G URBAN ENVIRONMENTS

According to the UN, much of the world's population lives in urban environments. These areas are constantly evolving as people enter and leave. This creates opportunities and challenges economically, socially and environmentally for local and national governments, infrastructure and for the people who live in these places.

You should be able to show:

- ✔ the characteristics and distribution of urban **places**, populations and economic activities;
- ✔ how economic and demographic **processes** bring change over time to urban systems;
- ✔ the varying **power** of different stakeholders in relation to the experience of, and management of, urban stresses;
- ✔ future **possibilities** for the sustainable management of urban systems.

G.1 THE VARIETY OF URBAN ENVIRONMENTS

You should be able to show the characteristics and distribution of urban places, populations and economic activities:

- ✔ Characteristics of urban places, including site, function, land use, hierarchy of settlement (including megacities) and growth process (planned or spontaneous);
- ✔ Factors affecting the pattern of urban economic activities (retail, commercial, industrial), including physical factors, land values, proximity to a central business district (CBD) and planning;
- ✔ Factors affecting the pattern of residential areas within urban areas, including physical factors, land values, ethnicity and planning;
- ✔ The incidence of poverty, deprivation and informal activity (housing and industry) in urban areas at varying stages of development.

- **Site** – the actual land on which a settlement or an urban area was established.
- **Function** – the main economic activities that take place in an urban area.
- **Deprivation** – people and groups that experience a lower standard of living than the majority of people living in an urban environment.
- **Informal housing** – residential areas that have been built illegally by residents.
- **Informal sector** – people who work in the informal sector do not declare their income and pay no tax on it. This is also known as the black economy, the shadow economy or the grey economy.

Characteristics of urban places

When considering the original sites of settlements, the presence of flat land would have allowed for the straightforward construction of buildings, and the proximity to water would provide a supply for drinking and for irrigating crops.

Concept link

PLACES: Urban environments evolve, and towns and cities develop an identity as a whole along with the areas within them. Economic and social processes take place and the physical geography of a locality will also enable change.

Test yourself

G.1 State an alternative name for informal housing. [1]

G.2 Describe the location where informal housing is normally found in a LIC. [2]

G.3 Suggest two reasons why the housing has been built in the location you described above. [2+2]

The location of a settlement would subsequently give a village, town or city a function. For example, a market town could develop where agricultural produce from nearby rural areas could be bought and sold.

A settlement can be multifunctional and it can evolve over time. The land use in a town or city can also vary, with industrial, residential and recreational land uses existing in many urban environments. Planning regulations may dictate how land is to be used in an urban area and also how it is not be used.

Urban growth can be spontaneous (for example, illegal settlements) or it can be planned (such as new private or public housing developments). Thus urban places are unique and dynamic as they are established and evolve.

Factors affecting the pattern of urban economic activities (retail, commercial, industrial)

Secondary (manufacturing) and tertiary (services) economic activities are located in urban areas. Secondary activities will require a larger amount of land compared to tertiary economic activities. All land has a value, and in theory the closer you get to the central business district (CBD), the higher the cost of the land. Service industries such as offices, restaurants and bars tend to be located closer to the CBD as workers and consumers will all have access to this area via public and private transportation.

Factors affecting the pattern of residential areas within urban areas

Residential areas have already been mentioned above in relation to the establishment of informal housing. The location of formal housing is decided based on the cost of the land and the planning restrictions set by the local authorities. Land that is more expensive and closer to the CBD will be used for apartment blocks, since building upwards rather than outwards (which might not be possible anyway) will reduce the development costs in terms of the purchase price of the land.

Redevelopment can take place. For example, apartment blocks may be demolished and replaced with detached/single-family houses.

Housing can be both privately owned and public (provided by the government), and the location of public housing can vary. For example, inner-city public housing and edge-of-city public housing can exist in cities in the same country. The value of the housing can also vary, with some parts of an urban area being more desirable than others.

Test yourself

G.4 Suggest three reasons why different ethnic groups are often concentrated in different parts of cities. [3+3]

As people migrate to urban environments, the diversity of places increases. Some areas may have a higher concentration of people from a particular ethnic background due to the existence of familiar cultural traits or cheap rent prices.

In summary, a range of processes creates patterns of different housing types in an urban area.

G.2 CHANGING URBAN SYSTEMS

You should be able to show how economic and demographic processes bring change over time to urban systems:

- ✔ Urbanization, natural increase and centripetal population movements, including rural–urban migration in industrializing cities, and inner-city gentrification in post-industrial cities;
- ✔ Centrifugal population movements, including suburbanization and counter-urbanization;
- ✔ Urban system growth including infrastructure improvements over time, such as transport, sanitation, water, waste disposal and telecommunications;
  - ✔ Case study of infrastructure growth over time in one city;
- ✔ The causes of urban deindustrialization and its economic, social and demographic consequences.

- **Centripetal** – movement towards an urban area.
- **Centrifugal** – movement away from an urban area.
- **Gentrification** – a general term for the arrival of wealthier people in an existing urban district, a related increase in rents and property values, and changes in the district's character and culture.
- **Post-industrial city** – a city whose economy has shifted from producing goods and products to one that mainly offers services.
- **Deindustrialization** – the process of social and economic change which is due to the reduction in industrial capacity or the activities of a country's manufacturing and heavy industry.
- **Urbanization** – an increase in the proportion of people living in towns and cities compared to rural areas.
- **Counter-urbanization** – a movement of people away from urban areas to rural areas and smaller settlements.

Urbanization, natural increase and centripetal population movements

Urbanization has taken place over time; both middle-income countries (MICs) and low-income countries (LICs) have experienced significant urban growth in population over recent decades. Rural-to-urban migration, a centripetal movement, has increased the amount of people living in urban areas. Migrants may then have children once they are settled in the urban area, thus the processes of migration and natural increase (the difference between crude birth and death rates) can increase the population.

Gentrification is a process that has been increasingly highlighted in many towns and cities, as wealthier people move into an area creating significant and sometimes controversial economic and social effects.

Content link

Connect this information with the population changes described in unit 1.

Centrifugal population movements

Centrifugal population movements are the opposite of centripetal movements as people move away from the centre of urban areas via processes such as suburbanization and counter-urbanization.

Urban system growth

Urban areas should be acknowledged as systems, and as such they have inputs, processes and outputs. The inputs, for example, could be the in-migration of people. The processes might be the movement of people via public and private transportation. Outputs can be waste such as rubbish, and the management of the outputs can determine the level of sustainability within an urban system. The ability for an urban environment to cope with change within the system, such as an increase in people or a need to reduce the level of pollution, can create issues and challenges for different stakeholders.

Test yourself

G.5 Identify one type of centripetal movement. [1]

G.6 Discuss the process of gentrification. [6]

G.7 Explain why cities in some parts of the world have higher rates of population growth than others. [2+2]

Concept link

PROCESS: Movement takes place to and from, and within, a town or city. These processes require a response from city authorities in order to ensure that services are managed. In addition to these processes, other changes connected with industry, and the process of industrial decline, results in a range of consequences that require attention from political organizations at a local and national level.

Test yourself

G.8 Analyse the environmental consequences from city growth relating to solid waste in São Paulo. [4]

Case study: Infrastructure growth over time in São Paulo, Brazil

São Paulo is a city within the state of São Paulo and it is one of the largest cities in the world. In 2018 the population of the metropolitan urban area was estimated to be 21,730,000. While the total fertility rate (TFR) is below replacement level (1.69), the city has grown due to previously higher fertility rates and rural-to-urban migration which began in the mid-19th century.

The city has had issues with transport, sanitation and water. Congestion is a major issue which increases the urban stress for those travelling in and around the city. With one car for every two people, the city's road networks have not grown at the same pace as car ownership.

Water is sourced from outside the city. This system has been described as inefficient due to leaks which mean that additional water has to be sourced from elsewhere to meet the needs of residents. In addition, recent drought led to 12-hour water cut-offs for many of the city's population and reservoirs fell to very low levels. Both the state of São Paulo and the city have struggled to treat sewage, and waste has entered rivers, reservoirs and coastal waters. Two of São Paulo's main rivers, the Tietê and the Pinheiros, are in the top 10 most polluted rivers in Brazil.

Each citizen produces approximately 1.1 kg of waste per day and most of this waste is deposited in landfills. Teams of garbage collectors (*catadores*) travel around the city to collect waste that can be recycled.

The causes of urban deindustrialization and its economic, social and demographic consequences

As already discussed, cities are dynamic with a constant flux of people arriving and leaving, and industrial areas of a city are also subject to change. Cities in high-income countries (HICs) have seen the demise of heavy industry in cities and the relocation of secondary industry to MICs. The loss of industry, or deindustrialization, in a city can have economic, social and demographic consequences.

Economic consequences may include the loss of employment which can then create a cycle of poverty if former employees find that there are no alternative jobs in their urban area or they do not have the required skillset or retraining opportunities. The loss of income can create health problems, such as depression, as people feel that they can no longer support themselves and their families. Crime and social unrest may increase, causing people to leave an area in search of new employment. So not only will the area have lost industry and jobs, there will also be a reduction in the number of people living there. Alternatively, renovation could take place, and old mills and factories could be converted into apartments.

The process of deindustrialization creates a range of consequences as places evolve.

G.3 URBAN ENVIRONMENTAL AND SOCIAL STRESSES

You should be able to show the varying power of different stakeholders in relation to the experience of, and management of, urban stresses:

- ✔ Urban microclimate modification and management, including the urban heat island effect, and air pollution patterns and its management;
  - ✔ Case study of air pollution in one city and its varying impact on people;
- ✔ Traffic congestion patterns, trends and impacts;
  - ✔ Case study of one affected city and the management response;
- ✔ Contested land-use changes, including slum clearances, urban redevelopment and the depletion of green space;
  - ✔ Detailed contrasting examples of two affected neighbourhoods and their populations;
- ✔ Managing the impacts of urban social deprivation, including the cycle of deprivation and geographic patterns of crime;

- **Albedo** – the amount of incoming solar energy reflected back into the atmosphere by the Earth's surface.
- **Microclimate** – the distinctive climate of a small-scale area, such as a garden, park, valley or part of a city.
- **Urban heat island** – an urban area where the temperatures are higher than the rural areas surrounding it.
- **Slum clearance** – the demolition of slums, sometimes accompanied by the rehousing of the inhabitants, to improve living conditions and the environment of an inner city.
- **Cycle of deprivation** – The persistence of poverty and other forms of socio-economic disadvantage through generations via a sequence of events.

Urban microclimate modification and management

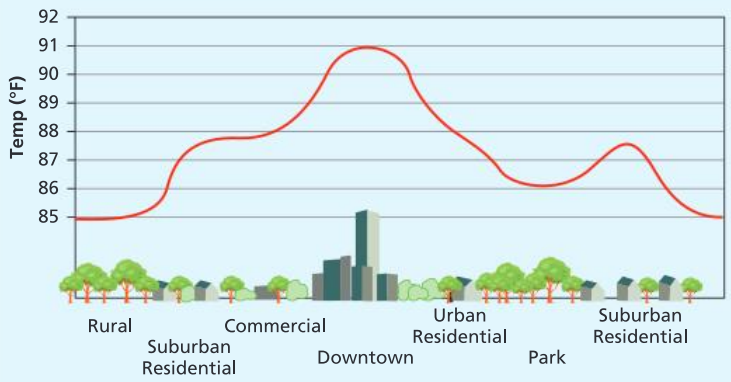
An urban microclimate is an urban area that has a climate that is different to the surrounding rural area. Towns and cities are often warmer than their surrounding areas due to the urban heat island effect, as tall buildings and dark surfaces retain heat from solar radiation. There will also be more rainfall as there is a greater amount of dust particles upon which water vapour can condense. Wind speeds vary more due to the layout of buildings in relation to prevailing winds. The large number of vehicles and higher frequencies of congestion in urban areas will also increase the amount of pollution compared to rural areas, especially when there is less vegetation to filter the air.

Concept link

POWER: Every person living in an urban environment contributes to the social and environmental well-being of that place. For example, the collective will of residents, industry, and city authorities have the power to try and control stress to maintain and improve the quality of life. As cities change, it is necessary to re-evaluate the choices that these different stakeholders make. For example, further reducing the amount and type of vehicles on the place's road network.

Test yourself

▼ **Figure G.3.1.** Urban heat island profile



G.9 Define the term albedo. [2]

G.10 Use figure G.3.1 to **describe** how the temperature changes between the rural area and the suburban residential area. [3]

Assessment tip

Ensure that data or quantification is included when describing charts or diagrams. The inclusion of data will not necessarily earn you a mark, but it will often be necessary in order to gain the total marks available for a question.

G.11 Choosing either rural, downtown or urban residential, **justify** how human activities can either increase or decrease the effects of an urban heat island. [2+2]

G.12 Apart from temperature, **justify** how human activities can modify the microclimate of an area. [3+3]

Air pollution is much higher in urban areas than in rural areas, but cities have differing levels of air pollution, for example, Mexico City compared to Vancouver. Various pollutants can be present from vehicle emissions and from industry. $PM_{2.5}$ and PM_{10} (particle matter 2.5 and 10 micrometres respectively) can get into a person's lungs and pass into the bloodstream, causing breathing problems and lung cancer. The World Health Organization states that 20 micrograms per cubic metre of air is an annual average, but in some cities the average PM_{10} is over 300 micrograms per cubic metre.

Case study: Air pollution in Onitsha, Nigeria

The city of Onitsha in Nigeria has an annual pollution reading of 594 PM_{10}, which is one of the highest in the world. This is a result of emissions from vehicles as well as from industry (mining, manufacturing cement). Dust storms that occur in the region also generate finer particles such as $PM_{2.5}$. There is currently limited evidence about the impact on people's health, but it is anticipated that air pollution will be a major cause of premature death in Onitsha in the coming years.

Traffic congestion patterns, trends and impacts

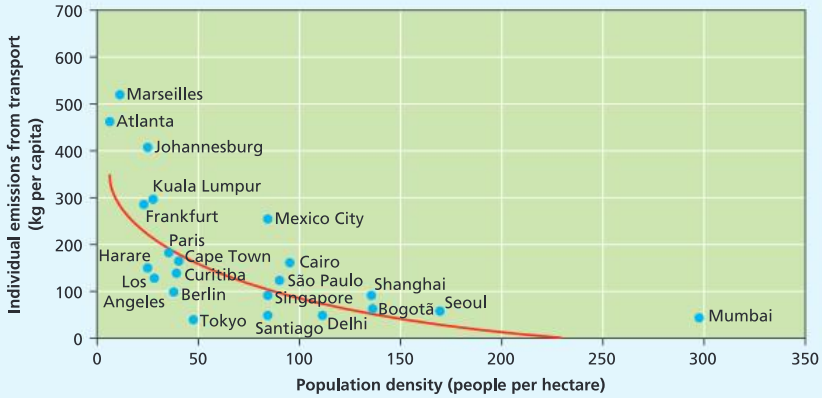
Case study: Traffic congestion in Mexico City

Mexico City has been plagued by traffic congestion for decades and this has contributed to the environmental and social stress that exists there. The physical geography and prevailing winds ensure that the emissions from vehicles plus those from industry to the north of the city remain in the "bowl" in which the city is located, surrounded by volcanoes.

Several management strategies have been implemented, such as the introduction of the Metrobus-dedicated bus lane, to encourage people to avoid driving into the city by providing efficient public transportation.

Test yourself

Figure G.3.2. Transport emissions in kilograms per capita vs population density (people per hectare)



Source of data: World Bank (2009)

G.13 Describe the relationship between population density and air pollution from transport. [2]

G.14 Compare and contrast the air quality in two cities of your choice. [6]

Contested land-use changes

Slum clearance takes place in both HICs and LICs, and the term "slum" can relate to illegal settlements in LICs and dilapidated 19th-century housing in cities in HICs. Slums in LICs are often demolished by the city authorities since they have been illegally built or the land has been sold to be developed. Slums in HICs have been redeveloped into new public and private housing developments. Redevelopment can often be controversial, for example, if the new housing does not provide affordable homes.

Case study: Depletion of green space in Sydney

In Sydney, almost 75% of all new residential developments between 2011 and 2030 will be constructed at "in-fill" sites within the city's boundaries. Cook Cove is one such site and local campaign groups have been protesting about the loss of playing fields, cycle tracks, community playgrounds and the wetlands in order to build 10,000 homes. There are also plans to relocate a golf course to the park, which is green space of course, but this has been met with protests since the multi-use public park will be replaced by a private access only, single-use golf course.

Case study: Redevelopment in Mumbai

In Mumbai, the redevelopment of the Dharavi slum has attracted controversy. As part of the redevelopment, those living in the slum would be entitled to a home measuring 350 square feet, which is smaller than some of the current homes constructed by Dharavi's residents. The new development will involve building upwards, whereas people currently live in homes that are on the ground level. In addition, there is no plan for the provision of space for the informal industry that is currently present. Therefore many local people are not happy with the plans.

▼ **Figure G.3.3.** Huts in the Dharavi slum

Managing the impacts of urban social deprivation

Urban environments are areas with significant inequality. Economic and social differences exist, with some residents marginalized in cities at varying levels of development.

In many countries, local and national governments have the responsibility of trying to improve the quality of life in these areas and to break the cycle of poverty. In the borough of Newham in London, for example, which is one of the most deprived parts of the city, the council created a team that identified people living in low-quality housing, such as in garden sheds that had been converted. A strategy called Workplace was also developed in which people were able to attend training courses paid for by the local authority which resulted in those people finding work as a result of their new skills.

The power of developers and politicians can be very influential in changing land use when developing urban areas.

Test yourself

G.15 Choosing a particular stakeholder, **discuss** how they have the power/responsibility to resolve a social or environmental stress in urban areas. [1+4]

G.4 BUILDING SUSTAINABLE URBAN SYSTEMS FOR THE FUTURE

- **Resilient city design** – a city that has been designed to absorb future shocks and stresses to its social, economic and technical systems and infrastructures so that it can maintain essentially the same functions, structures, systems and identity.
- **Geopolitical risk** – the risk from a government or an organization in one country influencing an urban area's policies in another country.
- **Urban ecological footprint** – the theoretical measurement of the amount of land and water that an urban population requires to produce the resources it consumes and to absorb its waste under prevailing technology.
- **Smart city design** – the effective integration of physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future for its citizens.
- **Retrofitting** – the directed alteration of the fabric, form or systems that comprise urban environments to improve energy, water and waste efficiencies.

Content link

This section of the syllabus connects with unit 1, since it examines changing amounts of people living in urban areas. The inclusion of content from units 1–3 (paper 2) and units 4–6 (paper 3) is perfectly valid in order to develop your exam responses for paper 1 options.

You should be able to show examples of future possibilities for the sustainable management of urban systems:

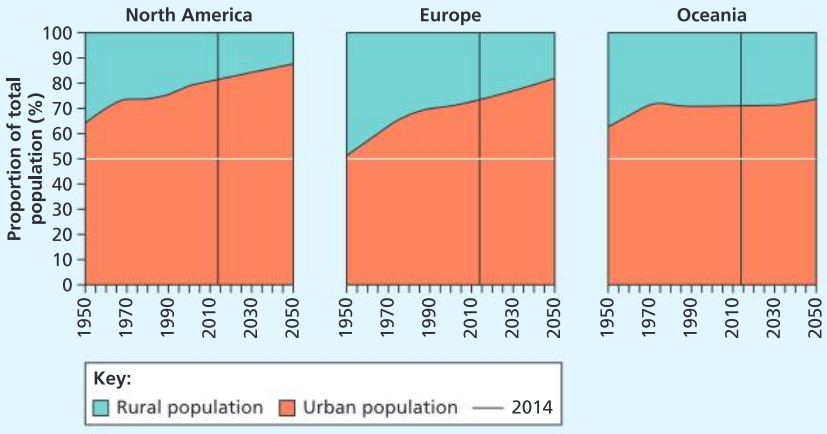
- ✔ Urban growth projections for 2050, including regional/continental patterns and trends of rural–urban migration, as well as changing urban population sizes and structures;
- ✔ Resilient city design, including strategies to manage escalating climatic and geopolitical risks to urban areas;
  - ✔ Two detailed examples to illustrate possible strategies;
- ✔ Eco-city design, including strategies to manage the urban ecological footprint;
  - ✔ Two detailed examples to illustrate possible environmental strategies;
- ✔ Smart city design and the use of new technology to run city services and systems, including purpose-built settlements and retrofitting technology to older settlements.

Urban growth projections for 2050

Each year, the United Nations produces its World Population Prospects report which details current and future demographic trends based on past and current data. A greater number of the world's population is now living in urban areas. In 2018 the UN reported that 70% of the world's projected population in 2050 (10 billion) will be living in urban areas.

Test yourself

▼ **Figure G.4.1.** Past and future urban and rural populations: North America, Europe and Oceania (data from 2014)



Source of data: Department of Economic and Social Affairs, United Nations (2014)

G.16 Define the term urbanization. [1]

G.17 Using figure G.4.1, **identify** the continent with the highest proportion of people living in urban areas in 2014. [1]

G.18 Identify the continent with the projected lowest rate of urbanization between 1950 and 2050. [1]

G.19 Describe the projected change in the proportion of people living in urban areas in Asia between 1950 and 2050. [3]

Concept link

POSSIBILITIES: Towns and cities are being retrofitted in order to respond to climatic and geopolitical risks, while new urban environments are being planned and designed to ensure that environmental sustainability is achieved.

Resilient city design

The UN reported in 2016 that 90% of the world's cities were located in areas that are vulnerable to natural disasters relating to climate such as flooding, drought and cyclones. Cities need to have plans in place to withstand these climate-related risks.

Possible environmental strategies: Rotterdam and Singapore

Rotterdam, in the Netherlands, is vulnerable to flooding from three rivers and from sea-level rise from the North Sea. Managed flooding from these rivers is allowed in some public areas which contain sunken voids in the ground made of concrete that can be filled with water. The Maeslant Barrier is positioned on the River Rhine and it protects the city from a storm surge from the sea.

In Singapore, a city state that is vulnerable to tropical storms, hard walls have been built to protect against storm surges, and if any land is reclaimed for construction it must be at least 4 metres above sea level compared to a previous level of 3 metres.

Geopolitical risks to urban areas can also involve conflict. Instability that exists in nearby places can spread to cities, especially when there are historical or cultural connections between places. For example, since 2011, refugees have spread from Syria to neighbouring countries, such as Jordan, as well as European cities, such as Cologne, which puts pressure on national and city governments to accommodate this diaspora.

Eco-city design

In general, there has been an increase in environmental awareness and cities are striving to implement city designs in order to become more environmentally sustainable. This is beneficial to the urban ecological footprint as outputs are recycled.

Content link

Environmental sustainability in societies is discussed further in unit 3.3.

Smart city design incorporates technology in order to run city services and systems in a more efficient manner. Many different aspects of a city can be affected when new technology is introduced, such as cyber defence, mobility, renewable energy, etc.

There is a range of possibilities for improving urban areas.

Possible environmental strategies: Milan and Oregon

Greening of a city is a strategy that has been implemented by Milan, Italy. One of the famous examples, Bosco Verticale ("vertical forest"), consists of two apartment blocks that contain 800 trees and a range of other vegetation equating to 20,000 square metres of forest which absorbs carbon dioxide and dust particles.

▼ **Figure G.4.2.** A shaded street in Masdar City, a planned eco-city project in the UAE

Portland, Oregon, has been a pioneer amongst US cities in developing green initiatives by creating 188 miles of cycle paths, and almost 10% of the population commutes via bicycle. It has also invested significantly in public transportation with an extensive bus and tram network, and the city aims to be powered completely by renewable energy by 2050.

Assessment tip

Since the ecological footprint is calculated using several different variables, there are a number of different answers to question G.21. A good approach would be to discuss land and water for one part of the answer and then to discuss the way in which waste is managed for the second part of the answer.

Assessment tip

If question G.21 was in the middle of the structured questions, then it would be a good opportunity to include an example that you have studied. Marks are available for developing descriptions and explanations via extension, and for the inclusion of examples. The Brazilian city of Curitiba would be an ideal example of a city that implemented various measures to reduce its urban ecological footprint.

Test yourself

G.20 Define the term urban ecological footprint. [2]

G.21 Analyse how the urban ecological footprint can increase or decrease. [3+3]

QUESTION PRACTICE

Examine figure 6.3.3, on page 103, which shows the Dharavi slum in the city of Mumbai.

a) **Identify** two pieces of evidence showing that this is an informal residential area, other than the poor quality of housing. [1 + 1]

b) Using an example of a city you have studied, **outline** two reasons why certain ethnic groups tend to be located in specific places. [2 + 2]

c) **Explain** two processes that are responsible for population growth in megacities. [2 + 2]

Essays

Either: Using examples, **examine** the varied effects of human activity on urban microclimates. [10]

Or: Examine the similarities and differences in patterns of urban deprivation for two or more cities you have studied. [10]

How do I approach these questions?

a) The question states that you are not permitted to discuss the construction of the dwellings. Therefore you should write about other aspects of how the place has developed in your answer.

b) You should have studied an example that demonstrates why different groups tend to locate in certain areas of an urban settlement. Consider a range of social reasons in your answer.

c) Further explanation is needed for this question and you must recall the fundamental reasons why population in any place increases or decreases.

First essay choice:

This essay requires an understanding of the different climatic variables. So there is plenty of opportunity to include a wide range of appropriate terminology which will increase your mark for knowledge and understanding. Your introduction should define the term "urban microclimate", and you should be aware that human activity does not always have a negative impact on urban microclimates.

Second essay choice:

The question requires information about the distribution of deprivation in different cities, so this must be discussed in the answer. Evaluation is expected, so consider how the location of deprivation is either similar or different in cities in countries at different levels of development. The introduction should define important terms in the question, such as deprivation and development, while the main body of the essay should explain the causes behind the development of these areas of deprivation. You should contextualize the level of deprivation in relation to the socio-economic status of each city and consider what the characteristics of these places are that classify them as deprived.

SAMPLE STUDENT ANSWER

a) There is a lack of infrastructure present such as official roads and pavements. Also, the development has not be planned since it is haphazard in nature and does not follow a urban plan, for example.

▲ Two pieces of evidence from the figure given

Marks 2/2

b) Most cities will have areas where certain ethnic groups tend to reside in an area. Amsterdam Zuidoost is area of Amsterdam that contains a high concentration of people from Suriname because the cost of rent was very cheap when people moved from Suriname. In addition, when people move from Suriname to Amsterdam, they may prefer to live in an area that contains other people from Suriname because there is more chance that the same cultural traits may be seen, such as being able to purchase Surinamese food such as Moksi Meti.

▲ 1 mark—valid city and area within the city

▲ 1 mark for a valid reason

▲ Another valid reason given

Two distinct and developed reasons have been provided by using a place-specific example.

Marks 4/4

c) Population increases or decreases due to changes to a city's fertility rate. More children will mean more people and vice versa. The second reason is due to the death rate. If more people are dying then this change the population.

▼ 2 marks—the natural increase or decrease is discussed in the answer. Population changes due to natural and migration and the latter should also be discussed with reference to in-migration and out-migration

Marks 2/4

Essays

Either: Using examples, **examine** the varied effects of human activity on urban microclimates.

Human activities in urban environments cause the formation of an urban microclimate. The different human activities in urban environments have different effects on the climate. Heavy polluting industries and transport lead to the creation of smog. The construction of buildings and the release of particulate matter lead to the urban heat island effect. The construction of buildings also disrupts wind patterns, causing the venturi effect. These different effects combine to create the unique microclimate experienced by urban areas.

The urban heat island effect is the formation of an area of higher temperature in the urban island which is surrounded by rural areas that have a lower temperature. This effect is caused by a variety of different human activities. Many human activities such as transport and industry result in the release of particulate matter into the atmosphere. This particulate matter can then act as cloud condensation nuclei as it allows water to condense around it, which will increase the cloud coverage raising the possibility of increased rainfall. In addition, the cloud coverage will trap solar insolation raising the temperature. Humans also raise urban temperatures due to the buildings and infrastructure in urban areas. In many inner city areas, concrete and tarmac are used in the construction of buildings and roads. This lowers the albedo of the area as concrete absorbs 60% of solar insolation, meaning that more solar insolation is absorbed so it can be released at night, increasing the temperature. Recently this has changed slightly as in more modern cities the central business district contains many buildings made mainly of glass that increases the albedo. This means that more solar insolation is reflected during the day, but this will then be trapped by the high cloud coverage causing temperatures to increase during the day. Many different human activities result in the release of heat into the atmosphere as heat escapes from residential buildings.

▲ Appropriate knowledge

▲ Appropriate terminology

▲ The introduction shows knowledge and it provides a foundation for discussing temperature, air quality and wind

▲ Shows knowledge

▲ Appropriate terminology

▲ Appropriate terminology

▲ Explanation present

▲ A focused paragraph that discusses the causes of temperature increase

The effect of human activities on the urban microclimate is so great that in cities such as London the average temperature is two degrees above that of the surrounding rural area.

Human activities affect the urban microclimate through the creation of photochemical smog due to the emissions from cars and other vehicles. The smog affects the climate as it can act as cloud condensation nuclei increasing cloud coverage. This photochemical smog has had a big effect on the temperature as it can react with other chemicals in the atmosphere. Nitrous oxides can cause ozone depletion as they catalyse the photodissociation of ozone, meaning that more solar insolation can reach the urban area, increasing the temperature. Human activity also affects winds patterns in urban environments, leading to greater wind speeds and more fluctuating wind directions due to the Venturi effect. In cities, the normal route for wind is blocked by different buildings, so wind is channelled through gaps in buildings increasing the wind speed. However, wind is also refracted around the sides of buildings meaning that the wind is more disordered and chaotic in cities. This effect causes wind speed to be three times higher in urban areas, as seen in Chicago, nicknamed "the windy city".

Human activities of transport, buildings and industry have an important effect on the urban microclimate. The different activities affect different areas of the climate and to a different extent, but they eventually result in urban areas having higher temperatures, wind speed and precipitation. The effect of these activities varies in different cities and while they may be welcomed in some for providing a more comfortable climate, they can cause significant effects in others. The impact of this microclimate can exacerbate issues such as with the Paris heatwave of 2003 where 2,000 people died from heat-related issues and Tokyo in 2018 where over 50 people died. The impact of the urban environment on the climate is changing, however, as industries expand but alter slightly, such as the high albedo of the CBD or the release of photochemical smog.

▼ Only one example has been included with limited detail

▼ This needs clarification, and it repeats what has been said above

▲ Knowledge

▲ More relevant knowledge and understanding although no examples provided

▼ There should be a new a paragraph here since the next section discusses wind speed and direction

▲ A second example is included although again, limited in detail. The response includes some relevant knowledge and understanding

▲ The conclusion summarizes the content of the response. However, some of these relevant examples could have been included earlier in the response

This is a very good response which addresses a range of different factors that can be influenced by human activity. There is description and explanation with brief examples present. The structure could be improved slightly by having a greater focus for each paragraph. Evaluation could be been included by discussing how human activities have reduced the amount of pollution or temperature in cities. This would have increased the mark.

Marks 8/10

Or: Examine the similarities and differences in patterns of urban deprivation for two or more cities you have studied.

Deprivation can be defined as people experiencing a low quality of life due to a lack of or low level of income and health issues or a low life expectancy. Urban areas, being unequal, will have some parts that contain people with high levels of deprivation and other parts with low levels. Development refers to the economic development of a city or country or the level of their HDI. The statement is somewhat correct in that cities at different development levels will have areas that are deprived, but the location of these will differ. This will be demonstrated by discussing Lagos, London and Paris.

▲ The introduction contains a very good level of knowledge with important terminology defined, a clear thesis statement and evidence of structure with the examples listed to be discussed

In LICs and MICs, areas that are deprived tend to be located towards the outskirts of cities. Illegal settlements are established, quite often by rural to urban migrants who construct their own homes. In Lagos, the shanty town of Makoko where 250,000 people live, is located where the land meets the water on the edge of the city. The land is swampy and many of the homes are built on stilts to avoid the water. The children that live there tend to drop out of school at a young age in order to try and bring in money via fishing and there is a lack of government investment. In fact, they are under constant threat of their homes being removed by the government. No basic services are provided such as clean water and electricity and most residents live below the extreme poverty line of $3 a day. This example demonstrates that deprivation is located on the outskirts of a city, on land (and water) that is undesirable.

▼ Quite a sweeping statement when including both LICs and MICs

▲ Appropriate example

▲ There is plenty of evidence in this paragraph for the location of deprivation and the characteristics of the deprivation

▼ It is actually US$1.90 a day for the extreme poverty threshold

▲ Connects with the thesis statement, a well-structured paragraph

In London, one of the poorest districts is called Tower Hamlets and unlike Makoko, it exists in the inner-city rather than the outer-city. It is the most deprived part of London with just less than 50% of children living in poverty and an unemployment rate of 8%. Here though there is government investment which attempts to improve the socio-economic status of the residents of Tower Hamlets.

▼ Refers to location although could be more explicit in order to fully connect with the essay statement

▲ Detail is provided for this example

It should be noted that the definition of poverty used in Lagos is different to London. In Lagos it is absolute poverty, living on less than $3 a day whereas in London, the level of poverty is 'relative poverty' which means that peoples' income is 60% below the UK's median income. This means that when comparing areas of poverty in both cities, the type of poverty is different. Therefore not only is the location of poverty in both cities different, but the level of deprivation in both cities is different also. A similarity though is that both cities have levels of inequality and that there are clear areas where people are more deprived than other parts of the city. Finally there is a similarity between the pattern of deprivation in cities in MICs and LICs in terms of deprivation being on the outskirts. Paris has a number of 'sink estates' which are located on the outskirts of the city. The centre of Paris contains some of the most expensive real estate in the world whilst the sink estates contain government-provided housing or private rented accommodation that is in poor condition. People on these estates feel marginalized and forgotten about by the government. In summary, patterns of deprivation are different and similar in cities with different levels of development.

▼ This figure is inaccurate

▲ Knowledge is demonstrated

▲ This paragraph includes explanation which extends the explanation of the difference between two cities

▲ Clear point made linked to the thesis statement

▲ Appropriate example

▲ Some evidence provided for deprivation

▼ The evidence of deprivation could be more detailed—this information could relate to any city

▼ The conclusion is very brief and the points that have been made in each paragraph should be included

Apart from the inaccurate reference to the extreme poverty level, this essay contains a high level of knowledge and each paragraph contains explanations linked to the thesis statement and question. Evaluation is present since similarities and differences are justified via the well-chosen examples. Some paragraphs contain more explanation than other paragraphs whilst the conclusion is very brief, which prevents the response from receiving full marks.

Marks 9/10