in cases of diarrhea
Improved water quality	16
Improved water availability	25
Improved water quality and availability	37
Improved sanitation	22

Source: Briscoe 1993.

7. How do you interpret the fact that 95 percent of children's deaths in developing countries in 1990 were preventable? Do you view this fact negatively or positively or both? Why?

8. In addition to improved water and sanitation, what other ways can you think of to reduce infant and child mortality in developing countries?

9. How might you and your classmates contribute to the reduction of infant and child mortality in your community? How might you contribute to the reduction in the developing world?

Glossary

Catarrh An inflammation of the nose and throat.

Child mortality rate (CMR) A figure calculated by dividing the number of children who die before age 5 in a given year by the number of babies born in that year. The rate is expressed per 1,000 live births.

Crude death rate (CDR) The number of total deaths in a given year per 1,000 population.

Fertility rate The average number of children born in a given population.

Fluke A microscopic worm that penetrates a person's skin and attacks the vital organs, such as the liver.

Gross National Product (GNP) The total value of all goods and services produced by a country.

Infant mortality rate (IMR) A figure calculated by dividing the number of infants who die before age 1 in a given year by the number of babies born in that year. The rate is expressed per 1,000 live births.

Juju The native belief system in parts of Central Africa.

Literacy The ability to read and write.

Lorry The British word for a large truck. In many poor parts of the world, people ride standing in the back of a truck rather than in buses, as in the United States.

Night soil The term for human excrement that is collected (at night) to be used for soil fertilizer.

Queue A line of people waiting to get into some place or waiting to be served.

Tributary A stream that flows into a larger stream.

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