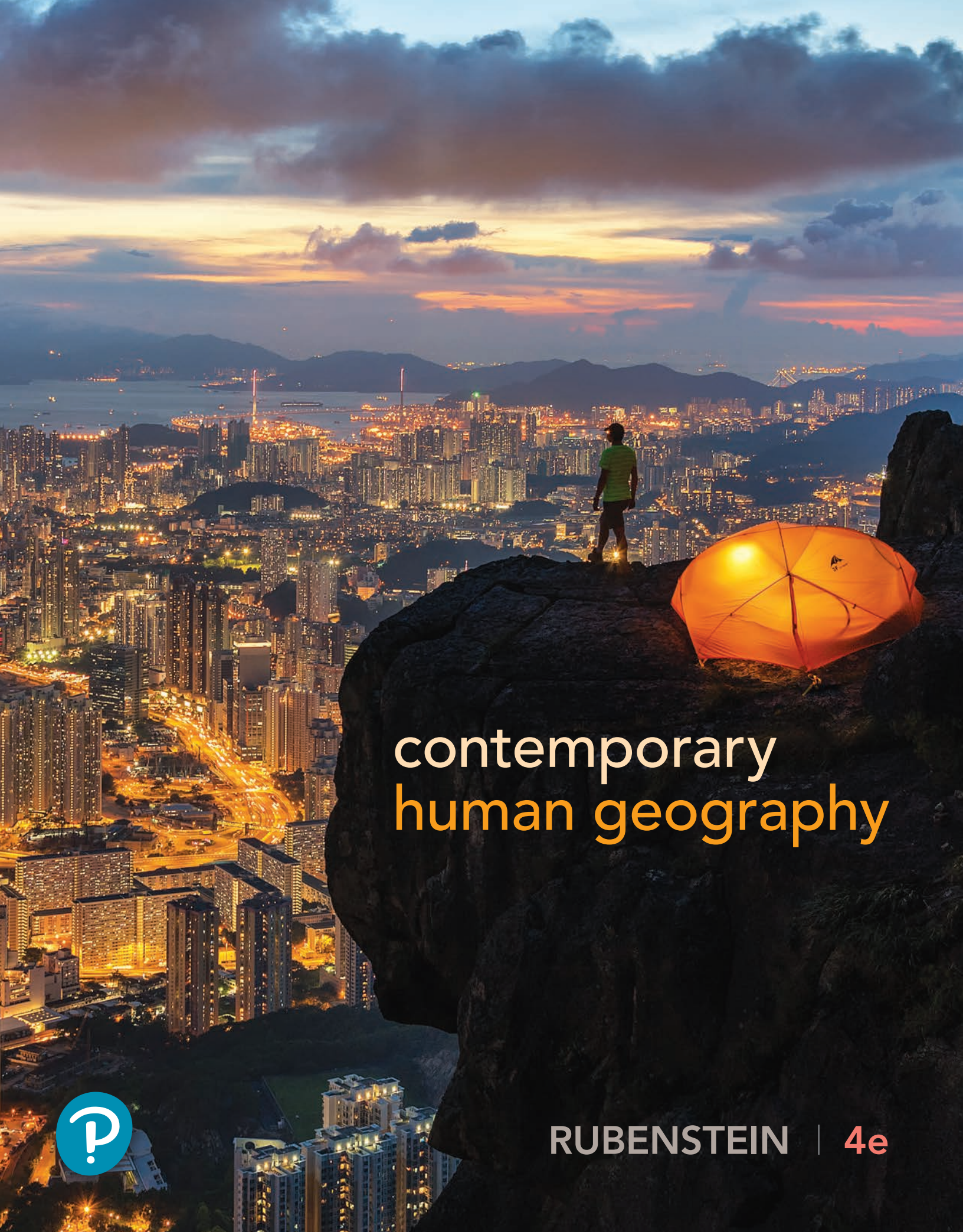
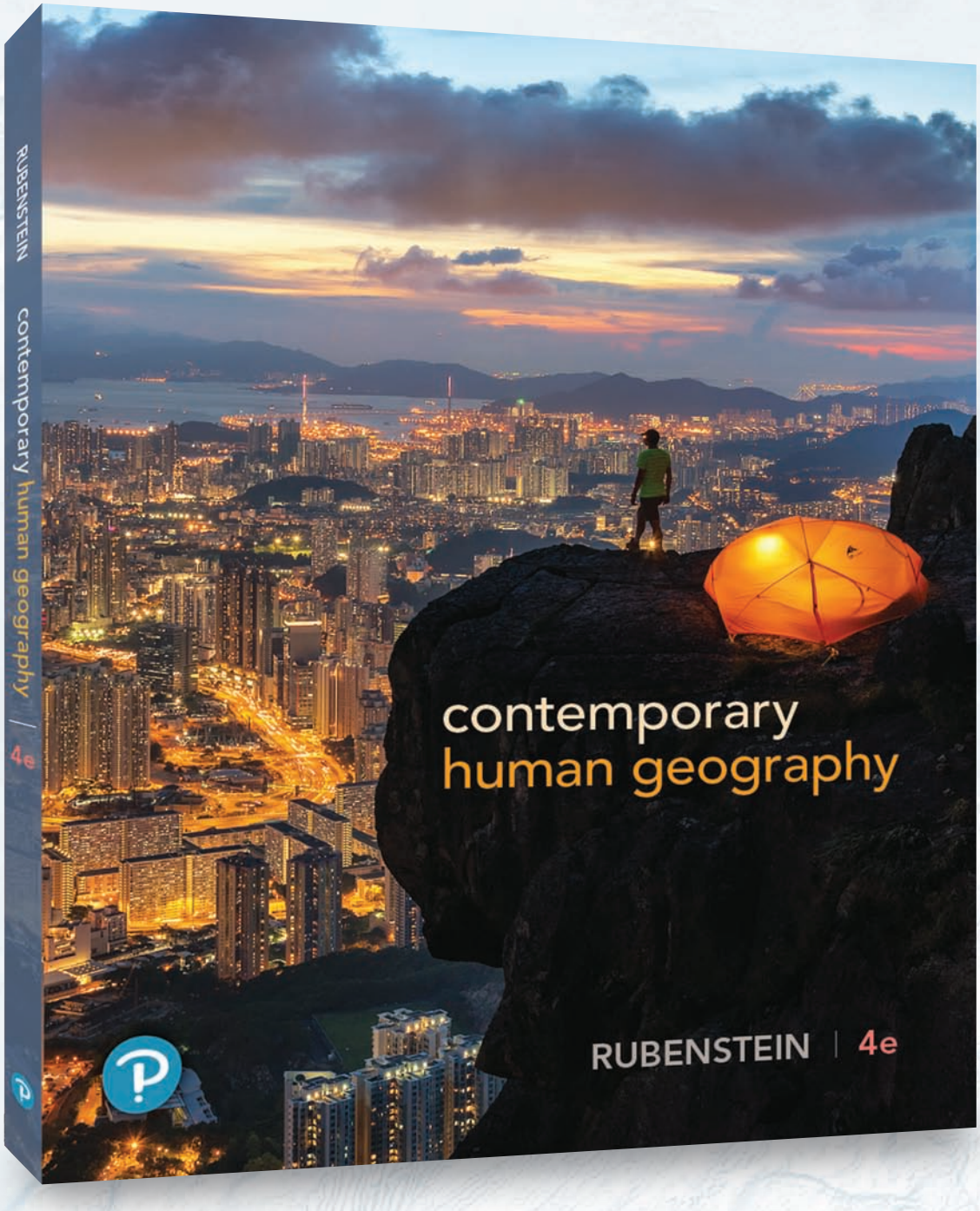

contemporary
human geography
RUBENSTEIN | 4e

What's *Your* Map to Human Geography?



Contemporary Human Geography **is a modular springboard into essential human and cultural geography concepts. Designed for the modern student, this innovative text explores the key issues of contemporary human geography in a bold, visual style. Topics are organized into self-contained, two-page spreads, supported by cutting-edge cartography and a rich array of media and assessment, including videos and MapMaster 2.0™ in Mastering™ Geography.**

A Brief, Visual Introduction

HALLMARK! The highly-visual modular approach of this text consists of chapters made up of self-contained two-page spreads—a reliable presentation that gives instructors flexibility when assigning material to students.

Population Concentrations

- Explain reasons for the distribution of the world's peoples.

Human beings are not distributed uniformly across Earth's surface (Figure 2.1.1). World maps depict this distribution in several ways.

▲ 2.1.1 **POPULATION CONCENTRATION, SOUTHEAST ASIA**
Housing in Jakarta, Indonesia.

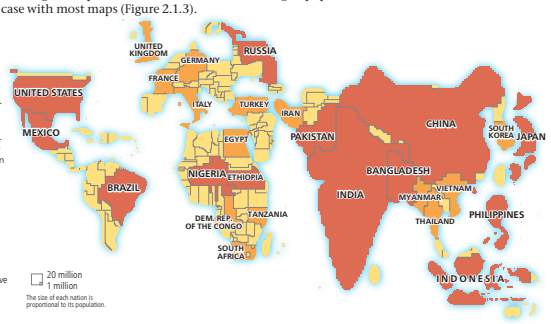
Population Portions

The world can be divided into seven portions, each containing approximately 1 billion people (Figure 2.1.2). The small size of the Asia portions shows the large number of the world's inhabitants living there.

▶ 2.1.2 **POPULATION PORTIONS**
Each of the seven portions contains approximately 1 billion inhabitants.

Population Cartogram

A cartogram depicts the size of countries according to population rather than land area, as is the case with most maps (Figure 2.1.3).



▶ 2.1.3 **POPULATION CARTOGRAM**
In a cartogram, countries are displayed by size of population rather than land area. Countries with populations over 50 million are labeled.

Population Clusters

Two-thirds of the world's inhabitants live in four regions—East Asia, South Asia, Southeast Asia, and Europe (Figure 2.1.4). The four population concentrations occupy generally low-lying areas, with temperate climate and soil suitable for agriculture. Physical environments that are too dry, too cold, too wet, or too mountainous have relatively few inhabitants (Figure 2.1.5).

The areas of Earth that humans consider too harsh for occupancy have diminished over time, whereas the portion of Earth's surface occupied by permanent human settlement—called the **ecumene**—has increased.

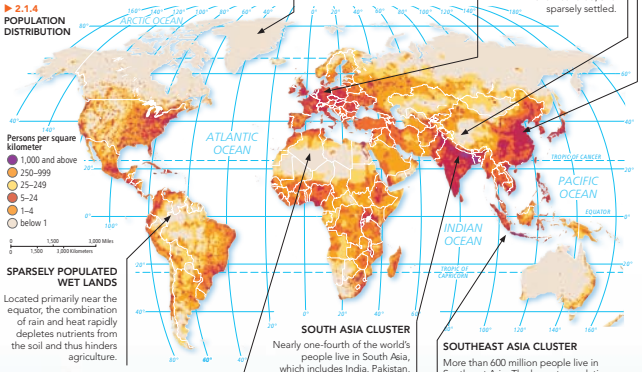
EAST ASIA CLUSTER
Nearly one-fourth of the world's people live in East Asia, primarily in China, the world's most populous country. China's population is clustered near the Pacific Coast and in several fertile river valleys that extend inland, though much of China's interior is sparsely inhabited mountains and deserts.

EUROPE CLUSTER
Europe includes four dozen countries, ranging from Monaco, with 1 square kilometer (0.7 square miles) and a population of 38,000, to Russia, the world's largest country in land area when its Asian part is included. Three-fourths of Europe's inhabitants live in cities, and fewer than 10 percent are farmers.

SPARSELY POPULATED HIGH LANDS
The highest mountains in the world are steep, snow covered, and sparsely settled.

SPARSELY POPULATED COLD LANDS
Much of the land near the North and South poles is perpetually covered with ice or the ground is permanently frozen (permafrost).

▶ 2.1.4 **POPULATION DISTRIBUTION**



SPARSELY POPULATED WET LANDS
Located primarily near the equator, the combination of rain and heat rapidly depletes nutrients from the soil and thus hinders agriculture.

SPARSELY POPULATED DRY LANDS
Areas too dry for farming cover approximately 20 percent of Earth's land surface. Unless irrigated, deserts lack sufficient water to grow crops that could feed a large population, although some people survive there by raising animals, such as camels.

SOUTH ASIA CLUSTER
Nearly one-fourth of the world's people live in South Asia, which includes India, Pakistan, Bangladesh, and Sri Lanka. The largest concentration of people within South Asia lives along a 1,500-kilometer (900-mile) corridor from Lahore, Pakistan, through India and Bangladesh to the Bay of Bengal.

SOUTHEAST ASIA CLUSTER
More than 600 million people live in Southeast Asia. The largest population concentration is on Indonesia's island of Java, inhabited by more than 100 million people.

▼ 2.1.5 **SPARSELY POPULATED COLD LANDS**
Angmagssalik, Greenland.

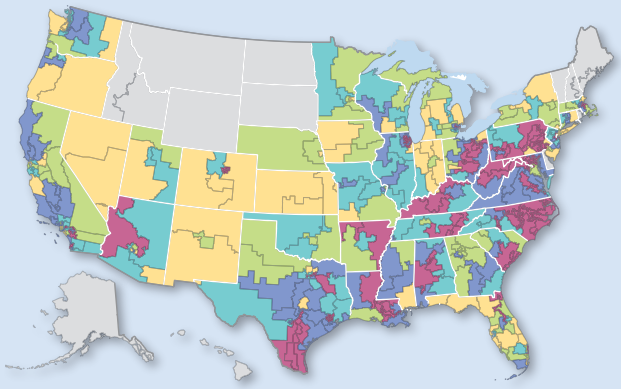
Applied Human Geography

NEW What's Your Geography? activities ask students to apply the skills and techniques of geographers to their personal experiences and local environments, helping to connect the relevance of human geography with everyday life.

WHAT'S YOUR POLITICAL GEOGRAPHY?

Check out the shape of your state's legislative districts.

1. In your search engine, ***enter*** *[your state] congressional district map*. If you live in a state with only one state-wide at large Representative (Alaska, Delaware, Montana, North Dakota, South Dakota, Vermont, and Wyoming), enter another state.
2. Are the districts compact and geometrically shaped, or are they irregularly shaped? If irregularly shaped, can you see a geographical reason for the shape, perhaps a natural feature such as a body of water, or a cultural boundary such as between ethnicities?
3. A gerrymander score has been calculated for each Congressional district (Figure 8.9.5). Use your Internet browser to ***search*** for *gerrymander score*. Or ***search*** *How gerrymandered is your Congressional district?* at **www.washingtonpost.com**. The higher the score, the more severe the gerrymandering. What is the gerrymander score for your Congressional district? Did you expect your district to have a higher score or a lower score? Why?



▲ 8.9.5 GERRYMANDERING SCORE

DEBATE IT! Should countries restrict immigration?

Immigration has become a controversial issue in many developed countries, including the United States and much of Europe.

CONTROL THE NUMBER OF IMMIGRANTS

- Immigrants compete for jobs with people already in the country and make it harder for citizens to find jobs.
- Immigrants place strains on services designed for citizens, such as schools and hospitals.
- Immigrants lack understanding and support for the host country's cultural traditions.

▲ 3.10.2 ANTI-IMMIGRANT RALLY
Cambridgeshire, United Kingdom.

WELCOME IMMIGRANTS

- Immigrants fill low-paying jobs that citizens don't want, such as in food services and agriculture.
- Immigrants place limited demands on public services.
- The different cultural heritage of immigrants enriches the life of the host country.

▲ 3.10.3 PRO-IMMIGRANT RALLY
London, United Kingdom.

UPDATED Debate It! features present two sides of a complex human geography topic, encouraging students to engage in active debate and decision-making. Readers may find that they agree with one side of the debate, or they may find merits in both perspectives.

Analyzing Earth's Dynamic Geography

NEW Geospatial Analysis activities leverage GIS-inspired MapMaster 2.0 in Mastering Geography, allowing students to layer various thematic maps to analyze spatial patterns and data at regional and global scales. The interactive maps are fully mobile, with enhanced analysis tools, such as split screen, bivariate mapping, data probing, map styling, and data filtering. Students can geolocate themselves in the data a d upload their own data for advanced mapmaking. This tool includes zoom and annotation functionality, with hundreds of map layers integrating recent data from authoritative sources such as the PRB, the World Bank, NOAA, NASA, USGS, United Nations, the CIA, and more.

Geospatial Analysis

Log in to the Mastering Geography Study Area to access MapMaster 2.0

Emissions and energy consumption

Carbon dioxide emissions and energy consumption have both increased. At the national scale, are the two related?

Add the *Energy Consumption* layer.

1. What world regions have the highest energy consumption per capita?
2. ***Add*** the *Carbon Dioxide Emissions* layer and ***select*** *Join with data layer*. Probe the map. Are countries with high carbon dioxide emissions per capita those with relatively high energy consumption per capita or relatively low? What might account for this relationship?

▲ 14.CR.7 ENERGY CONSUMPTION & CARBON DIOXIDE EMISSIONS

NEW Research & Analyze activities have students explore data from authoritative and up-to-date online sources, responding to critical thinking questions based on the data.

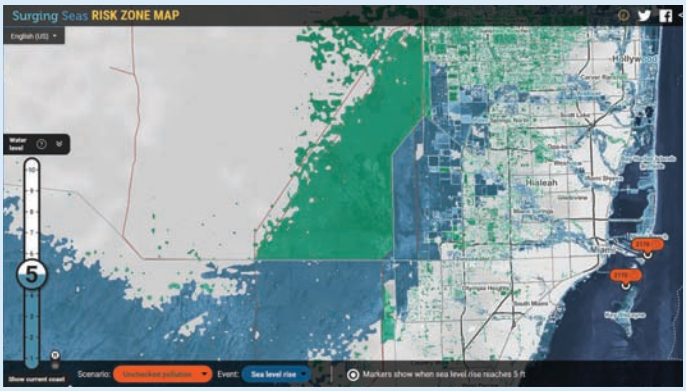
Surging Seas
https://goo.gl/Cj4osb.

RESEARCH & ANALYZE
Rising sea level

Climate change has raised the global sea level about 8 inches since 1880, and by nearly 2 feet along the U.S. East Coast. The interactive map at **SurgingSeas.org** shows different amounts of flooding, depending on the level of sea level rise.

At **SurgingSeas.org**, ***click*** *Maps & Tools*, then *Risk Zone* map. At *Enter a Global Coastal Place*, ***type*** *Miami*.

1. What are some of the features in Miami Beach that would be underwater if the sea level rises 5 feet?
2. ***Click*** *Property*. Are properties in Miami Beach at risk of sea level rise mostly of high value or low value? Why might that be?



▶ 1.13.6 IMPACT OF RISING SEA LEVEL ON MIAMI

Review, Analyze, & Apply

NEW Review, Analyze, & Apply. The final two-page spread of eac chapter reviews the main points of the chapter, organized around the four Key Issues. The end-of-chapter material also includes *Key Terms* as well as numerous activities, including *Thinking Geographically*, *GeoVideos*, *Geospatial Analysis*, and *Explore* activities.

CHAPTER 3

Review, Analyze, & Apply

KEY ISSUE 1 Where Are Migrants Distributed?

Emigration is migration from a location, immigration is migration to a location, and net migration is the difference between the two. The largest numbers of migrants are from Asia and Latin America to North America and from Asia to Europe. The principal sources of immigrants to the United States have changed over time.

THINKING GEOGRAPHICALLY

1. In recent years, has your community seen net in-migration or net out-migration? What factors might explain your community's net migration?

▲ 3.CR.1 NATURALIZATION CEREMONY

KEY ISSUE 2 Where Do People Migrate Within Countries?

Two main types of internal migration are interregional (between regions of a country) and intraregional (within a region). Large countries, including the United States and Canada, have had important patterns of interregional migration. Two intraregional migration patterns are from rural to urban areas (especially in developing countries) and from urban to suburban areas (especially in developed countries).

THINKING GEOGRAPHICALLY

2. Have you personally experienced (a) international migration, (b) interregional migration, or (c) intraregional migration? If so, why did your family migrate? Was the experience easy or difficult? Why?

▲ 3.CR.2 LOS ANGELES SUBURBS

KEY ISSUE 3 Why Do People Migrate?

People migrate for a combination of push and pull factors. Most people migrate for economic reasons, pushed from areas with limited economic prospects and pulled to areas of relative prosperity. Some migration is caused by environmental factors, as well as political and other cultural factors.

THINKING GEOGRAPHICALLY

3. When you graduate from your school, do you expect to undertake international, interregional, or intraregional migration? Why?

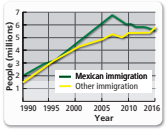
▲ 3.CR.3 TODAY'S GRADUATES, TOMORROW'S MIGRANTS?

KEY ISSUE 4 What Challenges Do Migrants Face?

Many countries, including the United States, limit the number of immigrants. For many developed countries, the demand for legal residency from international migrants significantly exceeds the number of slots set by the government. Hostility to immigrants is common, including among some Europeans.

THINKING GEOGRAPHICALLY

4. The number of unauthorized immigrants from Mexico to the United States has been declining since 2007. Given the push and pull factors underlying people's reasons for migrating, what might account for this decline?



▲ 3.CR.4 UNAUTHORIZED IMMIGRANTS IN U.S.

Explore

Mexico's other border

Use Google Earth to explore Mexico's southern border (Figure 3.CR.5).

Search *for Talisman, Mexico, border crossing.*

1. Use *Street View* for a ground-level view of the border crossing. Which if any of Mexico's border crossings with the United States in Figure 3.9 does the Talisman one resemble? Why?
2. ***Click*** the X in the upper left to return to aerial view. ***Zoom*** out to around 3 km.
3. What is the country bordering Mexico? The border mostly follows a river. What is the river's name?
4. Follow the river to the south. Do you see any other official border crossings? Does the border look easy to cross or difficult? Why?

▲ 3.CR.5 MEXICO'S SOUTHERN BORDER

Key Terms

Asylum seeker (p. 73) Someone who has migrated to another country in the hope of being recognized as a refugee.
Brain drain (p. 78) Large-scale emigration by talented people.
Chain migration (p. 78) Migration of people to a specific location because relatives or members of the same nationality previously migrated there.
Counterurbanization (p. 71) Net migration from urban to rural areas in developed countries.
Emigration (p. 64) Migration from a location.
Floodplain (p. 74) The area subject to flooding during a given number of years, according to historical trends.
Guest worker (p. 82) A term once used for a worker who migrated to the developed countries of Northern and Western Europe, usually from Southern and Eastern Europe or from North Africa, in search of a higher-paying job.
Immigration (p. 64) Migration to a new location.
Internal migration (p. 65) Permanent movement within a particular country.
Internally displaced person (IDP) (p. 73) Someone who has been forced to migrate for similar political reasons as a refugee but has not migrated across an international border.
International migration (p. 65) Permanent movement from one country to another.
Interregional migration (p. 65) Permanent movement from one region of a country to another.
Intervening obstacle (p. 72) An environmental or cultural feature of the landscape that hinders migration.
Intraregional migration (p. 65) Permanent movement within one region of a country.
Migration (p. 64) A form of relocation diffusion involving a permanent move to a new location.
Migration transition (p. 64) A change in the migration pattern in a society that results from industrialization, population growth, and other social and economic changes that also produce the demographic transition.
Net migration (p. 64) The difference between the level of immigration and the level of emigration.
Pull factor (p. 72) A factor that induces people to move to a new location.
Push factor (p. 72) A factor that induces people to leave old residences.
Quota (p. 79) In reference to migration, a law that places maximum limits on the number of people who can immigrate to a country each year.
Refugees (p. 73) People who are forced to migrate from their home country and cannot return for fear of persecution because of their race, religion, nationality, membership in a social group, or political opinion.
Remittance (p. 75) Transfer of money by workers to people in the country from which they emigrated.
Unauthorized immigrant (p. 80) A person who enters a country without proper documents to do so.

GeoVideo

Log in to the Mastering Geography Study Area to view this video.

Title: Xenophobia in Lampedusa

Thousands of unauthorized migrants from Tunisia arrived in small boats on Lampedusa, an island in the Mediterranean Sea with 6,000 inhabitants that is part of Italy.

1. What push and pull factors motivated the Tunisians to migrate to Lampedusa?
2. How have most of the 6,000 inhabitants of Lampedusa reacted to the arrival of Tunisians?
3. Explain why Tunisians have been migrating to Lampedusa, by consulting a map showing the location of the island.

Mastering Geography

Looking for additional review and test prep materials? Visit the Study Area in Mastering Geography to enhance your geographic literacy, spatial reasoning skills, and understanding of this chapter's content. Access MapMaster™ interactive maps, video case studies, *In the News* current articles, flashcards, self-study quizzes, an eText of *Contemporary Human Geography*, and more. **pearson.com/mastering/geography**

Geospatial Analysis

Log in to the Mastering Geography Study Area to access MapMaster 2.0.

Europe's immigrants and emigrants

Substantial immigration is occurring within Europe. Let's see where people are coming and going.

Add *the Net Migration data layer.* ***Select*** *the Settings icon from the Legend, and* ***select*** *Show Political Labels.* ***Add*** *the Gross National Income per capita layer and* ***select*** *Split Map Window.* ***Zoom*** to Europe.

1. Europe can be divided between east and west. Which of the two has net outmigration, and which has net inmigration?
2. Which half of Europe has higher gross national income per capita?
3. In what way do you think the patterns on the two maps are associated with each other?

▲ 3.CR.7 NET MIGRATION AND GROSS NATIONAL INCOME PER CAPITA EUROPE

Continuous Learning
Before, During, and After Class

Mobile Media and Reading Assignments Ensure Students Come to Class Prepared.

Pearson eText in Mastering Geography gives students access to the text whenever and wherever they can access the internet. eText features include:

- Available on smartphones, tablets, and computers.
- Seamlessly integrated videos and other rich media.
- Fully accessible (screen-reader ready).
- Configurable reading settings, including resizable type and night reading mode.
- Instructor and student note-taking, highlighting, bookmarking, and search.

Pre-Lecture Reading Quizzes are easy to customize & assign

Reading Questions ensure that students complete the assigned reading before class and stay on track with reading assignments. Reading Questions are 100% mobile ready and can be completed by students on mobile devices.

with Mastering™ Geography

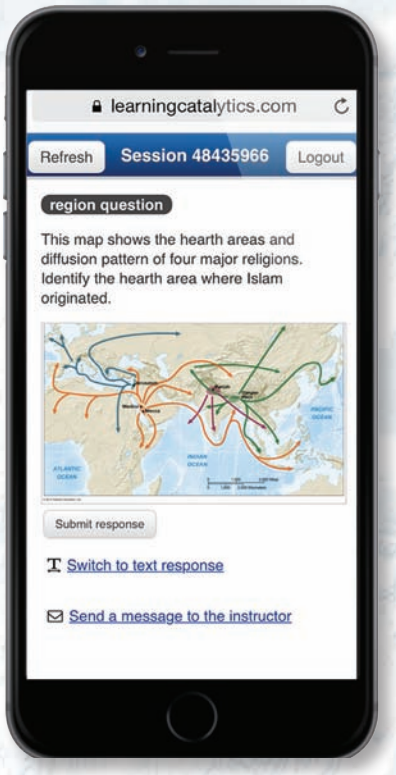
Learning Catalytics and Engaging Media

What has Professors and Students excited? Learning Cataltyics, a 'bring your own device' student engagement, assessment, and classroom intelligence system, allows students to use their smartphone, tablet, or laptop to respond to questions in class. With Learning Cataltyics, you can:

- Assess students in real-time using open ended question formats to uncover student misconceptions and adjust lecture accordingly.
- Automatically create groups for peer instruction based on student response patterns, to optimize discussion productivity.

"My students are so busy and engaged answering Learning Catalytics questions during lecture that they don't have time for Facebook."

Declan De Paor, *Old Dominion University*



Enrich Lecture with Dynamic Media

Teachers can incorporate dynamic media into lecture, such as Videos, MapMaster 2.0 Interactive Maps, Google Earth Virtual Tour Videos, and Geoscience Animations.

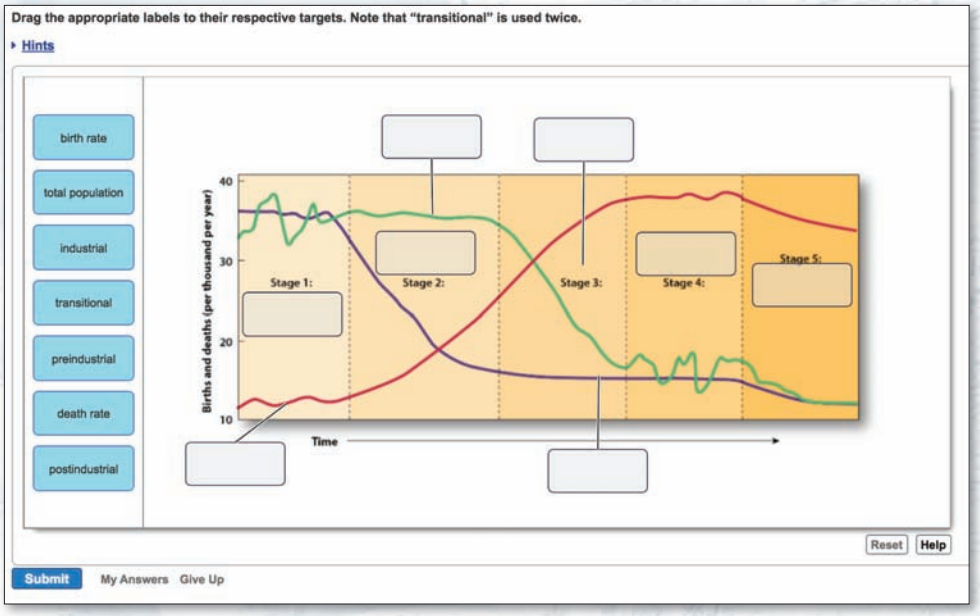
Mastering Geography

Mastering Geography delivers engaging, dynamic learning opportunities—focusing on course objectives and responsive to each student's progress—that are proven to help students absorb human geography course material and understand challenging geography processes and concepts. Visit **www.pearson.com/mastering/geography**.

Easy to Assign, Customizable, Media-Rich, and Automatically Graded Assignments

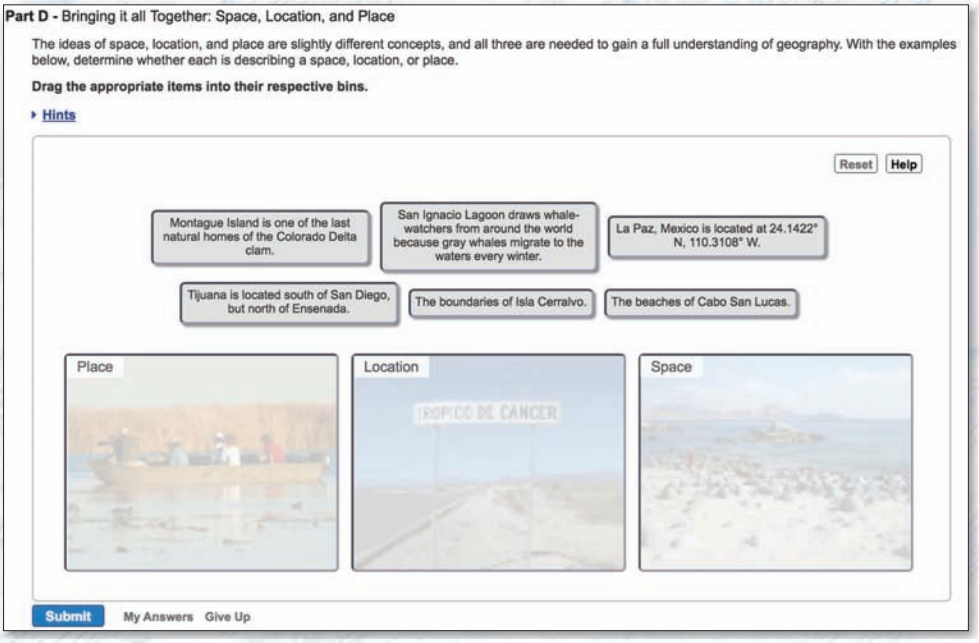
UPDATED! Over 240 Geography Videos from sources such as the BBC, The Financial Times, and Television for the Environment's *Life* and *Earth Report* series. Available for student self study or for assignment with quizzes.

HALLMARK! Thinking Spatially & Data Analysis activities coach students through spatial reasoning and real world data analysis activities related to core geography concepts.



21st Century Technology & Tools for Today's Students

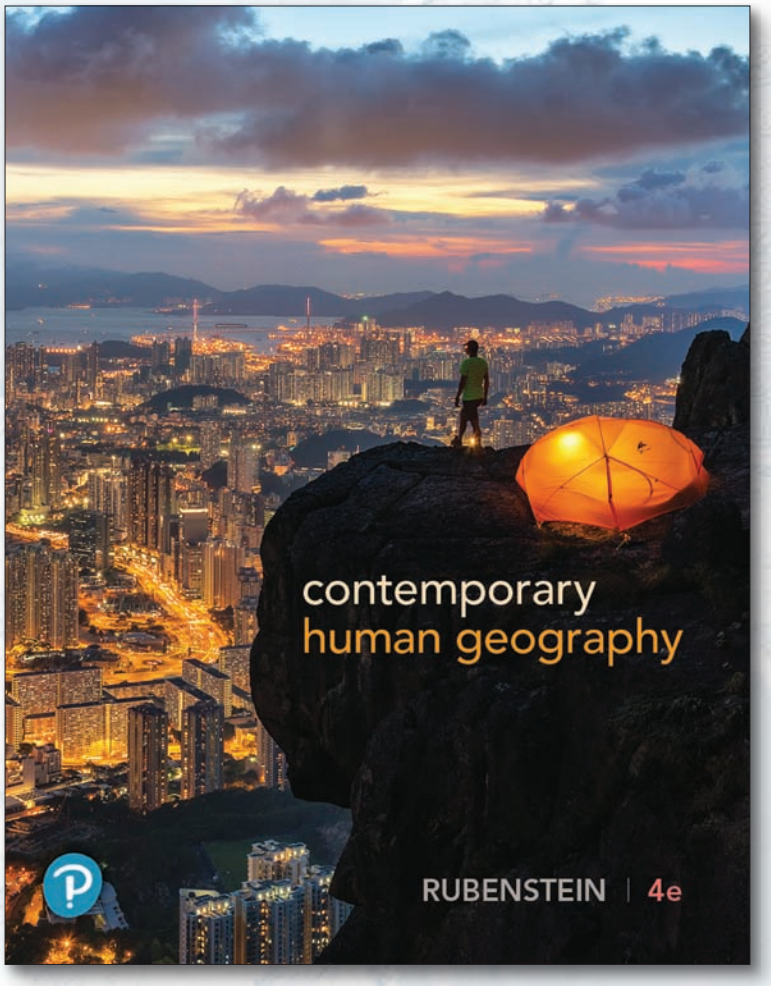
NEW! MapMaster 2.0 Interactive Map Activities are inspired by GIS, allowing students to analyze spatial patterns and data at regional and global scales by combining multiple thematic maps. The maps are now fully mobile, with enhanced analysis tools, such as split screen, allowing students to geolocate themselves in the data and upload their own data for advanced mapmaking. This tool includes zoom and annotation functionality, with hundreds of map layers leveraging recent data from authoritative sources such as the PRB, the World Bank, NOAA, NASA, USGS, United Nations, the CIA, and more.



UPDATED! GeoTutor Activities help students master even the most challenging geography concepts with highly visual, kinesthetic, and data-rich activities focused on critical thinking and the application of core geoscience concepts.

Resources for YOU, the Instructor

Mastering Geography provides you with everything you need to prep for your course and deliver a dynamic lecture, in one convenient place. Resources include:



LECTURE PRESENTATION ASSETS FOR EACH CHAPTER

- PowerPoint Lecture Outlines
- PowerPoint Clicker Questions
- Files for all illustrations, tables, and photos from the text

TEST BANK

- The *Test Bank* in Microsoft Word formats
- TestGen Computerized *Test Bank*, which includes all the questions from the test bank in a format that allows you to easily and intuitively build exams and quizzes

TEACHING RESOURCES

- *Instructor Resource Manual* in Microsoft Word and PDF formats
- Pearson Community Website **www.communities.pearson.com/northamerica/s/**
- Goode's *World Atlas*, 23rd Edition
- Mann/Kump, *Dire Predictions: Understanding Climate Change*, 2nd Edition

Measuring Student Learning Outcomes

All of the Mastering Geography assignable content is tagged to key learning concepts from the book, the National Geography Standards, and Bloom's Taxonomy. You also have the ability to add your own learning outcomes, helping you track student performance against your course goals. You can view class performance against the specified learning outcomes and share those results quickly and easily by exporting to a spreadsheet.

Contemporary Human Geography

Fourth Edition

James M. Rubenstein

MIAMI UNIVERSITY, OXFORD, OHIO

Pearson

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Brief Contents

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2 Population & Health

3 Migration

4 Folk & Popular Culture

5 Languages

6 Religions

7 Ethnicities

8 Political Geography

9 Food & Agriculture

10 Development

11 Industry

12 Services

13 Urban Patterns

14 Resource Issues

Preface

Welcome to a truly contemporary geography textbook! We live in a visual age, and geography is a highly visual discipline, so Pearson—the world's leading publisher of geography textbooks—invites you to study human geography as a visual subject.

The fourth edition of *Contemporary Human Geography* builds on the strengths of the first three editions, while responding to user feedback to make important changes and improvements, and incorporating innovative features, current data, and new information.

NEW & ENHANCED FEATURES

This edition brings substantial changes in both organization and content, as well as updated information and data. Especially important is the consideration of digital as well as paper versions of the book. This book has been designed to be legible—and attractive—in either paper or electronic format. Several features integrated into the text enhance student understanding and analytic skills.

New & Updated in the 4th Edition

- **NEW *What's Your Geography?*** features ask students to apply the skills and techniques of geographers to their real-world experiences and environments. *What's Your Geography?* helps students connect the relevance of human geography to their everyday lives.
- **NEW *Geospatial Analysis*** activities leverage GIS-inspired MapMaster 2.0 in Mastering Geography, allowing students to analyze spatial patterns and data at regional and global scales through overlaying multiple maps. The fully-mobile interactive maps have enhanced analysis tools, such as split screen, bivariate mapping, data probing, map styling, and data filtering. Students can geolocate themselves in the data and upload their own data for advanced mapmaking. MapMaster 2.0 includes zoom and annotation functionality, with hundreds of map layers leveraging recent data from sources such as the PRB, the World Bank, NOAA, NASA, USGS, United Nations, the CIA, and more.
- **NEW *Research & Analyze*** activities help students examine data from authoritative and up-to-date online sources and to respond to critical thinking questions based on the data.
- **UPDATED *Debate It!*** features present two sides of a complex human geography topic and encourages students to engage in active debate and decision-making. Readers may find that they agree with one side of the debate, or they may find merits in both perspectives.
- **UPDATED Word clouds,** on the first page of each chapter visually depict the most important concepts and terms to be addressed in the chapter.
- **UPDATED Location maps** present a spatial overview of each chapter, identifying select places explored in each chapter's applications and case studies.
- **UPDATED *Explore*** features have students use Google Earth™ to investigate in more detail a concept or place discussed in the chapter and answer questions based on their observations.
- **UPDATED *GeoVideo*** features integrate videos related to core subjects of each chapter. Students are encouraged to log into Mastering Geography to view videos that explore contemporary applications of chapter topics.
- **UPDATED *Thinking Geographically*** questions consist of several visual and thought-provoking "essay-style" questions at the end of each chapter, suggesting directions for further reflection, based on concepts and themes developed in the chapter.

NEW & ENHANCED ORGANIZATION

This book has a clear, easy-to-use organization and outline.

- **Opening spread.** Each chapter opens with an outline of the four Key Issues that will be addressed in the chapter, and introduces key terms and places found in the chapter.
- **Key Issues.** Each chapter follows an outline based on four Key Issues that outline the main topics and big questions in human geography covered in the chapter.
- **Self-contained spreads.** Each two-page spread is titled and numbered to enhance the clarity of the outline.
- **Learning Objectives.** Each two-page spread (or "module") begins with a Learning Objective that frames the main concept of that spread for students.

- **Self-contained pages.** Each page within the two-page spreads is also self-contained. As a result, maps and photos appear next to where they are discussed in the text. No more going through a chapter to find a figure that has been referenced on one page but actually appears on another page. This approach is especially critical for reading the eText on a tablet or computer.
- **Review, Analyze, & Apply.** The final two-page spread of each chapter (four pages for Chapter 1) reviews the main points of the chapter, organized around the four Key Issues. The end-of-chapter material also includes Key Terms as well as the activity features described above, including Thinking Geographically, GeoVideos, Geospatial Analysis, and Explore activities.

NEW & ENHANCED CONTENT

Human geography is a dynamic subject. Topics that were central to the discipline a generation ago have faded in importance, while new ones take their place. Each chapter naturally provides updates of the most recently available data. Below are examples of entirely new material included in each chapter.

What basic concepts do geographers use? The first portion of the book welcomes students to the study of human geography and introduces basic concepts that geographers use. Geographers employ several concepts to describe the distribution of people and activities across Earth, to explain reasons underlying the observed distribution, and to understand the significance of the arrangements.

Chapter 1 provides an introduction to ways that geographers think about the world. New topics include volunteered geographic information (VGI), citizen science, participatory GIS, and mashups. Geography's five most basic concepts (place, region, scale, space, connection) are introduced through the example of Timor-Leste, one of the world's newest and least-familiar countries. The discussion of sustainability includes new information on the drought in the U.S. West.

Where are people located in the world? Why do some places on Earth contain large numbers of people or attract newcomers whereas other places are sparsely inhabited? Chapters 2 and 3 examine the distribution and growth of the world's population, as well as the movement of people from one place to another.

Chapter 2 (Population & Health) includes an expanded discussion of gender- and age-related health issues, as well as the continuing debate over health care in the United States. As the rate of population growth declines from its peak during the second half of the twentieth century, population geography is increasingly concerned with the health of humans, not just their fertility and mortality.

Chapter 3 (Migration) includes recent controversies concerning U.S. borders and the surge of migration into Europe from Africa and Asia. The *What's Your Geography?* feature helps students consider their own family's migration stories.

How are different cultural groups distributed? Geographers look for similarities and differences in the cultural features at different places, the reasons for their distribution, and the importance of these differences for world peace. Chapters 4 through 8 analyze the distribution of different cultural traits and beliefs and the political challenges that result from those spatial patterns.

Chapter 4 (Folk & Popular Culture) includes new material on differences in popular culture within and between countries. The chapter also expanded coverage of the diffusion of various forms of social media, as well as limitations on accessing them.

Chapter 5 (Languages) uses the leading authority *Ethnologue*'s latest 5-point classification of languages as institutional, developing, vigorous, in trouble, and dying. A new *Debate It!* feature focuses on the need for learning foreign languages.

Chapter 6 (Religions) has been substantially reorganized and rewritten, and includes input from some of the nation's leading authorities on the geography of religions. A new section has been added concerning the contemporary diffusion of religions.

Chapter 7 (Ethnicities) includes new material on ethnic enclaves in large cities, including London, Paris, and New York. A new *Debate It!* feature considers recent independence movements among ethnicities.

Chapter 8 (Political Geography) addresses current conflicts and terrorist organizations. The chapter also includes a new *Debate It!* feature on "Brexit" (Britain's withdrawal from the European Union) and updated information on gerrymandering.

How do people earn a living in different parts of the world? Human survival depends on acquiring an adequate food supply. One of the most significant distinctions among people globally is whether they produce their food directly from the land or buy it with money earned by performing other types of work. Chapters 9 through 12 look at the three main ways of earning a living: agriculture, manufacturing, and services. Chapter 13 discusses cities, where the world's economic and cultural activities are increasingly centered.

Chapter 9 (Food & Agriculture) now precedes the chapter on development, in accordance with the order suggested by the Advanced Placement™ Human Geography course syllabus. Key Issue 4 includes expanded information on trade, productivity, biotechnology, and sustainability.

Chapter 10 (Development) reflects recent changes in United Nations development indices and the organization's sustainable development goals.

The chapter includes an expanded discussion of gender-related development, including inequality and empowerment. The chapter also addresses current challenges to the international trade development path.

Chapter 11 (Industry) has been reorganized, though still maintaining the geographic distinction between site and situation factors. Readers are asked to identify the national origin of their t-shirts and their car.

Chapter 12 (Services) includes expanded discussion of the new sharing economy, such as Uber™ and Airbnb™. New features include an interactive study of food deserts.

Chapter 13 (Urban Patterns) includes updated census definitions of "urban." A new case study illustrates the CBD (Central Business District) of Mobile, Alabama. The chapter also contains new material on transportation epochs and bicycles in urban areas.

What issues result from using Earth's resources? Geographers recognize that cultural problems result from the depletion, destruction, and inefficient use of the world's natural resources. Chapter 14 is devoted to a study of issues related to the use of Earth's natural resources. Readers are asked about their use of plastic bottles, a major cause of solid waste pollution.

CONTEMPORARY PERSPECTIVES

The main purpose of this book is to introduce you to the study of geography as a social science by emphasizing the relevance of geographic concepts to human problems. It is intended for use in college-level introductory human or cultural geography courses. The book is written for students who have not previously taken a college-level geography course.

Titling this book "contemporary" is a bold claim. All credible geography books—including this one—contain up-to-date statistics, recent world events, and current geographic concepts. This book claims to be more contemporary—not merely up-to-date—for three reasons.

1. **We live in an electronic age.** This book has been designed to be equally usable—and attractive—in both paper or digital formats. Most books are still composed in pages designed for paper—as in the past—and converted to electronic format after printing of the paper version. As a result, the conversion to electronic format is frequently awkward. For example, maps and photos are often placed in the paper version in positions that don't work well in electronic format.

   This is the best-looking human geography textbook available anywhere in paper—and it is also the best-designed book for electronic reading. Furthermore, within the book, some of the learning will take place through accessing information online. Quick Response codes (QRs), URLs, online searches—these are the tools of contemporary teaching.

2. **We live in a visual age.** This book has been composed in the reverse order of traditional textbooks. A traditional book has the text written first and the graphic material is added later almost as an afterthought. Instead of beginning with an author's complete manuscript, this book starts with an outline and a visual concept for each two-page module in the book. What would be the most important geographic idea presented on the spread, and what would be the most effective visual way to portray that idea? The maps, graphs, and photos are placed on the page first, and the text is written around the graphics. The production of this book does not have a traditional manuscript; from the outset, the text is written to complement the graphics.

3. **We live in a sound bite age.** This book replaces the narrative style of traditional books. Each page of this book is self-contained. Material doesn't carry over to the next page. This places more of a premium on clear, concise outlining as an important pedagogical feature. The text introduces maps, graphs, and photos so that captions can be as brief as possible.

CONTEMPORARY RELEVANCE

Many speculated that geography would be irrelevant in the twenty-first century. Geography's future was thought to be grim because the diffusion of electronic communications and social media would make it easier for human activities to be conducted remotely. If any piece of information could be accessed from any place in the world (at least where electronic devices work), why live, shop, work, or establish a business in a crowded city or a harsh climate?

In reality, geography has become more, not less, important in people's lives and the conduct of business. Here are several ways that location matters more now than in the past, because of—not despite—the diffusion of electronic devices:

1. Smartphones and other electronic devices match specific demand to supply in a particular locality. For example: Restaurant apps match hungry people to empty seats in a locality's restaurants. Real estate apps help people find housing for sale or for rent in a locality. Social apps let people know where their friends in a particular locality are hanging out that night. Transportation apps match vehicles with available seats to people trying to get to specific locations.

   These sorts of apps generate data on people's preferences in space, which in turn helps even more location-based business get started and grow. Instead of looking for restaurants in printed "Yellow Pages," we find places to eat that are mapped on our device and in our locations. No wonder that geography apps,

in the form of maps (including navigation) and travel (including transportation), rank as two of the five most frequently used services on smartphones.

2. Electronic devices are essential to the smooth movement of people and goods. For example: Turn-by-turn information can prevent you from getting lost or steer you back if you do get lost. Traffic jams on overcrowded roads can be avoided or minimized. Vehicles in the future will be driverless, so you can spend driving time working, learning, or social networking. Instead of turning on a radio to hear traffic information, we look at the red and green traffic flow patterns on an electronic map.
3. The people who make all of these new location-based apps are themselves highly clustered in a handful of places in the world, such as the San Francisco Bay Area. Ideas—both brilliant and far-fetched—are still easier to communicate face-to-face than across long distances. Living and working in places like Silicon Valley, despite high expenses and choking traffic jams, put people next to other like-minded innovators in the electronic-based geography of the twenty-first century.
4. Electronic devices also impact the changing geography of cultural diversity. What if you searched for an available restaurant table in a foreign language? Would you find the same places? What if you conducted an Internet search in a foreign country? Would you find the same information?

LOCAL DIVERSITY VS. GLOBALIZATION

A central theme in this book explores the tension between two important themes—cultural diversity and globalization. In many respects, we are living in a more unified world economically, culturally, and environmentally. Geography's spatial perspectives help to relate economic change to the distributions of cultural features such as languages and religions, demographic patterns such as population growth and migration, and natural resources such as energy, water quality, and food supply.

This book argues, though, that after a period when globalization of the economy and culture has been a paramount concern in geographic analysis, local diversity now demands equal time. People are taking deliberate steps to retain distinctive cultural identities. They are preserving little-used languages, fighting fiercely to protect their religions, and questioning free trade agreements. Local diversity even extends to addressing issues, such as climate change, that at first glance are considered global. For example, the "greenest" cars for motorists to drive in Oregon are different than the "greenest" cars for Ohio.

Since 2013, I have written a weekly column for our local newspaper on behalf of our local cooperatively owned grocery store. The column has come to extol the virtues of "local" here in Midwestern USA: the local food, the local farmers, the local seasons, and the locally owned co-op. I admire the farmers and the agriculture from far away, but our local food is more nutritious, consumes less energy, and tastes better. In a world where we feel anger and helplessness at the plight of people in other places, it is at the local scale that we all can make a difference.

THE PUBLISHING TEAM

The steps involved in creating most traditional textbooks haven't changed much. The book passes from one to another like a baton in a relay race. The author writes a manuscript, which then passes in turn through development, editing, and production specialists on the way to the printing press. The preface typically includes a perfunctory litany of acknowledgments for the many fine people who contribute to the development, editing, and production of the book.

In contrast, this book starts as a genuine partnership among the key development, editorial, and production teams. For this truly contemporary book, collaborative partnership better describes its creation. The traditional separation of development, editorial, and production personnel does not occur, and in fact the lines among these functions are deliberately blurred.

Christian Botting, Executive Editor for Geosciences at Pearson Education, is the captain of this team. He has now been the leader on seven of my book projects. Because Pearson is the dominant publisher of college geography textbooks, the person in charge of geography wields considerable influence in shaping what is taught in the nation's geography curriculum. Christian knows when to lead the market and when to listen to users, when to innovate and when to stick with success, when to let the team do its job and when to step in and make a tough decision. His instincts are infallible.

Corey Brincks, Research Assistant, first came to my attention as a sophomore at Miami University. Although the only sophomore in a class of 22 seniors, he was the strongest student in the class. He has since co-authored with me a couple of papers on the auto industry. Corey has embarked on a career at nonprofit organizations concerned with international development in Asia, including stints in Timor-Leste and Vietnam. His imprint appears in this book from the very first feature on Timor-Leste to the very last feature on cars of the future.

Stuart Jackman is the creative genius responsible for the spectacular graphics. He deserves the lion's share of the credit for giving this book the best graphics in geography. Stuart honed his craft as longtime Design Director at DK Education. DK is well-known for producing the best travel guides. The DK "style" is immediately recognizable as distinctive from traditional geography books. You can tell that the graphics are the central element of the book, not an afterthought.

Kevin Lear, Senior Project Manager at International Mapping, and his team produce the outstanding maps for this book. Back in the 1980s, Kevin was the first cartographer to figure out how to produce computer-generated full-color maps that are more accurate and more attractive than hand-drawn ones.

Jonathan Cheney, Portfolio Management Specialist at Pearson Education, plays a key role at the start of the project by reviewing and collating the many reviews and sorting out what needs to be preserved and what needs to be improved. Jonathan reviews the rough drafts of each spread of each chapter that Stuart and I prepare, and helps develop many of the special features.

Brett Coker, Content Producer at SPi Global, serves as ringmaster. Brett oversees the unusually complex task of managing this book's extremely nontraditional work flow.

Julie Kidd, Project Manager at SPi Global, smoothly manages the flow of copyediting and other production tasks for this project.

Carole Katz, Research Consultant, ably assisted with development of material, especially languages and environment.

REVIEWERS

I would like to extend a special thanks to my colleagues who served as reviewers on the first four editions, as well as on overlapping material from *Introduction to Contemporary Geography*:

Roger Balm, Rutgers University
Joby Bass, University of Southern Mississippi
Steve Bass, Mesa Community College
David C. Burton, Southmoore High School
Michelle Calvarese, California State University, Fresno
Craig S. Campbell, Youngstown State University
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Mark VanderVen, Western Washington University
Daniel Vara, College Board Advanced Placement Human Geography Consultant
Timothy Vowles, University of Northern Colorado
Anne Will, Skagit Valley College
Lei Xu, California State University, Fullerton
Daisaku Yamamoto, Central Michigan University
Robert C. Ziegenfus, Kutztown University of Pennsylvania

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The Mastering platform is the most widely used and effective online homework, tutorial, and assessment system for the sciences. It delivers self-paced coaching activities that provide individualized coaching, focus on course objectives, and are responsive to each student's progress. The Mastering system helps teachers maximize class time with customizable, easy-to-assign, and automatically graded assessments that motivate students to learn outside of class and arrive prepared for lecture. Mastering Geography offers:

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- Student study area with GIS-inspired MapMaster 2.0 interactive maps, Geoscience Animations, web links, geography videos, glossary flash cards, "In the News" current articles, reference maps, an optional Pearson eText and more.

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Updated for the fourth edition, the *Instructor Resource Manual* is intended as a resource for both new and experienced instructors. It includes lecture outlines, additional source materials, teaching tips, advice about how to integrate online media, and various other ideas for the classroom.

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TestGen is a computerized test generator that lets instructors view and edit *Test Bank* questions, transfer questions to tests, and print the test in a variety of customized formats. This *Test Bank* includes over 1,000 multiple choice and short answer/ essay questions. Questions are correlated to the revised U.S. National Geography Standards and Bloom's Taxonomy to help instructors better map the assessments against both broad and specific teaching and learning objectives. The questions are also tagged to chapter specific learning outcomes. The Test Bank is available in Microsoft Word, and is importable into Blackboard.

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The *Instructor Resource Materials* provides high-quality electronic versions of photos and illustrations from the book in JPEG, pdf, and PowerPoint formats, as well as customizable PowerPoint lecture presentations, Classroom Response System questions in PowerPoint, and the *Instructor Resource Manual* and *Test Bank* in MS. Word and TestGen formats. For easy reference and identification, all resources are organized by chapter.

FOR STUDENTS

Teaching College Geography: A Practical Guide for Graduate Students and Early Career Faculty (0136054471)

This two-part resource provides a starting point for becoming an effective geography teacher from the very first day of class. Divided in two parts, Part One addresses "nuts-and-bolts" teaching issues. Part Two explores being an effective teacher in the field, supporting critical thinking with GIS and mapping technologies, engaging learners in large geography classes, and promoting awareness of international perspectives and geographic issues.

Aspiring Academics: A Resource Book for Graduate Students and Early Career Faculty (0136048919)

Drawing on several years of research, this set of essays is designed to help graduate students and early career faculty start their careers in geography and related social and environmental sciences. *Aspiring Academics* stresses the interdependence of teaching, research, and service—and the importance of achieving a healthy balance of professional and personal life—while doing faculty work. Each chapter provides accessible, forward-looking advice on topics that often cause the most stress in the first years of a college or university appointment.

Practicing Geography: Careers for Enhancing Society and the Environment (0321811151)

This book examines career opportunities for geographers and geospatial professionals in business, government, nonprofit, and educational sectors. A diverse group of academic and industry professionals share insights on career planning, networking, transitioning between employment sectors, and balancing work and home life. The book illustrates the value of geographic expertise and technologies through engaging profiles and case studies of geographers at work.

Goode's World Atlas, 23rd Edition (0133864642)

Goode's World Atlas has been the world's premier educational atlas since 1923, and for good reason. It features over 250 pages of maps, from definitive physical and political maps to important thematic maps that illustrate the spatial aspects of many important topics. The 23rd edition includes digitally produced reference maps, as well as new thematic maps on demography, global climate change, sea level rise, CO_2 emissions, polar ice fluctuations, deforestation, extreme weather events, infectious diseases, water resources, and energy production.

The atlas is also available in Pearson Collections and in various eText formats, including an upgrade option from Mastering Geography courses.

Encounter Human Geogrtaphy Workbook & Website by Jess C. Porter (0321682203)

For classes that do not use Mastering Geography, *Encounter Human Geography* provides rich, interactive explorations of human geography concepts through Google Earth. Students explore the globe through themes such as population, sexuality and gender, political geography, ethnicity, urban geography, migration, human health, and language. All chapter explorations are available in print format as well as online quizzes, accommodating different classroom needs. All worksheets are accompanied with corresponding Google Earth KMZ media files, available for download for those who do not use Mastering Geography, from **www.mygeoscienceplace.com**

Dire Predictions: Understanding Climate Change, 2nd edition, by Michael Mann and Lee R. Kump (0133909778)

Periodic reports from the Intergovernmental Panel on Climate Change (IPCC) evaluate the risk of climate change brought on by humans. But the sheer volume of scientific data remains inscrutable to the general public, particularly to those who may still question the validity of climate change. In just over 200 pages, this practical text presents and expands upon the essential findings of the IPCC's 5th Assessment Report in a visually stunning and undeniably powerful way to the lay reader. Scientific findings that provide validity to the implications of climate change are presented in clear-cut graphic elements, striking images, and understandable analogies.

The **Second Edition** covers the latest climate change data and scientific consensus from the IPCC Fifth Assessment Report and integrates links to online media. The text is also available in various eText formats, including an upgrade option from Mastering Geography courses.

Television for the Environment *Earth Report* Geography Videos on DVD (0321662989)

This three-DVD set is designed to help students visualize how human decisions and behavior have affected the environment and how individuals are taking steps toward recovery. With topics ranging from the poor land management promoting the devastation of river systems in Central America to the struggles for electricity in China and Africa, these 13 videos from Television for the Environment's global *Earth Report* series recognize the efforts of individuals around the world to unite and protect the planet.

About the Author

Dr. James M. Rubenstein received his B.A. from the University of Chicago in 1970, M.Sc. from the London School of Economics and Political Science in 1971, and Ph.D. from Johns Hopkins University in 1975. He was Professor of Geography at Miami University for 37 years, where he taught urban and human geography. Dr. Rubenstein is now a full-time writer. In addition to this book, Dr. Rubenstein is the author of *The Cultural Landscape*, the bestselling textbook for college and high school human geography, as well as co-author of *Introduction to Contemporary Geography*, both published by Pearson Education. He also conducts research in the automotive industry and has published four books on the subject—*The Changing U.S. Auto Industry: A Geographical Analysis* (Routledge); *Making and Selling Cars: Innovation and Change in the U.S. Auto Industry* (The Johns Hopkins University Press); *A Profile of the Automobile and Motor Vehicle Industry: Innovation, Transformation, Globalization* (Business Expert Press); and *Who Really Made Your Car? Restructuring and Geographic Change in the Auto Industry*(W.E. Upjohn Institute, with Thomas Klier). He also writes a weekly column about local food for *The Oxford Press*. Winston, a lab-husky mix with one brown eye and one blue eye, takes Dr. Rubenstein for long walks in the woods every day.

This book is dedicated to my wife Bernadette Unger, the love of my life, and my companion through life.

About our Sustainability Initiatives

Pearson recognizes the environmental challenges facing this planet, as well as acknowledges our responsibility in making a difference. This book is carefully crafted to minimize environmental impact. The binding, cover, and paper come from facilities that minimize waste, energy consumption, and the use of harmful chemicals. Pearson closes the loop by recycling every out-of-date text returned to our warehouse.

Along with developing and exploring digital solutions to our market's needs, Pearson has a strong commitment to achieving carbon-neutrality. As of 2009, Pearson became the first carbon- and climate-neutral publishing company, having reduced our absolute carbon footprint by 22% since then. Pearson has protected over 1,000 hectares of land in Columbia, Costa Rica, the United States, the UK and Canada.

In 2015, Pearson formally adopted *The Global Goals for Sustainable Development,* sponsoring an event at the United Nations General Assembly and other ongoing initiatives. Pearson sources 100% of the electricity we use from green power and invests in renewable energy resources in multiple cities where we have operations, helping make them more sustainable and limiting our environmental impact for local communities.

The future holds great promise for reducing our impact on Earth's environment, and Pearson is proud to be leading the way. We strive to publish the best books with the most up-to-date and accurate content, and to do so in ways that minimize our impact on Earth. To learn more about our initiatives, please visit **https://www.pearson.com/corporate/sustainability.html**

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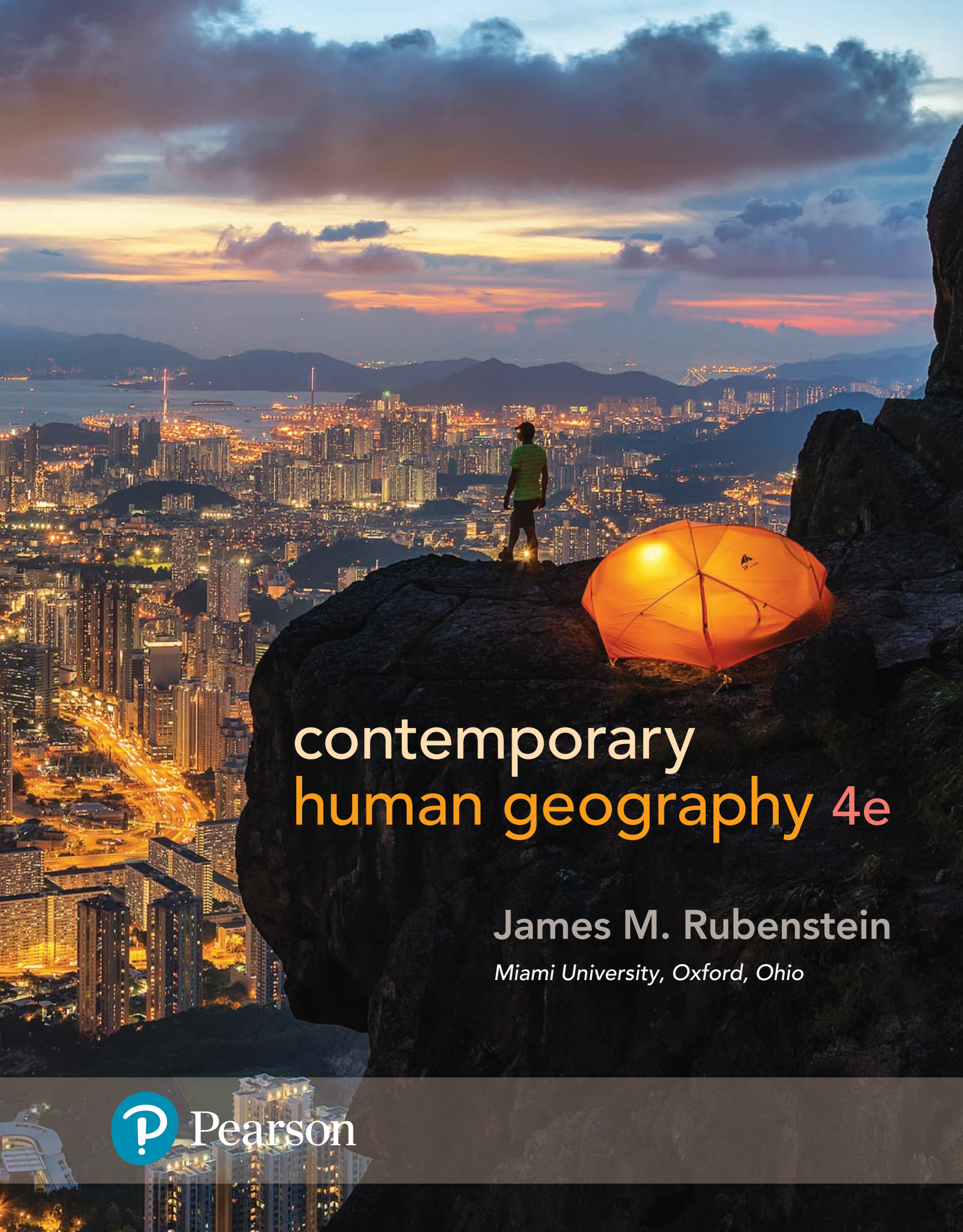

contemporary human geography 4e

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Pearson

CHAPTER

1 This is Geography

Contemporary geography is the scientific study of where people and activities are found across Earth's surface and the reasons why they are found there. Geography is distinctive because it encompasses both social science and natural science. This book focuses on geography as a social science (human geography).

Google Street View camera documenting Ulan Bator, Mongolia.

KEY ISSUES

1 Why Is Geography a Science?

Geography's most distinctive tool is the map. Prehistoric humans were the first people to make maps. Contemporary tools enable cartographers—and anyone else who has access to electronic devices—to make precise maps and to interpret their meaning.

2 Why Is Every Place Unique?

Geographers understand that each location on Earth is in some ways unique. Each specific place or larger region on Earth possesses a unique combination of features.

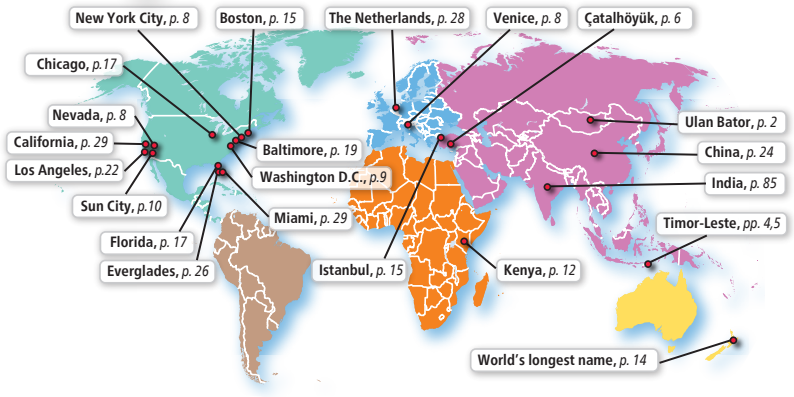
3 Why Are Different Places Similar?

Many features are organized in a regular manner across space. Some regularities are global in scale, whereas others have distinctive local character.

4 Why Are Places Connected?

Distinctive to geography is the importance given to connections between human activities and the physical environment. Some human activities are sustainable, but others are not.

LOCATIONS IN THIS CHAPTER



▲ 1.1.1
TIMOR-LESTE
A market in Dili, the capital of Timor-Leste. Timor-Leste is one of the world's poorest countries.

Welcome to Geography

- **Summarize geography's five most basic concepts.**

The word geography, invented by the ancient Greek scholar Eratosthenes (ca. 276-ca. 194 B.C.), is based on two Greek words. Geo mans "Earth" and graphy means "to write." Human geographers ask two questions: Where are people and activities found on Earth? Why are they there?

Geography and History

In his framework of all scientific knowledge, the German philosopher Immanuel Kant (1724-1804) compared geography and history:

GEOGRAPHERS . . .	HISTORIANS . . .
identify the location of important places.	identify the dates of important events.
explain why one human activity is found near another.	explain why one human activity follows another chronologically.
ask where and why.	ask when and why.
organize material spatially.	organize material chronologically.
recognize that an action at one point on Earth can result from actions at another point, which can consequently affect conditions elsewhere.	recognize that an action at one point in time can result from past actions and can in turn affect future ones.

History and geography differ in one especially important manner. A geographer can take a plane or car to another place on Earth (Figures 1.1.1 and 1.1.2), but a historian cannot travel back to another time in the past. This ability to reach other places lends excitement to the discipline of geography.

▼ 1.1.2 **CAPE FATUCAMA, TIMOR-LESTE**
A massive statue called Cristo Rei [Christ the King] towers over the coast of Timor-Leste.

Geographers Explain *Where* and *Why*

This chapter introduces basic concepts that geographers employ to address their "where" and "why" questions. To explain where things are, one of geography's most important tools is a map. Maps are discussed in the next several pages.

Geographers employ several basic concepts to explain why every place on Earth is in some ways unique and in other ways related to other locations. To explain why every place is unique, geographers have two basic concepts:

- A **place** is a specific point on Earth distinguished by a particular characteristic. Every place occupies a unique location, or position, on Earth's surface.
- A **region** is an area of Earth defined by one or more distinctive characteristics.

To explain why different places are interrelated geographers have three basic concepts:

- **Scale** is the relationship between the portion of Earth being studied and Earth as a whole. Geographers are increasingly concerned with the global scale.
- **Space** refers to the physical gap or interval between two objects. Geographers observe that many objects are distributed across space in a regular manner, for discernible reasons.
- **Connection** refers to relationships among people and objects across the barrier of space. Geographers are concerned with the various means by which connections occur. They are especially interested in connections between human activities and the physical environment.

Timor-Leste (East Timor), one of the world's newest countries, illustrates geography's five basic concepts: Place (Figure 1.1.3), region (Figure 1.1.4), scale (Figure 1.1.5), space (Figure 1.1.6), and connection (Figure 1.1.7).

▲ 1.1.3 PLACE
The Democratic Republic of Timor-Leste is an independent country situated on the eastern half of the island of Timor. The western portion of the island is mostly part of Indonesia.

▲ 1.1.4 REGION
Timor-Leste is located in Southeast Asia, one of the major areas of the world that geographers identify.

▲ 1.1.5 SCALE
At a local scale, in Timor-Leste's rural villages, such as Aituto, people trade and purchase locally-produced food and goods at a village market. At a global scale, the capital city Dili has supermarkets selling food imported from Indonesia, China, Australia, New Zealand, Portugal, and Brazil.

▲ 1.1.6 SPACE
The gap between places can be minimal or substantial. The distance between the capital Dili and Mount Ramelau, the country's highest elevation (2,986 meters, 9,797 feet), is only 70 kilometers (43 miles). In reality, the gap is substantial, because travel from Dili to Mount Ramelau requires a 5 hour drive followed by a 5 hour hike.

▲ 1.1.7 CONNECTION
Aeroporto Internacional Presidente Nicolau Lobato connects Timor-Leste with Australia, Indonesia, and Singapore.

Ancient & Medieval Maps

- Summarize the development of the science of cartography.

Geography's most important tool for thinking spatially about the distribution of features across Earth is a **map**. A map is a two-dimensional or flat-scale model of Earth's surface, or a portion of it. For centuries, geographers have worked to perfect the science of mapmaking, called **cartography**.

Geography in the Ancient World

The science of geography has prehistoric roots (Figure 1.2.1). Major contributors to geographic thought in the ancient eastern Mediterranean included:

- Thales of Miletus (ca. 624–ca. 546 B.C.), who applied principles of geometry to measuring land area.
- Anaximander (610–ca. 546 B.C.), a student of Thales, who made a world map based on information from sailors and argued that the world was shaped like a cylinder.
- Pythagoras (ca. 570–ca. 495 B.C.), who may have been the first to propose a spherical world and argued that the sphere was the most perfect form.
- Hecateus (ca. 550–ca. 476 B.C.), who may have produced the first geography book, called Ges Periodos ("Travels Around the Earth").
- Aristotle (384–322 B.C.), who was the first to demonstrate that Earth was spherical on the basis of evidence.
- Eratosthenes (ca. 276–ca. 195 B.C.), the inventor of the word geography, who accepted that Earth was round (as few others did in his day), calculated its circumference within 0.5 percent accuracy, divided Earth into five climatic regions, and described the known world in one of the first geography books.
- Strabo (ca. 63 B.C.–ca. A.D. 24), who described the known world in a 17-volume work titled Geography.
- Ptolemy (ca. A.D. 100–ca. 170), who wrote the eight-volume Guide to Geography, codified basic principles of mapmaking, and prepared numerous maps that were not improved upon for more than 1,000 years (Figure 1.2.2).

▲ 1.2.1 ONE OF THE EARLIEST SURVIVING MAPS
This map, dating from 6200 B.C., depicts the town of Çatalhöyük, in present-day Turkey and the eruption of the Hasan Dağ (Mount Hasan) twin-peaks volcano, which is actually located around 140 km northeast of the town. Archaeological evidence indicates that the volcano did erupt around the time that the map was made. The map is now in Turkey's Konya Archaeological Museum.

China was another center of early geographic thought. Ancient Chinese geographic contributions included:

- "Yu Gong" ("Tribute of Yu"), a chapter in a book called Shu Jing ("Classic of History"), which was the earliest surviving Chinese geographical writing, by an unknown author from the fifth century B.C., described the economic resources of the country's different provinces.
- Pei Xiu, the "father of Chinese cartography," who produced an elaborate map of the country in A.D. 267.

▶ 1.2.2 WORLD MAP BY PTOLEMY, CA. A.D. 150
The map shows the known world at the height of the Roman Empire, surrounding the Mediterranean Sea and Indian Ocean.

Geography's Revival

After Ptolemy, little progress in mapmaking or geographic thought was made in Europe for several hundred years. Maps became less mathematical and more fanciful, showing Earth as a flat disk surrounded by fierce animals and monsters.

Geographic inquiry continued, though, outside Europe. Contributors outside of Europe included:

- Muhammad al-Idrisi (1100–ca. 1165), a Muslim geographer who prepared a world map and geography text in 1154, building on Ptolemy's long-neglected work (Figure 1.2.3).
- Abu Abdullah Muhammad Ibn-Battuta (1304–ca. 1368), a Moroccan scholar, who wrote Rihla ("Travels") based on three decades of journeys covering more than 120,000 kilometers (75,000 miles) through the Muslim world of northern Africa, southern Europe, and much of Asia.

Making maps as reference tools revived during the Age of Exploration and Discovery. Columbus, Magellan, and other explorers who sailed across the oceans in search of trade routes and resources in the fifteenth and sixteenth centuries required accurate maps to reach desired destinations without wrecking their ships. In turn, cartographers used information collected by the explorers to create more accurate maps.

Influential European cartographers included:

- Martin Waldseemüller (ca. 1470–ca. 1521), a German cartographer who was credited with producing the first map to use the label "America"; he wrote on the map (translated from Latin) "from Amerigo the discoverer . . . as if it were the land of Americus, thus America (Figure 1.2.4)."
- Abraham Ortelius (1527–1598), a Flemish cartographer, who created the first modern atlas and was the first to hypothesize that the continents were once joined together before drifting apart.
- Bernhardus Varenius (1622–1650), who produced Geographia Generalis, which stood for more than a century as the standard treatise on systematic geography.

◀ 1.2.3 WORLD MAP BY AL-IDRISI, 1154
Al-Idrisi built on Ptolemy's map, which had been neglected for nearly a millenium.

◀ 1.2.4 WORLD MAP BY WALDSEEMÜLLER, 1508
The name "America" appears in very small print on the map.

Contemporary Geographic Tools

- Explain geography's contemporary analytic mapping tools.

Maps are not just paper documents in textbooks. They have become an essential tool for contemporary delivery of online services through smart phones, tablets, and computers.

GIScience: Analyzing Data

Geographic information science (GIScience) is analysis of data about Earth acquired through satellite and other electronic information technologies. A **geographic information system (GIS)** captures, stores, queries, and displays the geographic data. GIS produces maps (including those in this book) that are more accurate and attractive than those drawn by hand. Each type of information is stored in a layer.

The science of taking measurements of Earth's surface from photographs is called **photogrammetry**. The acquisition of data about Earth's surface from a satellite orbiting Earth or from other long-distance methods is **remote sensing**. At any moment, an aerial sensor attached to a satellite, airplane, or drone may be recording the image of a tiny area on Earth's surface (Figure 1.3.1).

Corporations and government agencies use photogrammetry and remote sensing to create high-quality 3D virtual representations of portions of Earth. These maps can depict the distribution of a wide variety of urban and rural features (Figure 1.3.2).

GIScience helps geographers create more accurate and complex maps and measure changes over time in the characteristics of places. Layers of information acquired through remote sensing and produced through GIS can be described and analyzed. GIScience enables geographers to calculate whether relationships between objects on a map are significant or merely coincidental.

▲ 1.3.1 PHOTOGRAMMETRY
A drone flies a test course in Nevada to determine the precision of its mapping capabilities.

GPS: Pinpointing Locations

Our smart phones, tablets, and computers are equipped with **Global Positioning System (GPS)**, which is a system that determines the precise position of something on Earth. The GPS in use in the United States includes two dozen satellites placed in predetermined orbits; a series of tracking stations to monitor and control the satellites; and receivers that compute position, velocity, and time from the satellite signals.

GPS is most commonly used for navigation. Pilots of aircraft and ships stay on course with GPS. On land, GPS detects a vehicle's current position, the motorist programs the desired destination into a GPS device, and the device provides instructions on how to reach the destination.

Thanks to GPS, our electronic devices provide us with a wealth of information about the specific place on Earth we currently occupy. The locations of all the information we gather and photos we take with our electronic devices are recorded through **geotagging**, which is identification and storage of a piece of information by its precise latitude and longitude coordinates. Geotagging has led to concerns about privacy (refer ahead to Debate It! feature on page 25).

▲ 1.3.2 3D VIRTUAL REPRESENTATION
A 3D Google Earth image of Venice, Italy, is projected on a large screen at the Whitney Museum of American Art in New York.

VGI: Collecting and Sharing Data

Most of the maps fed into our electronic devices are provided by a handful of companies (Figure 1.3.3). However, smart phones, tablets, and computers enable individuals to make maps and share them with others. **Volunteered geographic information (VGI)** is the creation and dissemination of geographic data contributed voluntarily and for free by individuals. VGI is part of the broader trend of **citizen science**, which is scientific research by amateur scientists, and **participatory GIS (PGIS)**, which is community-based mapping. Citizen science and PGIS collect and disseminate local knowledge and information through electronic devices.

After Hurricane Maria devastated Puerto Rico in September 2017, geographers at Miami University mapped a southeastern section of the island. Using software from the Humanitarian OpenStreetMap Team, the geographers placed on the map outlines of buildings from satellite imagery taken before the hurricane. The Red Cross requested the map to help identify where to respond first (Figure 1.3.4).

A **mashup** is a map that overlays data from one source on top of a map provided by a mapping service, such as Google Maps or Google Earth. The term mashup refers to the practice of overlaying data from one source on top of one of the mapping services; the term comes from the hip hop practice of mixing two or more songs.

▲ 1.3.3 GOOGLE STREET MAPPING

Individuals can create mashups on their personal computers because mapping services provide access to the application programming interface (API), which is the language that links a database such as an address list with software such as mapping software (see What's Your Geography?).

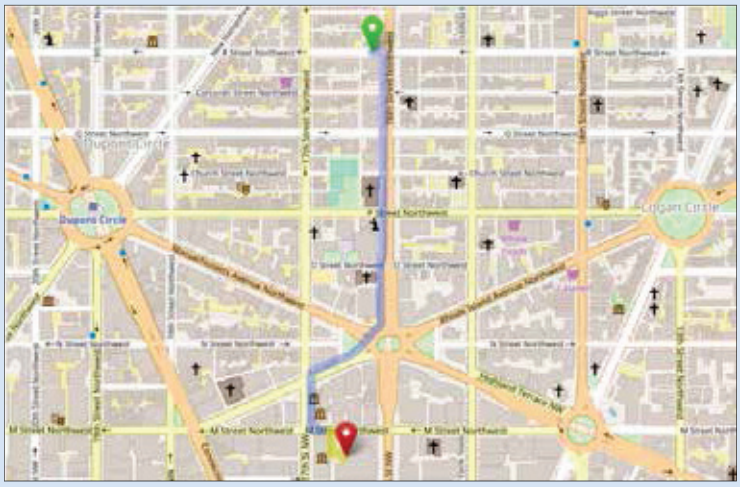
◀ 1.3.4 PARTICIPATORY GIS
Miami University geographers help Red Cross map devastation in Puerto Rico from Hurricane Maria.

WHAT'S YOUR GEOGRAPHY?

Mental Maps

A **mental map** is a personal representation of a portion of Earth's surface. A mental map depicts what an individual knows about a place, and it contains personal impressions of what is in the place and where the place is located.

1. Draw on paper a mental map depicting your route between two familiar places, such as between home and geography class. Show the paths (roads or walkways) and landmarks along the route, such as buildings or shops.
2. Compare your mental map to those made by others in your class. How detailed is your depiction of paths and landmarks compared to those of others? At school, for example, a senior is likely to have a more detailed map than a newcomer.
3. Compare your mental map to a map of the same area from Google Maps or Bing Maps. How accurate is your map? Did you forget something important or put something in the wrong place?
4. At **OpenStreetMap.org**, see if your route has been mapped. ***Click*** the arrow icon to the right of *Go*. ***Enter*** your starting and ending addresses. ***Choose*** car, bicycle, or foot. ***Press*** *Go*. Is this your preferred route? Why or why not (Figure 1.3.5)? Do what you consider important landmarks appear on the map? Why or why not?



▲ 1.3.5 OPENSTREETMAP, WASHINGTON, D.C.
The path by foot from the Association of American Geographers office (green pin) to the National Geographic office (red pin) passes several landmarks, including three churches.