Collins

Cambridge IGCSE®

Geography

TEACHER'S GUIDE

Also for Cambridge O Level and Cambridge IGCSE® (9–1)

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Downloadable resources
see page 5

1.1 (1) Why are some families larger than others?

Assessment objectives

- Candidates should be able to demonstrate knowledge and understanding of the nature and progress of world population growth.
- Candidates should be able to recognise ways in which different economies and societies influence family size, in particular the MEDC/LEDC contrasts.

0460/2217 syllabus

1.1 Population dynamics

- Describe and give reasons for the rapid increase in the world's population

Differentiated learning outcomes

- **All students must** be able to describe the progress and pattern of population growth in the world as a whole and the differences in timing and numbers involved in both the richer and poorer regions of the world (Grade E/D).
- **Most students should** be able to describe accurately graphs showing growth, understand a range of factors leading to these patterns of growth and be able to illustrate these with case studies (Grade C/B).
- **Some students could** discuss the positive aspects of growth in both LEDCs and MEDCs (Grade A/A*).

Resources

- **Student Book**: pp. 2–3
- **Worksheets**: None
- **Photographs**:
  1.1 An Afghan family
  1.2 A German family
- **Further reading and weblinks**: None

Key concepts

- Population growth has occurred throughout historical time.
- Population decrease is a recent occurrence in MEDCs.
- The situations and factors affecting natural change vary between countries/regions.

Starter suggestions

Begin the lesson with the **Fantastic fact** quoted on p. 2 of the Student Book. Ask the students to consider the likely implications of such growth. Question 2 in **Now investigate** supports this idea and takes it further. Question 2 could also be used later.

Use the two family situations of Kadlin (Norway) and Daksh (India): read out loud each of these sections and either ask for student comment or allow brief discussion.

Ask students about:

- the size of their family (i.e. number of children)
- how many siblings their parents had
- how many siblings their grandparents had.

This may reveal a pattern of decreasing family size over the generations, or stability, depending on the country you live in. Link this to Question 1 in **Now investigate** on p. 3 of the Student Book.

Main lesson activities

1 Look with students at graph **D** on p. 3 of the Student Book. Link its shape to a letter of the alphabet (J curve concept). **Now investigate** questions **4a** and **4b** on p. 3 could be useful here (or you may prefer to use it at the start of the lesson with the **Fantastic fact**). Ask students what the shape means in terms of population growth over time.

2 If not used as a starter activity, students can copy and complete the table in **Now investigate** question **3a**. This should support the idea that growth rates increase over time. Students should consider the gradient of graph **D** and what it shows in this context.

3 Look with students at graph **C** on p. 2 of the Student Book. Ask them to comment on the shape of the top line (the world total): as this continues to 2050, gradient decreases and it becomes an S shape. Students should write a description of what the graph shows. Follow this with a class discussion on the points they have made. Highlight the differences in the patterns of growth in MEDCs and LEDCs. Ensure that students understand that LEDCs are represented by the green section – that is, the area above the MEDC line only. Some students may find this type of compound graph quite difficult to read.

4 Over-population: ask students what they think this term means and ensure they have the correct definition. Use photos **1.1** and **1.2** from the downloadable resources to consider contrasting family sizes in LEDCs and MEDCs (Afghanistan, Germany). Invite students to comment on the photos – aim for some balance of advantages and disadvantages of these contrasting families.

5 A comparison of the problems and benefits of a growing population: students should write lists or an extended piece of writing (depending on ability) showing these, referring to the Student Book text. Daksh's experience can be included.

Give extra support by ensuring that students understand the more difficult concepts like population growth rate, and the compound nature of graph **C** on p. 2 of the Student Book.

Give extra challenge by including a second piece of writing to highlight the obvious benefits, but also the problems, of being an only child like Kadlin. There is less material in the text to give clues, so students will have to think independently. Students with time and ability could draw a line graph to show growth for a country like Norway where very small families dominate (extend the S curve idea).

Plenary suggestions

Ask students whether they think graphs **C** and **D** show the concept of population growth clearly or not. Encourage them to give reasons for their points.

Skills notes	Students here make use of simple and compound line graphs.

Assessment suggestions	Using **Now investigate** question **4** on p. 3 of the Student Book as homework will check whether students have grasped the use of the J curve line graph.

1.1 (2) Why did the population explosion happen?

Assessment objectives

- Candidates should understand the reasons behind the growth processes – why people make certain decisions.
- Candidates should be able to show empathy, putting themselves in the place of various decision-making parents.

0460/2217 syllabus

1.1 Population dynamics

- Understand the main causes of a change in population size
- Give reasons for contrasting rates of natural population change

Differentiated learning outcomes

- **All students must** understand the concepts of birth rate (BR), death rate (DR) and natural change (NC) and their impacts on population size. They should also grasp the timescale differences in the population explosion occurring in MEDCs and then in LEDCs (Grade E/D).
- **Most students should** understand the four main reasons for population growth (Grade C/B).
- **Some students could** apply their historical knowledge, for example of the Industrial Revolution, to give greater depth to their understanding of the demographic processes (Grade A/A*).

Resources

- **Student Book**: pp. 4–6
- **Worksheets**:
  1.1 How do we calculate natural change?
  1.2 Calculating natural change
- **Photographs**:
  1.3 Children at work
  1.4 Modern farming machinery
- **Further reading and weblinks**: None

Key concepts

- The population explosion happened in different places at different times and at different speeds.
- Reasons for the population explosion were fairly constant between MEDCs and LEDCs.

Starter suggestions

Referring to photo **B** on Student Book p. 4 (photo **1.3** from the downloadable resources), identify the type of country this represents (LEDC). Use this information to make a comparison with what children of equivalent age would be doing in an MEDC. Explore possible reasons for this key difference.

Main lesson activities

1 Ask the question, 'What makes population grow?' seeking the response that more people are born than die. Definitions of birth rate, death rate, natural change (increase + decrease) need to be written down by students. A brief question-and-answer session using **Worksheet 1.1** should reinforce this task and ensure that these facts are understood by students.

2 Use **Now investigate** question **1** (p. 5) to introduce the idea of remembering facts through mnemonics and spider diagrams.

3 Use **Worksheet 1.2** to teach students how to calculate natural change. The first box on the worksheet explains the difference between positive and negative change. Work through the second box (the example). This is followed by two national data sets: Estonia, chosen to illustrate typical natural decrease in eastern Europe, and Pakistan, chosen to show rapid natural increase in an LEDC. Conclusions should be shared across the class.

4 Repeat that growth occurs when BR > DR. Ask the question, 'What makes the BR high?' Use the text on p. 4 of the Student Book headed 'Economic', 'Care of the elderly' and 'Infant mortality'. Students should understand the impacts of each of these factors, and explore the relevant issues further through either class or group discussion.

5 The fourth reason for population explosion is 'Life expectancy'. The Student Book considers food production increases – photo **C** on p. 4 (photo **1.4** from the downloadable resources) helps here as a focus. Ask the students what health provision protects them (vaccinations, hospital care, midwives, etc.). What are the likely impacts of these? How would these contribute to population growth today in an LEDC?

Give extra support by prompting weaker students in making the conclusions on **Worksheet 1.1**, and give hints to help them with **Worksheet 1.2** for homework.

Give extra challenge by guiding students to calculate natural change for a variety of countries to illustrate all economic levels, for example western Europe, USA, NICs, and the poorest countries like Afghanistan (refer back to photos **1.1 and 1.2** from the downloadable resources).

Plenary suggestions

Now investigate question **2** is a useful consolidation exercise for homework and/or group work.

Construct a spider diagram to link the ideas explored in this lesson. Place 'Population' in the centre and draw four 'legs'. Ask students to offer ideas for each one.

Skills notes	Locating multiple bar graphs on a map demonstrates a useful higher-level skill that students could use when writing up a fieldwork study.

Assessment suggestions	Supply your students with current BR and DR data for your country (and for others, if you wish). Students can then calculate the natural increase or decrease. They should then write one or two paragraphs to explain what this situation (increase or decrease) means for their country.

1.1 (3) Why do populations grow at different rates?

Assessment objectives

- Candidates should know the main causes of death in LEDCs and MEDCs.
- Candidates should understand the factors affecting birth rate and death rate.
- Candidates should be aware of the potential impact of natural hazards, but understand that only occasionally are large numbers of people killed in such events.

0460/2217 syllabus

1.1 Population dynamics

- Understand the main causes of a change in population size
- Explain how birth rate and death rate contribute to the population of a country increasing or declining

Topic links: more on migration can be found in Topic 1.2 pp. 21–26; more on birth and death rates can be found in Topic 1.1 pp. 2–5.

Differentiated learning outcomes

- **All students must** know which factors affect population growth/decline and how and when they have affected both MEDCs and LEDCs (Grade E/D).
- **Most students should** understand that the different factors operate in different places and at different times and speeds (Grade C/B).
- **Some students could** evaluate the relative importance of physical and human factors – that is, natural hazards versus human conflict (Grade A/A*).

Resources

- **Student Book**: pp. 6–8
- **Worksheet**: 1.3 Why did the birth rate stay high in LEDCs?
- **Photographs**: None
- **Further reading and weblinks**: None

Key concepts

- The key factors affecting population growth are: birth and death rates (infant mortality rate in particular), disease, natural hazards, human conflict, and migration.

Starter suggestions

Ask students to look back to Topic 1.1 pp. 2–5 as a reminder about population increase. Then quiz them on:

- the key factors affecting population growth/decline when most growth occurred (LEDCs)
- in which type of country (MEDC/LEDC) greater growth happened (LEDCs)
- in which type of country growth is continuing today (LEDCs)
- places now experiencing population decline (eastern Europe and some countries in western Europe).

Revise definitions that will be needed in this lesson, of: death rate, birth rate, infant mortality rate, natural hazard, famine, migration.

Main lesson activities

1 The three most basic factors affecting population growth in your country are birth rate, death rate and international migration.

(a) Birth rate: explore the circumstances that keep birth rate high in LEDCs. Students should try to put themselves in the places of poor people and write down three reasons for having many children, for example lack of access to birth control (rarely the case now), tradition, religious reasons, labour supply, caring for elderly parents, desire for sons. Use **Worksheet 1.3** to summarise the points raised in your class discussion.

(b) Death rate: as a country develops, death rate decreases. Ask students which groups in society are the weakest physically (the elderly and the very young – concentrate here on the very young). Infant mortality rate not only raises the death rate as a whole, but it encourages parents to have more children to ensure that some will survive. This keeps the birth rate high. Add an extra leg to the diagram on **Worksheet 1.3** to represent this factor.

(c) International migration: take a minute only to define *emigration* and *immigration* and ask students to work out the impact of each of these on a country's population. (This topic is explored in more detail in Topic 1.2)

2 Impact of natural hazards on population levels: Ask students to recall recent natural disasters, for example the Japanese earthquake/tsunami (March 2011), Indian Ocean tsunami (December 2004), Haiti earthquake (March 2010), followed only 10 months later by Hurricane Tomas. 2016 and 2017 brought Hurricanes Matthew and Irma to Haiti. These all had high death rates – emphasise that disasters affect both property and life in LEDCs. In MEDCs property is affected more than life. Hurricane Irene (USA, August 2011, 21 deaths) and the eruption of Eyjafjallajökull (Iceland, March 2010, 0 deaths) are examples. Most hazards have little impact on population growth. A useful homework exercise would be to research results of selected, contrasting events.

3 **Now investigate** question **1** (p. 8) fits well here. Map **A** (p. 6) shows only the most lethal hazards in recent history. Students can answer part (a), but for (b) only China stands out from the map, so you should point them towards, say, the Philippines and Indonesia. There are links here with Topic 2.1 (on earthquakes and volcanoes). Introduce the idea of hazard hotspots here. The Philippines, Indonesia and parts of China can be classed like this.

4 Famine can be seen as a natural hazard or one brought about by people. Work through **Now investigate** question **2** to help students understand the impact of famine on population growth. You could take this as an opportunity to discuss with students the type/s of graphs most suitable for displaying such data.

5 Some areas of the world have experienced civil wars and other human conflicts in recent decades. These too have an impact on population growth. Graph **B** shows the number of fatalities in these events in Africa, Asia and Europe. Use this data to answer **Now investigate** question **3**.

Give extra support by completing **Worksheet 1.3** with small mixed ability groups, to support those who find the explanations more difficult.

Give extra challenge by encouraging the most able to work on the worksheet explanations themselves.

Plenary suggestions

Construct a spider diagram or similar to show the factors affecting population growth.

Skills notes	In this lesson students describe distribution of features on a map, use line and bar graphs, and consider the most appropriate type of graph for a particular purpose.

Assessment suggestions	Students should write a summary of the factors affecting population growth, based on the work in this lesson.

1.1 (4) How are population growth and resources linked?

Assessment objectives

- Students should acquire the concepts of over- and under-population
- Students should understand exactly what 'lack of resources' means
- Students should be able to apply this knowledge, and possibly other case studies, when answering questions.

0460/2217 syllabus

1.1 Population dynamics

- Show an understanding of over-population and under-population
- Understand the causes and consequences of over-population and under-population

Differentiated learning outcomes

- **All students must** have a basic knowledge of the evidence for Liberia's poverty (Grade E/D).
- **Most students should** have some knowledge of population growth statistics (Grade C/B).
- **Some students could** understand the cause/effect links between high population growth rate and persistent poverty (Grade A/A*).

Resources

- **Student Book**: pp. 8–10
- **Worksheets**: None
- **Photographs**:
  1.5 Oasis in the Sahara Desert
  1.6 Houses crowded together in Liberia
- **Further reading and weblinks**: None

Key concepts	• Population and resources available act together to affect standard of living and economic development in a country.

Starter suggestions

Use the **Fantastic fact** on p. 8; it is very striking. You could illustrate this with an atlas or wall map of the world, a globe, or an image of Earth from space. Whichever you choose, it is clear that most of the image is sea!

Show the photos on the downloadable resources of an African desert landscape and of urban Liberia. Ask students to comment on what they see. You could introduce the concept of what these show regarding over-/under- population, having read the text on p. 8 of the Student Book.

Main lesson activities

1. Ask students to close their Student Book and to write their own definitions of over- and under-population. You could use mini-whiteboards if you have them available. Students could then show their ideas to each other as well as to you.
2. In pairs or small groups, discuss the **Now investigate** question **1** on p. 10 of the Student Book. Report back to the class. To what extent do your students agree with each other?
3. Stay in pairs or small groups. Ask students to define what they think a resource is. They should also give their own examples. This could be done in the context of their own lives.
4. Find out more about Liberia, the case study on p. 9. Allow time for some internet research, individually, and then reporting back.

5 Liberia was growing at a rate of 4.5% per annum, one of the fastest rates in the world, although by 2017 this had reduced to 2.4% per annum. What does this mean to the birth/death rate balance and therefore to population growth? You should explain to students (or revise if they have met this already) that the death rate, despite the war deaths, is low due to the youthfulness of the population; and that the birth rate stays high in a very poor nation, plus the reasons for this. Diagram **B** on p. 9 in the Student Book, will assist here. Students can then consider the equivalent situation in their own country.

6 Students can draw a large spider diagram, based on that in Figure **B** to show the impacts of poverty and reasons for the continuing high birth rate. The spider as in Figure **B** can then have extra legs extending from the existing ones for students' own ideas.

7 Whole class or Extension exercise:
Refer back to **Now investigate** question **1,** on p. 10 in the Student Book: Use Figure **A** on p. 9 to describe what is expected to happen to global population growth up to the year 2100. Able students should tackle this on their own, to stretch them. Or, if doing this as a whole class task, mix small groups in terms of ability, so the less able can learn from the ideas of the more able students.

Homework assignment	Answer this question: To what extent does Liberia's economy supply people's needs as shown in Figure **C** on p. 10 in the Student Book?

Give extra support to weaker students by mixed ability group working, as suggested above.

Give extra challenge to more able students by having them work independently on the most difficult tasks, and work with weaker students to enhance everybody's understanding.

Plenary suggestions

Students can review the situation in Liberia and in their own country. Which is in a more favourable population/resource balance situation, and why?

Skills notes	In this lesson students have the opportunity to grasp a new concept, to analyse several data sets on the same country, and to make some comparisons with their own country.

Assessment suggestions	In a test situation: (a) Define the term *over-population*. (b) Describe the characteristics of a country in this situation.

1.1 (5) Over-population and under-population

Assessment objectives

- Candidates should acquire knowledge of contrasting countries' population balance situations.
- Candidates should be able to apply this knowledge to answering questions.

0460/2217 syllabus

1.1 Population dynamics

- Show an understanding of over-population and under-population
- Understand the causes and consequences of over-population and under-population

Differentiated learning outcomes

- **All students must** understand the differences between over- and under-populated countries (Grade E/D).
- **Most students should** be able to interpret some of the statistics given for Tanzania and Canada (Grade C/B).
- **Some students could** be able to understand how Tanzania and similar countries can develop from their current base (Grade A/A*).

Resources

- **Student Book**: pp. 11–13
- **Worksheets**:
  1.4 Singapore
  1.5 A case study of over-population
- **Photographs**:
  1.7 The Canadian West
  1.8 Central Toronto
  1.9 Uninhabited Canadian landscape
  Google Earth images of Kibera, or similar in Dodoma or Dar-es-Salaam (Tanzania); Google Earth images of rural savanna grassland areas of Tanzania, such as the Serengeti
- **Further reading and weblinks**: None

Key concept	• The relationship between population numbers, area of a country/region and quantity of resources is essential in controlling standard of living.

Starter suggestions

Consider the **Fantastic Fact**, p. 11 in the Student Book.

Use photos **1.7, 1.8** and **1.9** from the downloadable resources. Students should think about densely and sparsely populated areas and how this might relate to over- and under-populated areas. Does dense equate to over-populated? Does sparse equate to under-populated?

Main lesson activities

1 Students should consider the location of Canada and its size in comparison with other countries in the world (e.g. it is second in area after Russia). They should use an atlas, but remember that areas on the flat page can be deceptive.

2 Locate Tanzania and its main cities, Dodoma and Dar-es-Salaam. Look at an urban shanty area and rural Tanzania (savannah grassland) on Google Earth. (You will need to have researched your locations for this in order to be efficient in the classroom. Perhaps take a snapshot to speed you up.)
Ask students to compare the images they have seen.

3 Ask the students to consider the Canada/Tanzania factfile on p. 11 of their Student Book. They should take each piece of data at a time and evaluate it. For example, for the population size, they should make a direct comparison between the two and also between their own country and others with which they are familiar. Students could create an extended table to show these comparisons. **Now**

investigate question **2a** will support this activity. Stretch your most able students by encouraging them to make more comparisons.

4 Population/resource case study: Canada is a huge country in terms of its area. Diagram **C** on p. 12 shows the wide range of its natural resources. Students can use **Now investigate** question **1** to decide whether Canada is under-populated.

5 Population/resource case study: Tanzania
Use **Now investigate** questions **2b** and **3** to consider the population balance situation in Tanzania.

6 Homework suggestions:

(a) **Worksheet 1.4** on Singapore involves differentiation – the last question is very definitely for your brightest students only.

(b) **Worksheet 1.5** on Bangladesh is more accessible to all students. You might want to utilise one of these two worksheets in a number of weeks as revision.

Give extra support to weaker students when setting the assessment question to ensure that they understand the demands of each part of the question. Ask them to recall the images shown to supply evidence.

Give extra challenge to the brightest students by expecting them to make comparisons between as many of the countries considered as possible.

Plenary suggestions

All return to class to compare internet research information. Discuss the students' findings in terms of whether each country is over-populated, under-populated or has an optimal population (or close to that situation).

Skills notes	In this lesson students have the opportunity to compare sets of statistics, construct tables and use case studies in answering examination questions.

Assessment suggestions	Present students with an examination-style case study question (potential marks are indicated): (a) Define the terms *over-population* and *under-population*. (2) (b) Describe the characteristics of a country in each of these situations. (3 + 3) (c) Name one country which illustrates *either* over-population *or* under-population and explain your choice using facts and figures relating to your chosen country. (8)

1.1 (6) Diseases are deadly!

Assessment objectives

- Candidates should understand the range of diseases suffered in the tropics, especially by the poor.
- Candidates should be able to link this information to the consequences for population growth.

0460/2217 syllabus

1.1 Population dynamics

- Give reasons for contrasting rates of natural population change
- Understand the impacts of social, economic and other factors (including HIV/AIDS) on birth rates and death rates

Differentiated learning outcomes

- **All students must** know about a limited range of diseases and their impact on people, e.g. increase in death rate, inability to work and produce food (Grade E/D).
- **Most students should** have a wider range of knowledge on disease and its impacts and use case studies, such as HIV/AIDS in Botswana (Grade C/B).
- **Some students could** project such impacts onto the economy and rate of development of the country (Grade A/A*).

Resources

- **Student Book**: pp. 13–15
- **Worksheets**:
  1.6 Types of disease affecting people in LEDCs
  1.7 The malaria cycle
- **Photographs**:
  1.10 Malarial mosquito
  1.11 An AIDS patient
  1.12 A patient with river blindness
  1.13 A new AIDS hospital in Lusaka, Zambia
- **Further reading and weblinks**:
  www.avert.org/worldwide-hiv-aids-statistics.htm
  www.who.int/csr/disease/swineflu/en/index.html

Key concepts

- Diseases in LEDCs fall into three main groups: those caused by parasites, by poor hygiene and by poor diet.
- Diseases of the poor in the tropics affect both population growth and development.
- Most diseases can be controlled, and even wiped out.

Starter suggestions

Ask students to name any tropical diseases they know of (answers will depend on the country in which you live). Ask also about HIV/AIDS – is it a tropical or a global disease? Where in the world is it most common? Diseases affecting children are often those caused by poor diet and hygiene. This is covered on **Worksheet 1.6** – see below.

Use photos **1.10–1.12** to illustrate a selection of diseases. Unless students are already personally familiar with the diseases, you can expect a reaction.

Main lesson activities

1 **Now investigate** question **1** encourages students to use complex pie charts and increases their awareness of diseases.

2 Together read the first part of the Student Book text. Use **Worksheet 1.6** to categorise the main LEDC diseases which still affect death rates and therefore population growth. In class, go through the 'tree' diagram so that students see the three categories of disease. (The questions might be more appropriate for homework.)

3 Malaria example: this disease weakens people, and kills a million people a year. Using diagram **B**, explain how the parasite moves through the body and on to the next victim. By completing **Worksheet 1.7**, students will have more understanding of the 'cycle' of malaria. Ask them to find out the symptoms of malaria.

How would these affect people's productivity, death rate, birth rate and well-being? Students can work out the overall impact on natural change. **Now investigate** question **2** concludes this section well.

4 Pandemics: this can be a homework activity, or group work. Define the word *pandemic*. Students can *either* research the examples in the text (Black Death 1347–53 in Europe when one third of the population died; 20th-century Spanish flu event) *or* research more recent pandemics (SARS and swine flu). The websites listed in **Further reading and weblinks** for this lesson are a useful resource here.

5 HIV/AIDS: allow students to discuss this condition. Whichever country you live in, they will have some knowledge of it. Students can list answers to these questions:

- What type of disease is HIV/AIDS?
- How does it pass between people?
- What are its symptoms and results? (Students should know that the virus itself rarely kills, but it destroys the immune system and people contract other illnesses and infections from which they die.)

Now investigate question **3** (using graph **E**) supports this section. It is useful to draw a best-fit line to show the trend. This should not be horizontal, but have a gradient from top left to bottom right, i.e. countries with a higher rate of HIV/AIDS have a lower fertility rate. Leave this topic on a positive note by looking at photo **D** on Student Book p. 15 (photo **1.13** from the downloadable resources), and the ABC prevention system.

6 'Do you feel lucky?': students produce a rating for your country, on the chances of young people surviving to the age they are now. Which of the problems mentioned in the Student Book are relevant in the country where you live? They should identify the different risks that young people face in your country, and produce a score from 1 to 5, with 1 being a dangerous place to live and 5 being very safe.

Give extra support with graph interpretation.

Give extra challenge by encouraging research into the detail of a larger number of relevant diseases.

Plenary suggestions

Ask students which of the diseases discussed in this lesson affect (to a greater degree) each of LEDCs and MEDCs (all are found in LEDCs; only HIV/AIDS to any degree in both LEDCs and MEDCs).

Now investigate question **1** can be used here if time, or for a homework activity to develop skills.

Further skills homework: use table **C** to present a discussion on the impact of HIV/AIDS on population growth in Botswana.

Skills notes	Students have the opportunity to interpret data from graphs and tables, and to summarise a sequence of events using a cycle diagram.

Assessment suggestions	Assess students' discussion of the situation in Botswana.

1.1 (7) Anti-natalist population policies

Assessment objectives

- Candidates should understand the possible ways in which governments deliberately reduce the population growth rate.
- Candidates should be able to use case studies to illustrate different government policies and their level of success.

0460/2217 syllabus

1.1 Population dynamics

- Describe and evaluate population policies
- Understand the impacts of social, economic and other factors (including government policies) on birth and death rates

Differentiated learning outcomes

- **All students must** understand that some governments want to control their country's population growth rate and that there are different ways of approaching this (Grade E/D).
- **Most students should** understand the details of the Chinese one-child policy and consider the successes and problems it has brought (Grade C/B).
- **Some students could** analyse the advantages and disadvantages of the Chinese one-child policy (Grade A/A*).

Resources

- **Student Book**: pp. 16–18
- **Worksheet**: 1.8 Kerala: case study of smaller families in an LEDC
- **Photographs**: None
- **Further reading and weblinks**: en.wikipedia.org/wiki/One-child_policy

  en.wikipedia.org/wiki/Two-child_policy

  www.bbc.co.uk/news/world-asia-china-25533339

Key concepts

- Some countries make the decision to control their population growth, but do so in various ways, sometimes by law and sometimes by democratic means.

Starter suggestions

Place students in small groups to discuss:

- why governments might want to reduce their population growth rate
- how they might do this.

Bring the class back together to consider their ideas.

Ask whether anyone knows of any country where this has occurred – they are likely to respond with China, leading into the main body of this lesson.

Main lesson activities

1 Read the text in the Student Book and the suggested websites above. Some wider reading is needed here, by students and/or by the teacher, to illustrate the ways in which people were forced to abide by the policy, e.g. late abortions, pay cuts etc. This will provide more balance in judging the policy. Students can summarise the policy by finding answers to the following questions:

- Why was the one-child policy needed in China?
- How were people encouraged to obey the policy?
- How were people who did not want to obey the rules pressurised into doing so?
- What are the results of the policy for both individuals and for the country as a whole?
- What is likely to happen to the policy in the near future?

2 The benefits and penalties of the one-child policy: use diagrams **A** and **B** to help students see both sides of this important policy, which affects 2 in 11 people in the world (as stated in the **Fantastic fact** on p. 16). Students should list the points on both sides and draw their own conclusion on how persuasive this policy is. If you were a young person living in China in 1980, would you consider having a second child? Give reasons for your answer.

   Students should discuss the advantages and disadvantages of the one-child policy.

3 Optional activity: produce a short play which dramatises a discussion between two Chinese parents. One of them is keen to have a second child, but the other wants to follow the one-child policy. Think through what the policy means for families. The traditional 'family tree' is changed completely, for example:

   - No one in the class would have brothers and sisters.
   - No one would have any aunts or uncles.
   - There would be a problem for men in finding a partner due to gender imbalance (more young men than young women – 117:100 M:F).

   If you have any mainland Chinese students, the discussion and short play can be especially interesting.

4 Use table **D** to compare China's population change 1970–2010 with that in Asia and the world as a whole.

5 How has China updated the one-child policy? Read the text and ask for students' reactions to these updates.

   One of the major reasons for this change of approach is the threat of a rapidly ageing population and too few working adults to support the future elderly. Ask students to explain the nature of the problem, using the 4-2-1 idea in the text (a family will consist of two parents, four grandparents but only one child/grandchild – this is an economically impossible situation).

6 A contrasting case study – Kerala: use **Worksheet 1.8** to teach students about a different approach to anti-natalist policy.

Homework assignment	Answer **Now investigate** question **2a**. Read the suggested weblinks, and then answer **Now investigate** question **2b**.

Give extra support by encouraging weaker students to understand the positive and negative aspects of the one-child policy.

Give extra challenge by discussing the similarities and differences between the communist policy in China and the democratic one in Kerala. This is best done in the plenary session.

Plenary suggestions

Make a comparison of the two case studies considered during this lesson, China and Kerala.

Skills notes	Tasks in this lesson enable interpretation of various diagrams and construction of a timeline.

Assessment suggestions	**Now investigate** question **1**, the timeline: check students' ability to summarise the one-child policy. **Now investigate** question **2b**: assess students' evaluation of the long-term effects of China's population control policies.

1.1 (8) Pro-natalist population policies

Assessment objective

- Candidates should understand that some countries – usually those that have experienced natural decrease – wish to increase their population growth once again.

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1.1 Population dynamics

- Describe and evaluate population policies
- Understand the impacts of social, economic and other factors (including government policies) on birth and death rates

Differentiated learning outcomes

- **All students must** know the difference between pro-natalist and anti-natalist policies (Grade E/D).
- **Most students should** be able to state the key points of both anti-natalist and pro-natalist policies (Grade C/B).
- **Some students could** know the detail of how and why some countries are following pro-natalist policies (Grade A/A*).

Resources

- **Student Book**: pp. 18-20
- **Worksheets**: None
- **Photographs**: None
- **Further reading and weblinks**: https://data.gov.sg

Key concepts

- Those European countries that have moved into Stage 5 of economic development often wish to grow once again for economic reasons.

Starter suggestions

Use the **Fantastic fact** on p. 18 of the Student Book regarding Western Europe. Ask students to interpret this. Tell them that some countries in this region are still growing – for example the UK – and ask what that says about those which are in a state of natural decrease (their birth rate must be very low).

Check the current birth rate and death rate of such countries (for example Germany, Sweden, Czech Republic, Greece).

We have studied anti-natalist policies. What do we mean by a 'pro-natalist' policy?

Main lesson activities

1 Ask the question, 'Why would a country whose death rate is greater than its birth rate want to increase its birth rate?' Answers should be: to maintain population size; so there are enough people to fill the jobs and to care for the elderly, etc.

2 Together read the first paragraph in the Student Book and look at the data in table **A** to support (or correct) the answers just given. Ask why it matters that Europe's fertility rate is significantly lower than the global average. This could be positive (this region is not growing) or negative (it lacks workers).

3 A pro-natalist policy example – France: the Student Book introduces the policies that operate in France to encourage larger families. Here are some additional facts about the French policy:

- three years of paid parental leave around the birth of a child – this can be used by either mother or father
- free day care until a child is three years old
- full-time school, funded by the government, now starts from age three
- the number of children a woman has affects her age of retirement: the larger the family, the earlier the retirement.

Students should answer **Now investigate** question **1** to assess the French system, taking in the points in the text and as above.

4 Use **Now investigate** question **2**. This supports your discussion on Europe's fertility rate and gives skills practice. The graph could be drawn as a compound bar graph.

5 **Now investigate** question **2** allows students to make a comparison of France with other European countries, as well as giving practice at bar graph construction. When answering question **2c**, students should pay particular attention to the example country (France).

Give extra support by using your own country as another example: does it have a clear anti-natalist or pro-natalist policy? Does it need such a policy?

Give extra challenge by directing students to look at Singapore data (https://data.gov.sg). That country offers a Baby Bonus to families. Students could make a brief presentation on their findings.

Plenary suggestions

Ask students at which stage of economic development are countries with a pro-natalist policy likely to be (Stage 5 is the most likely, but late Stage 4 is also possible).

Does the class think pro-natalist policies will move Stage 5 countries back to Stage 4?

Skills notes	Students have practice in drawing bar graphs, including compound graphs.

Assessment suggestions	**Now investigate** question **3** allows students to assess more aspects of the French pro-natalist policy.

1.2(1) Why, where and how do people move around?

Assessment objectives

- Candidates should be able to demonstrate knowledge and understanding of processes, spatial patterns and interactions contributing to the development of economic, social and political environments.
- Candidates should be able to recognise the role of decision making as affected by different human contexts, values and perceptions.

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1.2 Migration

- Explain and give reasons for population migration
- Understand internal movements such as rural-urban migration, as well as international migrations, both voluntary and involuntary

Differentiated learning outcomes

- **All students must** understand that people sometimes move from one area to another and be able to give reasons why migration takes place in their local area (Grade E/D).
- **Most students should** be able to define different kinds of migration and describe some of the reasons for migration within an example country (Grade C/B).
- **Some students could** complete detailed descriptions and explanations of internal migration, making full and proper use of examples (Grade A/A*).

Resources

- **Student Book**: pp. 21–23
- **Worksheets**:
  1.9 Migration: push and pull factors
  1.10 Experiences of moving to the big city
- **Photographs**: None
- **Further reading and weblinks**: www.citymayors.com/statistics/urban_growth1.html lists the world's fastest growing cities – mainly as a result of internal migration

Key concepts

- Migration is the movement of people from one place to another.
- There are many different reasons why people migrate.
- Migration takes place both from rural to urban and urban to rural areas.

Starter suggestions

Begin the lesson by introducing the concept of migration using the opening paragraph on the spread.

Ask students the following questions as part of a class discussion:

- How many have moved to different places in their lives and why?
- What kinds of migration have they been involved in (examples could be rural to urban, urban to rural, international)?

Collate answers on why students have moved, as an introduction to the next section.

Main lesson activities

1 Working as a class, draw up a list from the experiences of the whole class detailing migration movements within your country. These can include movements by themselves, other members of their family, friends and any other people they know of, including celebrities, sports people, etc. Mark the information on a large-scale map of your country.

2 Read through the section on 'The bright lights of the big city' and migration push and pull factors. In pairs or groups, students should use **Worksheet 1.9** to draw up a list of the 'push' and 'pull' factors that would cause migration (both inward and outward) in their home town or region.

3 **Worksheet 1.10** shows an area that internal migrants may want to move into. Students should draw a talking head (or find a picture) of a migrant who may want to move here and write a speech bubble describing their experiences.

4 Students can reflect on the most popular places to live in their own country. What are the reasons why these places are so popular? Are they all urban areas or are their advantages in moving to the countryside?

5 Read through the section on counter-urbanisation. Use this as a basis for a class discussion on whether this kind of migration is happening in the students' own country. They should be able to identify examples of cities that are depopulating and rural areas that are gaining more people (and the reasons why).

Extension activity	Students could use the internet to find out about Ravenstein and Lee's theories of migration. How do these extend what is provided in the Student Book?

Give extra support by concentrating on the local area and getting students to think of examples of services, jobs, etc. that are special in the place where they live.

Give extra challenge by asking students to think further about the effects of migration to cities. What consequences will the pressure of services have for individuals, services and the city authorities that are trying to cope?

Plenary suggestions

Draw a spider diagram to bring together all the different strands surrounding migration. Place the title 'Migration' in the centre and add separate headings for the reasons for migration (both push and pull factors), directions of migration (rural to urban and urban to rural) and any effects of migration that students can think of.

Use **Now investigate** question **4b** as a discussion prompt, and ask students whether they would prefer to live in an urban or a rural area, and why. This could be written up as a homework exercise.

Assessment suggestions	**Now investigate** questions **1** and **2** present a good opportunity for students to display factual knowledge on migration. They also ensure that key words and phrases are fully understood.

1.2(2) Moving from one country to another

Assessment objectives

- Candidates should be able to demonstrate knowledge and understanding of human actions, the importance of scale and the changes that occur through time.
- Candidates should be able to analyse and interpret geographical data using annotated maps.
- Candidates should be able to recognise the role of decision making as affected by different human contexts, values and perceptions.

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1.2 Migration

- Demonstrate an understanding of the impacts of migration
- Understand that positive and negative impacts should be considered, on the destination and origin of the migrants, and the migrants themselves

Topic link: for more on the impacts of climate change see Topic 3.7 pp. 213–34.

Differentiated learning outcomes

- **All students must** understand that people move from one country to another, even when they don't want to, and give basic reasons why this may take place (Grade E/D).
- **Most students should** be able to define key terms related to international migration, including forced and voluntary migrations, and describe some of the issues associated with migration in relation to a case study country (Grade C/B).
- **Some students could** complete detailed descriptions and explanations of international migration, making full and proper use of case studies (Grade A/A*).

Resources

- **Student Book**: pp. 23–6
- **Worksheets**:
  1.11 Refugees and other types of international migration
  1.12 Migration case study: Senegal
- **Photographs**: None
- **Further reading and weblinks**:
  Up-to-date news on the global refugee situation at:
  www.unhcr.org/uk/ and
  www.guardian.co.uk/world/refugees

Key concepts

- Migration occurs on a large scale between different countries.
- Much international migration is forced rather than voluntary.
- International migration causes both problems and benefits for many countries.

Starter suggestions

Use the opening paragraph in the Student Book to introduce the concept of international migration.

Give students five minutes to discuss in pairs what immigration occurs in their own country and where immigrants come from.

Collate answers from pairs to draw up a list of places where migrants come from.

Discuss with students why these migrations occur.

Remember that the discussion may need to be handled sensitively if there are certain groups of immigrants within the class.

Main lesson activities

1 Find out which countries members of staff in your school have lived in, and mark them on a world map. This should provide a good example of voluntary migration. Some staff could be developed as 'pen portraits': can the students identify the member of staff when they are told where they have lived? Students could use proportional flow lines on the maps (as outlined in Section 4 on p. 257 of Student Book) to highlight where the largest number of staff migrants come from.

2 Read through the section in the Student Book on forced migration. Students could use the internet to find examples of refugee movements around the world and the causes behind them. The information could then be used to complete the table on **Worksheet 1.11**.

3 The case study section on Senegal has a good deal of information on the causes, benefits and problems of international migration. Students should use this information to annotate the map of Senegal on **Worksheet 1.12**.

4 Working in pairs or groups, students should come up with two lists showing the problems and benefits of international migration for the country of destination. These lists can then be used to feed into the plenary discussion below.

5 **Topic link** 3.7 p. 223 to sections on climate change**:** rising sea levels may be a future source of refugees from low-lying coastal areas. Students can use appropriate maps to identify the areas that are likely to produce these 'climate refugees' and to suggest what issues will be caused if such migration occurs.

Give extra support by directing students to use a simpler atlas or online help, or by initiating group work to help them identify individual countries.

Give extra challenge by getting students to collect news articles, or reports from the internet, about migration movements around the world. This material can be used to write a short report on the current state of global migration.

Plenary suggestions

Question **2** in the **Now investigate** section on p. 25 can be used to gauge students' views on migration and to empathise with migrants from other countries.

Ask how students feel about immigration. What are the problems and benefits caused by international migration? These could include the effects on the economy, job opportunities and culture.

Finish off with an online search to identify how your country's newspapers deal with the issue of immigration – this could be followed up or used as a homework exercise.

Skills notes	Flow lines are a very clear way to illustrate information about migration. They are even more useful if drawn as proportional lines. There are more details in Section 4 of the Student Book, p. 257.

Assessment suggestions	Detailed knowledge of the Senegal case study can be assessed using the annotated maps suggested in the main lesson activities above.

1.3(1) Why are there more older or younger people where you live?

Assessment objectives

- Candidates should know how to draw and interpret an age/sex pyramid.
- Candidates should understand how a country's population structure may change as it becomes more economically developed.
- Candidates should know that the life expectancies of males and females are different.

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1.3 Population structure

- Identify and give reasons for and implications of different types of population structure

Topic link: there is more detail on the changing stages of economic development in Topic 3.1 on p. 139 of the Student Book.

Differentiated learning outcomes

- **All students must** understand how an age/sex pyramid 'works', be able to draw and interpret them at a basic level (Grade E/D).
- **Most students should** be able to recognise youthful and ageing populations by pyramid shape (Grade C/B).
- **Some students could** compare countries effectively in terms of both age and gender structure, plus use pyramids to predict likely future growth/decline patterns (Grade A/A*).

Resources

- **Student Book**: pp. 27–28
- **Worksheets**:
  1.13 What does an age/sex pyramid tell us?
  1.14 Annotating and understanding age/sex pyramids
- **Photographs**: None
- **Further reading and weblinks**:
  Sources of pyramid diagrams:
  https://www.census.gov/data-tools/demo/idb/informationGateway.php
  Choose 'Population Pyramid Graph' in the 'Select Report' section, choose a country and 'Submit' – you can find your own country data this way.

Key concepts

Age/sex pyramids are a useful tool for:

- identifying age structure and gender patterns
- predicting future population growth/decline/zero growth and therefore helping governments in their strategies and planning for the future.

Starter suggestions

Read the first paragraph in the Student Book together. Ask students the question it poses regarding the number of elderly versus young people in your community. Ask them who is likely to be at home, or indoors at work, where they may be less visible in society. This idea can be supplemented by the fieldwork suggestion in the main lesson activities below.

Main lesson activities

1 What is a *census*? (A national survey, taken every 10 years, funded by the government and/or the UN, to gather data on the characteristics of the population of a country.) When was the last census in your country? For most countries it's in the year ending with zero. (In the UK it takes place in the year ending with a number one – except for 1941 which was in the Second World War when a census was not seen as a priority.)

2 If you have the opportunity, students could conduct a small piece of fieldwork, assessing the people who pass by in different streets/areas of your village/town/city. Categorise people's ages into the usual age groups: 0–4 years, 5–9, 10–14 and so on. The best way to record the count is to use a tally chart. The class can do this in groups, and the totals and percentages then calculated from their combined results. Ask the students how the day and time of the survey might have affected the results of their survey (or a hypothetical one).

3 Identify the questions that need to be asked to understand the age/gender patterns for a particular country. Why does a government need this information? (Provision of schools and health care, care for the elderly and the very young). How does the census assist government in this respect? (Refer to **Now investigate** question **3**.) Which age groups pay taxes? A country needs enough people of working age to earn and pay taxes to support the very young, the elderly and the poor/unemployed. Discuss the points raised above – students need to understand all these situations in the context of their own country and of others.

4 Age/sex pyramids: refer to graphs **A** and **B**. Explain the structure of a pyramid: horizontal and vertical axes, width of the bars in the various age groups, etc. Students compare the shapes of graphs **A** and **B** and explain what they mean (Germany a rich MEDC, Haiti a poor LEDC).

- What is represented by the width of the bars?
- In any given age group, is there a difference between male and female bars? (See **Fantastic fact** and use **Now investigate** question **1**.)
- **Now investigate** question **4**: pyramid construction using data from the table.
- Students try **Worksheet 1.13** for reinforcement of pyramid labelling.
- Students use the internet to find the age/sex pyramid for your country. Use the weblinks above. Does it fit with the pattern found in your school? Aim to explain the result (**Now investigate** question **2**).

Homework exercises	**Now investigate** question **5** and **Worksheet 1.14**.

Give extra support by helping weaker students with pyramid construction and interpretation.

Give extra challenge with this extension exercise: Use the internet to investigate the census in your country. What type of question is asked? What other information does your government need to know in order to help it manage the country?

Plenary suggestions

Summarise the key points of age/sex pyramid construction and meaning.

Skills notes	Students practise basic data collection, and question their methods, validity, and the impact of time of day on quality of results; they learn how to construct and interpret age/sex pyramids.

Assessment suggestions	**Worksheets 1.13** and **1.14** provide opportunities for assessment by both teacher and student.

1.3(2) Changing stages of economic development

Assessment objectives

- Candidates should be able to describe age/sex pyramids and relate them to the different stages of economic development

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1.3 Population structure

- Explain the structure of age/sex pyramids of countries at different levels of economic development

Differentiated learning outcomes

- **All students must** be able to recognise the main characteristics of an age/sex pyramid and understand what type of country it represents (Grade E/D).
- **Most students should** be able to draw a population pyramid from given age/sex data, and know how to read a pyramid to obtain data about the country's population structure. They should understand how detailed information about a country's population structure can help with that country's future planning (Grade C/B).
- **Some students could** use age/sex pyramids to investigate a country's population structure, and know how and why the differently shaped pyramids are linked to the different stages of economic development (Grade A/A*).

Resources

- **Student Book**: pp. 29–31
- **Worksheets**:
  1.15 Which stage of economic development?
- **Photographs**: None
- **Further reading and weblinks**:
  For pyramid research:
  https://www.census.gov/data-tools/demo/idb/informationGateway.php
  For population change and links to levels of economic development:
  www.geographyalltheway.com

Key concepts

- Each stage of economic development has a typically shaped population pyramid from which it can be identified.
- Pyramids are a useful tool for any country to analyse and plan for the future.

Starter suggestions

Together read the first paragraph on page 29 in the Student Book. Students could identify the five stages of economic development and population change, and say something about the characteristics of each.

Use the **Fantastic fact** that there are no longer any *countries* in Stage 1 and ask students to explain why this is so (medical services at some level are now available in all countries, so death rate decreases). Refer to map **C** (Student Book p. 30) to identify those peoples who are in Stage 1, and note why (these groups are so remote that knowledge from the outside world barely reaches them).

Main lesson activities

1 Study the remote communities pyramid (Stage 1) and those for Burkina Faso, Mexico, Australia and Japan (Stages 2, 3, 4 and 5) in diagrams **A** and **B**. In groups, or as a whole class, students should discuss the general differences in the pyramid shapes and how they change over time. Students should write a summary of the changes, especially at the base and the apex of each pyramid.

2 Location of countries at different stages of economic development: students use **Worksheet 1.15** and a copy of the world map available from the downloadable resources. They will also need to refer to an atlas. This could be used as a homework exercise.

3 Activity based on your country: The population of any country changes over time and this is reflected in the age/sex pyramids. Use the website address above to search for two pyramids for your country dated 50 years apart, e.g. 2000 and 2050 or 1975 and 2025, or similar dates depending on when your censuses were recorded. Students should:

(a) describe the shapes of each of the two pyramids, using these key terms: *base, apex, concave/straight/convex sides*

(b) note the major differences between the two pyramids

(c) explain what has happened over the 50-year (or similar) period of time in terms of birth rate, death rate and life expectancy

(d) What has your government done to influence the population? For example, has it tried to raise/lower the birth rate or death rate? What should your government do in the future to manage population growth?

4 **Further research**: use the internet to find and print out a pyramid for your country or a neighbouring one. Each student needs their own copy. In pairs, annotate the pyramid to show the key characteristics of the age and gender structures. Students should compare their ideas with those of other pairs. They can refer here back to their earlier work on **Worksheet 1.14**. This could be an extension activity or extra homework assignment.

5 Read the text on p.30 of the Student Book on Japan's population situation.

(a) Define the term 'ageing population'.

(b) Answer the **Now investigate** question **1**.

(c) Discuss: what are the social and economic advantages of having more older people in a population? (e.g. In Japan they tend to be well off and spend money on tourism and leisure. They may help with childcare for working parents.) Also, what are the advantages of a youthful population? (e.g. A large workforce when these young people reach adulthood, which then helps the economy to grow.) You could choose another suitable country.

Give extra support by helping those less able students in using an atlas to locate countries; reinforce what the shape of a pyramid tells us.

Give extra challenge for the most able students in main lesson activity **3** by asking them to find additional age/sex pyramids for their country showing different stages.

Plenary suggestions

Summarise the key characteristics of your own country's age/sex pyramid.
Ask students whether their earlier observations of people's age categories in the street (previous lesson) fits in with the pattern shown in your national diagram.

Skills notes	Students have practice in the construction of age/sex pyramids, comparing and interpreting age/sex pyramids, using an atlas, and using and interpreting the links between population change and economic development.

Assessment suggestions	Main lesson activity **3** covers many aspects of economic development, age/sex pyramids and the links between these. If students complete it individually in class or for homework, it will provide a clear measure of the level of their understanding.

1.4(1) Why do some people have more neighbours than others?

Assessment objectives

- Candidates must know how people are distributed around the Earth's surface.
- Candidates should understand why some places are more densely populated than others.
- Candidates should understand the problems of people living in very densely and sparsely populated areas.

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1.4 Population density and distribution

- Describe the factors influencing the density and distribution of population

Differentiated learning outcomes

- **All students must** know how people are distributed around the Earth's surface and know why some places are more densely populated than others (Grade F/E).
- **Most students should** know about the problems of people living in very densely and sparsely populated areas and understand where their own home area lies within the continuum (Grade C/B).
- **Some students could** apply the factors in this spread to their home area (Grade A/A*).

Resources

- **Student Book**: pp. 32–3
- **Worksheets**:
  1.16 Densely populated urban places
  1.17 Rating your own home
- **Photographs**:
  1.14 A densely populated city
  1.15 A sparsely populated rural area
  1.16 Hot desert
  1.17 Dense forest
  1.18 Mountainous region
  1.19 Polar region: Antarctica
- **Further reading and weblinks**:
  www.worldmapper.org

Key concepts

- World population is very unevenly distributed.
- The main reasons for this are environmental and resource availability.

Starter suggestions

Begin with photos **A** and **B** in the Student Book (photos **1.14** and **1.15** from the downloadable resources), showing the contrast between very densely packed urban areas and very sparsely peopled rural areas. Ask for students' reactions to the contrasts shown. Compare/contrast these with your local home area. The response will clearly depend on the nature of the area where you live.

The **Now investigate** activity **1** (Student Book p. 33) will help continue this initial discussion.

Use the Worldmapper website > Animations > Land area to Population to show students how unevenly distributed world population really is.

Main lesson activities

1 Make sure that the students know the five key definitions: *population distribution, population density, densely populated, sparsely populated, uninhabited.*

2 Describing and explaining world population distribution/density: world map **C** is a choropleth showing population distribution and density. (A choropleth map is a shaded map – the darker the shading, the higher the value.)

(a) Look at the world as a whole. State where the highest and lowest values are found. Name places and quote data from the map to make a really good description. Which continents/countries are the most/least densely populated countries?

(b) Try to explain why these areas are especially densely or sparsely populated. Your atlas will help you here. Look at relief, climate and vegetation maps to see whether areas are likely to be attractive to people or not.

3 Factors affecting population density: this can be explored using photos **D** to **G** in the Student Book (photos **1.16–1.19** from the downloadable resources). They represent four entirely different environments, all of which are difficult environments to some extent. Allow students five minutes to look carefully at each photo. Ask them which of these environments they think is the most difficult to live in, and which the least difficult. There are no right or wrong answers, but students should be encouraged to justify their opinions.

4 Use **Worksheet 1.16** to explore the attractions and problems of more densely settled urban environments.

5 Apply what students have already learned regarding the advantages/disadvantages of various locations across the world to their home area using **Worksheet 1.17**.

6 Use **Now investigate** questions **3** and **4** as follow-up homework to reinforce the lesson's key ideas.

Give extra support by using **Worksheet 1.17** to help students understand the idea of the various factors affecting the attractiveness/unattractiveness (pull/push) of an area for people trying to make a living there.

Give extra challenge by encouraging students to look at other environments in the same way, anywhere in the world, familiar to the students or unfamiliar. This will stretch their ability to apply ideas to particular global environments.

Plenary suggestions

What variations are there in population density within your home area? Discuss and note these down. This relates the material used in the lesson to the students' own direct experience.

Skills notes	Students develop their skills in internet use, by interpreting the Worldmapper animation to see the misfit between land area and population size in many countries across the world. They also understand the idea of a continuum and of scoring an area based on various criteria. Map construction.

Assessment suggestions	**Now investigate** questions **3** and **4** (suggested as homework) reinforce much of the lesson's work.

1.4(2) Areas of high population density

Assessment objectives

- Candidates should understand clearly the difference between the definitions of population distribution and population density.
- Candidates should know the issues faced by people living in a densely populated area.

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1.4 Population density and distribution

- Describe the factors influencing the density and distribution of population
- Explain the physical, economic, social and political factors which result in an area of high population density

Topic links: For more on population and resources and over-population see Topic 1.1 pp. 2–15; on migration Topic 1.2 pp. 21–6; on the site and situation of settlements see Topic 1.5 pp. 39–44 and Topic 1.6 pp. 50–63.

Differentiated learning outcomes

- **All students must** know the difference between *densely populated* and *over-populated*. They should be able to annotate a photo to point out the characteristics of a densely populated area (Grade E/D).
- **Most students should** understand the factors leading to an area being densely populated, and that some factors are physical whilst others are human. They should know the issues arising in a densely populated area (Grade C/B).
- **Some students could** apply the points made in the case studies in the Student Book to their own country, and use these in new examples given to them (Grade A/A*).

Resources

- **Student Book**: pp. 34–5
- **Worksheet**: 1.18 Annotating photographs
- **Photographs**:
  1.20–1.21 Views of different parts of Singapore
  1.22 Lagos Island, Nigeria
  1.23 Sousse, Tunisia
  1.24 An area of densely populated coastline
  1.25 The Nile Valley in Egypt
  1.26 The port of Singapore
- **Further reading and weblinks**:
  These sites support the homework exercise on Singapore and provide more photos of the city:
  http://en.wikipedia.org/wiki/Economy_of_Singapore
  http://en.wikipedia.org/wiki/History_of_Singapore

Key concepts

- Half the world's population lives in densely populated urban areas, usually by their own choice.
- Several factors can lead to high-density populations.
- There are different degrees of population density across a city.

Starter suggestions

Ask students to identify the key differences between *population distribution* and *population density*. They should write down clear definitions.

Use the **Fantastic fact** to show how much of the world lives in more densely populated areas. Reflect on this in view of your home area's density characteristics – is it densely or sparsely populated, or somewhere in between?

Pose the question, 'Is a densely populated area necessarily over-populated?' Make use of photos **1.20–1.23** from the downloadable resources. Allow students to make points but do not draw any conclusions yet. This will be revisited later in the lesson.

Main lesson activities

1 Densely populated areas develop because of the features that attract people to live there:

- Physical: water supply, ease of transport, good soil, flat land for building on, mineral or other resources available, comfortable climate with enough rainfall and sufficiently high temperatures for agricultural production.
- Human: people with initiative to begin businesses and make them flourish, capital (money) available to invest and develop new enterprises/companies, to set up health and education facilities, opportunities for leisure and tourism.

Read the section of text on p. 34 of the Student Book. Students must decide whether the ideas listed can be categorised as physical or human resources.

Create two large spider diagrams, one with 'Physical resources' at the centre and the other 'Human characteristics'. From each centre draw legs to link to these categories – flat/gently sloping land, fertile soil, climate, fossil fuels, mineral deposits, coastal location, fresh water (rivers) – putting each on the appropriate 'leg'. From each of these draw more legs: explain why that feature is likely to attract people to settle there. This should provide a good summary of all the factors involved.

2 Using photos **A**, **B** and **C** on pp. 34–5 (photos **1.24–1.26** from the downloadable resources), students should analyse their features likely to attract people to live and work there.

3 Students answer **Now investigate** questions **1a** and **1b** (p. 35). These relate to what they have just completed above to your home location, and allows them to think more widely.

4 Case study – Singapore: read the section on Singapore which begins to explain why it is so densely populated. Refer back to photos **1.20–1.21** of Singapore from the downloadable resources, and to photo **C** in Student Book p. 35 (photo **1.26**). Students should list the attractions of Singapore, comparing their ideas.

Homework assignment	Students should carry out further research on the reasons for Singapore being so densely populated. Many of these are historical, while others are linked to its coastal location and resulting trade. See websites above as a starting point. Students should write two to three paragraphs to explain Singapore's high population density.

5 Students should already understand the meaning of the instruction 'annotate'. Explain or reinforce this. Answer questions **2** and **3** in the main **Now investigate** section on p. 35.

6 Having considered a case study, now move on to a more global perspective with **Now investigate** question **4**. Once again, this involves map construction.

7 Ask the question relating dense population to over-population: 'Is Singapore over-populated – that is, are there too many people for the resources the city has to offer?'

Homework activities	• Use **Worksheet 1.18** to reinforce the skill of annotation needed for **Now investigate** question **2**. • Research more photos from the internet and annotate them in the same way as in **Worksheet 1.18**.

Give extra support by using **Worksheet 1.18** to teach the difference between simple labelling and detailed annotation.

Give extra challenge by exploring with the most able students the difference between dense population and over-population.

Plenary suggestions

This should have been quite a busy lesson – a quick summary of the ideas used should be sufficient.

Skills notes	A number of different skills are practised here: annotation, photo interpretation, atlas use, map construction, case study interpretation.

Assessment suggestions	The homework exercise on Singapore would make a useful assessment. Assess students' skills in annotation from **Worksheet 1.18** and their own choice of extra photos for annotation. The map constructed in **Now investigate** question **4** also offers opportunities for assessment.

1.4(3) Areas of low population density

Assessment objectives

- Candidates should understand the major influences on population distribution and density – physical, economic and other human factors.
- Candidates should know the issues faced by people living in a sparsely populated area.

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1.4 Population density and distribution

- Describe the factors influencing the density and distribution of population
- Explain the physical, economic, social and political factors which result in an area of low population density

Topic link: For more on population and resources, and under-population, see Topic 1.1 pp. 2–20 of the Student Book.

Differentiated learning outcomes

- **All students must** know the difference between *sparsely populated* and *under-populated*. They should be able to annotate a photo to point out the characteristics of a sparsely populated area (Grade E/D).
- **Most students should** understand the difference between population distribution and population density, the pattern of distribution of densely populated and sparsely populated areas in the world, and the factors leading to an area being sparsely populated; also that these factors are both physical and human. They should understand how desertification and soil degradation adversely affect farming communities (Grade C/B).
- **Some students could** understand the processes of deforestation and soil degradation, and be able to apply the points made in the case studies in the Student Book to their own country, and use these in new examples given to them (Grade A/A*).

Resources

- **Student Book**: pp. 36–8
- **Worksheets**: None
- **Photographs**: None
- **Further reading and weblinks**:

  East African famine:

  www.bbc.co.uk/news/world-africa-14248278

  Crop production in Mali:

  www-naweb.iaea.org/nafa/swmn/water-docs/Mali-Sorghum-water-crop-yield.pdf

Key concepts

- Sparse populations are often the result of physical factors.
- With appropriate technology, standard of living can be raised and food supply made more secure.

Starter suggestions

Remind students of the differences between densely populated and sparsely populated areas. Ask whether densely populated = over-populated (answer is *no*).

Read the first paragraph in the Student Book (p. 36) on population density in North Africa. Ask students whether they think sparsely populated always = under-populated (this is simply to get students thinking).

Main lesson activities

1 Use the world map you created in the previous lesson, showing the more densely populated parts of the world, and add the least densely populated areas. Use an atlas to help you here. Make sure the areas shaded are named.

2 Note that the Sahara and Sahel regions are classified as being sparsely populated. Students should label them on their world map. Identify the key differences in terms of climate and vegetation between desert (the Sahara) and semi-desert (the

Sahel). This can be done with reference to the climate graphs and map **A**, or equivalent data which can be found in an atlas.

3 Sparse population and under-population: read the text on the Sahel. Review the difference between the meanings of these terms. Students should make a clear note of these.

4 Sahel case study: discuss the processes involved in desertification. The text in the spread has some useful information, but it would be interesting to research some more. Make a list of the difficulties experienced by farmers in the Sahel region, clearly identifying the reasons for low population density in the Sahel. Students should use this material to write an explanation of why people are not attracted to live in this region (aim for two paragraphs). They may do this individually or in small groups/pairs. Ideas can be compared afterwards.

5 Search the internet for items on the East African famine of 2011 – and/or see weblink on the previous page. If you are working on this spread at a time when the Sahel is suffering from famine, the content is particularly pertinent.

6 **Now investigate** questions **1** and **2** make a supportive homework. Question **2** involves an adaptation of the written exercise in main lesson activity **4** above.

Homework assignment	Research homework: • Find more news websites concerning any angle on the Sahel, its people, climate and economy. As a follow-up discuss the students' findings. • Do some research online to discover how people in the Sahel have managed to overcome some of the problems of living in that region. A good start would be to investigate how farmers in Mali have managed to increased their crop yields (see weblink in **Further reading and weblinks**). • Research which areas in the world are currently under threat of desertification.

Give extra support by explaining the link between physical difficulties and people's experiences.

Give extra challenge by encouraging the most able students to research more challenging websites in terms of reading level and complexity of ideas.

Plenary suggestions

Summarise the key terms for the processes that make farming difficult in the Sahel: *deforestation* (due to reliance on fuelwood), *soil degradation*, *erosion*, *salinisation*, *leaching*, *desertification*. Students could quiz each other until they get the definitions completely accurate.

As a class, discuss the differences between your way of life and that of nomads and other farmers in the Sahel.

Discuss whether the Sahel is under-populated. Could it support more people if technology was available to make use of its resources?

Skills notes	In this lesson students develop their map and photo interpretation skills, and practise writing a reasoned answer.

Assessment suggestions	Quiz students on the key terms and place names in this lesson: Sahel, semi-desert, deforestation, soil degradation, salinisation, erosion, leaching, sparse population, under-population.

1.5(1) Why do people live in the countryside?

Assessment objectives

- Candidates should be able to describe the patterns of rural settlement – dispersed, linear, nucleated.
- Candidates should understand which factors are important when deciding where to site a new village.
- Candidates need to know the factors that influence the growth or decline of rural settlements.
- Candidates should be able to explain what influences patterns of settlement in rural areas.

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1.5 Settlements and service provision

- Explain the patterns of settlement – dispersed, linear and nucleated
- Describe and explain the factors which may influence the sites, growth and functions of settlements
- Explain the influence of physical factors (including relief, soil, water supply) and other factors (including accessibility, resources)

Differentiated learning outcomes

- **All students must** understand the concept of site and the characteristics involved (Grade E/D).
- **Most students should** know how to apply these ideas to their own and other settlements (Grade B/C).
- **Some students could** apply these ideas to settlements they do not know personally (Grade A/A*).

Resources

- **Student Book**: pp. 39–40
- **Worksheets**: None
- **Photographs**:
  1.27 A small village in a rural environment
- **Further reading and weblinks**: None

Key concepts	
	• Most settlements are old and have developed and changed over time in pattern, scale and function. • A minority are recently planned and mostly built all at the same time.

Starter suggestions

Defining key terms: ask students what they think the word *settlement* means. Bring in the idea of scale and these terms: *isolated settlement, hamlet, village, town, city, conurbation*. This could be drawn as a flow diagram.

Explain that 'rural settlement' refers to all settlement up to and including small towns in a rural environment. However, note that in some countries meanings can vary. For example, in India 'villages' can have up to 30 000 people, but in the UK the upper limit is around 10 000.

Main lesson activities

1 Begin with your own home area – is it classed as rural or urban and why? Refer to its characteristics. Students can consider why they live where they do, as suggested in the Student Book.

The most common reasons are likely to be to do with earning a living, e.g. owning land, job opportunities. You can prompt your students with the following suggestions: services may be important, or the family may simply have lived there for generations.

In wealthier countries, the exact location may be to do with proximity to a certain school, the size of house that is needed/can be afforded. The location of work is likely to come out high on the list.

2 The concept of site: students need to know this definition: the *site* of a settlement is the actual land on which the settlement is built. (Think of it like this: if you picked up the buildings in the settlement, the site is the land underneath.) Students need to note down this definition.

When they describe site, students should think about:

- height
- gradient
- water supply
- resources.

It might be useful to test this concept by asking students to look at settlements in their local area and applying these criteria. Or use photo **B** in the Student Book (photo **1.27** from the downloadable resources) and ask students to identify the characteristics of its site. You might also consider how each settlement has grown from its original roots, and why, if you have the relevant data available. Students can practise this exercise using the Ordnance Survey map of part of St Lucia on p. 42.

3 Consider the town/city in which you live, or the one closest to you. As the teacher, you need to know/research how it began and its history of growth. Invite students to interpret any images of growth you have. Has it grown from a village/small town? Describe the ways in which this has happened.

Identify the ways in which one settlement (your own settlement or an adjacent one) is accessible to its surrounding area.

Use diagram **C** and **Now investigate** questions **1** and **2** to identify why your chosen settlement grew.

4 How can the characteristics of a landscape limit the potential for settlement establishment and development? Use **Now investigate** question **3**.

5 Most settlements develop gradually over time. Again using the St Lucia map on p. 42, ask students to find evidence that this has been the case. You could also refer to your own area and the way in which it has developed.

6 Some settlements, however, are new towns and villages. They have been deliberately planned and constructed more or less all at the same time. Either present an example of a new settlement to students, or ask them to research one.

Give extra support by guiding students on the factors affecting settlement development. All students need to note down the key factors.

Give extra challenge by asking students to apply the principles of site (positive and negative) to any settlements that they know well.

Plenary suggestions

Revise the definition of site. How does this help us explain the growth, development and present-day characteristics of our home settlement?

Skills notes	Students have practice in map interpretation, and the application of generic site characteristics to specific examples.

Assessment suggestions	A useful homework task: use an Ordnance Survey or equivalent map to identify the site characteristics of a particular settlement. Classify these characteristics into positive and negative in terms of growth, development and the well-being of residents.

1.5(2) Rural settlements on Ordnance Survey maps

Assessment objectives

- Candidates should be aware of the three types of settlement pattern: dispersed, linear and nucleated.
- Candidates should be able to use an OS map to identify and explain settlement pattern.
- Candidates should understand the concept of site and how it affects settlement patterns.

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1.5 Settlements and service provision

- Explain the patterns of settlement – dispersed, linear and nucleated
- Explain the influence of physical factors (including relief, soil, water supply) and other factors (including accessibility, resources)
- Describe and explain the factors which may influence the sites, growth and functions of settlements

Topic link: See Topic 4.2 pp. 245–50 for more information on using maps

Differentiated learning outcomes

- **All students must** know the basic range of rural settlement shapes (Grade E/D).
- **Most students should** be able to identify these on an OS map (Grade C/B).
- **Some students could** interpret a satellite image, using it in a similar way to an OS map (Grade A/A*).

Resources

- **Student Book**: pp. 41–3
- **Worksheet**: 1.19 Settlement shape
- **Photographs**:
  1.28 An isolated, dispersed settlement (Capel Cefnywaen, Wales, UK)
  1.29 A linear settlement (Champlain, Quebec, Canada)
  1.30 A nucleated settlement (Cogolo in the Pejo valley, Trentino, Italy)
- **Further reading and weblinks:**
  www.nationsonline.org/oneworld/map/google_map_Castries.htm

Key concepts

- Site affects both the size and shape of settlements.
- OS maps allow geographers to understand the impact of site on settlement.

Starter suggestions

If your students live in a rural area, ask them to consider the size and, in particular, the shape of their settlements. If you are located in an urban area you can do this based on the OS map on p. 42 of the Student Book, or refer to a rural area that all your students know. Ask these questions:

- Are all rural settlements the same size? The answer is obviously *no*, leading on to the naming of different settlement sizes – the rural settlement hierarchy of: isolated house/farm, hamlet, village, small town.
- Do they all have the same pattern? Use the map, or examples that you know, to have a short discussion on the possible differences.

Main lesson activities

1 Continue working on identifying settlement patterns using photos **1.28–1.30** from the downloadable resources. These illustrate the three key settlement shapes: dispersed, linear, nucleated (see also table **A** in the Student Book).

2 St Lucia example: read the short text detail on St Lucia. Spend a few minutes on OS map revision (symbols, shading, grid references). Does the map extract support the text in showing that the majority (72%) of St Lucians are rural inhabitants?

Try to identify typical village patterns from the map. Students answer **Now investigate** questions **1a** and **1b** on specific villages.

3 Settlement site was discussed in the previous spread. Ask students to define it. One really good way to visualise it is that if you could pick up a settlement off the ground, the site would be the land you now see, i.e. the actual land on which a settlement is built. **Now investigate** question **2** allows students to use their knowledge of site applied to an OS map. This is a much more demanding skill.

4 Apart from new towns, all towns and cities today began as hamlets or villages. It is the advantages of the *site* that make people choose the location of their settlement, but it is the *situation* (the settlement's relation to its surroundings) that leads to its growth and development.

Some extra mapwork tasks:

(a) Port Castries, St Lucia's capital, has close to 60 000 people – about one third of the total island population. Use the OS map to determine which of its site and situation characteristics have encouraged its foundation and growth. (Hint for weaker students: consider height, relief and shape of the coastline, communications with other parts of the island and outside of the island.) Internet research will give historical background on the town's development.

(b) Use www.nationsonline.org/oneworld/map/google_map_Castries.htm to obtain a satellite image of Port Castries. Students should explain reasons for the shape and layout of the town (the built-up areas are quite scattered).

Give extra support by using **Worksheet 1.19** to reinforce settlement shape. Weaker students may need to refer back to diagram **C** on p. 40 of the Student Book to help them with **Now investigate** question **2**.

Give extra challenge by using the additional questions in main lesson activity **4**. These extend the mapwork further and introduce a satellite image.

Plenary suggestions

Summarise with students what they have discovered during this lesson regarding settlement patterns. Invite opinions on the usefulness of both OS maps and satellite images in this respect.

Skills notes	Students practise interpreting OS maps and using grid references. They also have opportunities to interpret photos and satellite images.

Assessment suggestions	The **Now investigate** questions present opportunities for assessment.

1.5(3) Life in rural areas

Assessment objectives

- Candidates should be able to describe sites of settlements and to identify reasons for settlement development, size and pattern in different environments.

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1.5 Settlements and service provision

- Describe and explain the factors which may influence the sites, growth and functions of settlements

Differentiated learning outcomes

- **All students must** know how to identify settlement patterns and site advantages on maps and locate them using the grid reference system (Grade E/D).
- **Most students should** know how site factors affect settlement development (Grade C/B).
- **Some students could** understand how a wide range of site and situation factors can both help and hinder settlement development, and know how to assess settlements according to the suitability of their individual locations (Grade A/A*).

Resources

- **Student Book**: pp. 43–4
- **Worksheet**:
  1.20 Comparing sites
- **Photographs**:
  1.31 Farming by hand
  1.32 A typical street scene in a rural town in the Tamil Nadu region of Southern India
- **Further reading and weblinks**:
  None

Key concepts

- Settlement patterns vary – site is often a factor in this.
- Different factors, including site and situation, affect the growth of a settlement.

Starter suggestions

To begin this lesson, use the introductory sentences in the Student Book concerning percentage of world population living in villages, and the **Fantastic fact**. Note that this figure of 37% living in villages and working on farms is a rapidly reducing portion of the global population. Also, China has the world's largest population, closely followed by India. Check current data for the year in which you are teaching this, so that students have the most accurate and recent data.

India is known as the 'country of 800 000 villages'. How does it compare with your own country? Allow students to make both local and global comparisons.

Main lesson activities

1 Illustrate the starter material with the Chembakolli example. Remember that case studies/examples have huge value in examinations in gaining marks, when correctly applied to a particular question.

Locate Chembakolli using map **A** in the Student Book. Note that Adivasi society has a simple organisation. The people grow basic crops and draw a large proportion of their resources directly from the forest in which they live. Students should read the example. Then conduct a short question-and-answer session to test whether or not they have absorbed the main facts.

In the discussion, encourage students to compare their lives and society with that of the Adivasi people (**Now investigate** question **1**). Photo **B** on Student Book p. 43 (photo **1.31** from the downloadable resources) shows an Adivasi group, which will give your students a more complete image of these people and allow more worthwhile comparisons to be made.

2 The text shows that the Adivasi people are, in some ways, experiencing a little more of the outside world. Ask students to identify these recent developments.

Use photos **B** and **E** to help compare Gudalur and Chembakolli (photos **1.31** and **1.32** from the downloadable resources).

3 Graph **C** shows climate data for Chembakolli. This is a good opportunity to teach or revise the construction/interpretation of climate graphs. Note: emphasise that precipitation is always shown by shaded bars (blue, if in colour) and temperature by a solid line (red).

Take a few minutes to practise climate graph interpretation. Students should produce a written description of the patterns shown by both the temperature and precipitation sections of the graph, noting the months of the wet and the dry seasons (**Now investigate** question **2a**).

Compare Chembakolli's climate with your own (**Now investigate** question **2b**) and consider the problems that climate (in this case, the monsoon pattern) can cause for local people (**Now investigate** question **2c**).

Homework activities	Suggested homework activities: • **Worksheet 1.20** provides extra practice in site characteristics. • **Further research** as suggested on p. 44 of the Student Book: students look in detail at settlements in your local area.

Give extra support by giving students extra practice in identifying site characteristics using **Worksheet 1.20**.

Give extra challenge by comparing the patterns shown on a variety of climate graphs.

Plenary suggestions

Have a short discussion on the site and shape of Chembakolli. Is it likely to grow and develop further in the future? Is its site suitable for further development, or not?

Skills notes	Students have opportunities to interpret climate graphs and maps.

Assessment suggestions	**Worksheet 1.20** provides an opportunity for assessment.

1.5(4) The settlement hierarchy

Assessment objectives

- Candidates should understand the concept of a settlement hierarchy and recognise such patterns in individual countries.
- Candidates should be able to look back and apply the concept of hierarchy to locations they have already studied in the Student Book.

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1.5 Settlements and service provision

- Give reasons for the hierarchy of settlements and services

Topic links: For more on the functions of urban settlements see Topic 1.6 pp. 52–6.

Differentiated learning outcomes

- **All students must** understand the idea that a hierarchy places settlements in order (Grade E/D).
- **Most students should** understand the characteristics of a settlement hierarchy based on population size (Grade C/B).
- **Some students could** know the characteristics of hierarchies based on different types of service provision (Grade A/A*).

Resources

- **Student Book**: pp. 45–7
- **Worksheets**: 1.21 Settlement hierarchies
- **Photographs**: None
- **Further reading and weblinks**: www3.sympatico.ca/truegrowth/demographics.htm www.nationsonline.org/oneworld/bigcities.htm

Key concepts

- The settlement hierarchy helps geographers classify any size of settlement within an area/region/country.
- The number of megacities in the world is increasing rapidly – these are located primarily in LEDCs and NICs.

Starter suggestions

Read the first paragraph of text in the Student Book. Students should note the definitions of *settlement hierarchy* and *megacities*. Ask students about what they see as the definition of a city, given the references to Sweden and Romania.

In the UK, a *city* is any settlement with a castle, a cathedral or a university, or a population of over 250 000. This includes St Andrews in Scotland, with 16 870 (2011 census) people in its permanent population including some of the 7000 students at the university. Its famous ancient university, as well as an early cathedral and castle ruins, explain its city status. However, its population would otherwise classify it as a small town.

Main lesson activities

1 Teach the concept of hierarchy by referring to your school's staff hierarchy. The headteacher/principal is like the capital city, with lower layers of heads of department, subject teachers and then the students. Within a school, teachers might get promoted and move up the hierarchy. How do villages become towns, or towns become cities?

2 Settlement hierarchy: hierarchies can be based on population size or on function. Students need to know a definition of settlement *function* (what the settlement does and why it is there). Some settlements have one main function, such as port, capital city with government activities, market town, coastal resort, centre of education, commuter (dormitory) settlement, or mining village. Most settlements have more than one function – all provide a residential function and most have some retailing, in addition to other key functions. Ask your students to list the functions of their own settlement, the one in which your school is located (if different) plus another of a different size in your region/country. In this way you are already introducing the idea of levels in a hierarchy.

2 Referring to diagram **A**, consider the range of scale of settlements. Use the population sizes to help students understand the differences. Ask students to interpret the narrowing of the pyramid triangle (the larger the settlement, the fewer of them exists in one country/region).

3 Given the St Andrews example in the 'Starter suggestions' and the statistics of Croatia, Sweden and Romania, ask students which system for identifying cities they agree with. Ask them to give their reasons, and then compare them with those of others in the class.

4 Settlement hierarchies based on population size: ask students to think of examples at all stages of the settlement size hierarchy. Paris could be included: it classifies as a world city and as a megacity, if you include its wider urban area. Ask students to suggest world megacities and check their populations using www3.sympatico.ca/truegrowth/demographics.htm. Use **Now investigate** question **1** to apply hierarchy to your home settlement.

5 **Worksheet 1.21** provides useful questions to support this work on hierarchies. Use this worksheet to improve student understanding of the settlement hierarchy diagram. This considers settlement hierarchies based on population size. A key idea is that the great majority of the world's megacities are located in the poorer countries, i.e. in LEDCs and in NICs. Depending on time constraints, all or part of this worksheet may be completed as homework.

6 Settlement hierarchies based on function: read the second paragraph on p.45 and study table **B**. Functional hierarchies are based on service provision. Table **B** orders functions likely to be found in settlements from megacities down to isolated settlements, which effectively have no services at all. Megacities and conurbations often have several examples of a particular function like an international airport, while smaller cities may have only one. **Now investigate** question **2** supports this idea of functional hierarchy.

7 Example: Port Castries, St Lucia. Port Castries is an example of a settlement with several high-level functions, so it is much further up the settlement hierarchy than its population size suggests. It is a small town in terms of population (15 000) but, as the capital of the island, it has many functions. Use the text in the Student Book to explain why this is so.

8 Settlement hierarchies in less economically developed countries: LEDCs often have a *primate city* that is disproportionately larger than all other settlements in the country. Use graph **D** to illustrate this. Explain to students the idea of rank order and then illustrate the situation in your own country in a similar way.

9 **Now investigate** questions **3** and **4** represent a lengthy exercise, for which students will need teacher support. Ideally, these will make a supplementary lesson, supportive of the concepts here and practising a range of important skills.

Give extra support by helping some students with **Worksheet 1.21**, especially the later questions which are quite challenging. Working in mixed ability groups is a possible way of achieving this.

Give extra challenge by allowing the most independent students to tackle **Worksheet 1.21** in pairs or small groups.

Plenary suggestions

Consider the key points of this lesson, i.e. the two types of hierarchy and their application to any country/region.

Skills notes	Students have practice in interpreting tables, the pyramid diagram and graphs.

Assessment suggestions	The last few questions on **Worksheet 1.21** can be set as a homework or individual class exercise and then assessed. **Now investigate** questions **1** to **4** also present opportunities for assessment.

1.5(5) Service provision in an area

Assessment objectives

- Candidates should understand that people are more willing to travel longer distances to obtain certain goods and services than they are for others.
- Candidates should know that, as a rule, the more expensive the item, the more choice people want and the further they will travel to find this.

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1.5 Settlements and service provision

- Understand high-, middle- and low-order settlements and services, as well as sphere of influence and threshold population

Topic links: For more on the settlement hierarchy see pp. 45–6.

Differentiated learning outcomes

- **All students must** know that different sizes of settlements provide different shops and services (Grade E/D).
- **Most students should** know why different types of service provision often have different population thresholds (Grade C/B).
- **Some students could** know the key terms associated with urban settlement (Grade A/A*).

Resources

- **Student Book**: pp. 47–9
- **Worksheet**:
  1.22 Spheres of influence
- **Photographs**:
  1.33 Market stalls in Bangkok, Thailand
  1.34 Shopping centre in Hong Kong
  1.35 Union Street, Ryde, Isle of Wight
- **Further reading and weblinks**: None

Key concepts	• Application of the ideas of threshold population and sphere of influence/catchment area to particular locations.

Starter suggestions

Ask students about their shopping patterns and those of their parents. For instance, where would they buy particular items or services? Note the type of good/service suggested, whether it is needed rarely/often, whether its cost is high/low, and how far your students are prepared to go for it (they could estimate the distance in km) and to what size of settlement.

You should find a pattern: they go further for expensive things needed occasionally, and only a short distance for something cheaper and needed more often. Any size of settlement, from village upwards, can supply the basics, but expensive items are usually found only in towns and cities. Compare particular items like daily food, for which you would not go far, and luxury items for which you would want more choice and you would be prepared to go further to get that.

Photos **1.33** and **1.34** from the downloadable resources show different shopping locations. Ask students to identify the type of product/service they might buy in each of these.

Main lesson activities

1 Read the first paragraph in the Student Book. Consider the idea of demand, using the cake shop idea or something similar that your students relate to well. Explain to students the key definition of *threshold population*. Illustrate this using table **A**. Note down the definition. Add in extra examples of your own that are meaningful to your students. Google 'Sarlat market', and then click 'Images'. Sarlat is a market town in the Dordogne region of France. It serves the local population plus many tourists in the summer. Use the market stall photos and ask the students what size of threshold population is likely for each of these businesses.

2 Graph **B** shows population thresholds for a variety of services. Ask students to describe the pattern shown, then read the text on population threshold data. Many factors affect threshold population, such as community preferences and traditions, shown in the football kit example (prior to case study on p. 48). Ask your students to think of similar examples that apply to their home area.

   Use **Now investigate** question **1** on 10 items bought by your family. This uses the students' own experience so it should help them understand the concept.

3 Specific businesses have their own threshold for establishing a store. For example, in the UK and Canada, the Marks & Spencer company considers a market of 50 000 people is the minimum for setting up a small department store. The wealth of the population in the area is also taken into account. Ask students to think of an equivalent business in their home area which considers not just the number of possible customers but also their wealth.

4 Use the Isle of Wight case study to teach the idea of *catchment area/sphere of influence*. The definition should be noted down. Students can learn about the characteristics of Ryde from photo **C** on p. 49 of the Student Book and also photo **1.35** from the downloadable resources. Graph **E** shows the number of businesses on the Isle of Wight by category. Ask students to write a description and explanation of the data on this graph and to relate it back to your previous discussions on your local area.

5 Students should work in small groups on **Now investigate** questions **2**, **3** and **4**. It would be useful if they present their thoughts to the rest of the class.

6 Use **Worksheet 1.22** as a support and assessment of students' understanding of this topic.

Give extra support by discussing other examples of particular goods or services and how far it would be reasonable to travel to obtain them.

Give extra challenge by asking students about the shape of spheres of influence. What affects their size and shape (for instance the travel network, landscape features)?

Plenary suggestions

The **Fantastic fact** (Student Book p. 47) states that the catchment area for the highest-quality jewellery sold in central London is the whole of the British Isles. In fact, it may be even greater, as London has many global tourists who come to Hatton Garden, the city's jewellery district, to shop. Ask students to think of other very high-order goods or services available in cities and to suggest where the customers come from. This will reinforce the ideas taught in the lesson.

Skills notes	Students have further practice in the interpretation of graph, map and photo.

Assessment suggestions	**Worksheet 1.22** will test some of the ideas taught in this lesson.

1.6(1) What kind of settlement do you live in?

Assessment objectives

- Candidates should know how settlements can be put in order of their size and importance.
- Candidates should understand how the size of a settlement and its sphere of influence are linked.
- Candidates should know that large urban areas have land use zones, which can serve different functions.
- Candidates should understand that growth depends on the nature of a settlement's site and situation.

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1.6 Urban settlements

- Describe and give reasons for the characteristics of, and changes in, land use in urban areas

Differentiated learning outcomes

- **All students must** know the main difference between site and situation (Grade E/D).
- **Most students should** know the key differences between site and situation and be able to apply them to a particular example (Grade C/B).
- **Some students could** understand the many advantages of the situation of a major urban area (Grade A/A*).

Resources

- **Student Book**: pp. 50–2
- **Worksheet**: None
- **Photographs**:
  1.36 Aerial view of Paris
- **Further reading and weblinks**:
  www.geography.learnontheinternet.co.uk/topics/urban.html
  (follow the route to the case study of Rio de Janeiro as a South American city)

Key concepts

- Differences between site and situation.
- An appreciation of the type and scale of settlement in which the student lives.
- Reasons for the growth of a world city, represented by the example of Paris.

Starter suggestions

Refer back to previous lessons by asking students to recall the definition of *rural settlement* and to make a list of the differences between rural settlement and urban settlement.

Use the **Fantastic fact** regarding the Parisian population to show how dominant a city can be within a country – especially a capital city.

Download an aerial view of Paris and ask students to discuss the characteristics of a large world city such as this.

Main lesson activities

1 Refer to photos/text **A** and **B** in the Student Book to see how people in different situations see their own urban environments. Compare the locations and attitudes/perceptions of Pedro and Maria. Note that this exercise involves a comparison of young people from different social and economic backgrounds in urban settlements at varying scales.

2 What is the point of the speech bubbles comparing the contrasting situations regarding car sales/top showrooms for new cars as against second-hand vehicles? Ask students what they think these comments are showing them.

3 Explore the idea of how your students see the town/city in which they live. This is easier if you live in an urban area, but most students who are village-based know a local town/city and can use their imagination to make such a comparison possible.

4 Use **Now investigate** question **1** on p. 51 to get students to compare the settlement where they live with those of Pedro and Maria.

5 Ask students to consider why Maria says she wants to move to the city when she leaves school. In what ways might she gain and lose? Are your students in a similar situation?

6 Look back at the definition of *situation* used in Topic 1.5 (see **Main lesson activity 4** on p. 51 of this Teacher Guide). Students need to note and know this definition well. A settlement is more likely to grow if it is a route centre, at a confluence where valleys meet, is on a navigable river or on the coast. Ask students to relate these things to Paris, their home town/city, or another one they all know.

7 Paris: location and growth of a capital city.

(a) Read through the Paris example with your students. Ask them what they think were the main characteristics of the *site* and *situation* of Paris that encouraged its development.

(b) Answer **Now investigate** question **2**, which extends these ideas on the *site* of Paris. Reference to map **C** and photo **1.36** from the downloadable resources will help here. Use the opportunity here to remind students of the value of an annotated map.

8 Use map **E** to answer **Now investigate** question **3** on the *situation* of Paris.

9 Homework: **Now investigate** question **4** helps students to apply to other urban locations the ideas taught in this lesson in the context of Paris.

Give extra support by asking weaker students to identify the site and situation of their own settlement, so that they understand the key differences.

Give extra challenge by asking students to apply this work to an urban settlement they do not know.

Plenary suggestions

Discuss the St Lucia map (Student Book p. 42) in preparation for the suggested homework, main lesson activity **9** above. Continue to emphasise the difference between *site* and *situation*.

Skills notes	Students interpret annotated sketch maps and develop their ability to draw these. They also develop the ability to comment on photos in the context of site and situation. There is opportunity for some graph interpretation.

Assessment suggestions	Homework questions that could be used for assessment: **1** In what ways does the *site* of Paris contribute to its success as a world city today? **2** In what ways does the *situation* of Paris contribute to its success as a world city today? These will enable students to use the example, and show you that they can differentiate successfully between the concepts of site and situation.

1.6(2) How does urban land use change, and why?

Assessment objectives

- Candidates should know that an increasing proportion of the world's population live in urban areas.
- Candidates should understand that large urban settlements are made up of zones with different functions and that urban land use models can be used to understand these patterns.
- Candidates should understand the main functions and characteristics of each urban zone, and that these can change over time.
- Candidates should be able to explain how land use zones in LEDCs and MEDCs are both similar and different.

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1.6 Urban settlements

- Describe the land use zones including the Central Business District (CBD), residential areas, industrial areas, and the rural-urban fringe of urban areas in countries at different levels of economic development

Topic links: See Topic 1.7 pp. 66–8 for more on squatter settlements.

Differentiated learning outcomes

- **All students must** know how urban settlements are made up of different land use zones (Grade E/D).
- **Most students should** know how to use the Burgess and Hoyt land use models to evaluate zone patterns in urban settlements, using photos and other evidence (Grade C/B).
- **Some students could** apply the Burgess and Hoyt land use models to their own urban settlements and to others they may study (Grade A/A*).

Resources

- **Student Book**: pp. 52–4
- **Worksheets**:
  1.23 Using the Burgess land use model
  1.24 Hoyt's urban land use model
- **Photographs**: None
- **Further reading and weblinks**:
  http://en.wikipedia.org/wiki/Concentric_zone_model
  https://people.hofstra.edu/geotrans/eng/ch6en/conc6en/burgess.html
  http://en.wikipedia.org/wiki/Sector_model
  http://geobytesgcse.blogspot.com/2007/02/urban-land-use-models.html

Key concepts

- Urban areas can be divided into different land use zones which are located in particular parts of the town/city; there are four main land use zones.
- Transects show a cross-section through an urban area, showing the various land use zones.

Starter suggestions

Begin the lesson by introducing the term *urbanisation* – the process by which an increasing proportion of the world's population lives in cities. The **Fantastic fact** gives a figure for the proportion of the world's population living in urban areas in 2008.

Main lesson activities

1 Read the text in the Student Book on Keetan's view of his home city of Kolkata. Ask students to identify the different land use areas of the city based on this. Follow this with **Now investigate** question **1** to do a similar exercise on your own town/city (or the nearest town/city if you are in a rural area).

2 Two key land use models: use this opportunity to teach/revise the concept of a model in Geography. Students have already used the stages of economic development in this section, so they should understand that the purpose of a model is to simplify the real world with the aim of understanding basic patterns, and then bringing detail back into the picture in order to explain particular situations.

(a) Burgess urban land use model (diagram **B**): Burgess designed this model in the 1920s, based on the real city of Chicago. Chicago did not, in fact, spread evenly in all directions due to landscape factors, but Burgess simplified it to a more universal pattern that could be applied to any town or city. Explaining this background theory to your students at an appropriate level will help them understand what a model is and why we use them in Geography.

Use **Worksheet 1.23** to help students understand the growth of a town/city in the style of the Burgess model.

(b) Hoyt urban land use model (diagram **C**): this is a similar but contrasting urban land use model. It is based on the premise that major routes – roads, railways, canals, rivers – attract certain types of economic development (mainly industry) and repel others (middle to higher-class residential). Homer Hoyt was an American like Burgess, but he looked at city land use from a slightly different angle.

Read the text in the Student Book on the Hoyt model with your students. Identify the key characteristics that make this model different from the Burgess model. Consider your own home town/city (or nearest urban settlement). Does it fit more with Hoyt's or Burgess's model, or with neither of these? **Worksheet 1.24** allows your students to work with the Hoyt urban land use model.

3 Recent changes in urban land use: read the text on changes in today's urban land use in the Student Book. Ask your students the following:

(a) Identify the recent land use changes in your home/nearest urban area. In what ways have these altered the urban land use model for this settlement?

(a) Has this settlement had additional development on its edges – out-of-town retailing, for example – which have made the Burgess/Hoyt models less relevant to explaining its land use? Ask students to list these new developments.

4 Using transects: a transect is a cross-section, in this case (diagram **D**) drawn through a city and its different land use zones. Students should be encouraged to identify the land use zones across the city. How do these relate to the Burgess/Hoyt models?

Give extra support by simplifying models where necessary, to help weaker students understand the basic concept of a model as well as its possible applications.

Give extra challenge by using the question in main lesson activity **4** and encouraging students to research other urban land use models (e.g. the multiple nuclei model). Does this apply to your settlement or one you know well?

Plenary suggestions

Summarise the land use zones identified in this lesson.

Return to Keetan in Kolkata. Re-cap the land use zones mentioned in his account.

Skills notes	Students study diagrams showing geographical models, urban transects, and apply these to places in the real world.

Assessment suggestions	Use the **Now investigate** question **2** on p. 54 to test students' understanding of the general themes and content. Main lesson activity **4** will test the brightest students.

1.6(3) Urban zones

Assessment objectives

- Candidates should know the key characteristics of the main urban land use zones.
- Candidates should understand the links between urban land use zones and maps, street plans and photos of equivalent areas.
- Candidates should be able to identify urban land use zones relevant to their own home area.

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1.6 Urban settlements

- Describe the land use zones including the Central Business District (CBD), residential areas, industrial areas and the rural–urban fringe of urban areas in countries at different levels of economic development

Differentiated learning outcomes

- **All students must** know the four main land use zones in an urban area, and their characteristics (Grade E/D).
- **Most students should** be able to recognise each of these four zones on photographs, maps and street plans (Grade C/B).
- **Some students could** recognise details of the different land use zones on local maps (Grade A/A*).

Resources

- **Student Book**: pp. 54–6
- **Worksheets**: None
- **Photograph**:
  1.37 Part of the CBD in Shanghai, China
  1.38 Suburban scene in an MEDC
- **Further reading and weblinks**: None

Key concepts

- There are four main types of urban zone: the CBD, the inner zone, the outer zone (suburbs) and the rural–urban fringe.
- CBDs have very similar characteristics whether they are located in MEDC or LEDC cities.

Starter suggestions

Refer back to the urban land use models in the previous lesson and ask students to list the key land use zones and their basic characteristics.

Main lesson activities

1 Use photo **A** on Student Book p. 54 (photo **1.37** from the downloadable resources) to link the CBD characteristics stated above to this real world image. Many of these buildings are high-rise. Answer these brief questions with your students:

(a) Why are so many buildings in the CBD high-rise? Can you distinguish between the older and newer buildings within the CBD on this photo by looking at the style and building materials involved? Explain how you know the differences.

(b) Research some more photos showing the CBDs of both MEDC cities and LEDC cities, and then answer these questions:

- What are the differences between the CBDs of MEDCs and of LEDCs?
- What are the similarities between these cities?

2 Together read the text in the Student Book on the CBD. Draw a basic spider diagram with 'CBD' at the centre. Students should copy this and then add as many 'legs' as necessary to show the variation in land use found in this central urban zone. Do not make the centre too large, to reflect the fact that the actual area of the CBD is remarkably small. Ask students to suggest why you have made it so small; this will act as a useful revision of material from the previous lesson. Use **Now investigate** question **1** to emphasise these ideas.

3 Use the photos to show students that not all CBD buildings are shops and offices; some are residential. Together read the text and find out which members of the class would choose to live in the CBD, why and in what type/s of accommodation.

4 Using maps of CBDs: to take the work a stage further, answer **Now investigate** question **2**. This exercise will help students to see the links between photo and map interpretation.

5 Ask your students whether all the buildings in a CBD were built at the same time. The answer is *no* – in all urban zones they develop gradually over time. Older buildings become defunct as technology allows taller structures to be built. Refer to the photos (in the Student Book on pp. 54–56 and from the downloadable resources) to find evidence of this process.

6 Are CBDs in LEDCs the same as or different from those found in MEDCs? Photo **D** on Student Book p. 56 (photo **1.38** from the downloadable resources) will help here. The key point is that they do look very similar. In LEDCs enough technology and finance are available to build virtually identical urban zones. There are wealthy people to live there and companies to locate their offices there.

In that case, what do your students think are the key differences between richer and poorer world urban areas? They should read the text on the outer zones of cities and the rural–urban fringe. Then go back to their urban model diagrams and label these land use zones on those diagrams.

Draw up a table to show differences between cities in LEDCs and MEDCs. Use the land use zones from the urban models as headings.

7 Consider the inner and outer zones of the town/city when answering **Now investigate** question **3**. The land use here is considerably different to the CBD. You might have time to consider why this is so.

Give extra support by helping students identify the key characteristics of the CBD and other particular urban land use zones.

Give extra challenge by encouraging research into rural–urban fringe land uses.

Plenary suggestions

Students need to relate the material covered in this lesson with the urban land use models in the previous lesson. Working as a class, or in small groups, a Burgess and/or Hoyt model could be annotated with the key characteristics of each land use zone in a city that the students know.

Skills notes	Students practise photo interpretation. There are also links here to map identification of different urban areas.

Assessment suggestions	Use the **Now investigate** questions as a homework exercise to assess students' understanding of the material covered in this lesson.

1.6(4) The environmental impact of pollution

Assessment objectives

- Candidates should know that there are different types of pollution and how urbanisation increases the amount of pollution.

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1.6 Urban settlements

- Explain the problems of urban areas, their causes and possible solutions
- Understand different types of pollution (air, noise, water, visual), inequality, housing issues, traffic congestion, and conflicts over land use change

Differentiated learning outcomes

- **All students must** know the basic types of pollution (Grade E/D).
- **Most students should** understand a number of ways in which the natural environment is put at risk due to the impact of urbanisation (Grade C/B).
- **Some students could** understand in detail how and why the natural environment is put at risk due to the impact of urbanisation (Grade A/A*).

Resources

- **Student Book**: pp. 57–8
- **Worksheets**:
  1.25 Types of pollution in cities
  1.26 Living with pollution – a problem, or not?
- **Photographs**:
  1.39 Smog over Tel Aviv, Israel
  1.40 Eiffel Tower in Paris
  1.41 A wind turbine
  1.42 Polluted water
  1.43 Litter
  1.44 Air pollution
- **Further reading and weblinks**:
  www.time.com/time/specials/packages/completelist/0,29569,1661031,00.html

Key concepts

- There are four main categories of urban pollution, primarily caused by people.
- With care and planning, it is possible to limit people's pollution of their urban environment.

Starter suggestions

Decide with your students on a definition of pollution. Ask them what they think it is. They should aim to categorise it into different types. A standard definition of pollution is: 'The contamination of air, water or soil by substances that are harmful to living organisms. Pollution can occur naturally, for example through volcanic eruptions, or as the result of human activities.'

Note the term 'smog' and the source of the word: **sm**oke and f**og** = **smog**. Refer to the photo **B** on p. 57 of the Student Book (photo **1.39** from the downloadable resources) so that students understand the appearance and potential impact of this type of air pollution.

Main lesson activities

1 In their opinion, what categories of urban pollution are there (for this lesson use these four: air, water, visual, noise)? Ask students to identify examples from their own home area or from a town or city that they know, or simply from having read about cities or seen images on television or on the internet. For each idea offered to the discussion, place it into one of the four categories of pollution identified above. Identify the source of the pollution.

Students should use **Worksheet 1.25** and **Now investigate** question **1** to summarise their ideas and examples. They should keep the sheet to one side in case more detail can be added later on in this lesson.

2 Use diagram **A** to recap on the different types of pollution.

3 Research the world's most polluted cities using the Time website (see above). Students should choose one of the locations on the website and identify the key types of pollution shown. Then, in groups, they should produce a guide for visitors to that city, identifying the places that should be avoided for health reasons.

Are there certain parts of the world that have more heavily polluted cities than others? Students should list these.

Add 'smog' to **Worksheet 1.25** if your class does not already have this category on the sheet. Consider the consequences of air pollution in terms of people's health: coughs, bronchitis, asthma, etc. Use students' own experience to elaborate here.

4 Ask students to think about the types of pollution in their home/school area. They can then:

- identify the pollution problems
- list the ways in which residents experience the various types of pollution.

Are there any obvious ways in which people in your area cope with/reduce the pollution problems?

5 Noise pollution: read the extract in **Worksheet 1.26**, written by a resident living close to Gatwick, one of London's main airports. Students should discuss the text in small groups and then produce written comments. Groups can compare their opinions.

Discuss with students diagram **C** in the Student Book, to help them identify different levels of noise.

6 Visual pollution: use photo **1.40** from the downloadable resources and the **Fantastic fact** to illustrate how people can perceive the same structure very differently. Referring to photo **D** in the Student Book (photo **1.41** from the downloadable resources), discuss students' opinions of the visual impact of a wind turbine. Note that these can also be noisy. Students should answer **Now investigate** questions **2a** and **2b**.

7 Water pollution: discuss photo **1.42** from the downloadable resources. Do students know any local examples of water pollution? This ties in with answering **Now investigate** question **1** for homework.

8 Read the text on the Mercer Survey, which is a way of assessing how 'green' or pollution-free a city is. Can students think of any other environmental criteria that it would be useful to measure?

Give extra support by reinforcing the skills needed for **Now investigate** question **1** (set as homework) and by confirming the four categories of urban pollution listed above.

Give extra challenge by asking students to research the Mercer Survey.

Plenary suggestions

Return to **Worksheet 1.25**. Add any more forms of pollution students can think of. Using photos **1.39** and **1.41–1.44** from the downloadable resources, discuss in detail what aspects of pollution are being illustrated and link them to the relevant section of the worksheet. This creates a summary of the types of pollution covered in this lesson.

Skills notes	Students have further practice in photo interpretation, and in the construction of a table, sketch map or annotated photos, according to student choice in **Now investigate** question **1**.
Assessment suggestions	Students can be assessed on their research on the different types of pollution illustrated on diagram **A**. **Now investigate** question **1** should test students' overall understanding of the material on pollution presented in this lesson.

1.6(5) The effects of rapid urban growth on the rural–urban fringe

Assessment objectives

- Candidates must understand what is meant by 'urban sprawl', and its consequences for the rural–urban fringe.
- Candidates should know the types of development that are most likely to occur at the rural–urban fringe.
- Candidates should understand the ways in which development can be limited in the rural–urban fringe.

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1.6 Urban settlements

- Understand the effects of change in land use and rapid growth in an urban area, including the effects of urban sprawl

Topic links: See Topic 1.2 p. 22–3 for information on counter-urbanisation, and Topic 3.7 pp. 220–6 for more on environmental issues.

Differentiated learning outcomes

- **All students must** be familiar with a range of land uses that are typical of the rural–urban fringe (Grade E/D).
- **Most students should** know how rural–urban sprawl can be controlled (Grade C/B).
- **Some students could** understand the detail of land use conflicts in the rural–urban fringe (Grade A/A*).

Resources

- **Student Book**: pp. 59–61
- **Worksheet**:
  1.27 Activities in the rural–urban fringe: extension exercise
- **Photograph**: 1.45 Modern retail park
- **Further reading and weblinks**:
  On green belts:
  www.cpre.org.uk
  http://en.wikipedia.org/wiki/Green_belt
  On new towns:
  http://en.wikipedia.org/wiki/New_town

Key concepts

- Urban areas can have a significant impact on their surrounding environment.
- The rural–urban fringe contains land useful for large developments in industry, retailing and leisure activities, yet much is still used as farmland.
- Some land uses in the rural–urban fringe cause conflict with each other.

Starter suggestions

Begin with key definitions: *rural–urban fringe, urban sprawl, mobility, counter-urbanisation, green belt*. These are all terms that will be needed during this lesson. Students may be able to recall some of them from previous study.

Main lesson activities

1 In any town or city, the rural–urban fringe is the area where land is most likely to be available for new developments, in particular for activities that need a lot of land. There is increasing demand from leisure activities. Read the first paragraph in the Student Book to find out why.

Students answer **Now investigate** question **1a**, the OS map exercise on Mauritius, to identify some rural–urban fringe land uses. They could then add two columns to their table to record the following for each of the land uses:

- whether the land use serves urban residents, those in the rural area, or both
- whether the land use is for leisure.

Students then complete question **1b** (colour-coding), to further classify land use.

Students can apply what they have learned to their own home area by answering **Now investigate** question **2**. The same categories of who benefits, and the colour-coding, could be applied here. This might be best carried out as a whole class activity, to allow students to interact and exchange ideas.

2 Example of land use in the rural–urban fringe – retail parks: use the annotated photo **A** on p. 59 (photo **1.45** from the downloadable resources) to discuss the advantages that this area has for retail development. Think of the requirements of both the large retailing companies and of potential customers. Make a list. Ask your students whether this location fulfils all or most of these needs.

3 Controlling urban sprawl: read the text in the Student Book and ask students to identify ways in which the rural–urban fringe can be protected from development, for example by creating a green belt or establishing new towns at a distance from the city in order to attract people elsewhere. Divide students into two groups, one to research green belts and the other new towns. Some websites are suggested above.

4 Conflict in the rural–urban fringe: not all land uses work well together. Read the text to discover some areas of conflict. Students could write a paragraph to answer each of the following:

Farmers and visitors to the countryside often clash – why?

Local people are usually against quarrying in their area – why? Are there any advantages to having quarrying in the rural–urban fringe? (**Now investigate** question **4**).

5 Students use **Worksheet 1.27** to consider the changes that occur across the rural–urban fringe, from the city into the really rural area.

6 In many LEDC cities, urban sprawl results from shanty town development and new heavy industry. How do these developments affect the rural–urban fringe of these LEDC cities? Students could choose a particular LEDC city for further investigation as an extension exercise.

Give extra support by revising mapwork skills for those who find this difficult.

Give extra challenge by asking students to compare directly the rural–urban fringe developments of any two towns/cities, for example St Louis in Mauritius and Port Castries in St Lucia, or your home area and an area known to your students.

Plenary suggestions

Now investigate question **3** will serve as a revision of several points made during this lesson.

Skills notes	Students have practice in their map skills, using annotated photos, and table construction.

Assessment suggestions	**Now investigate** question **1b**, as proposed for main lesson activity **1**, provides opportunity for assessment.

1.6(6) Urban change

Assessment objectives

- Candidates should understand that today's cities came from small settlements but have changed radically over time to evolve into global cities.
- Candidates should understand that regeneration of poorer urban areas can be a bi-product of large scale projects, such as the Olympic Games.
- Candidates should understand the nature of urban redevelopment.

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1.6 Urban settlements

- Describe and give reasons for the characteristics of, and changes in, land use in urban areas
- Understand the effects of change in land use and rapid growth in an urban area, including the effects of urban sprawl
- **Topic links:** For more on site and situation see Topic 1.5 pp. 39–42 and on the environmental impact of urbanisation see Topic 1.6 pp. 57–60.

Differentiated learning outcomes

- **All students must** be able to understand, from map and photo evidence, how a city grows (Grade E/D).
- **Most students should** know how London began and developed and is likely to develop into the future (Grade C/B).
- **Some students could** conduct research on how regeneration projects will have long-term effects on parts of East London (Grade A/A*).

Resources

- **Student Book**: pp. 61–3
- **Worksheets**: None
- **Photographs**:
  1.46 London's East End
  1.47 Westminster, London
  1.48 London Docklands today
  1.49 London Olympic Park
- **Further reading and weblinks**:
  http://en.wikipedia.org/wiki/List_of_Olympic_Games_host_cities
  www.thoughtco.com/olympic-game-cities-1434453

Key concepts

- Today's cities have developed and changed through time.
- Great events, such as the Olympic Games, can be used to regenerate poorer urban areas.

Starter suggestions

Begin with the **Fantastic fact** that London was the largest city in the world in 1900. Today it is far from being the largest city, having been overtaken by other cities in both LEDCs and MEDCs. Research London's present population and compare it with those of other major world cities. This shows that London has changed dramatically in just over a century.

Main lesson activities

1 Study map **A**, which shows London as it was much further back in time, to its original site as Roman Londinium, which was primarily due to its being the lowest bridging point of the River Thames at that time. Ask students what is meant by the term 'lowest bridging point' and why it is important in terms of settlement development.

Ask students to describe the site of London and to explain the advantages and disadvantages this site held for these early settlers.

2 Use photos **B** and **C**, showing the East End of London and Westminster (photos **1.46** and **1.47** from the downloadable resources). Ask students to produce a written description and comparison of each area. This is an opportunity to emphasise key command words – *describe*, *explain*, *compare*, *contrast*, etc.

3 Students should read the text on the development of London, then answer **Now investigate** question **1**.

4 London's Olympic development – the sustainability of the future East End: London Docklands was redeveloped from the 1980s onwards into an extension of the 'City' of London (the financial district – photo **D** on p. 62 of the Student Book, and photo **1.48** from the downloadable resources). In many ways this was successful, but housing and employment for local people was not fully catered for in this project. One major aim of the Olympics was to change the Lea Valley, the area just east of Docklands, into an area with new buildings and opportunities. Study photo **1.49** of the Olympic Park. Ask students for their reactions and how they think London's development would be affected.

Research Activity: to investigate the changes the Olympic Park made to London.

Homework exercise	Students use the text and map **E** to answer **Now investigate** question **2**.

Give extra support by using map **E** to review annotation skills.

Give extra challenge by asking students to research previous Olympic city venues to see how the Olympic developments altered the city. Barcelona (1992) and Beijing (2008) are suggestions. Other cities are possible. Look at the websites in **Further reading and weblinks** for all the cities and their dates to give you a start. These events both stimulated economic growth and improved recreational facilities for the local population.

Plenary suggestions

Ask students whether they know of any large-scale projects in their own country linked to urban redevelopment, or in any other country.

Create a list, perhaps in small groups, to have as a revision tool when learning urban regeneration.

Skills notes	Students have practice in skills of description, annotation of sketch maps and of photos, and in summarising a short text.

Assessment suggestions	Students can be assessed on the homework research exercise (main lesson activity **4**). They should begin with the text and map **E** showing changes to the London Docklands area and the Olympic Village. Students could research the growth of a city other than London in the same way. The following headings could be used: • Original site • Reasons for growth • Changes in land use today • Possible future changes.

1.7 (1) What problems are caused when cities grow?

Assessment objectives

- Candidates should know that traffic congestion is now a global urban problem.
- Candidates should learn what strategies are available for reducing traffic congestion.

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1.7 Urbanisation

- Identify and suggest reasons for rapid urban growth
- Describe the impacts of urban growth, along with possible solutions to reduce the negative impacts

Topic link: For more information on the effects of pollution in cities see Topic 1.6 pp. 57–8.

Differentiated learning outcomes

- **All students must** know a limited range of reasons why traffic congestion occurs (Grade E/D).
- **Most students should** know the main causes and times of traffic congestion, and a number of strategies for reducing traffic congestion (Grade C/B).
- **Some students could** know a wide range of strategies for reducing traffic congestion (Grade A/A*).

Resources

- **Student Book**: pp. 64–6
- **Worksheet**:
  1.28 Solving traffic congestion
- **Photographs**:
  1.50 Traffic in Los Angeles, USA
  1.51 Traffic jam in Darjeeling, India
  1.52 Section of the Metro Monorail in Sydney, Australia
- **Further reading and weblinks**: None

Key concepts

- All cities in the world suffer from traffic congestion.
- Traffic congestion is worst at the times when people are travelling to and from work (commuting).
- There are many ways of tackling traffic congestion, mostly through making public transport services more frequent and more affordable.

Starter suggestions

Ask students to identify any traffic problems in your home area or in other settlements with which they are familiar. Ask them why they personally travel and then widen the question out to include family members, friends and so on.

Read the first paragraph on p. 64 about why people travel. This states that the main reason is travelling to work/school/college and should coincide with the comments made in this introductory conversation.

Main lesson activities

1 Commuting as the main cause of traffic congestion: ask students to what extent there is a rush hour in their neighbourhood, then aim to identify the key busy times. (If students live in a rural area, they can still answer these questions based on their knowledge of a town or city known to them.) Use photos **1.50** and **1.51** from the downloadable resources to illustrate just how bad traffic jams can be.

2 Use diagram **A** to list other reasons for travel that may lead to congestion. Overall, travel to work/school/college is likely to come out as the top reason.

3 Graph **B** shows the changing volume of road traffic on a typical work day. It should reinforce your discussion to date. Use the graph to identify the busiest times of the day, as asked in **Now investigate** question **1** on p. 65. Students could

use this opportunity to write a description of the data shown in the graph, not forgetting to quote figures from the diagram.

4 Use the text on the changing volume of road traffic on a typical work day to make a list together, or in small groups, of the reasons for rush hours. Students should compare lists with each other to ensure that everyone has the most comprehensive list possible.

The most common reason for traffic congestion is the dramatic rise in car ownership, especially in LEDC cities. As the standard of living rises, people have greater disposable income and are therefore more likely to be able to afford a car. As the economy expands, there are more vans, lorries/trucks on the road as well. Graph **C** illustrates this for India, today classed as an NIC (Newly Industrialised Country) with a rapidly expanding middle-class population. Students should answer **Now investigate** question **4**.

5 Discuss with students their experience of traffic congestion. What are the consequences of congestion in terms of people's time, stress levels and the environment? Can students think of any personal examples to illustrate here?

6 Solving traffic congestion: refer to photo **D** on p. 65 (photo **1.52** from the downloadable resources) showing a public transport system. Students should note down the possible solutions suggested in the text, and research extra information on one particular example. For instance, many cities have congestion charging – London, Singapore and Oslo, for example. They should research one city and write a few lines on its method. The **Fantastic fact** idea on p. 65 can be included in the list.

Give extra support with graph and photo interpretation.

Give extra challenge by asking students to identify likely locations on the map where traffic congestion may occur; and by encouraging extra research in sustainability using the website address above.

Plenary suggestions

A short summary of this lesson can be done by completing **Worksheet 1.28**.

Skills notes	Students have practice in graph description and interpretation, data collection (recording by tally chart and interpreting this primary data), and in using map symbols and general map reading.

Assessment suggestions	**Now investigate** question **2**: it will take a week to collect the necessary data and then a little time for the write-up. **Now investigate** question **4** allows students to write a longer answer on the basis of their own data interpretation and understanding of the text.

1.7 (2) Squatter settlements

Assessment objectives

- Candidates should understand that many cities grow so rapidly they cannot meet people's needs.
- Candidates should know that squatter settlements are a major feature of most large cities in less economically developed countries.
- Candidates should understand that, while moving to a squatter settlement can be very difficult, it can bring upward mobility to some migrants or to their children.

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1.7 Urbanisation

- Identify and suggest reasons for rapid urban growth
- Understand the physical, economic and social factors which result in rural depopulation and the movement of people to major cities
- Explain the effects of urbanisation on the people and natural environment and the characteristics of squatter settlements

Topic links: For more information on push–pull factors in migration see Topic 1.2 pp. 21–2; on land use zones in cities see Topic 1.6 pp. 52–6.

Differentiated learning outcomes

- **All students must** be able to describe a squatter settlement and its buildings and understand some reasons why people migrate there (Grade E/D).
- **Most students should** be able to differentiate between the negative and positive aspects of living in such a settlement (Grade C/B).
- **Some students could** research other squatter settlements and be able to compare them (Grade A/A*).

Resources

- **Student Book**: pp. 66–8
- **Worksheet**:
  1.29 Rural–urban migration crisis!
- **Photographs**:
  1.53 A squatter settlement in Mumbai, India
  1.54 Kibera, Nairobi
  1.55 A favela in São Paulo, Brazil
- **Further reading and weblinks**:

  www.coolgeography.co.uk/GCSE/AQA/Changing%20Urban/Shanties/Squatter%20settlements.htm

  www.slideshare.net/tudorgeog/case-study-of-a-squatter-settlement-kibera-nairobi-6439924

  www.bbc.co.uk/schools/gcsebitesize/geography/urban_environments/urbanisation_ledcs_rev3.shtml

Key concepts

- Squatter settlements have both negative and positive aspects for the people who live in them and for the city as a whole.
- One in seven people in the world live in some sort of slum settlement.

Starter suggestions

Read the first paragraph on p. 66 together as a class. Refer to photo **B** on Student Book p. 67 (photo **1.53** from the downloadable resources), and photos **1.54** and **1.55** from the downloadable resources, so that students get a clear image of exactly what such an area looks like. Use map **A**, of Mumbai, to demonstrate just how extensive squatter settlements can be.

Main lesson activities

1 Ask students to think about the high population densities found in the shanty towns. A figure of 30 000 per km^2 is quoted. Look up the overall densities of some cities in less economically developed countries and compare them with this figure.

2 Why do people migrate from rural areas to urban squatter settlements? It may seem that they are not getting a very good deal. There are two sets of reasons why people decide to make such a move. Economic problems at home in the countryside leave them in severe poverty (push factors), and they are attracted by news of opportunities in the cities (pull factors). Students could list the push and pull factors involved, which will help them understand these people's decisions.

3 Read the text on p.66 on challenges facing new migrants in the city: getting a job and finding somewhere to live. Ask students for their reactions to these people's situation. They should work through the first exercise on **Worksheet 1.29**, which shows the negative side of people's experience. Answer **Now investigate** question **1a**.

4 Mumbai case study: read this section in the Student Book, and go online using the coolgeography website listed above. Search and follow links to find images of Dharavi, in Mumbai. Students should list the problems they can observe in the text and on the website, considering environmental, social and economic issues. They should then contrast that list with positive aspects of living in a squatter settlement. How might moving to such a settlement improve people's chances in life? (**Now investigate** question **1b**). This ties in with the second exercise on **Worksheet 1.29**.

Students should decide whether they think, on balance, that the negative aspects of living in a squatter settlement outweigh the advantages.

Give extra support by asking students to annotate a photo of Dharavi or other squatter settlement to highlight the advantages and disadvantages of living there.

Give extra challenge by asking students to research a case study of a particular squatter settlement other than Dharavi, perhaps one in South America.

Plenary suggestions

This lesson has contrasted the advantages and disadvantages of living in a squatter settlement. Students have had plenty of opportunity to consider and evaluate these. Ask them to write a short paragraph to summarise their feelings on the prospect of having to live in such a location.

Recap on the key terms in this lesson: *informal sector, formal sector, favelas/barriadas/bustees/bidonvilles.*

Skills notes	Students have practice in photo and diagram interpretation and annotation. They should also develop empathy – putting oneself in the position of others and assessing their reactions.

Assessment suggestions	Students can be assessed on their ability to describe the scale and distribution of squatter settlements in Mumbai, using the case study map; and on their answers to **Now investigate** questions **2** and **3**. They can conduct research on 'favela tourism', a new development in some cities. Tourists can visit squatter settlements, such as Khayelitsha in South Africa, and even stay there to get a taste of what life is like. Use the Nomvuyos website www.nomvuyos-tours.co.za/township_info.shtml. In some Brazilian cities, squatter settlements were being cleared in the run-up to the 2014 World Cup, so that visitors did not have to look at these slums. Students should write about their reactions to this policy. This work could take the form of a newspaper article.

1.7 (3) Ways of upgrading residential areas

Assessment objectives

- Candidates should be able to explain how housing can be upgraded by renovation and redevelopment.
- Candidates should be able to compare different examples and their characteristics in terms of environmental, social and economic criteria.

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1.7 Urbanisation

- Describe the impacts of urban growth on both rural and urban areas, along with possible solutions to reduce the negative impacts
- Suggest strategies to reduce the negative impacts of urbanisation

Differentiated learning outcomes

- **All students must** know that there are different strategies by which squatter settlements can be improved (Grade E/D).
- **Most students should** know the difference between renovation and redevelopment – strategies to improve poorer urban areas (Grade C/B).
- **Some students could** know a wide range of ways of renovating and redeveloping urban communities (Grade A/A*).

Resources

- **Student Book**: pp. 68–70
- **Worksheets**: None
- **Photographs**:
  1.56 A self-help scheme in Roçinha, Rio de Janeiro
  1.57 High-rise flats in 6th of October City
  1.58 Low-quality terraced housing in Harlem, New York
  1.59 A 'new town' area in Singapore
- **Further reading and weblinks**: None

Key concepts

- Self-help schemes aim to create a community, improve people's standard of living and upgrade services.
- Site and service schemes are more ambitious: they are based on a whole new development, with a higher level of services provided.

Starter suggestions

Use photos **A** and **B** on Student Book p. 69 (photos **1.56** and **1.57** from the downloadable resources) to encourage students to make comparisons between these two urban areas.

Answer **Now investigate** question **1**.

Main lesson activities

1 Ask students to list the problems being faced by families living in squatter settlements in poorer world cities. This is revision from the previous lesson.

2 Comparing improved areas in LEDC cities: read the examples on Roçinha in Rio de Janeiro, Brazil (a self-help scheme) and 6th of October City, Egypt (a site and service scheme). Students should prepare a table of similarities and differences between the two types of improvement. Note the **Fantastic fact** on p. 70 about Cairo.

Now investigate question **2** would fit well here to reinforce the LEDC example material.

3 If you live in an LEDC, identify a squatter settlement that is in need of improvement. Students should follow the instructions in **Further research** on p. 70 of the Student Book, including the location map and annotated photos.

They should then decide what type of improvements would most benefit this settlement – a self-help or site and service scheme – giving reasons for this decision and making suggestions for the necessary improvements.

4 Improving poorer areas in MEDC cities: new towns have been built in many MEDCs to relieve population pressure in cities, and today this is sometimes carried out in LEDC cities too. 10th of Ramadan City, being built entirely from new, could be classified as a new town. In the UK during the 1950s and 1960s, many new towns were constructed around London, Glasgow and Edinburgh to relieve urban areas cramped and poor-quality housing. Crawley and Harlow (near London) are examples.

Read the text on pp. 69–70 and look carefully at the detail in photos **C** and **D** (photos **1.58** and **1.59** from the downloadable resources).

Ask students to identify any similarities and differences they can see between these MEDC developments and the previously discussed LEDC changes.

Extension activity	Students could conduct further research on another MEDC city's solutions to housing problems.

Give extra support by asking weaker students to make clear lists of the characteristics of each type of improvement scheme, for comparison and to make the key points easier to learn.

Give extra challenge by asking brighter students to research similar schemes in other cities and to write a two-to-four paragraph section on their findings and any further comparisons they are able to identify. They could also consider ways in which these recent developments are or are not environmentally sustainable.

Plenary suggestions

Ask students to think of any other ways in which people in squatter settlements might be helped to improve their lives. Consider the practicalities and economic soundness of their suggestions.

Skills notes	Students have practice in photo interpretation and in summarising and evaluating material.

Assessment suggestions	**Now investigate** question **4** will engage students in many aspects of squatter settlement and slum district change in both LEDCs and MEDCs. It will act as an excellent summary of the material in this lesson.

1.7 (4) More sustainable cities

Assessment objectives

- Candidates should understand the concept of a sustainable city and know the ways in which it avoids pollution.

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1.7 Urbanisation

- Suggest strategies to reduce the negative impacts of urbanisation

Topic link: For more on sustainable development see Topic 3.7 pp. 227–34.

Differentiated learning outcomes

- **All students must** know some strategies for making cities more sustainable (Grade E/D).
- **Most students should** know the details of at least one example of a sustainable city (Grade C/B).
- **Some students could** understand how the four strategies for sustainability interact with each other (Grade A/A*).

Resources

- **Student Book**: pp. 70–2
- **Worksheet**:
  1.30 Four strategies for sustainability
- **Photographs**:
  1.60 A three-section bus and 'tube' bus stop
  1.61 A park in the centre of Curitiba
- **Further reading and weblinks**:
  http://reimaginerpe.org/node/344

Key concepts

- Some cities have clear strategies to limit the pollution emitted and thereby to reduce the impacts of urbanisation on the environment.
- Public transport and green spaces are two key strategies in making a city more 'green'.

Starter suggestions

Ask students for their ideas on the meaning of the word 'sustainable'. Make sure this is placed in the context of urban areas.

Read the final paragraph of text on p. 70 of the Student Book and use this to complete the simple diagram on **Worksheet 1.30**.

Main lesson activities

1. Read the section of text on the development of Curitiba, Brazil (pp. 71–2), and the progress of its green policies. Students could summarise this historical information in their own words or in a flow diagram.
2. For each of the four actions taken to make Curitiba greener in the 1970s, ask students to explain likely reasons for these policies. For example, establishing bus-only lanes makes buses faster than other vehicles, encouraging people out of their cars and onto the public transport system (p. 72).
3. Read together the section of text about the Bus Rapid Transit system under the side-heading 'In the 1990s', and ask students what is meant by a mass transit system – refer to photo **C** on p. 72 of the Student Book (photo **1.60** from the downloadable resources).

Use a search engine to research further into this public transport network. Ask the following questions:

- What are the advantages and disadvantages of this system?
- Would your students choose it over car travel to work, college or school? They should try to give their reasons.

4 Photo **B** on p. 72 of the Student Book (photo **1.61** from the downloadable resources) shows a planned green area, typical of several in Curitiba. The city government has actively promoted such areas and continues to do so. Students should answer the following:

- What are the characteristics of the green areas in Curitiba?
- What are the main uses to which they will be put by the population of the city?
- Are there any disadvantages of having these green urban zones?

Note the **Fantastic fact** on p. 72 about sheep being used to control the grass in the parks rather than lawn-mowing equipment!

Extension activity	Consider how the green policies in Curitiba might be used in: (a) your home town or city (b) a town/city you know well, or in the city you have chosen when answering **Now investigate** question **2** (below). This will create a case study on sustainable cities. In each case students should ask the questions: • What strategies have been used to improve the environment? • What plans are there to make the city greener in the future?

Give extra support by encouraging students to think of suitable annotations for several photos in the Student Book and on the websites recommended for this lesson. (This is an extension of the plenary activity.)

Give extra challenge by asking students to answer **Now investigate** question **2**. This will require personal research. Other possible cities are Beijing, Los Angeles and Kuala Lumpur. You could also refer to the website https://wikipedia.org/wiki/List_of_most_polluted_cities_by_particulate_matter_concentration which gives a list of the world's most polluted cities.

Plenary suggestions

Choose any photo of 'green' Curitiba and ask students to think of suitable annotations to highlight pollution control methods.

Skills notes	Students have practice in designing a flow diagram, and photo annotation.

Assessment suggestions	Using the material in the Student Book on Curitiba, students should answer **Now investigate** question **1** and write an account of all the ways in which Curitiba's city government has managed to fulfil each of the four strategies listed at the top of p. 71 and on **Worksheet 1.30**.