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# **AUTHOR TEAM**

Graham Draper, formerly York Region DSB Lew French, OISE, University of Toronto, formerly Thames Valley DSB

## **CONTRIBUTING AUTHORS**

Ethel Johnston, formerly Toronto DSB Jennifer L. McGowan





# NELSON

Nelson GEO8 Authors

Graham Draper Lew French

**Contributing Authors** Ethel Johnston Jennifer L. McGowan

Fact Checker Marc-André Brouillard

Director, Content and Media Production Linh Vu

Senior Production Project Manager Kathrine Pummell

Content Production Editors Rebecca Rosenblum Cheryl Tiongson

Copyeditor Paula Pettitt-Townsend

Proofreader Shana Hayes

Indexer Marilyn Augst

Design Director Ken Phipps

Interior Design Courtney Hellam

Cover Design Cathy Mayer

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Art Coordinator Suzanne Peden

Illustrators Michael Borop Crowle Art Group Jennifer de Jong Steven Hall Bob Kayganich Suzanne Peden Ralph Voltz

Compositors deboraH brock Courtney Hellam Cathy Mayer

Photo/Permissions Researchers Marc-André Brouillard Eva Svec

Cover Research Adele Reynolds

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Publisher, Social Studies and Business Paula Smith

Managing Editor Jennifer Hounsell

Product Manager Jessie MacKinnon

**Program Managers** Adele Reynolds Sarah Tanzini

**Consultants** Jennette MacKenzie Janice Schoening

Developmental Editors Jonathan Furze Naomi Go Margaret Hoogeveen Jennifer Hughes Susan Hughes Betty Robinson

**Editorial Assistants** Sarah Jones Megan Watcher

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Student Text ISBN-13: 978-0-17-659055-0 ISBN-10: 0-17-659055-2

Student Text + PDF ISBN-13: 978-0-17-659056-7 ISBN-10: 0-17-659056-0

Printed and bound in Canada 6 7 8 9 21 20 19 18

For more information contact Nelson Education Ltd., 1120 Birchmount Road, Toronto, Ontario M1K 5G4. Or you can visit our website at nelson.com.

# NELSON GEO8 Advisors and Reviewers

#### **ADVISOR TEAM**

Mark Cassar, Dufferin-Peel Catholic DSB Stephanie Giannatselis, Halton DSB Ethel Johnston, formerly Toronto DSB Mark Lowry, formerly Toronto DSB Jonathan Rajalingam, Simcoe Muskoka Catholic DSB

#### SPECIALTY REVIEWERS

Jayson Childs, PhD, Department of Geography, Brock University, Accuracy Nancy Christoffer, Bias Monika Orzechowska, First Nations, Métis, and Inuit

#### CLASSROOM REVIEWERS

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# USING THIS **RESOURCE**

## INTRODUCTION



MATERIAL

**VI** USING THIS RESOURCE

# **UNIT OPENER**

There are two units in this book. Each unit has four chapters.

This is the main question (Unit Big Question) that you will explore in the unit.

These questions are from the point of view of each **geographic thinking concept**. You will also see these bubbles throughout each chapter. The colours will always connect to the same thinking concept. **PINK** means Interrelationships, **YELLOW** means Spatial Significance, **GREEN** is Patterns and Trends, and **BLUE** means Geographic Perspective.



The **Global Concern** case studies take an in-depth look at an issue related to the unit.



## **CHAPTER OPENER**

Chapter openers introduce the theme and content covered in the chapter.

The Chapter Big Question is the main question that you will explore in the chapter.

These are the skills and ideas that you will cover in the chapter.



# SAMPLE MATERIAL

## **CHAPTER FEATURES**

Important words are highlighted and defined directly on the page.

Figure references tell you what the photo, graph, map, diagram, or table is about.

These questions ask you to think about a photo in different ways and from your own perspective.





different thinking concept.

The Focus On features will help you look more closely at a geographic thinking concept or inquiry skill and practise





Use the **Check-In** questions and activities to assess your understanding. They are labelled by **geographic thinking concept** and **inquiry skill**.

# SAMPLE MATERIAL



**Heroes in Action** profiles individuals and organizations from around the world that have taken action to improve conditions for people and the environment.



## **CHAPTER FEATURES** (CONTINUED)

Activity pages appear in every chapter to help you to read, analyze, and create different kinds of **maps** and **graphs**.



In every chapter, you will use **Case Studies**, including **National Geographic Case Studies**, to explore different places around the world and look at how people are responding to challenges.





# LOOKING BACK

You will have the opportunity to look back at what you've learned at the end of each chapter and at the end of each unit.

These questions and activities help to apply your learning. Each question relates to an **inquiry skill** or to a **geographic thinking concept**.



# CHAPTER 3 IM PACTS OF SEI TLEMENT

# WHY CARE ABOUT THE EFFECTS OF SETTLEMENT?

## **LEARNING GOALS**

As you work through this chapter, you will

- understand current trends in settlement
- analyze how settlement affects the environment and human populations
- gather and organize information related to settlement and the environment
- create a flow map

When you look at this photo of Mexico City, the urban area seems to stretch on endlessly. In 2014, the population of the metropolitan area, which includes the surrounding communities, was 21.2 million, which is about the population of Ontario and Quebec combined. The population of the city continues to climb.

In 1992, the United Nations (UN) called Mexico City's air the most polluted in the world. The city made several changes; for example, it closed down some factories and put in place more public transportation. These and other changes reduced its air pollution dramatically, but Mexico City still has a long way to go. The number of vehicles in the city has tripled since 2000. This contributes to air pollution. The city is facing other challenges too. There is a high level of poverty. The main source of water comes from underneath the city itself, and this water is running low. The loss of the water is causing the land to collapse in on itself, and some areas are sinking. As well, Mexico City's landfill sites are full.

Why should we care about the effects that settlements such as Mexico City have on the environment and on people's ways of life?

# SAMPLE MATERIAL



# WHAT ARE TODAY'S SETTLEMENT TRENDS?

When you think of trends, what do you think of? Trends are patterns of how something is changing. Are there any trends that you have observed? In this chapter we will examine settlement trends, which are patterns in how people are settling around the world.

# **INCREASED GLOBAL MIGRATION**

Today, there is more migration of people from place to place than ever before. In 2013, there were 232 million migrants worldwide. The number of migrants is expected to grow to 405 million by 2050.

Migration is caused by pull factors and push factors. **Pull factors** are attractions that draw people to new areas. People may move to reunite with family members. They may move to look for better education or higher-paying jobs. **Push factors** are forces that drive people from their homes to search for new places to live. Environmental migrants are one example of people moving because of push factors. They are escaping drought or the loss of natural resources near their homes. Other kinds of migrants may be escaping poverty, religious persecution, conflict, or war.

In 2013, over one-quarter of the most educated people from several countries in Central America, the Caribbean, and Africa had moved to a different country, most often in a more developed nation. For example,



pull factor a social, political, economic, or environmental attraction that draws migrants to an area

push factor a social, political, economic, or environmental force that drives migrants away from an area

Guyana's migration rate is among the highest in the world. More than 55 percent of its population—and 85 percent of its university-educated citizens—have left. Many moved to find jobs with higher salaries, a pull factor. But many also left because they opposed government policies at home, a push factor (**Figure 3.1**).

> FIGURE 3.1 In 2001, protestors marched in Georgetown, Guyana, to demonstrate their opposition to racial discrimination by the government.

I wonder what happens to countries when so many skilled people leave?



# CREATING A FLOW MAP

## SAMPLE MATERIAL

A flow map shows the movement of people or goods using arrows. The arrows begin at the source of the movement and end at the destination. Sometimes the width of the arrows shows the quantity of movement. By reading a flow map, you can determine the distance, direction, and quantity of the movement.

Flow maps are used to show patterns, such as which world regions send oil to the United States. They are also used to show spatial significance, such as which urban areas receive more migrants. **Figure 3.2** shows the flow of refugees out of Syria during the Syrian Civil War. The map shows refugee movements between January 2012 and November 2014.

**Figure 3.3** lists numbers of immigrants to Canada from different world regions in 2012. Use the data to make a flow map.

Region of Origin	Number of Immigrants
United States	9 414
Europe and the United Kingdom	35 830
Central and South America	26 865
Africa and the Middle East	56 061
Asia and the Pacific	129 593

# Syrian Civil War Refugee Migration, 2012 to 2014



**FIGURE 3.2** Flow map showing the number of Syrian war refugees in several countries using data collected in November 2014

FIGURE 3.3 Number of immigrants to Canada in 2012 by region of origin





urbanization the process by which the percentage of people living in urban areas increases

#### more developed country

a wealthier country with access to technology and education, with generally high life expectancy

#### developing country

a less wealthy country with limited access to technology and education, with generally low life expectancy

# MIGRATION TO URBAN AREAS

Whether people are migrating from country to country or within a country, they usually move from a rural area to an urban area. The flow map in **Figure 3.4** shows migration from 20 countries around the world to Sydney, Australia. Sydney has the highest population of all cities in Australia. Most of the migrants arriving in Sydney were looking for work or reuniting with family members who were already there. A small number were refugees.

As you read in Chapter 1, urbanization began during the Industrial Revolution. **Urbanization** is the increase in the percentage of people living and working in urban areas. It continues today, especially in countries that have recently become **more developed**, or wealthier, such as Brazil. The percentage of people living in cities in Brazil went from 74 percent in 1990 to 85 percent in 2013.

**Developing countries** have limited access to technology, education, and goods and services. More people in developing countries migrate from rural areas to urban areas than they do in more developed countries. Why? More people live in rural areas in developing countries. Also, people migrate to cities because of pull factors: they hope that life will be better there. People who live in cities usually have better access to clean water and services, such as schools, healthcare, and electricity. They are generally healthier and have higher incomes than people who live in rural areas.

#### Migrant Flow to Sydney, Australia, 2006-2011



**FIGURE 3.4** This map shows the top 20 source countries for migration to Sydney, Australia. What might be the pull factors that caused this migration?

#### **INCREASING URBAN POPULATIONS WORLDWIDE**

The world's urban population is increasing (**Figure 3.5**). This trend is expected to continue. In 2014, there were 3.9 billion urban dwellers. By 2045, there will be 6 billion people living in cities. According to the UN, two-thirds of the world's population will live in urban areas by 2050.

The populations of individual cities are increasing. Some cities are now **megacities**—they have populations of more than 10 million people. Did you know that, in 1990, there were 10 megacities in the world, and in 2014, there were 28? The three largest megacities are Tokyo, Japan, with a population of 38 million; Delhi, India, with a population of 25 million; and Shanghai, China, with a population of 23 million. This shift toward urban living creates both opportunities and challenges in urban areas.

#### DECREASING RURAL POPULATIONS WORLDWIDE

Migration to cities means fewer people living in rural areas across the globe. The number of people who leave rural areas increases every year. In 2014, there were about 3.4 billion people living in rural areas. By 2050, this will have decreased to 3.2 billion. What will happen to rural settlements as people move away?



megacity an urban area with more than 10 million people



FIGURE 3.5 Facts about global urbanization





## SPRAWLING CITIES

Around the world, most urban areas are increasing in size to make room for their growing populations. Many cities grow at their edges, creating **urban sprawl**. For example, Houston, Texas, is the most sprawling city in the United States (Figure 3.6). It now covers about five times the area it did in 1984. Cities grow in this pattern because land in the centre of cities is usually already built up. It is also expensive to buy. Land on the outskirts of cities is often agricultural or forested. Developers buy this land because it is less expensive. They build whatever reflects the needs of the growing urban population.

Sometimes developers build low-density settlements of one-family houses on the outskirts of urban areas. These settlements are called **suburbs**. Building new suburbs increases urban sprawl. You will learn more about the impacts of urban sprawl on the environment in the next section.

Many people choose to live in suburbs even if they work in the city centre. They can drive or take public transportation from their home to work, but they can live where there is less noise, more privacy, and more open space. Houses in suburbs are often less expensive than houses of the same size in the city.

#### **COMPACT CITIES**

Some cities grow in population but do not have enough land to expand outward. Instead, they become more compact. They may have more highrise buildings and more people living and working in a small area. They have higher population densities. For example, Dhaka, Bangladesh, is the most dense city in the world. Dhaka has between 12 000 and 45 000 people per km<sup>2</sup>. By comparison, Toronto, Ontario's population density is about 945 people per km<sup>2</sup>. FIGURE 3.6 Houston, Texas, is the least dense, most car-dependent, and most sprawling city in the United States.

I wonder how higher gas prices will affect Houston in the future?

<mark>urban sprawl</mark> the expansion of a city into previously undeveloped areas

suburb a low-density settlement, near a larger urban area, mostly made up of single-family houses



# MORE SETTLEMENT ALONG COASTS

As you learned in Chapter 1, many people settle along coastlines worldwide. The coastal settlement trend is increasing. The number of people settling along coastlines is predicted to increase by 30 percent from 1995 to 2025.

Some coastal cities cannot grow inland. There may be limited space or obstacles, such as mountains. Instead, they may grow vertically and become more dense.

Other cities are expanding into bodies of water, as you read in Chapter 2. These cities are in countries such as Nigeria, Japan, China, and Singapore. They have expanded their settlements in two ways: by reclaiming land from the water and by creating new islands. The new land is used for various purposes, such as for new housing, for a new or longer runway for an airport, or to expand a port. For example, three artificial islands in

Dubai, United Arab Emirates, were created to provide land for housing, hotels, and entertainment centres (Figure 3.7).

#### **ENVIRONMENTAL DAMAGE**

Environmentalists are concerned about the damage that expansion into the sea causes to shoreline features, such as sand dunes and mangrove forests, and to marine ecosystems. For example, 25 percent of all developed land in Hong Kong, China, is already reclaimed from the sea. Hong Kong has plans for several more engineering projects in the sea. They include adding a new runway to its international airport, which is already on reclaimed land, and will require reclaiming from the sea an area as large as 5000 Olympic-sized swimming pools. These projects threaten the habitat of the Chinese white dolphin. In 2012, there were only 61 white dolphins left.



## CHECK-IN

- 1. **GATHER AND ORGANIZE** Create a graphic organizer to show the reasons why people migrate. Use two categories: push factors and pull factors.
- 2. GEOGRAPHIC PERSPECTIVE Reclaiming land can have economic advantages. It also has environmental impacts. Explain whether or not you think more land should be reclaimed from the sea, and give reasons.
- **3. EVALUATE AND DRAW CONCLUSIONS** How would you explain the increase in urban sprawl to a family member? Why is it important to know about urban sprawl?
- 4. EVALUATE AND DRAW CONCLUSIONS Many young people migrate from rural areas to urban areas. What impact might this have on birth rates in rural areas?



FIGURE 3.7 This satellite photo shows the Palm Islands, the largest artificial islands in the world, off the coast of Dubai.

I wonder how rising sea levels would impact these islands?

# **CASE STUDY**

# THE BIG SQUEEZE MEGGA-REGIONS



What happens when megacities sprawl and merge? They become a megaregion. There are 21 megaregions in the world. By 2025, there will likely be at least 30 more. Megaregions form in countries with strong economic growth, such as Brazil, India, the United States, and China. One of the largest megaregions in the world is in China's Pearl River Delta (**Figure 3.8**).





FIGURE 3.9 These satellite images show the Pearl River Delta in (A) 1973 and (B) 2003. The photos were taken using infrared photography, and the red areas represent vegetation. You can see that in 1973, there was mainly vegetation and only a few villages. By 2003, the area was developed (grey areas).

#### PEARL RIVER DELTA

In the 1970s, there were several small villages in the Pearl River Delta. The area was almost completely agricultural; it was only 1 percent urban. Today, it is a megaregion of nine cities with a total population of 120 million (Figure 3.9). The growth of factories, housing, roads, and other infrastructure has devoured the farmland and most of the remaining forest.

#### BENEFITS

Megaregions can provide benefits for their populations. For example, when urban regions make plans to combine their services and share their costs, they can be more efficient. They can lower expenses as well.

The Chinese government plans to connect the water, energy, and telecommunication systems among the nine major cities and nearby Hong Kong and Macau. A maze of tunnels, high-speed rail, and bridges across the delta will create a "one-hour living circle." Anyone living in the vast megaregion or Hong Kong will be able to travel anywhere in the circle in under an hour.

Megaregions can also share services more equitably. For example, instead of only the wealthier areas having good schools and clean streets, all the areas could have similar services and resources because they are managed by the same government.

#### CONCERNS

The Pearl River Delta megaregion is about one-third of the size of Ontario, but it has 108 million more people living there. Loss of agricultural land is already a problem. What about pollution? According to the chief planner of the megaregion, uniting the cities will mean that one pollution policy can be applied to all the cities. However, this region already has severe air pollution. In October 2013, China's Environmental Protection Ministry said it was the most polluted area in the country. There are few environmental controls in the region. For example, in 2011, over 4.5 billion metric tonnes of raw sewage flowed into the Pearl River Delta from the Guangdong province alone.

#### **EXPLORE THE ISSUE**

- 1. What are some pros and cons of megaregions? Would you want to live in a megaregion?
- 2. How could you apply the goal of the "one-hour living circle" to a region in Ontario? Draw a map with suggestions of how it might work.
- 3. What factors do you think led to the Pearl River Delta becoming a megaregion?

# HOW DOES SETTLEMENT AFFECT THE ENVIRONMENT?

If you had lived 1000 years ago, what would your life have been like? You probably would have lived with a small community of people. Your settlement would have had little impact on the environment. Today, there is a global population of 7.3 billion. As every year goes by, more of us are moving to cities. Now more than 450 cities have a population over 1 million.

Our settlements now affect the environment in significant ways. Growing populations need water, food, land, and other resources, such as electricity and a system of sewage disposal. In both rural and urban areas, these needs

<mark>light pollution</mark> the brightening of the sky with human-made light

SAMPLE

MATERIAL

can put stresses on the air, water, and soil, and can create different kinds of pollution.

## LIGHT POLLUTION

Cities now produce so much light that it is affecting animals. Light pollution is the brightening of the night sky with artificial light (Figure 3.10). Light pollution can change the behaviour of insects, birds, sea turtles, fish, and mammals. The unnatural light causes disorientation. Lights in skyscrapers that are left on all night result in the deaths of nearly one billion birds every year. Birds, especially those migrating at night, strike the windows because they are attracted to the lights.

> FIGURE 3.10 The city of Chicago, United States, shown here, is working to reduce the huge amounts of light pollution it creates.

I wonder how we could get people to turn off the lights in empty skyscrapers at night?



## **AIR POLLUTION**

A **pollutant** is something that pollutes or contaminates, such as carbon monoxide from car exhaust. About 90 percent of city dwellers in Europe, including those in Paris, France, breathe in polluted air (Figure 3.11). When people are exposed to pollutants, their health can be harmed.

According to the World Health Organization, in 2014, air pollution in most cities was getting worse. As urban populations increase, they produce more pollution than settlements with fewer people. As well, pollutants tend to be concentrated over urban areas. The air is often cleaner in less populated areas, away from cars and factories.

Large cities produce more pollutants overall than rural areas or suburban communities. However, high-density cities sometimes produce less pollution per person than rural areas or sprawling lower-density cities. Why? In rural areas and suburban areas, families drive more. Urban families in the United States drive 11 200 fewer kilometres and use one-third less total energy than rural families. However, in sprawling cities, such as Houston, people must travel farther distances to work. They use cars and other types of transit, which can create large amounts of greenhouse gases.

> FIGURE 3.11 In March 2014, Paris, France, was suffering from very high levels of air pollution. To reduce the pollution, the city offered free public transportation for three days.

pollutant something that contaminates, making air, land, and water unsafe or unusable

> If pollution continues to get worse, how might this affect settlement patterns in the future?

I wonder if more people in Paris now use public transit?



# WATER AND SOIL POLLUTION

As cities grow, they need to provide clean water for their populations. Cities also need to deal with the waste that their residents produce. This waste can include liquids from baths, toilets, and sinks; waste liquids from industries or manufacturers; and stormwater runoff. Wastewater needs to be treated so pollutants are removed before it is returned to any waterways. Solid waste, or garbage, also needs to be disposed of in a way that does not harm waterways or the land.

Not all cities can meet these needs. They may not have enough money. They may have poor **infrastructure**, which means they lack the services they need to function. Untreated sewage, which includes human waste, is a major source of water pollution. About 80 percent of sewage around the world is untreated and flushed into waterways. As more people migrate into cities with poor wastewater treatment, the problem will get worse. The sewage systems in many cities are already overloaded.

The more than 9 million residents of Jakarta, Indonesia, create more waste than the city can manage. As a result, much of the garbage is thrown directly into local rivers. Some factories dump toxic waste into the rivers as well. The Citarum River, which runs through Jakarta, is one of the most polluted rivers in the world (**Figure 3.12**). Despite the pollution, the Citarum is the only water source for millions of Indonesian people who live along the river.

Landfill sites are places where garbage is buried under the soil. The landfill sites in many cities are full, and they struggle to find new sites for storing waste safely. Many waste materials, especially electronic waste such as computers and televisions, contain toxic pollutants. As the waste breaks down, pollutants can be released into the soil and pass into waterways. This can threaten the local freshwater supply. Pollutants from landfills can eventually reach the ocean.

#### MALE AND ITS ISLAND OF GARBAGE

Many cities have environmental laws in place to protect the air, rivers, and soil by controlling the dumping of waste. Others have created problems by dumping their waste irresponsibly. For example, Male is the capital of the Maldives, an island nation south of India. Male is the most populated city in the Maldives. Ten thousand tourists a week visit the Maldives, creating a huge amount of garbage. There is no space in Male to store all of this waste.

In 1991, Male created an artificial island, Thilafushi, to deal with its garbage problem. Built on a coral reef, Thilafushi is used as a dump site (Figure 3.13). Now there are mountains of garbage on the island. Smoke from the burning waste pollutes the air. Hazardous waste, such as asbestos and lead, is mixed with solid waste. It seeps into the ocean, harming local ecosystems. So much garbage is brought to Thilafushi that the island expands by a square metre every day. Many people worry that "garbage island" will affect tourism in the Maldives, in addition to damaging the environment.

FIGURE 3.12 People search for recyclable plastic among the waste in the Citarum River, Indonesia.

I wonder what health risks are faced by children living near this river?

infrastructure the basic equipment and services that a city or country needs to function well, such as roads, bridges, and schools

> What is the connection between overcrowded urban areas and pollution?

<mark>landfill site</mark> a place where solid waste is buried under the soil



FIGURE 3.13 This garbage has been dumped on the island of Thilafushi, in the Maldives.

I wonder how we can prevent illegal dumping of waste?



### DEFORESTATION

Forests absorb and store carbon. This reduces the effects of carbon dioxide emissions, which cause global warming. However, forests near cities are often cut down to make way for new factories and housing. **Figure 3.14** shows new housing built where there were once trees near Panama City, Panama. A 2013 report stated that 2.3 million km<sup>2</sup> of forest were lost worldwide between 2000 and 2012. Only 800 000 km<sup>2</sup> of forest were added.

Is urbanization having an effect on forests everywhere? According to the UN, it is not. The rate of deforestation may decline when countries become wealthier and when more of their population lives in cities. People rely less on wood for fuel and heat. They use renewable sources instead. They may begin to protect their forests instead of cutting them down for firewood.

This is not always the case, however. For example, according to one 2014 report, Canada, a wealthy nation with a high urban population, damaged more hectares of untouched forests than any other country in the world. As well, because urban populations tend to be wealthier than rural populations, they buy and use more animal products, such as meat or dairy products. However, producing animal products requires large amounts of land. Grazing animals need space. As well, it can take 5 to 7 kg of grain to produce every kilogram of beef, and this grain also requires farmland to grow. Often forests are cut down to provide this land. For example, in South America, 70 percent of Amazon forests have been cut down to provide land for grazing.





FIGURE 3.14 This area on the edge of Panama City, Panama, was once a forest. Now it is the site of a new housing development. Panama City has the largest urban population in Central America.

I wonder how the wildlife that lived here was affected by the deforestation?

# LOSS OF ARABLE LAND

As populations increase, there is greater stress on the soil. More people are growing crops and raising livestock. As the soil becomes over-farmed, it loses nutrients. The soil dries up and blows away. Eventually the land is no longer arable. As you learned in Chapter 2, this process of soil degradation leads to desertification. Half of the world's topsoil has been lost in the last 150 years.

Increasing desertification means that people must migrate to find new land for farming. If they cannot find arable land, farmers may move to urban areas to find other work. However, even some cities are feeling the effects of desertification. For example, Nouakchott, Mauritania, is slowly being covered by desert sand (Figure 3.15). Many people have moved to Nouakchott from more rural areas in the past few decades because of drought. As the land outside the city becomes desertified, fewer people can survive there.

According to the UN, urbanization is also affecting the amount of arable land. For example, when people build structures, or use land for industry, that land is no longer available for farming. As well, it makes surrounding land less fertile. To fight against the loss of arable land, some urban communities are trying to increase local food production by turning open spaces—including backyards, parks, and even rooftops—into gardens for growing vegetables.



FIGURE 3.15 Settlements near the edge of Nouakchott, Mauritania, are being covered by the sands of the Sahara Desert. Nouakchott is the largest city in the Sahara Desert.

I wonder how it feels to live in a city on the edge of a desert?



**FOCUS ON** 

# **GATHER AND ORGANIZE**

To investigate a geographic topic, you need to gather information. Start by identifying sources that are reliable. Then read through the sources to find data or examples that connect to the topic.

Sometimes organizing your data in a visual way can help you see patterns and make connections between ideas. Choosing the right graphic organizer can often lead you to an answer to your research question (see **Figure 3.16**).

Graphic Organizer	Best For
Venn diagram	comparing and contrasting two or three sets of data; finding overlap in sets of data
fishbone organizer	analyzing causes and effects
flow chart	showing steps in a process
concept map	showing connections between ideas

**FIGURE 3.16** Graphic organizers can be used to present different types of information.

Read this case study, then practise gathering and organizing using what you have read.

#### CASE STUDY: ELEPHANT CORRIDORS

Asian elephants are highly endangered. There are fewer than 35 000 Asian elephants worldwide. Healthy elephant populations need large numbers of elephants in each herd. The herds need big territories to live in, away from humans. However, their territory is becoming smaller and more fragmented as human settlements expand.

The World Land Trust and the Wildlife Trust of India are two groups that are working to create wildlife corridors. Wildlife corridors are routes within populated areas through which animals can travel safely (**Figure 3.17**). So far, 88 elephant corridors have been identified.

**FIGURE 3.17** This wildlife corridor in India connects two areas of elephant habitat. The sign warns drivers that elephants have the right of way.

The World Land Trust and the Wildlife Trust of India raise money to help move settlements that are located in these corridors. These groups help people find land where they can farm away from elephants and help to build new houses. Local people are hired to help replant forests on the farms that have been left behind.

There are challenges to building wildlife corridors, such as controlling traffic through protected areas and moving already settled populations. However, these corridors are a lifeline for the Asian elephants of India.

#### **TRY IT**

- Create a graphic organizer to gather what you have read about elephants and wildlife corridors. Explain why you chose this graphic organizer.
- 2. Use the Internet to locate more information about elephant corridors. Add this information to your graphic organizer.
- Gather information about wildlife corridors in Canada or another part of the world. Use a graphic organizer to summarize the impacts of these corridors on humans and wildlife.



## LOSS OF HABITAT

As cities grow, they can create gaps and barriers between one area of wildlife habitat and another. Animals cannot use their full territories or migrate from place to place. Urban sprawl can destroy entire forests, grasslands, and wetlands. When habitat is destroyed, animals are forced to move. Animals and plants that cannot adapt are reduced in number or die. The result is an increase in the number of species becoming extinct. For example, there are only 690 000 elephants remaining in Africa. One of the key threats to them is habitat loss.

The extinction of species threatens biodiversity, which is the variety of life on Earth. Loss of biodiversity reduces the ability of all living things to survive. As settlements grow and change, people need to consider their impact on wildlife. Urban planners in many cities have created parks to provide habitat for wildlife and a place where people can connect with the natural world (Figure 3.18). In the next chapter, you will learn more about ways that settlements can reduce their impacts on the environment.

> FIGURE 3.18 The High Line is a public park in New York City, United States. It is built on part of an old rail line raised above the city streets.

I wonder how many different species of plants and animals live in this park?



## CHECK-IN

- 1. **COMMUNICATE** Use a graphic organizer to summarize the impacts of settlement on the environment.
- 2. EVALUATE AND DRAW CONCLUSIONS Do you think people in wealthier, more developed countries cause more forest loss than people in other countries? What information would you need to prove your opinion? Explain.
- **3. SPATIAL SIGNIFICANCE** Draw two simple maps, one showing a dense city and another showing a sprawling city, to illustrate what you know about urban sprawl and the kinds of environmental problems it can create.
- 4. **GEOGRAPHIC PERSPECTIVE** Describe two things that a sprawling city can do to reduce its environmental impact.

# WHAT OTHER CHALLENGES DO SETTLEMENTS CREATE?

Today's settlement patterns are damaging the environment. They are also causing social, political, and economic problems. Some experts say that the world's cities are in crisis.

The more we know about these challenges, the more we can manage them. We can reduce urban problems and take advantage of the opportunities that cities offer. By managing the growth of large settlements, we can make sure that they are safe places where all people can enjoy living and sharing a common space. We can also make sure that the environment in, and beyond, urban areas remains healthy.

## LESS LAND FOR GROWING FOOD

Growing populations have increased the need for food worldwide. At the same time, more and more farmland is being taken over by urban growth. There is less land available for growing food. In fact, the amount of farmland per person worldwide has fallen 50 percent since 1960. **Figure 3.19** shows urban growth in Calgary, Alberta, spreading onto arable land.

**FIGURE 3.19** Surburban housing in Calgary, Alberta, is encroaching on farmland.

I wonder where the people living in this suburb would have lived if these houses weren't here?

SAMPLE MATERIAL



#### **INCREASED FOOD PRODUCTION**

Despite the loss of farmland, food production worldwide has increased over the last 30 years. Why? Farmers are using more fertilizer, adding nutrients to the soil. They use more water to irrigate their fields. They are also using genetically modified (GM) crops, which are crops grown from seeds whose DNA has been changed. GM crops produce more food per hectare than traditional crops.

The increase in food production means lack of food may not be a global problem. But no one knows whether we can keep up this rate of food production. Already in some areas, such as sub-Saharan Africa, food production is not keeping up with population growth. People are going hungry because they cannot grow enough food on their land. Some countries are importing food, but many people do not have enough money to buy it. As well, no one is sure how using more fertilizers or growing GM crops affects human health and the environment.

#### **CHANGING LAND USE**

People with higher incomes are changing their buying and eating habits. They are buying more animal products than they did in the past. One billion people, most of them poor, raise and sell livestock. This increase in demand for animal products can help farmers by increasing their incomes. However, raising livestock puts stress on resources, such as water, and increases greenhouse gases. As well, raising livestock is the world's largest use of farmland. For example, in the Patagonia region of Argentina, overgrazing is one cause of the desertification of grasslands (**Figure 3.20**).

**FIGURE 3.20** Sheep graze on a ranch in the Patagonia region of Argentina. Overgrazing is one cause of desertification in Patagonia's grasslands.

I wonder how many crops they could grow here if they weren't raising sheep?



### **OVERCROWDING**

A city can be a wonderful place to live. When people live close together, there can be many benefits. Cities provide jobs. People can share resources and solutions to problems. Often it costs less to provide services for a large number of people in a city. For example, cities can provide education and healthcare services more efficiently than smaller communities in sparsely populated areas.

Sometimes, however, the population is greater than the city's carrying capacity. For example, traffic congestion is a problem in many cities. It wastes people's time, creates pollution, and costs money. In 2014, the three worst cities for traffic were Moscow in Russia, Istanbul in Turkey, and Rio de Janeiro in Brazil.

There are many other cities that have terrible problems with traffic. For example, more than half of the workers travelling into Mumbai, India, spend one to two hours on the bus or train. In Tokyo, Japan, 11 million people crowd onto the subway system daily. Since 1955, *oshiyas*, or "people pushers," help to pack the crowded trains (**Figure 3.21**).



**FIGURE 3.21** An *oshiya* crams people into a Tokyo subway train. Tokyo's trains run at 200% of their carrying capacity.

I wonder if populations are growing in Japanese cities?



<mark>slum</mark> a high-density informal urban settlement with inadequate housing and services

FIGURE 3.22 In Hanoi, about 90% of buildings have been built without the city's permission. The city still provides them with services, such as electricity and water. This allows the residents to have a good standard of living.

I wonder why the city decided to provide services to buildings built illegally? Some cities do not have enough adequate housing. They are becoming overcrowded. For example, in Hanoi, Vietnam, houses where one family once lived now shelter two or even three families (**Figure 3.22**). In some cities, newcomers arrive looking for work and a better life, but they are often unable to find any housing at all. They build their own shelters illegally, eventually creating slums. **Slums** are crowded urban settlements with poor housing where people live in poverty with few or no services.

#### SOLUTIONS FOR OVERCROWDING

Many cities that are running out of space are using their space creatively. They are building running tracks, vegetable gardens, and school playgrounds on city roofs, such as this one in Wuhan, China (**Figure 3.23**). By building up instead of out, it provides space in a crowded neighbourhood for young people to play.

# LACK OF SERVICES

Some cities also struggle to meet their growing population's needs for clean water, medical care, and schools. Often they cannot afford to provide these services to all their residents. This may create an inequality of services within a city. Some areas may have more, or better, services than others, depending on the ability of the residents in those areas to pay for them. As a result, some people may not be able to get medical care when they are ill, and they may have difficulty finding employment and schools for their children. As urban populations grow, poverty in cities is growing faster than in rural areas.

**FIGURE 3.23** This school in Wuhan, China, was built on top of a vegetable market to save space. The roof is used as a playground. Wuhan is home to almost 10 million people.

I wonder how else a city can use its space creatively?



SAMPLE MATERIAL

# HEROES IN **ACTION**

# FARM RADIO INTERNATIONAL: KEEPING FARMERS ON THE LAND

In 2014, the economy of Mali, a country in West Africa, was struggling. Drought and an ongoing conflict had forced over 460 000 people to leave their homes and farms. Many people were relying on international food aid to survive.

The need for locally grown food was high. Yet most young people believed that

farming led to a life of poverty. Many youth left their rural communities to search for work in the towns or mines.

Mamadou Diarra left

his community when he was 15 years old. When he could not find steady work in the city of Bamako after a few months, he returned to his family's farm in Ballan. He then learned about a reality contest to win the title of *Daba Kamalen*, or "best farmer

The contest was supported by the government of Mali and Farm Radio International. Farm Radio is a Canadianbased charity that works with over 400 radio stations in 38 African countries.



**FIGURE 3.24** Mamadou Diarra was a contestant on Farm Radio's reality show about young farmers.

#### Most farmers in Africa have access to radios. Farm Radio uses this technology to share technical knowledge and local experience with listeners.

Farm Radio sponsored the best farmer contest to motivate more farmers to tune in and learn about successful farming techniques. Empowering farmers could

> improve rural incomes. It could also increase food production for the country (**Figure 3.24**).

Diarra decided to compete. He grew corn

to be sold as seeds to other farmers. He learned a lot and was able to sell his seed corn for \$800. When he worked in the city, he had earned only \$220.

In the end, Diarra did not win the contest. However, he was happy with the experience. He made a profit in his first season. Others in his community now look up to him. "Young people now come to me for advice," he says with a smile. "They want to know how they can become a successful farmer like me."

## A CALL TO ACTION

- What people in your community may not have access to information that could improve their lives? Work with a partner to brainstorm ways that you could help them access this information.
- **2.** Fewer young people are becoming farmers in Canada. Research to learn more about becoming a farmer.
- **3.** Research the importance of growing food locally in Canada. Summarize your research in a brief paragraph or visual presentation.

# SAMPLE MATERIAL

"YOUNG PEOPLE NOW

COME TO ME FOR ADVICE."


FIGURE 3.25 Many farmers, such as this Kenyan farmer, use cellphones to get helpful information about farming practices.

I wonder how else technology can help people in rural communities?

Do you think the trend toward people leaving rural areas can be reversed? How?

## CHANGES IN RURAL AREAS

As you have read, people are leaving rural areas. In 2013, rural populations decreased for the first time in the United States. This decrease in population is causing serious problems in rural areas. When people move away, businesses close. There are fewer jobs. Some communities are left almost empty. Most of the people who leave are young males, so rural communities are made up of mostly females, as well as seniors and very young males. Fewer people work on farms. With many of the youth gone, traditional knowledge is lost—the younger generation is not around to learn it.

The UN suggests we should protect traditional agriculture. Examples of traditional agriculture include farmers producing their own seeds or exchanging seeds with other farmers in the community. Using new technology can also help rural farms. For example, nearly 60 percent of cellphone users live in developing countries. Many farmers use cellphones to track and compare prices for their products. Scientific Animations Without Borders provides farmers with educational videos that they can view on their cellphones (**Figure 3.25**). These videos share information on topics such as improving harvests, creating natural pesticides, and how to protect stored seeds from insects.



#### stakeholder a person, group, or organization that has an interest in or a concern about something

Why would environmentalists argue that Las Vegas is not sustainable?

#### LAND USE CONFLICTS

When land becomes scarce, people compete to use the land. Different groups, or stakeholders, have different ideas about how the land should be used. A **stakeholder** can include governments, local residents, Indigenous groups, and businesses, and each will have a specific concern. For example, a city government may want to build housing on an area of land to meet the needs of its growing population. Indigenous groups may hold land claims or have treaty rights to the area where the government wants to build housing. A builder may be interested in making a profit from constructing houses on the land and may support new housing projects. Which stakeholders should have the right to decide how the land is used?

#### **STAKEHOLDERS IN LAS VEGAS**

One example of a conflict over land use involves Las Vegas, Nevada, which is in the Mojave Desert in the United States (Figure 3.26). In 2013, it had a population of over 600 000 people, with over 100 000 tourists visiting daily. All of these people use huge amounts of resources, especially water. In fact, Las Vegas, a city in the middle of a desert, uses almost more water than any other city in the United States. For several decades, nearly all of the city's water came from Lake Mead, a reservoir behind the Hoover Dam. However, due to recurring droughts, the level of Lake Mead is dropping quickly. More water is taken out each day than goes in. The city may run out of drinking water by 2021.

#### **CHOICES**

The city of Las Vegas wanted to build a pipeline and bring in water from groundwater supplies in rural parts of Nevada or the neighbouring state of New Mexico for its residents and tourists to use. It would carry billions of litres of water to the city. However, many people spoke out against this proposal.



FIGURE 3.26 These satellite photos show the growth of Las Vegas sprawl in (A) 1972, (B) 1992, and (C) 2013. At night, it is the brightest place on Earth.

I wonder what will happen if Las Vegas runs out of water?



Many people in rural parts of Nevada and New Mexico rely on that water, such as farmers, ranchers, and people in Native American settlements. As well, residents are concerned that this will lower the groundwater levels and harm wildlife and vegetation in the areas from which the water is taken. They are speaking out against the proposal. They fear that this will cause the natural springs to dry up and disappear. Drought is already a problem. So is desertification. Desertification in the city and beyond could increase even more.

People spoke out against the proposals, but in 2013 the building of the 423 km water pipeline in Nevada was approved. Then, in 2014, there were more objections from environmental groups. The debate continued.

#### CHECK-IN

- 1. GEOGRAPHIC PERSPECTIVE What are some ways to reduce the number of livestock being raised worldwide? Which stakeholders may disagree? Why?
- GATHER AND ORGANIZE Gather information about urban sprawl. Organize it in a way that helps you understand how it impacts the environment. Do the same with rural farming villages.
- **3. COMMUNICATE** Give examples of some settlement challenges where you live, such as overcrowding or changing land use.
- 4. EVALUATE AND DRAW CONCLUSIONS If your school was deciding whether to build a new play area or a community garden, who would the stakeholders be? Suggest how each stakeholder might view the choices.
- 5. INTERPRET AND ANALYZE Refer to Figure 3.26. Estimate the percentage of green space in each photo. What does this tell you about water use in Las Vegas?

## LOOKING BACK: CHAPTER 3

# WHY CARE ABOUT THE EFFECTS OF SETTLEMENT?

#### **LEARNING GOALS**

As you worked through this chapter, you had opportunities to

- understand current trends in settlement
- analyze how settlement affects the environment and human populations
- gather and organize information related to settlement and the environment
- create a flow map

As you learned in this chapter, settlement has significant impacts on the environment. Settlements are growing and spreading. Many cities are merging together in giant megaregions. Bigger cities can have greater impacts on the environment. They are also changing the ways of life of people around the world. We need to come up with strategies to manage the impacts of changing settlement patterns.

#### Summarize Your Learning

Select one of the following tasks to help you summarize your learning:

- Create a poster, spatial journal, or story map to help communicate to other students in your school how settlement affects the environment. Include information on how current trends in settlement are changing the ways that people live.
- The trend in migration from rural to urban areas is affecting both rural and urban areas. Create a storyboard, spatial journal, or slide show to communicate information about this trend. Make sure to include the effects on populations and the environment.



#### **APPLY YOUR LEARNING**

- INTERPRET AND ANALYZE Some large coastal cities are building into the sea to create more land. Suggest two other ways that cities could cope with their increasing populations.
- 2. **PATTERNS AND TRENDS** Rural areas are losing people. Why is it important to reverse this trend and help people stay in rural areas?
- **3. INTERRELATIONSHIPS** How has the need to feed growing populations affected the environment? Show your thinking in a mind map.
- 4. SPATIAL SIGNIFICANCE Review the three satellite images of Las Vegas (Figure 3.26) on pages 96-97. Place a blank piece of paper over the 1972 image, and draw a line that represents the total area of the city. Do the same for the 1992 image, and the 2013 image, using the same paper. How would you describe the difference in city area over the time period? How would you explain why the city grew in this pattern?
- 5. FORMULATE QUESTIONS Create a research question related to the problems facing overcrowded cities. Research at least three ways to increase the carrying capacity of the city.

- 6. GEOGRAPHIC PERSPECTIVE Imagine that your city, or a city near you, is considering a development proposal to build a new airport on the edge of the city. Identify three stakeholders that would favour such a proposal and three that would likely vote against it. Suggest the main argument that each of the six stakeholders would have for or against the proposal. Explain how you would vote. Give two reasons for your decision.
- 7. EVALUATE AND DRAW CONCLUSIONS What area near you has the potential to become more urban? Suggest four considerations that planners and governments should keep in mind if this type of change begins to happen. Which consideration do you think is most important, and why?
- 8. GEOGRAPHIC PERSPECTIVE Imagine that you are a judge hearing a dispute between the city of Las Vegas and farmers and ranchers from Nevada or New Mexico about access to water. With a partner, make a video or audio recording in which you summarize the evidence from both sides, state your judgment, and explain your reasoning.

SAMPLE

MATERIAL



- Find information in the chapter that will help you answer the following question: How does my community affect the environment? List ways that infrastructure, services, and people's activities, such as housing developments, energy use, construction, transportation, and waste disposal, affect the environment, including the air, the water, and the soil.
- Through field study, find examples that show how your community affects the environment. For example, you might look for evidence of air or water pollution, the removal of trees or other vegetation, the amount of pavement cover, or excessive water use. Take photos or make sketches of these examples.
- **3.** Plot the examples you found on your map. Record the impact on the environment for each example. Consider how your community's population density might increase or decrease the overall impact.





## **TEACHER'S RESOURCE**





#### **Nelson GEO8 Teacher's Resource**

Advisors

#### Writing Team

Graham Draper, formerly York Region DSB Su Mei Ku, Professional Writer Margaret McClintock, Professional Writer Lisa Mulrine-Gorman, York Region DSB Chana Sousa, Dufferin-Peel Catholic DSB Mark Cassar, Dufferin-Peel Catholic DSB Lew French, OISE, University of Toronto Stephanie Giannatselis, Halton DSB Ethel Johnston, formerly Toronto DSB Mark Lowry, Toronto DSB Jonathan Rajalingam, Simcoe Muskoka Catholic DSB Assessment and DI Consultant John Piper

ELL Consultant Maureen Innes

Publisher, Social Studies and Business Paula Smith

Managing Editor Jennifer Hounsell

Product Manager Jessie MacKinnon

Program Manager Jackie Brown

Developmental Editors Linda Cahill Kelly Cochrane Naomi Go Jennifer Hughes

Editorial Assistant Sarah Jones

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ISBN-13: 978-0-17-659060-4 ISBN-10: 0-17-659060-9

Printed and bound in Canada 1 2 3 4 18 17 16 15

For more information, contact Nelson Education Ltd., 1120 Birchmount Road, Toronto, Ontario M1K 5G4. Or you can visit our website at www.nelson.com. Director, Content and Media Production Linh Vu

Production Project Manager Kathrine Pummell

**Content Production Editor** Debbie Davies-Wright

Copyeditor Julia Cochrane

Proofreader Paula Pettitt-Townsend

Design Director Ken Phipps

Interior Design Cathy Mayer

Compositor MPS Limited

#### Reviewers

The authors and publisher gratefully acknowledge the contributions of the following educators: Greg Dixon, Limestone DSB Alison Ellwood, Durham DSB Oriane Falkenstein, Private (Bialik Hebrew Day School) Patty Friedrich, London District Catholic SB Matt Gariepy, Hastings and Prince Edward DSB Melissa George, Peterborough Victoria Northumberland Clarington Catholic DSB Francesca Guinci, Dufferin-Peel Catholic DSB Todd Horn, Sudbury Catholic DSB Janice Maggio, Halton DSB Cindy J. McNeice, Simcoe County DSB Kris Oliverio, Algoma DSB Naomi Persaud, Toronto DSB Sonia Racco, York Catholic DSB Ian D. Robertson, Toronto DSB Adriana Silvestre, Toronto Catholic DSB Jean Tong, Esri (Environmental Systems Research Institute) Sharon You, Peel DSB

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BLM 0.2 Causes and Effects

BLM 0.3 Reviewing Sources for Credibility

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# CHAPTER 3 IMPACTS OF SETTLEMENT

Student Book pages 72-73

## LAUNCHING THE CHAPTER

- Review with students what they learned in Chapter 2 about the effects that physical processes, such as droughts, earthquakes, and climate change, have on settlements. Explain that just as the environment affects settlement, settlement also has an impact on the environment. Read the chapter title aloud, and ask students to suggest ways that settlement affects the environment. To deepen their thinking, ask: *If the population of a settlement suddenly increased, what would people need to have to be able to live?* (more resources, such as water and food; wood to build homes; land on which to build homes) *Where would people build their homes?* (on any available land in the urban area, resulting in tightly packed buildings; the rural area on the edge of the settlement; near water and other resources) Remind students to think back to their discussion of the effects of population increases in Chapter 1.
- Use a K-W-L Chart (BLM 0.29) as a pre-reading tool to assess where students are in their understanding of the effects of settlement on humans and the environment. Ask students to fill out the first two columns. In the What I Know column, instruct them to record their prior knowledge of the effects of settlement on the environment and society. In the What I Want to Know column, have them record questions about the effects of settlement or related concepts that they would like to learn more about. At the end of the chapter, students will revisit the chart to complete the last column, What I Learned.

#### CHAPTER BIG QUESTION

Why care about the effects of settlement?

#### LEARNING GOALS

SAMPLE

MATERIAL

- understand current trends in settlement
- analyze how settlement affects the environment and human populations
- gather and organize information related to settlement and the environment
- create a flow map



#### WHAT IS WHERE? WHY THERE? WHY CARE?

Invite students to examine the photo and read the text on Mexico City. Ask:

- *What do you see*? (a very dense city, tightly packed with buildings; volcano in the background; a peripheral settlement pattern)
- Where is Mexico City? Students should first try to guess its country before locating it on a map. Explain to students that Mexico City is the capital of Mexico (19.43°N, 99.13°W) and is one of the world's most important economic centres. Located in the Valley of Mexico, the city was established almost 700 years ago, but humans have lived in the valley for thousands of years. Prompt students to recall their knowledge from Chapter 1. Ask: Why did humans settle in Mexico City? (agriculture developed because of the mild climate, arable soil, and access to fresh water; in the area of the city, there was once a five-lake system; over thousands

of years, these lakes shrank as a result of a number of factors, including past eras of climate change and draining of the lakes for flood control; today, the lakes no longer exist, and industry and urban development have replaced agricultural land)

- Why do you think so many people live there today? (because it is the centre of government and an economic centre; both provide many jobs)
- What effects do you think Mexico City has the on the environment? (air pollution, shortage of water, land collapsing on itself)
- Why should we care about the effects that settlement has on the environment and people's ways of life? (because we need to protect our environment for future generations; pollution and resource overuse harm not just the environment, but human beings; without a healthy environment, all life suffers) (3)

## WHAT ARE TODAY'S **SETTLEMENT TRENDS?**

Student Book pages 74-79

#### GEOGRAPHIC THINKING CONCEPTS

Patterns and Trends Geographic Perspective

#### INQUIRY SKILLS FOCUS

Gather and Organize Evaluate and Draw Conclusions

#### CHAPTER FEATURE

Creating a Flow Map

#### RELATED MATERIALS

BLM 0.9 Political Outline Map of the World BLM 3.1 More Developed Countries versus Developing Countries: What Are the Differences?

#### LESSON SUMMARY

#### **EXPECTATIONS**

A2.3, A2.4, A3.1, A3.4, A3.5, A3.6

#### **CRITERIA FOR SUCCESS**

Students can

- identify and describe significant current trends in human settlement
- explain the impact of current settlement trends
- interpret and create flow maps

#### SUGGESTED ASSESSMENT STRATEGIES

- Think-Pair-Share
- 3-2-1
- Gallery Walk

#### **CROSS-CURRICULAR CONNECTIONS**

- Grade 8 Math: Number Sense and Numeration: solve problems involving percent that arise from real-life contexts
- Grade 8 Math: Data Management and Probability: organize into intervals a set of data that is spread over a broad range; collect ... secondary data, and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools; identify and describe trends, based on the rate of change of data from tables and graphs, using informal language

#### COMBINED GRADE CONNECTIONS

• Grade 7 Geography: A1.3, A1.4, A3.2

#### MAP, GLOBE, AND GRAPHING SKILLS

• extract information from, analyze, and create flow maps

#### **GEOGRAPHY BACKGROUND**

Urbanization happens when the percentage of people living in urban areas increases. Until the Agricultural and Industrial Revolutions of the 1700s (see Chapter 1), most people lived in rural areas. During the 1800s, as fewer people were needed for farming but more were needed for industry in urban areas, a population shift began. This was the beginning of urbanization in the western world. Urbanization in developing countries began later, in the 1950s. Today, 54 percent of the world's population is urban. North America is the most urbanized region in the world, with 82 percent of its population living in cities and towns.

#### **POSSIBLE MISCONCEPTIONS**

While the overall global population is more urban than rural, this is not the pattern in some parts of the world. In Africa, the urban population is still smaller than the rural population, at 40 percent. Similarly, in Asia, less than 50 percent of the population is urban.

#### **78** UNIT 1: Global Settlement: Patterns and Sustainability

SAMPLE

#### **TEACHING NOTES**

#### **MINDS ON**

Ask students: Why might people have come to Canada in the past, and why might they still migrate here today? (for work; for better business or employment opportunities; to be closer to family; for better quality of life; for education; for easier access to healthcare; to escape war; to start over after losing their home to a natural disaster) Invite students to share any personal reasons if they like. Record students' responses on chart paper. Then have students categorize them under the following headings: "Reasons People Might Move to a Different Country" and "Reasons People Might Leave Their Country." Point out that some people move from one community or country to another because of what the other place has to offer. However, other people are forced to leave their community or homeland because of lack of opportunity or safety reasons. Sensitivity Note: Some students may not wish to share information about their family. Respect their right to their family's privacy.

#### **ACTION**

- If the class did the suggested Minds On activity, have students revisit the chart that they created and place the terms *pull factors* and *push factors* in the appropriate sections of the chart.
- Have students respond to the photo question on Student Book page 74. Students may have different suggestions, such as the following: countries may become stagnant without skilled and educated people to help drive economic growth; those who remain may find it difficult to get access to services, such as healthcare, because of the lack of doctors and/ or healthcare providers. You might introduce the term *brain drain* to describe the loss of highly educated citizens to other places. Students may be surprised to learn that Canada is not immune to brain drain, as some highly skilled and educated Canadians are sought after by companies and institutions in the United States, or move there because of greater economic opportunity. This also happens within Canada, between provinces.
- Use Think-Pair-Share to check students' understanding of the trend of increased global migration. Pose questions such as these: *Why do people move to urban areas? What are some effects of this movement?* Students should be able to provide responses based on their learning in Chapter 1. Ask students first to think on their own before sharing their ideas with a partner. Then have partners create a word splash with key words and terms from their combined ideas. In a word splash, students organize the words and terms in a variety of ways to look like they have been splashed on a page. For example, the words might be slanted or set in different directions, and some may be larger than others for emphasis. Students might also consider different fonts and colours. Have them display their word splashes around the classroom. Suggest to students that, as they read the remaining pages in this lesson, they should check their word splashes to confirm their ideas and add any new learning.



#### ELL

Ensure that students understand the connection between the headings in the Minds On activity and the terms *push* and *pull*. Ask them to give examples.

#### DI To Support

Create flash cards, each with a reason why people leave or move to a country. Have students identify whether each is a pull factor or a push factor.



- Introduce the term *flow map* to students, and ask them to predict what such a map might show based on its name (movement of people and goods).
- If the cultural makeup of the class allows, consider the following strategy to explain this type of map: Project a map of the world and ask students to identify the country of origin of their family or ancestors. Count the number of students representing each country. Then draw an arrow from each country of origin to Canada. The thickness of each arrow represents quantity—the more students there are from one country, the thicker the arrow. Have students make observations about what they learn from the map, such as where most families or ancestors originated.

**Sensitivity Note:** Some students may be from First Nations communities, adopted, unaware of their family heritage, or uncomfortable sharing information about their family. It is important to consider the background of all students before planning this activity.

 Examine Figure 3.2 as a class. Recall with students what they learned about the Syrian civil war in Heroes in Action in Chapter 1. In the spring of 2011, inspired by a series of protests in other Arab nations, Syrians began to rise up against government dictatorship. Government troops were sent to end the protests. Before long, a bloody civil war began. Millions of people were forced from their homes, and many Syrians fled to neighbouring countries and other parts of the world. Have students notice the varying thicknesses of the arrows and relate this to the numbers of refugees. Also elicit that the arrows show where the refugees fled to.

#### CREATING A FLOW MAP

- Step 1: Students could work with a partner to create their flow map. Provide them with BLM 0.9 Political Outline Map of the World. A complete example of the flow map can be found in the BLM Answer Key.
- Step 2: Advise students that the thicknesses of the arrows need to be visibly distinct from each other so readers can interpret the information correctly.

Student B

SAMPLE MATERIAL

- **Step 3:** Remind students that a legend a main heading that describes what the categories represent.
- Step 4: Ask: What patterns does the map show? Point out that the United States and Europe and the United Kingdom are the regions with the fewest immigrants coming to Canada. Ask students to share any knowledge they may have as to why this might be. For example, they may note that these two regions are generally made up of countries with a good standard of living and relatively stable economies, so people tend to stay put. On the other hand, many countries in Africa and the Middle East and Asia and the Pacific have high population density, poverty, and internal conflict. These factors force people to go elsewhere in search of more living space, better economic opportunities, and peace and safety. You might also point out that the Canadian government policy to attract highly educated and business-class immigrants has also increased the number of people arriving from regions such as Asia and the Pacific.
- **Step 5:** After students have drawn their arrows, remind them to check that the thicknesses of the arrows match those in the legend.
- Step 6: Students who are using BLM 0.9 will not need to draw a compass rose or a scale, as these already appear on the map. Encourage students to share their completed maps with the class.
- **ASSESSMENT:** Use a **3-2-1** strategy to observe students' learning of flow maps. Students could organize their ideas as follows:
  - 3 distinguishing characteristics of a flow map (shows movement of people and goods; uses arrows of varying thicknesses to represent quantities; reveals the patterns and trends of movement)
  - 2 examples of mapping elements that must be included (legend to explain the arrows; scale)
  - 1 important consideration when drawing the arrows (the thickness must reflect the quantity—the thicker the arrow, the larger the number)

- Draw students' attention to Figure 3.4. Remind students what they have learned about flow maps. Ask: *Which countries represent the largest number of migrants going to Sydney?* (China and India) *Which countries represent the second largest?* (the United Kingdom and the Philippines) Point to the caption question, *What might be the pull factors that caused this migration?* (work, better business opportunities, family reunification, higher standard of living, more living space, less crowded)
- Introduce the terms *more developed country* and *developing country*. Ask students to try to guess their differences. After they read Student Book page 76, have them use **BLM 3.1 More Developed Countries versus Developing Countries: What Are the Differences?** to differentiate the two. Suggest to students that they update the BLM as they learn more about these categories of countries in later chapters. Return to Figure 3.4, and ask students whether they think Australia is a more developed or developing country. Students should be able to conclude that, based on the large numbers of migrants, Australia probably has a stable economy that has much to offer and is a more developed country.
- Ask students if they know of any megacities. Some students may provide a Canadian example, Toronto, as being a megacity. Explain that the "megacity" of Toronto was formed in 1998 when six municipalities and their governments merged. Globally, however, Toronto's population is small, compared with much larger megacities, such as Tokyo and Delhi (Metro Toronto's population at the 2011 census was 5583 064). So, Toronto does not fit the Student Book definition of *megacity*: an urban area with more than 10 million people. Toronto is part of a *conurbation*: an urban area consisting of several towns and merging suburbs.
- Have students research megacities. Ask students to share their findings with a partner or with the class to give them a sense of the size of these cities, some characteristics that they share, problems that they face, and possible solutions to these problems.
- Students' responses to the patterns and trends question on Student Book page 77 will probably be from a North American perspective. Sample responses may be as follows: the discovery and development of natural resources outside cities would lead to job creation and attract people to move closer to where they work; technology allows people to work from home, particularly in developed countries, so some people might choose to move to rural areas; with cities becoming overcrowded, people who want a quiet life might also choose to move to rural areas.
- Draw students' attention to the rural population decrease from 3.4 billion in 2014 to an estimated 3.2 billion in 2050 (Student Book page 77). Some students may mistakenly think this is a small decrease. Clarify that this is a decrease of 200 million people.
- Examine Figure 3.5 and ask students to respond to the information using a See-Think-Wonder activity. This can be done in a whole-class setting, or students can work in pairs. On the board or chart paper,

SAMPLE MATERIAL





81

ELL

Invite students to reflect on previous communities they have lived in. Some students may mention refugee camps, which were introduced in Chapter 1.

#### DI To Extend

Interested students can conduct additional research about the construction of Dubai's Palm Islands. Students can share their findings and their conclusions about the impact of this development on the environment by creating a video, comic strip, rap song, poem, or speech.



#### **DI** To Challenge

Students could use a drawing tool to create their infographics. They could then post their work to an online discussion forum for other groups to view and pose their questions. create a chart with the following headings: What Do You See?, What Do You Think?, What Do You Wonder? Record students' responses to help facilitate the discussion and recall students' ideas. Some students may be amazed at the numbers and wonder what cities and countries are doing to sustain the huge population growth. Others may express alarm and wonder about the impact of such growth on society and the environment.

- Have students differentiate between *urban, rural*, and *suburbs*. Using the information they now know about these terms, ask them to classify where they live. Do they live in an urban centre, a suburb of an urban centre, or a rural community? How do they know?
- Introduce the concept of *urban sprawl*. Refer back to the chapter opening photo of Mexico City on Student Book pages 72 and 73. Ask students to revisit their answers to *What do you see?* posed in the Launching the Chapter teaching notes. Ask: *How does the photo of Mexico City show urban sprawl?* (very dense population; increasing population; tightly packed buildings; houses and other buildings developed into previously undeveloped land) Share Online Figures 3.27 (Mexico City, Mexico), 3.28 (Nairobi, Kenya), 3.29 (Manila, Philippines), and 3.30 (the San Salvador Metropolitan Area, El Salvador) with students to show the progression of urban sprawl in various cities.
- For the two photo questions on Student Book pages 78 and 79, ask partners to exchange ideas with each other. Each could then take one idea and turn it into a newspaper headline; for example, "High gas prices have Houston residents leaving their vehicles at home" or "Scientists warn: Fish around Palm Islands will disappear from pollution." Encourage partners to share their ideas with the class.

#### CONSOLIDATION

• Use a **Gallery Walk** approach to observe where students are in their learning. Divide students into small groups and have them create an infographic (see Figure 3.5 for example) to capture the most important information that they encountered in this lesson. Remind students that they should include both text and data, and present the information visually. Have them display their infographics around the classroom. Invite groups to view each other's work and then formulate three questions based on their observations of each infographic. One question should be fact or recall-based, one opinion-based, and one open-ended. Come together as a class to discuss the questions and the ideas represented in each infographic.



1. **GATHER AND ORGANIZE** Push factors: conflicts like civil war, religious persecution, environmental disasters

Pull factors: better job opportunities, human rights/freedoms, better education and healthcare (*Knowledge and Understanding*)

- 2. **GEOGRAPHIC PERSPECTIVE** Land should be reclaimed so port cities that are running out of space can extend out into water bodies OR Land should not be reclaimed since this destroys seabed ecosystems and threatens endangered species. *(Thinking)*
- **3. EVALUATE AND DRAW CONCLUSIONS** Students will identify different facts about urban sprawl. Urban sprawl is the uncontrolled or controlled

spread of urban places into the surrounding countryside. It consumes agricultural lands and forests and threatens biodiversity. It causes low-density living and related problems like car dependence and long commutes, which add greenhouse gases. It costs communities to expand service systems like roads, buses, water, and hydro. (*Application*)

4. EVALUATE AND DRAW CONCLUSIONS Students might suggest that, since many youth are leaving rural areas, the proportion of the population in their reproductive years drops, growth rates decline, and birth rates drop as fewer people are needed. (*Thinking*)



## CASE STUDY

## THE BIG SQUEEZE: MEGAREGIONS

Student Book pages 80-81

#### RELATED MATERIALS

BLM 0.21 Interpreting Aerial Images BLM 0.27 Frayer Model BLM 3.2 PMI Chart: The Pearl River Delta

#### WHERE ON EARTH?

• Pearl River Delta, China 22.53°N, 113.73°E

#### LESSON SUMMARY

#### EXPECTATIONS

A3.1, A3.5

#### **CRITERIA FOR SUCCESS**

Students can

- identify and describe megaregions as a growing trend in human settlement
- assess the pros and cons of megaregions

#### SUGGESTED ASSESSMENT STRATEGIES

- Fold the Line
- Frayer Model

#### **CROSS-CURRICULAR CONNECTIONS**

- Grade 8 Math: Data Management and Probability: identify and describe trends, based on the rate of change of data from tables and graphs, using informal language
- Grade 8 Science: Systems in Action: 1.2 assess the impact on individuals, society, and the environment of alternative ways of meeting needs that are currently met by existing systems, taking different points of view into consideration

#### COMBINED GRADE CONNECTIONS

• Grade 7 Geography: A2.3, A2.5, A3.2

#### MAP, GLOBE, AND GRAPHING SKILLS

- extract information from and analyze aerial images
- extract information from, analyze, and create thematic maps

#### **GEOGRAPHY BACKGROUND**

Megaregions form when a number of megacities amalgamate. These huge regions extend hundreds of kilometres. Examples of megaregions are Hong Kong-Shenzhen-Guangzhou in China; Nagoya-Osaka-Kyoto-Kobe in Japan; and Rio de Janeiro-São Paulo in Brazil. In the future, there could be even larger regions that go beyond national boundaries and cover areas in a few different countries.

#### **POSSIBLE MISCONCEPTIONS**

Urbanization is often equated with problems, such as congestion, pollution, and poverty. While these are urban realities, there are benefits to living in cities. For example, residents have more economic opportunities and better access to a variety of services. Also, when municipalities merge to form a megacity or megaregion, their combined human and financial resources can translate to improved services for residents.



## **TEACHING NOTES**

#### MINDS ON

• Ask students to think back to their learning about megacities in the last lesson. Ask: *What is a megacity?* (a city with more than 10 million residents; the largest settlement in settlement hierarchy) Then introduce the term *megaregion*. Ask students to make an educated guess as to what this might be. You might provide students with some background information and use a map to show examples of megaregions around the world (see Geography Background at the start of this lesson).

#### ACTION

- Have students make predictions about the benefits and downsides of megaregions. Benefits might include combined resources and wealth to reduce costs, streamlined services for better efficiency, and generation of greater economic wealth. Downsides might include greater urban sprawl, loss of more rural areas, and unequal distribution of wealth.
- Provide students with some background information on the Pearl River Delta region. This region is in southeast China. (Consider projecting a world map to show its location in relation to Canada.) At one time, this region was mostly agricultural, but with China's economic reform, which began in the late 1970s, it has become one of the most important manufacturing centres in the world. The economic boom has led to a huge population increase, rapid urban growth, and high levels of pollution.
- Ask students to examine the two satellite images on Student Book page 81. Guide students to interpret them using **BLM 0.21 Interpreting Aerial Images**. What conclusion can they draw? Students should be able to see how, in a 30-year period, most of the vegetation (red areas) has been replaced by urban development (grey areas). It is no wonder that a major concern about urbanization is the loss of vegetation.
- Use Fold the Line to observe students' understanding of the benefits and concerns related to megaregions. Pose a statement to encourage students to explore the two sides of megaregions, for example, *The concerns related to megaregions far outweigh the benefits*. In the front of the room, use masking tape to create a line, with one end marked Completely Agree and the other Completely Disagree. Ask students to position themselves along the line. Those who do not completely agree or disagree may stand somewhere between the ends of the line. Then "Fold the Line" and have students discuss their position with those across from them. If all the students end up on one side of the line, challenge a few students to take the opposite view.

## CONSOLIDATION

• Have students complete **BLM 0.27 Frayer Model**. Ask students to fill in the BLM with current knowledge they have about the term *megaregion*: definition, some characteristics or facts, examples, and non-examples.



#### ELL

Ensure students understand what is meant by *benefits* and *downsides*. Have them think of other examples of comparative headings used to organize information, such as pros and cons, opportunities and challenges, and ups and downs





#### **EXPLORE THE ISSUE** SAMPLE ANSWERS

1. Pros: job opportunities, available services and products, high-level entertainment, education, healthcare facilities

Cons: crowded conditions, air pollution, lack of access to open space

You might provide students with **BLM 3.2 PMI Chart: The Pearl River Delta** to organize their responses. This question could be extended by having students note anything they found interesting while reading the case study, such as the rapid development of the region, the "one hour living circle," the size of the region, or the amount of raw sewage generated. Student Book page 81

- 2. Students may choose an area such as the Greater Toronto Area, where the coming plans to improve regional transport include various modes of movement (subway, light rail, bus). Students' map could show expected travel times/distances by a given mode to show areas covered in one hour from a few key central locations.
- **3.** Students may suggest factors such as productive agricultural land, large ports for trading, industries/factories encouraging rapid economic growth, well-connected communities, nearby resources, or water supply.



## HOW DOES SETTLEMENT AFFECT THE ENVIRONMENT?

Student Book pages 82-89

## LESSON SUMMARY

#### **EXPECTATIONS**

A2.2, A3.5

#### **CRITERIA FOR SUCCESS**

Students can

- describe various ways in which human settlement has affected the environment
- describe sustainable practices to lessen the impact of settlement on the environment
- gather and organize data and information from a variety of sources

#### SUGGESTED ASSESSMENT STRATEGIES

- Graffiti
- Piece It Together
- \$1 Summary

#### **CROSS-CURRICULAR CONNECTIONS**

- Grade 8 Math: Data Management and Probability: collect and organize categorical, discrete, or continuous primary data and secondary data, and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools; make inferences and convincing arguments that are based on the analysis of charts, tables, and graphs
- Grade 8 Science: Systems in Action: 1.2 assess the impact on individuals, society, and the environment of alternative ways of meeting needs that are currently met by existing systems, taking different points of view into consideration; 3.9 identify social factors that influence the evolution of a system
- Grade 8 Science: Water Systems: 3.1 identify the various states of water on Earth's surface, their distribution, relative amounts, and circulation, and the conditions under which they exist; 3.2 demonstrate an understanding of the watershed as a fundamental geographic unit, and explain how it relates to water management and planning

#### COMBINED GRADE CONNECTIONS

• Grade 7 Geography: A2.5, A3.2, A3.7, A3.10

#### MAP, GLOBE, AND GRAPHING SKILLS

- extract information from and analyze aerial images
- create sketch maps

#### GEOGRAPHY BACKGROUND

Human activity has an impact on the environment. Concentrated human activity compounds that impact. As the world population grows, the impact we have on the environment increases as well, and the need for environmental conservation becomes even more urgent.

#### **POSSIBLE MISCONCEPTIONS**

Environmental problems are not a modern-day phenomenon. Throughout history, there have been examples of civilizations that prospered by exploiting nature. Subsequently, however, they declined because of the overuse of resources.

## SAMPLE MATERIAL

#### GEOGRAPHIC THINKING CONCEPTS

Patterns and Trends Interrelationships Spatial Significance Geographic Perspective

#### INQUIRY SKILLS FOCUS

Gather and Organize Communicate Evaluate and Draw Conclusions

#### CHAPTER FEATURE

Focus On: Gather and Organize

#### **RELATED MATERIALS**

BLM 0.2 Causes and Effects BLM 3.3 How Does Settlement Affect the Environment? BLM 3.4 Reducing or Addressing Environmental Impacts of Settlement BLM 0.1 Understanding Interrelationships BLM 0.3 Reviewing Sources for Credibility BLM 0.30 Fishbone

# SAMPLE MATERIAL



#### ELL

Some students may need a guided approach to reading. Consider a teacher directed strategy, a partner activity, or a Cloze passage.



## **TEACHING NOTES**

#### MINDS ON

- Display Figures 3.10 to 3.15 to show some effects of cities on the environment, such as light pollution, air pollution, and landfills. If possible, project the photos on a screen. Ask students what they think these images represent.
- Pose the section question: *How does settlement affect the environment?* Ask students to begin recording ideas using **BLM 0.2 Causes and Effects**. Encourage them to update the BLM as they gain new information and understanding throughout the lesson.

#### ACTION

- Use a **Graffiti** strategy to observe students' learning as they work through this lesson. Divide the class into six groups and assign each a topic: Light Pollution, Air Pollution, Water and Soil Pollution, Deforestation, Loss of Arable Land, and Loss of Habitat. Topics may be combined to reflect the class size and to make the task more equitable. Students will record what they have learned related to their assigned topic. Assign each group member a number, starting with 1, to reflect the number of students in the group. Have students read their assigned topic and then take turns, in numerical order, to record ideas about what they have learned on poster paper. Their ideas may include words, symbols, and drawings. Encourage students to go beyond the words on the Student Book pages and think about their own related experiences, stories they may have read or heard about, their response to what they read, and so on. You may suggest a set amount of time, for example, two minutes, for each student to record their ideas. Afterwards, invite groups to circulate and review other groups' work. Suggest that they add other ideas, ask questions, or give feedback (for example, point out something that may be unclear). Have groups reconvene to review the notes from other groups and make changes to their work as necessary based on these notes. Then invite students to present their final ideas to the class. If students have access to a computer, this activity may be done using an online discussion forum, where groups first record their ideas and then others view their ideas and offer suggestions.
- Use Piece It Together to assess students' understanding of the effects of settlement on the environment. Cut and paste each cell of BLM 3.3 How Does Settlement Affect the Environment? on an index card. Distribute the cards randomly to students. Then have students find their matches. Do this a few times to give students an opportunity to get different cards and find their matches.
- Have students work in groups. Provide them with **BLM 3.4 Reducing** or Addressing Environmental Impacts of Settlement. Ask students to suggest one or more ways to lessen or address the impact of each environmental problem. For example, for the problem of air pollution,

students may suggest that cities should encourage cycling by having more bike lanes or banning cars from certain areas to encourage walking. For the problem of landfill, they may suggest that cities should investigate garbage incineration to combat landfills and turn waste into energy (note that this "solution" has both advocates and detractors). As another example, students may suggest that there be more public campaigns and/or education (similar to ads against smoking) to prevent illegal dumping of waste. Their ideas do not need to be large scale or complex, but may be at the individual level. This does not need to be an in-depth discussion, as students will learn more about ways that communities are helping to reduce the impacts of settlement on the environment in Chapter 4.

- Ask students to respond to the patterns and trends question on Student Book page 83. They are likely to suggest that people might start moving away from large cities to smaller urban centres and even rural areas where there is less pollution.
- When discussing the interrelationships question on Student Book page 84, students will likely draw connections, such as the following: more people living in cities means more waste is produced, and this waste has to be put somewhere; waste is often illegally dumped or put in landfills; contaminants from waste can seep into the land and water, and cause pollution. Students could create visuals to show this interrelationship, or they could use **BLM 0.1 Understanding Interrelationships**.
- For the topic of deforestation, it may be helpful to provide a concrete example to help students understand the size of the global forest degradation—2.3 million square kilometres. For example, point out that the size of Canada's largest territory, Nunavut, is about 1.9 million square kilometres.
- Students may be surprised to learn that Canada damaged more hectares of untouched forests than any other country in the world. Canada's damage to untouched forests accounts for 21 percent of the global total. Most of it is due to the building of infrastructure, such as pipelines and roads, by the oil and gas industry.
- When discussing the interrelationships question on Student Book page 86, students should explain that people in wealthy countries tend to use less wood for energy, and use other sources instead. This means that forests can be protected (although this does not always hold true, as noted in the Student Book). Ask students if they have seen examples of people in their community using alternative sources to wood. They may give examples of flow resources, such as solar and wind.
- Remind students that only 10.8 percent of Earth's land is arable, so this makes the loss of arable land and the need to find alternative ways to produce food critical.
- Remind students to update **BLM 0.2 Causes and Effects** using new information and understanding.



#### PATTERNS AND TRENDS

#### INTERRELATIONSHIPS

#### INTERRELATIONSHIPS

#### DI To Challenge

Students could work in groups to choose one of the photo questions in the section and investigate it further. They may share their findings in a format of their choice.

#### **FOCUS ON**

## GATHER AND ORGANIZE

- Remind students that before they begin gathering information, they need to think about their inquiry question. What do they know about the topic? What do they want to find out? Knowing this will assist them in focusing their search for information.
- Ask students to brainstorm a list of primary and secondary sources that they have used in the past. Discuss less obvious sources that they can use, such as interviews and surveys conducted by others or students themselves.
- Discuss how to check the credibility of sources. Ask students to suggest tips that they might have used in the past. For example, they might suggest looking at the name of the author and/or publisher. If the source is created by reputable authors or publishers, well-respected experts, governments, or well-respected educational institutions or organizations, then the information is probably credible. Students may also suggest looking at the currency of the content. If the information is out of date, then this is a clue for them to check other sources. For more information, students could refer to BLM 0.3 Reviewing Sources for Credibility.
- Ask: Why is it important to organize the information that you have gathered? (helps to identify if there is enough information or if there are gaps that need to be filled; helps in analysis of information)

#### TRY IT

#### Sample Answers

- Students may choose any graphic organizer that they think would work best for the information that they read. If they have difficulty coming up with an organizer, they could look at the examples in Figure 3.16. For example, they might choose a fishbone organizer (BLM 0.30 Fishbone) to show what is causing the need for elephant corridors and the effects of building these corridors.
- Students may work with a partner or in a small group to complete their research. A good starting point may be the websites of the World Land Trust and the Wildlife Trust of India.
- Canada has wildlife corridors, sometimes called ecopassages, for bears, caribou, elk, deer, wolves, and other large animals. For example, Banff National Park has a series of wildlife corridors that help animals cross the Trans-Canada Highway. Trees and shrubs are planted in these corridors to resemble animal habitat. Image

# SAMPLE MATERIAL

### CONSOLIDATION



ELL Model the use of the \$1 Summary strategy, if it has

not been previously used.

• Use **\$1 Summary** to collect information on students' learning. Have students respond to the section question, *How does settlement affect the environment?* Remind students that each word in their summary is worth 10 cents, so they cannot exceed \$1. Their summary will help you to gauge their understanding of the big idea in this section.

#### CHECK-IN SAMPLE ANSWERS Student Book page 89

- **1. COMMUNICATE** Graphic organizers for this question could include the following impacts of settlements on the environment:
  - Biodiversity: animals forced to move to new habitats and plant species removed
  - Deforestation: tracts of forest removed for housing or other uses like farming or cattle ranching
  - Agricultural lands lost: lands put into other uses
  - Water, soil, air, light pollution: damage to water supplies, contaminated soils, smog, light impacts on wildlife (*Knowledge and Understanding*)
- 2. EVALUATE AND DRAW CONCLUSIONS Students' opinions will vary. Some students may respond that in developing countries, when people use firewood or open up new lands for development, forests are reduced. It depends on rates of removal and renewal to tally total loss of forest. Not only do more developed countries remove forests for expansion of other activities, but their demand for products like beef also helps cause forest loss

in developing countries. However, wealthier countries put back more trees and protect many forested zones. *(Thinking)* 

- 3. SPATIAL SIGNIFICANCE Students might identify different environmental problems. The map of a sprawling city may show air pollution from car-dependent transportation and long commutes to work, while the map of a dense city may show similar air pollution from factories/industries and congestion of traffic. The dense city map may also show little room for open and green space, while the sprawling city map may show parks and open land between subdivisions. (Communication)
- 4. **GEOGRAPHIC PERSPECTIVE** Students might identify the following: encouraging higher downtown densities, discouraging large land lots and single-family homes in suburbs, increasing suburban densities, providing better mass transit in suburban areas, having more walkways and bike paths both downtown and in the suburbs, and maintaining parklands and wildlife corridors. (*Thinking*)



## WHAT OTHER CHALLENGES DO SETTLEMENTS CREATE?

Student Book pages 90-97

## SAMPLE MATERIAL

#### GEOGRAPHIC THINKING CONCEPTS

Patterns and Trends Geographic Perspective

#### INQUIRY SKILLS FOCUS

Gather and Organize Communicate Evaluate and Draw Conclusions Interpret and Analyze

#### CHAPTER FEATURE

Heroes in Action: Farm Radio International: Keeping Farmers on the Land

#### RELATED MATERIALS

BLM 0.21 Interpreting Aerial Images BLM 3.5 Challenges Created by Settlement

#### LESSON SUMMARY

#### **EXPECTATIONS**

A1.3, A2.1, A2.2, A2.4, A2.5, A2.6, A3.3, A3.5

#### **CRITERIA FOR SUCCESS**

Students can

- explain various social, economic, and political challenges caused by urbanization
- use role-play to demonstrate understanding of land use conflicts and the perspectives of various stakeholders

#### SUGGESTED ASSESSMENT STRATEGIES

- Numbered Tables
- Academic Controversy
- 3-2-1

#### **CROSS-CURRICULAR CONNECTIONS**

- Grade 8 Math: Data Management and Probability: collect and organize categorical, discrete, or continuous primary and secondary data, and display the data in charts, tables, and graphs that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools; identify and describe trends, based on the rate of change of data from tables and graphs, using informal language
- Grade 8 Science: Water Systems: 3.1 identify the various states of water on Earth's surface, their distribution, relative amounts, and circulation, and the conditions under which they exist (e.g., water is a solid in glaciers, snow, and polar ice-caps; a liquid in oceans, lakes, rivers, and aquifers; and a gas in the atmosphere); 3.2 demonstrate an understanding of the watershed as a fundamental geographic unit, and explain how it relates to water management and planning

#### COMBINED GRADE CONNECTIONS

• Grade 7 Geography: A1.2, A3.2

#### MAP, GLOBE, AND GRAPHING SKILLS

• extract information from and analyze aerial images

#### **GEOGRAPHY BACKGROUND**

According to a United Nations report, "Urban living is often associated with higher levels of literacy and education, better health, greater access to social services, and enhanced opportunities for cultural and political participation." However, as cities grow, they often result in social, political, and economic challenges. For example, cities may not be able to meet the growing demand for social services or be able to improve existing infrastructure as it becomes overused. Sometimes, there are also conflicts over how land should be used and developed as land becomes scarce.

#### **POSSIBLE MISCONCEPTIONS**

Some students may think that challenges resulting from growing cities do not exist in Canada since, as a country, Canada has a relatively low population density. Where appropriate, make connections to Canada by having students think about issues in their community or elsewhere in the country.

#### **TEACHING NOTES**

#### **MINDS ON**

• Ask students: *What challenges, other than environmental, do you think are created when more and more people come to live in a community?* Have students think about social, political, and economic challenges by prompting them to consider their local communities or news stories they may have read or heard. They may suggest ideas such as overcrowding, traffic jams, poverty, and the need for more services such as roads and schools. Create a class mind map of words and visuals to capture students' ideas, and post it on the wall for quick reference. Encourage students to add to it as they gain new information and understanding.

#### **ACTION**

- When discussing Less Land for Growing Food, ask students to suggest alternative ways to grow food (more use of greenhouses; community gardens; rooftop gardens). You may also wish to share with students examples of solutions that are under investigation, such as vertical farming. In vertical farming, abandoned skyscrapers are turned into indoor farms, similar to greenhouses, where food can be grown year round. An advantage of this type of farming is that crops are protected from extreme weather conditions, such as drought and cold. Farmers also do not need to use pesticides since crops are grown indoors in a controlled environment. Point out that vertical farming also ties to the idea of using space creatively (shown by the school in Wuhan, China, in Figure 3.23).
- Have students examine the photos on Student Book pages 92 and 93. Ask: *What were your first impressions when you saw the photos? How do they compare to where we live? How does overcrowding affect life?* (causes stress and conflict; increases time to travel from place to place; causes disease to spread faster) *Do you see any services in these photos?* (public transportation, electricity, education) *How do you think services are affected in overcrowded cities?* (overuse of services; not enough money to improve or provide services for everyone)

#### ELL

To ensure student understanding of social, political, and economic challenges, ask students to categorize their suggested challenges into these three groupings and explain why they were grouped this way.

#### DI To Extend

Some students may be interested in learning more about the pros and cons of vertical farming or other alternative ways to produce food, such as in-vitro meat cultivation, which is growing meat in labs.

## SAMPLE MATERIAL

## HEROES IN ACTION: FARM RADIO INTERNATIONAL: KEEPING FARMERS ON THE LAND Student Book page

 Have students locate Mali on a map. Ask: What do you notice about the location of Mali? (it is surrounded by other countries, meaning it does not border a sea—landlocked; part of the Sahara desert is in the country) Students can use a spatial journal to help with their understanding. Point out that desert or semi-desert covers about two-thirds of the country. The country has experienced periods of drought, famine, and desertification. These, along with ongoing internal conflict and economic instability, have forced hundreds of thousands of people to flee their homeland in recent years. Mali is one of the most impoverished countries in the world.

(continued)

- Ask: Why would somebody like Mamadou Diarra be interested in helping others? (because he has first-hand knowledge of hardship and now that he is successful, he wants to give back and help others) If you had the opportunity to compete to be the "best farmer," would you do so? Why, or why not? Some students may say "yes" because they want to learn something new or they just like the spirit of competition. Others may respond "no" because they have no interest or do not need to learn about farming. Ask students who responded "yes" how they might motivate those who said "no" to become interested. Students' suggestions might include the following: offer money as an incentive; raise awareness through public campaigns about loss of arable land/farmland and the increasing need to grow local food.
- Ask: Why should we care about food production for the world's growing population? (because everyone will suffer if we do not find alternative ways to produce food, not just in Africa, but also in Canada)

#### A CALL TO ACTION

#### Sample Answers

 For the first question, students may point out that community members such as senior citizens, low-income families, and homeless people may not have access to information that is helpful to them. For the second question, students may suggest that they could start a service at community centres to help people obtain information. They might also volunteer their time at senior residences or shelters, for example, to provide information.

- 2. In their research, students may learn that in Canada between 1991 and 2011, the average age of farmers increased from 47.5 years to 54 years. During the same period, the number of farmers younger than 55 decreased by 43 percent. These figures reveal that the farming population is aging and fewer young people are becoming farmers. Students may also consider the business of farming, politics, and food supply in their responses. Based on their findings, ask students to reflect on whether they would want to become farmers and the reason(s) for their response. Image:
- 3. Students' research may indicate that locally grown food has a number of different benefits, including the following: local food is fresher than imported food, which has to travel longer distances; less distance means less fuel burned during transportation, translating to lower transportation cost and less impact on the environment; buying local food supports local farmers and is beneficial to the local economy.

#### PATTERNS AND TRENDS

#### ELL

Provide exemplars of statements that express an opinion with supporting detail or reasons.



• Students could explore the patterns and trends question on Student Book page 95 with a partner or in a small group. Remind students that there are no right or wrong answers, but they should provide reasons for their response. If students have difficulty with the question, prompt them to think back to the patterns and trends question on Student Book page 77: *What factors might slow the trend of people moving to cities from rural areas?* The factors that were discussed in response to this earlier question might have an impact in reversing the trend toward urbanization.

Point students to the three satellite images of Las Vegas on Student
Book pages 96 and 97. Have them use the questions on BLM 0.21
Interpreting Aerial Images to understand the changes depicted.
Students should be able to see how urban development is expanding, as the city takes over more of the desert. Ask: *What are the implications of having a city in a desert?* (more water is needed; infrastructure needs to be built to bring in water from elsewhere; desert vegetation may be replaced by non-native plants that require watering)

- Introduce the idea of *perspectives* (views) when discussing land use conflicts (Student Book pages 96 and 97). Ask students to identify the stakeholders in the conflict and what their perspectives might be (government; business owners; people who live in rural Nevada, such as farmers, ranchers, and people in Native American settlements; environmentalists; engineers). Ask students to create a short role-play to present each perspective. Students may create a digital recording of their role-play. Afterwards, have students reflect on what citizens can do to ensure their voices are heard in decisions like this (attend council meetings, write to newspapers).
- During the discussion of the Las Vegas land use conflict, ask students which stakeholders were more likely to have been heard than others. Since the water pipeline was approved despite opposition, students will probably point out that the city government and business owners had the greatest influence and more resources to ensure that their voices were heard. Ask: *What conclusion can you draw from the Las Vegas case about making decisions like this?* (sometimes decisions are made based on the amount of influence one has—the greater your influence, the more likely it is that you will get heard; sometimes bad decisions are made, because the most influential stakeholders' interests overpower everyone else's; this case shows the need for community members to get involved and have their voices heard)
- For the geographic perspective question on Student Book page 96, students may point out that environmentalists are concerned that Las Vegas is not sustainable because it is located in a desert and lacks a water supply. To bring water from other sources, rivers have to be dammed and pipelines have to be built, all of which negatively affect the environment.
- Use Numbered Tables to gauge students' understanding of the material. Divide students into five groups to work at separate tables or in different areas of the classroom. Assign each member a number, starting at 1.
   Each group is responsible for learning one topic in this section: Less Land for Growing Food, Overcrowding, Lack of Services, Changes in Rural Areas, Land Use Conflicts. Distribute BLM 3.5 Challenges Created by Settlement, and ask students to complete the part of the BLM for which they are responsible. When you call out a number, students assigned the number stand up to share their group's discussion. Provide other groups an opportunity to ask questions to clarify anything that they do not understand or to comment on an interesting piece of information that was presented. Following the class discussion, ask students to work in their groups to complete the rest of BLM 3.5.
- For each of the challenges presented in this section, encourage students to make connections to your local community or elsewhere in Canada. Ask: *Is this challenge an issue in our community or another community you are aware of in Canada?* (they are all issues in Canada) *What can we do about this issue?* (write to newspapers to raise awareness; write to governments) *Whom in government could we write to about these issues?* (local council; government representative of the area)



#### ELL

Ensure students understand what is meant by a *stakeholder*. Use a teacher think-aloud with the first two sentences on page 96 to demonstrate making meaning when reading text.





#### ELL

If students have not had this type of sharing experience, give them the option of observing the process or using a group summary as a reference when sharing their findings.



#### ELL

For students unfamiliar or uncomfortable with this process, provide opportunities to practise the strategy using age-appropriate topics. Debrief the activity by assessing the strength of their arguments.



## SAMPLE MATERIAL

## CONSOLIDATION

- Use an Academic Controversy strategy to observe students' understanding of the section. Divide students into two groups and have them debate a statement such as the following: *Cities are good places to live and work, and we should encourage their growth.* Have students first prepare responses before presenting their position and reasons for agreeing or disagreeing with the statement. Each group will have about 60 to 90 seconds to present. Groups then reconvene to prepare their rebuttal. Again, they will have 60 to 90 seconds to present their rebuttal. Following this, students may change views, with the "agree" group taking on the "disagree" view, and vice versa.
- Use a **3-2-1** strategy to gather information on students' learning. Have them reflect on the following questions:
  - *What are 3 critical challenges caused by settlement?* (students may point to any of the challenges they have learned, including overcrowding, lack of services, and land use conflict)
  - What are 2 possible solutions for any of the challenges? (building highrises to combat overcrowding; creating community gardens to encourage local food production)
  - What is 1 conclusion you can draw about the challenges caused by *settlement?* (as our world's population grows, these challenges will become even greater if we do not address them now)

## CHECK-IN SAMPLE ANSWERS Student Book page 97

1. GEOGRAPHIC PERSPECTIVE Students might identify the following ways to reduce the number of livestock being raised worldwide: education showing resources to make a pound of beef versus food value, campaigns about red meat in diets and values of fruits/ vegetables, impacts of cattle ranching on environment.

Students might identify the following stakeholders: cattle producers, owners of steakhouses, fast-food burger establishments, companies that service the cattle industry, regions that depend on cattle businesses for economic well-being, and people who like red meat may disagree due to livelihoods, individual rights, and regional economic growth. (*Thinking*)

- **2. GATHER AND ORGANIZE** Students might identify the following:
  - Urban sprawl: impacts on wildlife and ecosystems; loss of agricultural and forest lands; pollution of air and water
  - Rural farming villages: forest or wildlife loss, but reduced in scale; soil erosion and blowing of topsoil; loss of high amounts of water used on fields through evaporation; harmony with environment (Knowledge and Understanding)
- **3. COMMUNICATE** Students' responses will vary depending on their location. For example, perhaps the local area is experiencing a new development that is causing an increase in traffic or local crowding, such as a new medical centre or highrise building. *(Application)*

(continued)

4. EVALUATE AND DRAW CONCLUSIONS Students might suggest the following as stakeholders for a new play area: families with young children, teachers concerned about lack of activity areas, custodians/maintenance workers concerned about upkeep or effects on other maintenance

Students might suggest the following as stakeholders for a community garden: parents/ students wanting to make the school area more "green" or learn about gardening, teachers interested in environment or teaching gardening skills, custodians concerned about garden maintenance/watering during school downtimes (*Application*)

- **5. INTERPRET AND ANALYZE** Students' responses should include the following observations:
  - 1972: approximately 60 percent green space with wooded areas in the surrounding hill country
  - 1992: approximately 30 percent, as most green has disappeared from the non-urban areas
  - 2013: 20 to 25 percent, as some of the green in 1992 is gone as well

Students could suggest that the local surface water/groundwater available has declined enough that forest can no longer grow on land outside the city, which likely gets urban irrigation. *(Thinking)* 



## WHY CARE ABOUT THE EFFECTS OF SETTLEMENT?

Student Book pages 98-99





#### STRATEGIES FOR CLOSING THE CHAPTER

- Use BLM 0.29 K-W-L Chart to check students' learning of the chapter's key concepts. Instruct students to revisit the BLM, which they began at the start of the chapter, and complete the What I Learned column. Suggest that students use the Learning Goals as prompts to help them complete the column. Remind them that they cannot, however, simply regurgitate each goal, but they can use each goal as a guide to organize their thoughts and provide specific examples of what they have learned. For instance, under the first learning goal, students may note that a current settlement trend is that a growing number of people are moving into cities.
- Revisit the photo of Mexico City to see if students' responses to it have changed since the start of the chapter, as well as to assess their ability to apply the main ideas that they have learned. Also check to see that students can use terms that they were introduced to in this and other chapters. Ask: *How do you know that Mexico City is a city with a large population?* (there are many buildings, tightly packed together—dense; the city is spread out—urban sprawl) *What might be some environmental issues that Mexico City is facing?* (loss of natural areas and arable land as the city grows and spreads; increase in garbage and the number of landfills—soil and water pollution; increase in traffic—air pollution) *What might be some social, economic, and political challenges that Mexico City is facing?* (lack of space to build new housing; overcrowding and traffic congestion; overtaxing of current infrastructure; poverty; crime; health issues caused by pollution)
- Remind students of the Chapter Big Question, *Why care about the effects of settlement?* Ask them to turn to a partner and discuss their ideas before sharing them with the whole class.

#### SUMMARIZE YOUR LEARNING

- For the first task, remind students that spatial journals are annotated maps on which they show important thematic information, connecting key data points to a location. In this activity, the spatial journal may be an outline map of the world with information about the effects of settlement on the environment (the theme) pointing to different locations in the world. Remind students that story maps are not simply annotated, but rather should tell a story about how settlements affect the environment. Students may use an online drawing or mapping tool to create their work.
- **TECHTOOL** For the second task, explain to students that a storyboard tells a story using elements such as images, dialogue, and direction for sound effects. Students may use computer software to create their work.



TECHTOOL

- 1. INTERPRET AND ANALYZE Students might suggest that cities could increase current urban densities through the design of multifloor structures or urban growth inland with direct connections to the coast. (*Thinking*)
- 2. PATTERNS AND TRENDS Students' responses might include some of the following: fewer young people are available to work and have families; local production suffers; the community culture and social makeup are altered; if rural areas are more livable and sustainable, both rural and urban areas will be better able to cope with rural to urban migration (including overcrowding). (*Thinking*)
- 3. INTERRELATIONSHIPS A mind map might include the following ideas: demand for food grows, more land is required, forest lands are cleared, wildlife/biodiversity is altered, more chemicals are used, soil pollution and water pollution increase, excess water is used. (Knowledge and Understanding)
- 4. SPATIAL SIGNIFICANCE Students should answer this question by providing relevant evidence from their observations. Students should recognize that the area of Las Vegas has more than tripled over time. It has grown over the lowlands and up into the adjacent hills and valleys. Less expensive and less desirable lands were taken up as the city grew out from the core of entertainment. (*Thinking*)
- 5. FORMULATE QUESTIONS Students' inquiry questions will vary. Students might identify the following questions about ways to increase the carrying capacity of a city: What areas are available for additional housing or other land uses? How can the population density in the core of the city be increased? Can the availability and service of mass transit be improved to serve more areas of the city? (Application)

- 6. **GEOGRAPHIC PERSPECTIVE** Possible stakeholders in favour of the proposal:
  - Airlines and airport services, which would favour growth and job opportunities
  - Core residents, who may be happy that the traffic and noise will be away from them
  - City government, which sees economic growth for the city

Possible stakeholders against the proposal:

- Local residents, who do not want the noise, traffic, and air pollution
- Environmentalists, who are against the added air pollution and greenhouse gas emissions
- Farmers, who work nearby and see a potential for extra traffic and loss of agricultural land (*Application*)
- 7. EVALUATE AND DRAW CONCLUSIONS Students' responses will vary depending on location. For example, if a new highrise apartment tower or new subdivision will be built, planners/ governments need to be mindful of impacts on current traffic and traffic flows, how the new development may affect local school capacities, how local mass transit will be affected, or how open space needs to be provided and maintained/protected. (*Thinking*)
- **8. GEOGRAPHIC PERSPECTIVE** Students might present the following evidence for each side:
  - Farmers and ranchers: Groundwater supplies they rely on are threatened, so their livelihoods are in danger. This group may demonstrate how Las Vegas wastes water to evaporation, lawn watering, and golf course greening.
  - City of Las Vegas: The city is the economic engine for the region, and a lack of water threatens prosperity and growth. (Communication)



## UNIT 1 CHALLENGE CHECK-IN Sample Answers Student Book page 99

- Students' responses may reference effects on the environment such as the following: light pollution, which wastes electricity and affects birds and other animals; the harmful disposal of waste in water bodies; urban sprawl contributing to long commute times, which waste fuel and add to greenhouse gas emissions.
- 2. To build on their field work from Chapter 2, students can look for examples of human impacts on the environment in their community. For example, a large paved parking lot limits the soak-in of precipitation and adds runoff water that may cause erosion and excess heat in summer. Other examples may be slopes lacking vegetation, oil leaking from vehicles, or examples of excessive water use, tree removal, and/or waste concerns. When students find each example, they should take a photo and then mark the location by GPS, record the location, or indicate the location on a map.
- **3.** Remind students of how they organized their data during their field work in the previous chapter. Students should summarize their findings and plot the location on a map. When considering how the community's population density might increase or decrease the overall impact, students should recognize the advantages and disadvantages of the different types of population density on the environment. Students' responses will vary depending on their community. For example, students may note that a high population density may increase the impact that certain issues, such as waste and the amount of pavement cover, have on the environment. On the other hand, a high population density may decrease the impact of some issues, such as air pollution, since there may be a mass transit system and fewer cars on the roads.


NEL

Date: \_\_\_\_\_

# **UNDERSTANDING INTERRELATIONSHIPS**



### **CAUSES AND EFFECTS**

Draw your own lines to show the links. For example, you may want to link one cause to one problem and many effects, or one cause to many effects, or many causes to one problem.

Topic: \_\_\_\_\_ Causes Problems Effects SAMPLE MATERIAL

BLM 0.9 Name: \_\_\_\_\_

#### **POLITICAL OUTLINE MAP OF THE WORLD**

My title: \_\_\_\_





# **INTERPRETING AERIAL IMAGES**

Use the following questions to help you interpret an aerial image, such as a satellite image.

What place does this image show? (State the name of the place or area.)	What physical features can I identify? (Colours often identify the physical features.)	What pattern(s) can I identify?	What does each pattern tell me?	What conclusion can I draw?



### **K-W-L CHART**

Topic: \_\_\_\_\_

к	w	L
What I Know	What I Want to Know	What I Have Learned
What I Know	What I Want to Know	What I Have Learned