# Contents

Preface ix

#### **CHAPTER 1**

## Introduction

The Nature of Geography 4 What Is Geography? 4 **Evolution of the Discipline** 6 Some Core Geographic Concepts 8 Location, Direction, and Distance 9 Location 9 Direction 10 Distance 10 Size and Scale 11 Physical and Cultural Attributes 13 Attributes of Place Are Always Changing 14 Interrelations between Places 14 Place Similarity and Regions 16 Geography's Themes and Standards 17 Organization of This Book 19 Key Words 21 For Review & Consideration 22 Selected References 22

3

#### **CHAPTER 2**

## Maps 25

Maps as the Tools of Geography 26 Locating Points on a Sphere 27 The Grid System 27 The Global Positioning System 28 Map Projections 30 Area 30 Shape 31 Distance 31 Direction 31 Scale 33 Types of Maps 33 Topographic Maps and Terrain Representation 34 Thematic Maps and Data Representation 38 Point Symbols 38 Area Symbols 39 Line Symbols 40 Deceptive Practices 40

#### Remote Sensing 42

Aerial Photography 42 Nonphotographic Imagery 42 *Remote-Sensing Techniques 42 Satellite Imagery 44* **Geographic Information Systems 45** The Geographic Database 47 Applications of GIS 47 **Summary 49 Key Words 50 For Review & Consideration 50 Selected References 51** 

# PART 1 The Earth Science Tradition 52



#### CHAPTER 3

## Physical Geography: Landforms 55

Earth Materials 56 Igneous Rocks 56 Sedimentary Rocks 57 Metamorphic Rocks 58 Geologic Time 58 Movements of the Continents 58 Tectonic Forces 62 Diastrophism 62 *Broad Warping 62 Folding 62 Faulting 63* Volcanism 66 Gradational Processes 68 Weathering 68 Mechanical Weathering 68 Chemical Weathering 69 Mass Movement 70 Erosional Agents and Deposition 71 Running Water 71 Stream Landscapes 72 Groundwater 74 Glaciers 75 Waves, Currents, and Coastal Landforms 76 Wind 80 Landform Regions 81 Summary 83 Key Words 83 For Review & Consideration 84 Selected References 84

#### **CHAPTER 4**

## Physical Geography: Weather and Climate 87

Air Temperature 89 Earth Inclination 89 Reflection and Reradiation 91 Lapse Rate 92 Air Pressure and Winds 92 Pressure Gradient Force 94 The Convection System 95 Land and Sea Breezes 95 Mountain and Valley Breezes 96 The Coriolis Effect 96 The Frictional Effect 97 The Global Air-Circulation Pattern 97 Ocean Currents 98 Moisture in the Atmosphere 99 Types of Precipitation 101 Storms 102 Climate, Soils, and Vegetation 104 Soils and Climate 104 Soil Formation 104 Soil Profiles and Horizons 107 Soil Properties 108 Soil Classification 110 Natural Vegetation and Climate 110 Succession 110 Natural Vegetation Regions 110

Climate Regions 112 Tropical Climates 114 Tropical Rain Forest 114 Savanna 114 Drvland Climates 116 Hot Deserts 116 Midlatitude Deserts and Semideserts 118 Humid Midlatitude Climates 118 Mediterranean Climate 119 Humid Subtropical Climate 120 Marine West Coast Climate 121 Humid Continental Climate 122 Subarctic and Arctic Climates 123 Climatic Change 123 Long-Term Climatic Change 124 Short-Term Climatic Change 125 The Greenhouse Effect and Global Warming 126 Summary 129 Key Words 129 For Review & Consideration 129 Selected References 130

#### **CHAPTER 5**

## The Geography of Natural Resources 133

**Resource Terminology** 135 Renewable Resources 135 Nonrenewable Resources 135 Resource Reserves 136 Energy Resources and Industrialization 137 Nonrenewable Energy Resources 137 Crude Oil 138 Coal 141 Natural Gas 143 Oil Shale and Tar Sands 144 Nuclear Energy 146 Nuclear Fission 146 Nuclear Fusion 147 **Renewable Energy Resources** 148 Biomass Fuels 148 Wood 148 Waste 148 Hydropower 148 Solar Energy 150 Other Renewable Energy Resources 152 Geothermal Energy 152 Wind Power 154 Nonfuel Mineral Resources 154 The Distribution of Nonfuel Minerals 156 Copper: A Case Study 157 Land Resources 159 Soils 159 Wetlands 163

Forest Resources 164 U.S. National Forests 166 Tropical Rain Forests 167 Resource Management 169 Summary 172 Key Words 173 For Review & Consideration 173 Selected References 173

The Culture-Environment Tradition 176



# CHAPTER 6 Population Geography 179

Population Growth 180 Some Population Definitions 182 Birth Rates 182 Fertility Rates 183 Death Rates 186 Population Pyramids 190 Natural Increase 193 Doubling Times 193 The Demographic Transition 194 The Western Experience 196 A Divided World Converging 198 The Demographic Equation 200 Population Relocation 200 Immigration Impacts 200 World Population Distribution 200 Population Density 204 Overpopulation 205 Urbanization 207 Population Data and Projections 207 Population Data 207 Population Projections 209 Population Controls 210

Population Prospects 212 Summary 213 Key Words 214 For Review & Consideration 214 Selected References 215

### **CHAPTER 7**

## Cultural Geography 217

**Components of Culture 218** Interaction of People and Environment 220 Environments as Controls 220 Human Impacts 221 Subsystems of Culture 221 The Technological Subsystem 222 The Sociological Subsystem 226 The Ideological Subsystem 228 Culture Change 229 Innovation 230 Diffusion 230 Acculturation 233 Cultural Diversity 235 Language 236 Language Spread and Change 237 Standard and Variant Languages 238 Language and Culture 242 **Religion 246 Classification and Distribution** of Religions 246 The Principal Religions 248 Judaism 248 Christianity 250 Islam 253 Hinduism 254 Buddhism 255 East Asian Ethnic Religions 257 Ethnicity 257 Gender and Culture 259 Other Aspects of Diversity 261 Summary 263 Kev Words 264 For Review & Consideration 265 Selected References 265

#### **CHAPTER 8**

## Spatial Interaction 267

The Definition of *Spatial Interaction* 269 Distance and Spatial Interaction 269 Barriers to Interaction 269 Spatial Interaction and Innovation 270 Individual Activity Space 271 Stage in Life 274 Mobility 275 Opportunities 275 Diffusion and Innovation 275 Contagious Diffusion 276 Hierarchical Diffusion 277 Spatial Interaction and Technology 278 Automobiles 278 Telecommunications 279 Migration 281 Types of Migration 281 Incentives to Migrate 282 Barriers to Migration 286 Patterns of Migration 289 **Globalization 291** Economic Integration 292 International Banking 292 Transnational Corporations 292 Global Marketing 293 Political Integration 295 Cultural Integration 295 Summarv 296 Key Words 296 For Review & Consideration 296 Selected References 297

#### **CHAPTER 9**

## Political Geography 299

National Political Systems 301

States, Nations, and Nation-States 301 Evolution of the Modern State 303 Geographic Characteristics of States 303 Size 303 Shape 305 Location 305 Cores and Capitals 307 Boundaries: The Limits of the State 310 Natural and Artificial Boundaries 311 Boundaries Classified by Settlement 311 Boundaries as Sources of Conflict 312 **Centripetal Forces: Promoting State** Cohesion 316 Nationalism 316 Unifying Institutions 316 Organization and Administration 317 Transportation and Communication 317 **Centrifugal Forces: Challenges to State** Authority 318 Cooperation among States 323 Supranationalism 323 The United Nations and Its Agencies 324 Maritime Boundaries 325 An International Law of the Sea 325 UN Affiliates 326 Regional Alliances 327 Economic Alliances 327 Military and Political Alliances 329

Local and Regional Political Organization 329 The Geography of Representation: The Districting Problem 330 The Fragmentation of Political Power 333 Summary 335 Key Words 336 For Review & Consideration 336 Selected References 337

The Locational Tradition 338



# CHAPTER 10 Economic Geography 341

The Classification of Economic Activity and **Economies 342** Categories of Activity 343 Types of Economic Systems 344 Primary Activities: Agriculture 345 Subsistence Agriculture 348 Extensive Subsistence Agriculture 348 Intensive Subsistence Agriculture 350 Expanding Crop Production 351 Intensification and the Green Revolution 352 Commercial Agriculture 353 Production Controls 354 A Model of Agricultural Location 355 Intensive Commercial Agriculture 357 Extensive Commercial Agriculture 357 Special Crops 359 Agriculture in Planned Economies 360 Other Primary Activities 361 Fishing 361 Forestrv 363 Mining and Quarrying 363

Trade in Primary Products 364 Secondary Activities: Manufacturing 367 Industrial Locational Models 367 Other Locational Considerations 369 Transport Characteristics 369 Agglomeration Economies 370 Just-in-Time and Flexible Production 370 Comparative Advantage 371 Imposed Considerations 373 Transnational Corporations (TNCs) 373 World Manufacturing Patterns and Trends 375 High-Tech Patterns 376 Tertiary and Beyond 378 Tertiary Services 380 Beyond Tertiary 381 Services in World Trade 382 Summary 384 Key Words 385 For Review & Consideration 385 Selected References 385

#### **CHAPTER 11**

## Urban Geography 389

An Urbanizing World 391 The Functions of Urban Areas 394 The Location of Urban Settlements 396 The Economic Base 398 Systems of Urban Settlements 400 The Urban Hierarchy 400 World Cities 400 Rank-Size and Primacy 401 Urban Influence Zones 402 Network Cities 402 Towns in Agricultural Areas 404 Inside the City 405 Competitive Bidding for Land 405 Land Values and Population Density 406 Models of Urban Land Use Structure 408 Social Areas of Cities 409 Social Status 410 Family Status 410 Ethnicity 411 Institutional Controls 411 Suburbanization in the United States 413 Central City Change 414 Constricted Central Cities 414 Expanding Central Cities 420 World Urban Diversity 421 The Anglo American City 421 The West European City 421 The East European City 423 Cities in the Developing World 424

Summary 427 Key Words 427 For Review & Consideration 427 Selected References 428

#### **CHAPTER 12**

## Human Impact on the Environment 431

Ecosystems 433 Impact on Water 433 Availability of Water 434 Modification of Streams 436 Water Quality 437 Agricultural Sources of Water Pollution 439 Fertilizers 439 Biocides 439 Animal Wastes 439 Other Sources of Water Pollution 440 Industry 440 Mining 441 Municipalities and Residences 441 Controlling Water Pollution 442 Impact on Air and Climate 442 Air Pollutants 442 Factors Affecting Air Pollution 443 Acid Rain 444 Photochemical Smog 446 Depletion of the Ozone Layer 446 Controlling Air Pollution 448 Impact on Landforms 449 Landforms Produced by Excavation 449 Landforms Produced by Dumping 450

Formation of Surface Depressions 451

Impact on Plants and Animals 451 Habitat Disruption 452 Hunting and Commercial Exploitation 452 Exotic Species 453 Poisoning and Contamination 455 Solid-Waste Disposal 456 Municipal Waste 456 Landfills 457 Incineration 458 Source Reduction and Recycling 459 Hazardous Waste 460 Summary 463 Key Words 463 For Review & Consideration 463 Selected References 464

# PART 4 The Area Analysis Tradition 466



#### **CHAPTER 13**

## The Regional Concept 469

The Nature of Regions 470 The Structure of This Chapter 472 Part I: Regions in the Earth Science Tradition 472 Landforms as Regions 472 **Dynamic Regions in Weather** and Climate 473 Natural Resource Regions 475 Part II: Regions in the Culture–Environment Tradition 476 Population as Regional Focus 477 Language as Region 478 Mental Regions 479 Political Regions 480 Part III: Regions in the Locational Tradition 482 Economic Regions 482 Urban Regions 484 Ecosystems as Regions 485 Summary 487 Key Words 487 For Review & Consideration 488 Selected References 488

Appendices 489 Glossary 504 Index 517