Chapter 1 Key Terms

conformal projections
Mercator projection
Azimuthal Equidistant Projection (Polar Projection)
population structure
cohort
age-sex cohort
regions: formal, functional, vernacular
linguistic region
regional boundaries
culture regions
political regions
environmental region
bioregions (biomes)
ecotone
functional regions (nodal regions)
vernacular region
mental map

CHAPTER 2

Population and Migration

This chapter is intended to help you better understand the dynamics, growth, and change of populations. First, we'll go over some population patterns and different ways to describe them. Then, we'll review some basic math tools to help you recall many of the complicated statistics and numerical indicators. Finally, we'll discuss how population moves, including types and implications of migration.

Geographical Analysis of Population

How are populations distributed? How do we determine these patterns? And what does this mean in the larger scheme of Human Geography? We'll answer these questions, and more, in the following sections.

Population Density, Distribution, and Scale

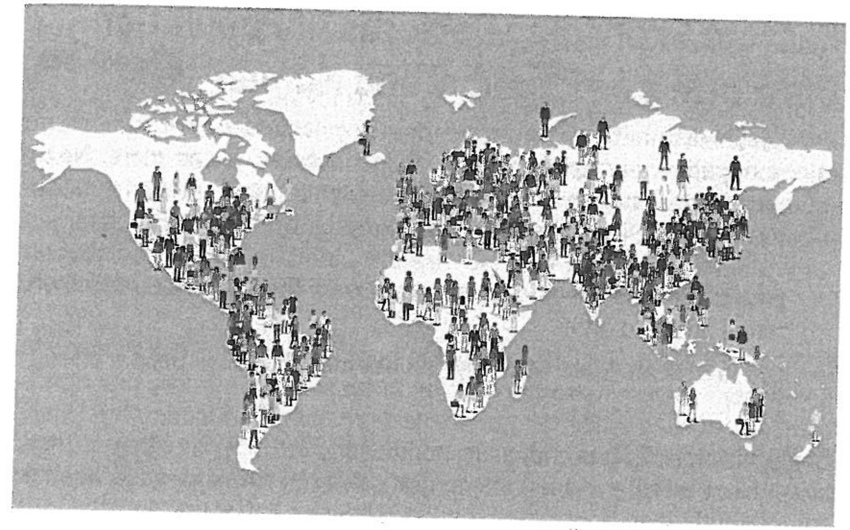
There are two main ways to calculate population density:

arithmetic density and
physiologic density.

The number of people per square unit of land is known as **arithmetic density**. Most island nations and microstates have extremely high arithmetic densities. Consider also the high arithmetic densities of countries such as India, Bangladesh, Japan, and South Korea.

Did You Know?

Holy High Rise! If everyone on Earth lived as densely as they do in Manhattan, New York, the whole human race could fit in New Zealand!



The number of people per square unit of farmland is known as the **physiologic density.** Physiologic density can be seen as a more practical tool in understanding the sustainability of a population of a certain region or country. Physiologic density is especially important in understanding the geography of countries where the amount of arable land, land usable for farming, is limited.

Limits to physiologic density can include overcrowding on farms or a lack of abundant farming regions due to geography. For example, Iraq, Egypt, Uzbekistan, and Pakistan are all arid countries that have narrow farming regions around river systems and deltas.

In countries like the United States and China, arable land sits in the eastern third of the country and the west is dominated by mountain and desert regions. There, high physiologic densities in farming regions have led to populations being squeezed into cities or westward into grassland and arid regions to expand agriculture to new areas.

Factors Explaining Patterns of Population Distribution—Physical and Human !

Population distribution is affected by many factors—birth rate, death rate, emigration, immigration, war, famine, outbreaks, and more. Newly Industrialized Countries (NICs) often experience rapid internal rural-to-urban migration. This migration is inspired by two types of factors:

- **push factors** are specific things about rural life that force people off farms and into cities
- **pull factors** are specific things about cities that draw people to them.

Some **physical factors** influence population distribution: climate (think about all of those grandparents retiring down to Florida for good weather year round), land forms and bodies of water (affecting whether it's feasible to move to a certain location or impossible). In addition, **human factors** affect population distribution: culture (perhaps you get a new job in a region that you don't know too well and you worry, *will I feel welcome and accepted there?*), economics *(are there jobs that pay enough in that area? Is there housing that's reasonably priced?),* historical (are you an Existentialism buff? Then Concord, Massachusetts, may be calling your name), political (if you wish to be surrounded by people of the same mindset, you might pick a famously conservative or liberal city).

Implications of Various Densities and Distributions !

Environmental and Natural Resources !

The most important concept to understand about the sustainability of the global population is **carrying capacity**. On a global scale, how many people can the Earth sustain? What is the capacity on a regional scale?

Across the ecumene*, the living space of humans on the Earth's surface, there are certain limits to how many people an environment can support in terms of the availability of food, water, and natural resources. Some regions support human settlement better than others. For instance, temperate grasslands support far more people than deserts do. That seems obvious, but why then are so many people, in this day and age, moving in greater number into arid regions (such as the south western region of the United States)? Second, how long before dry regions are pushed to their limits, especially in terms of fresh water?

Overpopulation is a major concern both in resource-poor regions and across the globe. Certain resources such as clean water, endangered plant and animal habitats, and nonrenewable energy sources (such as oil) will be depleted if conservation efforts and population control methods are not mandated by governments. Some theorists have expressed a need for the goal of zero population growth worldwide to stem the tide of resource depletion. To do this, some have proposed large-scale family planning and contraceptive programs. However, many have rejected these ideas based primarily on religious or political beliefs.

Another benefit arising from population control would be alleviating concerns over decreasing amounts of personal space as population densities increase. Some worry that too many people crammed into densely packed urban areas will lead to social unrest and, potentially, armed conflicts.

Other population theorists have examined the role of conservation in global population sustainability. To achieve sustainable resource use in coming decades, with an expected 10 billion person global population, massive and systematic global programs enforcing recycling, energy conservation, sustainable farming practices, and a wholesale reduction of personal consumption are believed to be necessary. Without conservation, many resources could be depleted before we have the chance to save them.

*What the ecumene?? Ecumene is just a term used by geographers to mean "inhabited land" but doesn't it sound wicked smart?

No Topic Is an Island

Searching for information on Population Composition and Population Pyramids? These topics are connected to this material, so flip back to Chapter 1 for more in-depth coverage.

Population Growth and Decline Over Time and Space

Population growth is understood through an examination of historical trends and projection of those trends into the future. Several models exist to predict population growth, such as the **Demographic Transition Model, Malthusian theory,** and the **Epidemiologic Transition Model.** The demographic equation uses birth rates and death rates along with immigration and emigration statistics to show population growth or change. Over the next few pages, we will walk you through the process of how population growth is calculated.

Historical Trends and Future Projections

We've talked a lot about the concepts of population change, but you'll also need to know a few basic equations that allow us to crunch the numbers. Read on to find out exactly how we quantify population growth and decline.

Demographic Equation

The **demographic equation** is the most commonly used method to calculate population growth. Using annual birth rates and death rates to calculate the natural increase in overall population (note that we're not talking about the "rate" of natural increase here, just the total number of people), we can add the balance to the **net migration rate (NMR)**. This is the number of immigrants minus the number of emigrants for every thousand members of the population. Here is the formula used to calculate the net migration rate:

$$\text{NMR} = \frac{\text{Number of Immigrants} - \text{Number of Emigrants}}{\text{Population} \div 1{,}000}$$

Take this and add it to the birth rate minus the death rate and you will have total population growth per thousand members of the population. Thus, you have your demographic equation, like so:

$$\frac{(\text{Birth Rate} - \text{Death Rate}) + \text{Net Migration Rate}}{10} = \begin{array}{l}\text{Population Growth}\\ \text{Percentage Rate}\end{array}$$

Did You Know?

Shrinkage: The United States has a birth rate of 13 and a death rate of 8. Add the product to a net migration rate of 2.45 and we find that the United States adds about 7.5 people for every thousand in the population, annually. Divide by 10 to find that the population growth rate (including immigra-tion) is 0.75 percent annually.

Do you have a tough time remembering the difference between immigrants and emigrants? Remember it this way: *Immigrants* come *in* to a country. *Emmigrants exit* a country.

Fertility Rate !

By definition, the **total fertility rate (TFR)** is the estimated average number of children born to each female of birthing age (15 to 45).

We can still use a basic formulaic definition to help remember TFR:

$$\text{TFR} = \frac{\text{Number of Children Born}}{\text{Women Aged 15 to 45}}$$

However, the TFR is not an annual statistic (like the RNI, or Rate of Natural Increase introduced in Chapter 1). It is more of an estimate, taken as a snapshot of fertility for birth over the prior 30 years. Thus, TFR and RNI are not comparable. There cannot be a negative TFR, for one thing. TFR highlights the importance of replacement in the population.

But Wait, There's More...

More demographic factors influencing population growth, that is. For information on Rates of Natural Increase and Population-Doubling Time, both of which are important for your exam, please put it in reverse and head back to Chapter 1 (but be careful to check your rearview mirror!).

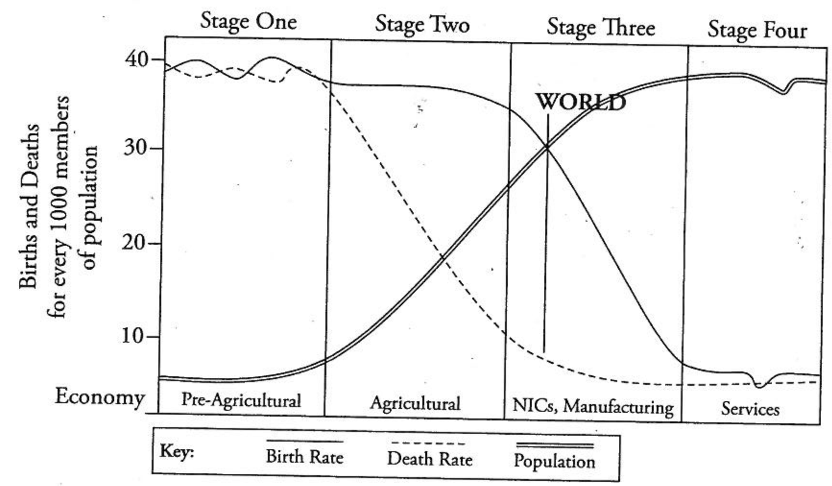
Theories of Population Growth !

There are three main theories of Population Growth and we name dropped them a few pages back, but now we're going to dig in. Those three main theories are:

- The Demographic Transition Model
- Malthusian Theory
- The Epidemiologic Transition Model

Let's explore all three, shall we?

Demographic Transition Model !

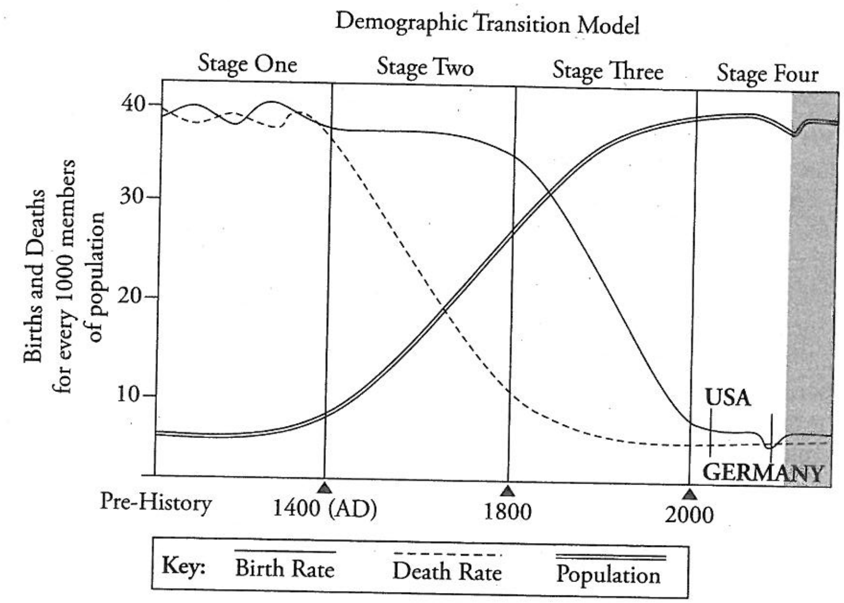


The **Demographic Transition Model** has a number of uses. You should think of it as a central unifying concept in your understanding of the AP Human Geography course. Not only is it a theory of how population changes over time, but it also provides important insights into issues of migration, fertility, economic development, industrialization, urbanization, labor, politics, and the roles of women.

By placing a country on the model, you are defining the **population dynamics** and **economic context** of that country. Knowing where a country falls on the model lets you know what kind of economy the country has, whether or not there is significant migration going on, and, like economic indicators, this "picture" of a country's population can tell you much about its quality of life. These are theoretical estimates and averages, and not all countries fit the model perfectly.

The model also has a **predictive capability** (just like that crystal ball seen above). If a country currently falls within Stage Two of the transition, we can use this model to predict how its population will change over time and speculate as to how much it can grow in size. Likewise, you can also look at the whole world, which falls into early Stage Three. Knowing this, we can estimate a **population projection** that the planet's population has reached only about two-thirds of its potential. If the planet is currently at about 7.2 billion people, then we can expect that once global populations level off in Stage Four, global population will be somewhere around 10 billion people. This may happen in your lifetime, sometime around 2060.

The DTM (that's what the cool kids call the Demographic Transition Model) also provides insight into economic history (see the graph on the next page). If we look at the United States, Canada, or Western Europe, we can apply dates to the bottom of the model to show how Stage Four countries have progressed through the system. Looking at the model on the next page, we can see in Western Europe the beginning of the Renaissance; in Western Europe and in the United States and Canada, the **Industrial Revolution**; and likewise the recent **deindustrialization** or shift to **service-based economies.**



Pre-history goes all the way back to human beginnings. Fourteen hundred represents the time when there was both a cultural and economic renaissance in Europe. Eighteen hundred represents the Industrial Revolution, when countries like the United States and Great Britain were **newly industrialized countries (NICs).** And 2000 represents a turning point of the rise of service-based economies of **more developed countries (MDCs).** The typical MDC has a birth rate of 11 and a death rate of 10, or very little growth.

Countries that are not as demographically or economically advanced can also be placed on the model, but you have to change the dates as to when they reach the significant turning point in their history. If we look at newly industrialized countries (NICs) such as Brazil, Mexico, and India, we can see a much more recent turning point from the **agricultural economy** of Stage Two to the **manufacturing-based economy** of Stage Three.

One Size Doesn't Fit All

Remember, this is a theoretical model and not all countries fit the trend. For example, China, due to its one-child policy, appears far more advanced than it should be, compared economically to other NICs.

You've probably noticed that the population line in the model has a distinct shape to it until stage four. This is what demographers (population scientists) and population biologists call the **S-curve**. Humans are not the only ones whose population follows such a pattern. In fact, give any animal population a vast amount of food or remove predators from their habitat and you will see rapid population growth followed by a plateau or decline due to a population reaching or exceeding the area's **carrying capacity.** Globally, humans may be doing the same thing and the human population may reach **equilibrium** in the global habitat.

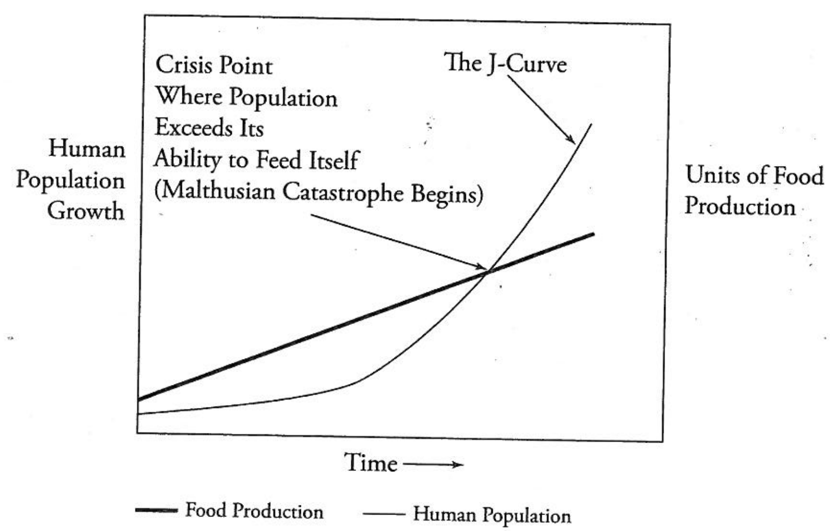
Below is a summary of each stage of the Demographic Transition Model and its characteristics. You'll definitely want to know these for the exam.

	Birth Rates	Death Rates	Life Expectancy	RNI
Stage One	High (25–50)	High (25–40)	Low (33–50)	Low–Moderate (–0.1–1.9%)
Stage Two	High (25–50)	Decreasing (8–25)	Increasing (<70)	Highest (1.5–3.5%)
NICs	Decreasing (12–30)	Lowering (5–18)	Increasing (<75)	Higher (1.1–2.7%)
Stage Three	Lowering (12–20)	Low (5–12)	Higher (<78)	Lowering (0.5–1.2%)
Stage Four	Low (8–16)	Low (5–12)	Highest (<82)	Low to Negative (0.8 to –0.6%)

Malthusian Theory

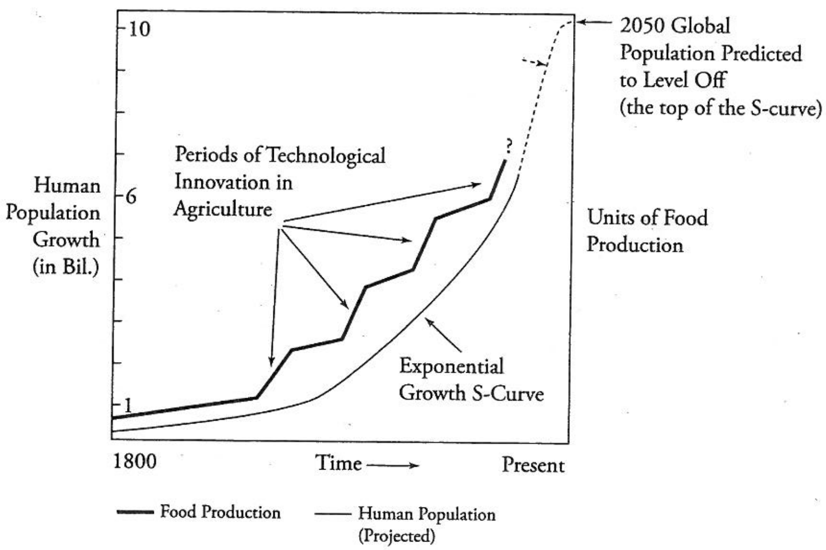
Englishman Thomas Malthus published *An Essay on the Principle of Population* in 1798. His main idea was that the global population would one day expand to the point where it could not produce enough food to feed everyone. He predicted this would happen before 1900. The Malthusian catastrophe did not happen by 1900 or even by today, but some more recent thinkers (neo-Malthusians) think it still could in the future.

Why did he have this idea? At the time the math made sense, as the United Kingdom was engaged in the Industrial Revolution and people were being born at a high rate. If we look at the Demographic Transition Model timeline, Britain was moving from stage two to stage three. Like we see in NICs of today, Malthus saw rapid migration to the cities and a population explosion.



Malthus's Prediction Regarding Population and Food Production

Mathematically, what Malthus saw was that food production did grow over time, but in a slow arithmetic manner. Arithmetic growth means that each year another unit of food production was added to the overall volume of agricultural products*. Meanwhile, human population grows in an exponential manner. Exponential growth means that a couple has a few children and then their children all have a few children, and so on through generations. Every few decades, you have population + the population, resulting in a logistic curve, or **J-curve,** of exponential population growth on the graph. Looking at the numbers of the time, Malthus believed that the population was going to catch up with agricultural production quickly.



*Think of this like a volume + 1 situation or a constant rate of change from algebra class. Wait, there's math on this test? Don't worry, not much!

It wasn't that Malthus was wrong, but that he couldn't have predicted that agricultural technology was going to boost food production several times over in the coming century. By 1900, massively important inventions such as the internal combustion engine, artificial fertilizers, pesticides, irrigation pumps, advanced plant and animal hybridization techniques, the tin can, and refrigeration were developed. As each of these new products and methods were adopted, another large volume of food would be added to global production and supply. Mathematically, this meant that food production has continued to stay ahead of population growth. For how long this will occur, we don't know. Let's hope that by 2050 or so, when the global population is predicted to level off around 10 billion (completing the top of the S-curve), that the world has food production in good working order.

Ask Yourself...

What About Genetics? Avoid the Trap!

In the early 1800s, Gregor Mendel was the first to research and write about genes and plant reproduction. However, the science of genetics did not make any impact on global food production until the 1950s and genetically modified foods did not enter markets until the 1980s. If you are asked about why Malthus was wrong, perhaps in an essay question, talk about new technologies including plant and animal hybrids, but not genetics, since that affects agriculture only in much more recent years.

Epidemiologic Transition Model

Closely linked to the Demographic Transition Model is the Epidemiological Transition Model, which specifically accounts for development due to the increasing population growth rates caused by medical advances. In the ETM, the phase of development is directly followed by a stabilization of population growth as the procreation rates decline.

Causes and Implication of an Aging Population

As modern people's life expectancy grows, the characteristics of the world's population evolve as well. We'll discuss the causes and consequences of our aging population in this section.

Birth Rates

Natality, which is the **crude birth rate (CBR)** (aka the birth rate) is an **annual statistic**. The total number of infants born living is counted for one calendar year and then calculated. This figure is then divided by the population divided by one thousand, or "every thousand members of the population," as it is often presented. Why? By standardizing the denominator (you probably know about common denominators from math class), the resulting quotient will be a small integer number, such as 32 or 14. This makes the data much easier to work with.

$$CBR = \frac{\text{Number of Live Births}}{\text{Total Population}} \times 1{,}000$$

Knock it Off!

So if you have a country with 100,000 live births in a year and a population of 5,000,000, the birth rate is 20; more precisely 20 live births for every 1,000 members of the population. To make this easier, 5,000,000 divided by 1,000 is 5,000.

Knock the 3 zeros off the end of 1,000 and the end of 5,000,000 and you have a simplified ratio of 5,000/1 or just 5,000. Do the same with 100,000 over 5,000. Knock off the three zeros of each and you have 100/5 or 20.

Birth rate is just one piece of the larger demographic picture. High birth rates (18 to 50) are found in mostly rural agricultural Third-World countries and low birth rates (8 to 17) are more likely to be found in urbanized industrial and service-based economies. However, without knowing what's going on with mortality in that country (death rate), it's hard to know whether the population is growing and, if it is, how quickly.

Death Rates

Okay, it sounds scary. Death is an emotional issue. What you need to do here is to think scientifically about these statistics. The mortality rate, also known as the crude death rate (CDR) or what we'll simply call the **death rate,** is an annual statistic calculated in the same way as the birth rate. The number of deaths are counted for the calendar year in a country and divided by every thousand members of the population.

$$CDR = \frac{\text{Number of Deaths}}{\text{Total Population}} \times 1{,}000$$

So what does the death rate tell us? Well, not much in today's world. High death rates usually indicate a country that is experiencing war, disease, or famine. Historically, higher death rates (20 to 50) were recorded in the poorest of Third-World countries where the combination of poverty, poor nutrition, epidemic disease, and a lack of medical care resulted in low **life expectancy**. However, as conditions have improved in the Third World through the **Green Revolution** (increased food and nutrition) and access to sanitation, education, and health care have increased, life expectancies have gone up, and the death rate has gone down.

Social, Economic, and Political Implications

An aging population can have social, economic, and political implications. In the United States presently, we are experiencing a demographic shift in which over the next few decades, the number of Americans who are older than 65 is expected to more than double. This shift is the result of rising longevity and is part of a larger shift in the age profile of the United States, partially caused by families having fewer children.

The economic implications of this shift are quite worrisome. Thanks to these longer life expectancies and lower birth rates, social programs such as Social Security, Medicare, Medicaid are burdened with many beneficiaries but fewer contributors paying into these programs via taxes. Some fear that the government will even increase taxes (a political implication of this growing, "greying" population) in order to cover the growing costs of this group.

In addition, a population that finds itself living longer will likely seek to work longer, so the average retirement age may creep up and there may be more stagnation at the top of companies, with corporate leaders sticking around longer than they did in generations past. This can affect the career trajectory of the next generation and have resultant economic implications.

Types of Migration

Voluntary

Migration can take many forms—**interregional** or **internal migrants** move from one region of a country to another where as **transnational migrants** move from one country to another. Voluntary migrants may be seeking better jobs or opportunities or programs (public schools or transportation options). **Step migration** occurs when people move up in a hierarchy of locations—perhaps from farm to small town, then from small town to regional city, then from regional city to major city. **Chain migration** occurs when a pioneering migrant or group settles in a new place and then encourages his or her friends or family to move to this location, also. This chain migration can end up turning certain areas into successful immigrant communities.

Involuntary

But not all migration is as deliberate and inspiring as the examples above. Some migration is involuntary or what is called **forced migration.** Governments can order their citizens to move from one place to another (an example of this is if a government wishes to build a large highway through a formerly residential area). Other people who are are forced to move by war, disasters, or fear of government repression are called **refugees.** Other, more stable countries may grant those refugees **asylum** and offer them the opportunity to apply for official status or citizenship.

Ask Yourself...

Think of some examples (either from present day news or from your history textbook) of voluntary migration and involuntary migration and marinate on them, as you might need to be familiar with those for an essay prompt.

Chapter 2 Key Terms

arithmetic density
physiologic density
push factors
pull factors
physical factors
human factors
carrying capacity
overpopulation
Demographic Transition Model
Malthusian Theory
Epidemiologic Transition Model
demographic equation
net migration rate (NMR)
total fertility rate (TFR)
population dynamics
economic context
predictive capability
population projection
Industrial Revolution
deindustrialization
service-based economies
Newly Industrialized Countries (NICs)
More Developed Countries (MDCs)
agricultural economy
manufacturing-based economy
S-curve
carrying capacity
equilibrium
J-curve
Crude Birth Rate (CBR)
annual statistic
death rate
life expectancy
Green Revolution

CHAPTER 3

Cultural Patterns and Processes

This chapter is intended to help you better understand the diversity of cultures across the globe. **Culture** is the shared experience, traits, and activities of a group of people who have a common heritage. While a definition of culture technically exists, it's an abstract concept, so in this chapter we'll give you the many components of the cultural landscape.

Whether something is original to a single culture or is the product of cultural synthesis, it is important to understand the underpinnings of the things we see in the cultural landscape. Combined, the many components come together to identify and define a single **culture group** or **nation.**