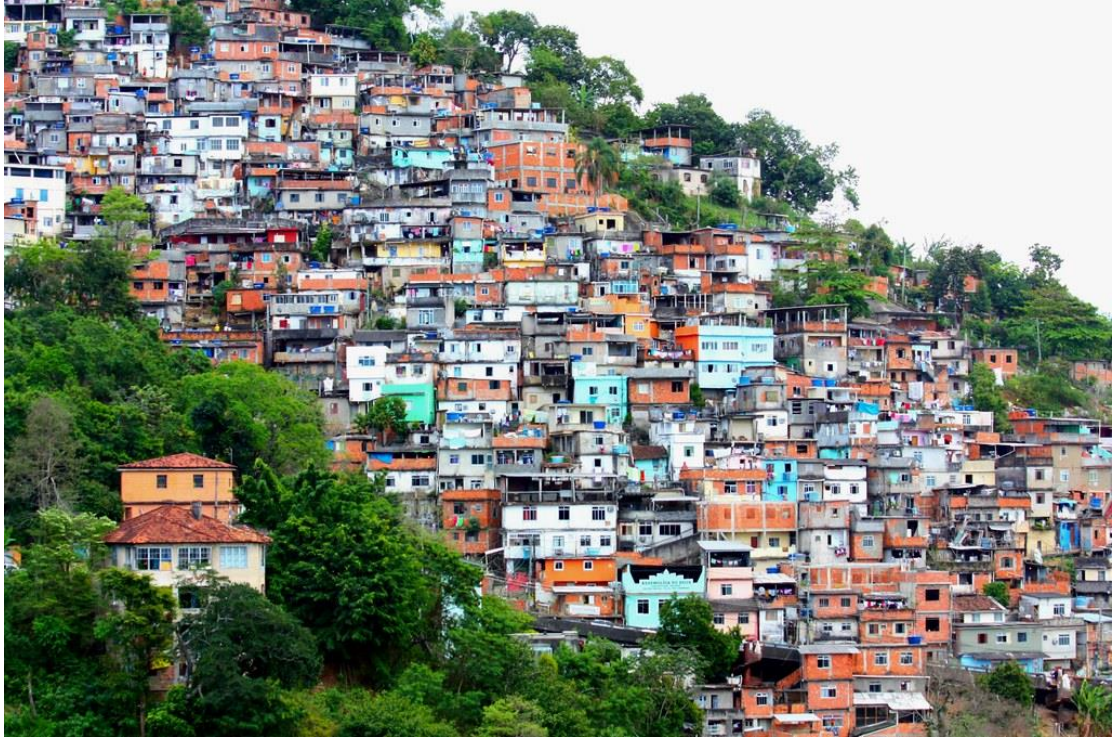# GCSE GEOGRAPHY KNOWLEDGE BOOK
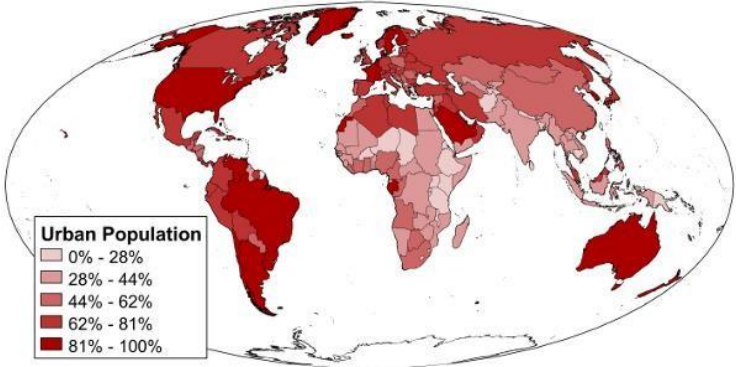

Unit 2:
Challenges in the Human Environment

Section A:
Urban Issues and Challenges
- Urban Growth across the world
- Urban Growth in the UK
- Urban Sustainability

The information here is what **all** students MUST know. If you hope to get a GCSE grade 7-9 you will need to extend your knowledge through additional reading of your class notes and the online text book which include more detail. You need to learn the information and then use the questions and activities at the end to test your understanding.

URBAN GROWTH ACROSS THE WORLD

Key content	What you need to know
Urbanisation	This is the proportion of people living in towns & cities. • This is growing as a result of *natural increase* (births – deaths) and *migration.* It is referred to as urban growth. • Urbanisation has taken place at different times and different speeds in different parts of the world. • In the world's richer countries over 60% of the population live in cities. • In the world's poorer countries, the urban population is as little as 20%. • In the future, urban growth will decline in HICs but grow in LICs. • By 2050, the countries of India, China and Nigeria will see the largest growth in urban population accounting for 37% of the total.
Megacities	These are urban areas with a total population of over 10 million people. • In 2015, there were 28 megacities worldwide. It is estimated that by 2050 there may be as many as 50. • Most of these megacities will be in either LICs or NEEs. • There are two main reasons why cities are getting bigger: *rural-urban migration* and *natural increase*. • Rural-urban migration is the movement of people from the countryside into towns and cities. • This is caused by *push* and *pull* factors. These are the real or imagined disadvantages of living in a rural area and the advantages of living in a town or city. • Natural increase is where the *birth rate* is higher than the *death rate*. In cities, this is due to the fact that most in-migrants are young people aged 18-35 who are of childbearing age resulting in a higher birth rate. In addition, the lower numbers of elderly and slightly better quality of life in cities means that the death rate tends to be low.

Urban growth in an NEE	*Rio de Janeiro* is a city on Brazil's Atlantic coast. Brazil is an *NEE (Newly Emerging Economy).* ☐ Rio has grown rapidly in the last 50 years. In 2014 , the population was 6.5 million with a further 12.5 million living in the surrounding area. ☐ It is a major *industrial, administrative, commercial* and *tourist centre* . These economic activities have attracted many migrants from Brazil and other countries increasing the city's population. ☐ These migrants have contributed to Rio's continuing economic development. As a result Rio has a *racially mixed* population. < The Christ the Redeemer Statue, Rio de Janeiro, Brazil.

Social challenges and opportunities in NEE cities	Rio faces many social challenges due to its rapidly growing population. These are made worse by the huge contrasts in wealth between the rich and poor. Below is an outline of some of the social challenges Rio faces along with the solutions the authorities have used to overcome them.

Social challenge	Solutions (opportunities)
Healthcare: Only 55% of the city have access to a local family health clinic. There are huge disparities in access to healthcare across the city.	In some favelas like Santa Marta which has 8,000 residents and which is built on a steep hillside with limited access, visiting medical staff have used portable health kits to treat people in their own homes. As a result infant mortality has fallen and life expectancy increased.
Education: education in Brazil is only compulsory up to the age of 14. A lack of money and the need to work means that few continue their education beyond this age. Many youths become involved in drug trafficking.	Access to education has been improved by: • Issuing grants to poor families to help meet the cost of their children's schooling • Opening a university in Rocinha, the largest favela • Paying for young people in Rocinha to get involved in sports e.g. volleyball, football and swimming
Water supply: Prior to 2014, 12% of Rio's population do not have access to running water due to leaks, drought and illegal access.	Money has been invested to improve supply. 7 new treatments plants have been built and 300km of pipes laid. Now 95% of the population have access to a mains supply.

	Energy: The city suffers frequent blackouts due to a shortage in electricity. Many in the poorer favelas illegally tap into the mains supply. This is very dangerous.	The electricity supply has been improved by: • Installing 60km of new power lines • Building a nuclear generator • Building a new *hydro-electric power* complex. This has improved electricity supplies by 30%.

Economic challenges and opportunities in NEE cities	**Opportunities:** Rio is the 2nd most important industrial centre in Brazil after Sao Paulo. Its large population, financial sector, port facilities and industrial areas have contributed to its rapid economic development. The city now provides more than 6% of all employment in Brazil with jobs in construction, the oil refining and petrochemical industry, manufacturing, tourism, banking and financial services. Growing economic prosperity has attracted large companies creating a range of opportunities in the *formal economy*. **Challenges:** In 2015, Rio was hit by recession increasing unemployment. Worse affected was the favelas with unemployment as high as 20%. Most work in the *informal economy*. This includes jobs such as street vendors, drivers, labourers, maids or in the production of sewing or handicrafts for the local street markets. They do not pay tax and as a result the government receives no income from them. High unemployment has caused many to turn to robbery and violent crime. Murder, kidnapping, carjacking and armed assault occur regularly. In the favelas, powerful gangs are involved in drug trafficking. **Solutions:** The **'**Schools of Tomorrow' programme has been introduced to encourage young people to stay in education and reduce youth unemployment by offering practical skills-based courses. Police Pacifying Units (UPPs) have also been established to reclaim the favelas from the drug dealers.
Environmental Challenges in NEE urban areas	Rio faces many environmental challenges which affect the quality of life for people in the city. These environmental challenges are caused by the physical geography as well as human activities and are featured in the table below. *Beach pollution at Guanabara Bay >*

Challenges	Solutions
Air pollution: Causes 5,000 deaths per year. The city is often covered by brown smog due to exhaust fumes and factory pollutants mixing with Atlantic mist.	To reduce traffic and improve air quality: • The metro system has been expanded • Toll roads into the city centre have been introduced • Coast roads have been made one-way during rush hours to improve traffic flow
Traffic Congestion: Steep mountains mean roads can only be built on the coastal lowlands. In addition, people choose to use their cars due to the high crime levels. As a result the number of cars has increased by 40% in the last decade.	

	Water Pollution: Guanabara Bay is highly polluted causing a major threat to wildlife and reducing commercial fishing by 90%. Pollution at Ipamena and Copacabana Beaches could damage tourism and the local economy. Sources of the pollution include sewage; industrial effluent and oil spills from local oil industries and tankers.	Overseas aid has been used to improve the sewage management facilities. 12 new sewage works have been built since 2004 costing ($68 million dollars) and 5km of new sewage pipes have been installed. Ships are now fined for discharging oil waste into the sea.
	Waste Pollution: The worst waste problems are in the favelas. Steep slopes make access difficult for refuse collection vehicles. Most waste is therefore dumped and pollutes the water system causing diseases like cholera and encouraging vermin (mice/rats).	A power plant has been set up which uses methane gas from rotting rubbish. It uses 30 tonnes of rubbish a day and produces enough electricity for 1000 homes.

The growth of squatter settlements in NEEs	Squatter settlements in Rio are called *favelas.* • They are illegal settlements where people have built homes on land they do not own. • The favelas have grown largely due to rural-urban migration from Brazil's rural north east (Amazonia). • There are 1000 favelas in the greater Rio area. Many near the city centre have been cleared to make it more attractive to businesses and tourists • *Rocinha* is one of the biggest favelas with a population of 75,000 (est. 2010) • Favelas are areas of social deprivation and face many challenges. These are summarised below:

Services	Many homes have limited access to running water; electricity or sewage connections. Water has to be obtained from the city water main at the foot of the steep slopes and this requires several trips. Electricity is tapped into illegally. Sewage pollutes the streets.
Unemployment	Unemployment is as high as 20%. People work irregular hours in the informal sector. Average incomes are as low as £75 a month.
Crime	Murder rates are high (20 per 1000 people). Drug gangs dominate. Many distrust the police due to violence & corruption.
Health	Population densities are high (37,000 per km^2). Infant mortality rates are high (50 per 1000). Waste builds up and diseases spread quickly. Fire is a hazard as people burn rubbish – the smoke is harmful to health.
Construction	Houses are poorly constructed with scrap materials. Many are built on steep slopes vulnerable to landslides. There is limited road access.

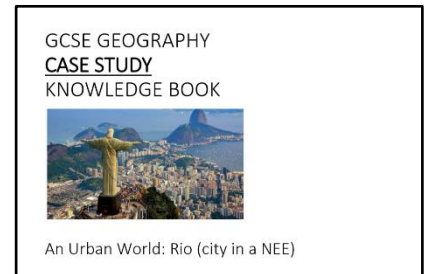|	
Urban planning in NEEs	Since the 1980s planners have focused their attention on helping to improve the living standards of the poorest residents in Rio. This has been achieved by upgrading the favelas and providing essential services. **Example: Favela Bairro Project** This is a *site and service* scheme where the local authority provides land and services for residents to build their own homes. It has been focused on the Complexo do Alemao, a group of favelas in the north of the city where 60,000 people live. Improvements include: • Paved and formally named roads • Access to water supply and sanitation • Secured hillsides to reduce the risk of landslides • The construction of health, leisure and education facilities • Installation of a cable car to provide easier access to the city centre • Access to credit so inhabitants can buy the materials needed to build their homes • A Pacifying Police Unit (UPP) to patrol the community and reduce crime **Successes:** This has improved the quality of life; mobility and employment prospects of the inhabitants and has been recognised by the UN as a model which other cities should follow. **Failures:** The limited budget of US$1 billion means it cannot cover all favelas. The newly built infrastructure is not being maintained. As a result of the improvements, rents in the favelas rise pricing some residents out. See Rio knowledge book for more case study detail GCSE GEOGRAPHY CASE STUDY KNOWLEDGE BOOK An Urban World: Rio (city in a NEE)

URBAN GROWTH IN THE UK

Key content	What you need to know
London case study: advantages and disadvantages of migration	**(+)** Mostly young migrants contribute to local and national economy through taxes; taxes they raise help support the ageing population; city's cultural life is enriched; vast majority of migrants are hard-working and help address skills shortages in the UK workforce. **(-)** Migrants increase London's population and may increase pressure on housing and education; possible challenge to integrate migrants into wider community due to language or cultural differences.

London case study: urban challenges	1. **Urban sprawl** – London is growing as new houses are built on **greenfield** sites to relieve pressure on housing (more houses needed as population is increasing). Sprawling city = increased traffic, more health issues (air pollution), cost to taxpayer to build new roads, destruction of habitats. *Urban sprawl affects Luton too.* Many people who live in Luton work in London. Barton-le-Clay, Silsoe and Toddington have all grown. 2. **Derelict buildings and land** – many **brownfield** sites in London are not being used. One key exception – 2012 Olympic Park (see below). 3. **Atmospheric pollution** – due to traffic congestion, many parts of London have unsafe levels of nitrogen dioxide and particulates, according to EU air standards. 4. **Urban deprivation** – inner cities declining due to lack of investment. Unemployment is high and populations are decreasing. 5. **Inequalities** - *in housing, education, health and employment.* Incomes in London more unequal than any other part of the UK. Richest 10% have 60% of the wealth. House prices too high for most renters to buy; wealthy areas get better GCSE grades and live longer than poorer areas. ***NOTE in this section:*** -**Greenfield site**: area of land that has not been previously built on -**Brownfield site:** land that has been built on before. 50,000 new London homes have been built on 20 brownfield sites since 2014.
Case study – 2012 London Olympics	-**Olympic Park** built on **brownfield land** in East London, bordering the neighbourhoods of Tower Hamlets, Newham and Hackney. -**Built in part to address London's challenges** above. *You need to revise the social, economic and environmental impacts of the 2012 London Olympics (both positive and negative).* The tables in your books should look like this, and have AT LEAST 2 POINTS in each box. <table><tr><td></td><td>**Pros (Positives)**</td><td>**Cons (Negatives)**</td></tr><tr><td>Environmental</td><td></td><td></td></tr><tr><td>Social</td><td></td><td></td></tr><tr><td>Economic</td><td></td><td></td></tr></table>

URBAN SUSTAINABILITY

Features of sustainable living	*Urban sustainability* is where a city organises and develops itself in such a way that it limits the damage done to the environment in order to preserve it for future generations. This can be achieved by: • Providing green spaces • Recycling water to conserve supplies • Reducing the reliance on fossil fuels and rethinking transport options • Involving local communities and providing a range of employment • Conserving cultural/historical buildings and environmental sites • Minimising the use of greenfield sites and using brownfield sites instead

How is London planning for urban sustainability?			
	Social	Environmental	Economic
	Creating sustainable communities e.g. Bedzed, SW London Introducing nightclubs where the kinetic movement on the dance floor generates electricity, the lighting is provided by low-energy LEDs and the remainder of the electricity is created by solar panels on the roof.	Providing more green spaces through a process of urban greening e.g. roof top gardens, community allotments; 'skip gardens' etc Retrofitting old public buildings so they are more energy efficient e.g. adding double glazing; roof and wall insulation; solar panels etc Adopting sustainable transport strategies – hybrid buses/taxes, 'Boris bikes', Congestion Charge, Sustrans cycle network, electric vehicle charging points etc Constructing more environmentally friendly buildings e.g. the iconic Gherkin which uses the wind for ventilation The development of 'Smart Grids' to consume energy resources when they are most available e.g. in the case of wind energy, adopting high consumption when the wind is blowing and the energy is available and avoiding using the energy when the wind has died down.	Creating jobs in the management and implementation of sustainable development initiatives

Case study: Bedzed, a sustainable community in south west London	*Bedzed* is an environmentally friendly housing development in Hackbridge, SW London designed to create *zero carbon emissions*.

How has this community been designed to promote sustainable living?

WATER CONSUMPTION
London is a water stress area where there is a limited supply. The Bedzed community use the water more sustainably by:

- Reducing the impact of waste water on the sewage system through recycling
- Using a green water waste plant which recycles 'grey' waste water from showers, washing machines etc by passing it through a series of reed beds which take out the impurities like soap and detergent so the water can be reused for toilet flushing and irrigation
- Allowing rainwater off the roofs to be directed by a series of pipes away from the storm drainage system and directed straight back into the river system to avoid the need for unnecessary treatment saving energy and resources
- Using *permeable* pathing surfaces that allow water to filter back through to the water table
- Reducing water consumption in the houses through the use of aerators on taps and showerheads; using smaller baths

These measures have allowed water consumption to be reduce to half the national average.

ENERGY CONSUMPTION
The buildings in the Bedzed community have been designed to reduce energy demand by:
- Having extra thick heavily insulated walls that retain heat
- Ventilating the buildings naturally to avoid the use of cooling mechanisms like air con
- Including a double-glazed south-facing sun space which generates heat to avoid the need for heating
- Using low energy lights and A-rated (low energy consumption) appliances
- Using solar panels on the sides of the buildings to generate electricity for the fridge/freezer appliances and the car charging points/outside lighting
- Installing a Biomass CHP (combined heat and power) system for the other power and heat energy needs

These measures have reduced energy usage by 90%

GREEN SPACE
The use of green roofs on the buildings in the Bedzed community helps to retain water for later use but also allows a *biodiverse* range of plant and wildlife species to colonise which is good for the environment.

TRANSPORT
The site is well connected for public transport and all residents have access to an electric car through the community 'Car Club'. Lots of the residents work in the offices on-site to reduce the need for transport. Those that don't generally use bikes or public transport.

WASTE MANAGEMENT
Compartmentalised recycling bins are provided for each home so all waste products can potentially be recycled.

Sustainable urban transport strategies	Traffic congestion is a huge problem for most cities. The problem of traffic congestion can be addressed through the implementation of *sustainable transport schemes*.

Why is there a need to reduce traffic congestion in cities?
- Traffic congestion leads to air pollution
- Increased journey time has a negative effect on the economy decreasing productivity
- Congested traffic has higher fuel consumption
- Results in more accidents
- Is damaging to public health causing respiratory problems and premature death

Transport is responsible for about 20% of London's CO^2 emissions. The city has tried to reduce traffic congestion by introducing:

1. ***The Congestion Charge*** – this is a toll that vehicle owners have to pay should they wish to drive through central London at peak times of the day e.g. Monday-Friday between 7am and 6pm. The daily fee of £11.50 has massivley reduced the number of vehicles entering the city, encouraged the uptake of public transport/cycling, reduced the prevalence of harmful particulates in the air and boosted the economy especially the retail sector. Steep penalities are issued to drivers that neglect to pay the fee.
2. ***The 'Boris Bikes'*** **–** this is a public bike hire scheme in London. The bikes can be obtained from a series of docking stations located throughout the city. For a small fee, the bike can be hired for a limited period and docked at the nearest docking station when no longer required. The scheme has encouraged the uptake of cycling and helped to reduce carbon emissions. The bikes have been in operation since July 2010.
3. ***Hybrid 'red' buses*** **–** Since March 2006, TfL has been introducing 'hybrid buses' to its existing fleet. These hybrid electric buses use a combination of an electric battery pack and a diesel engine to provide power, reducing carbon dioxide emissions by 40%. The energy used during breaking is designed to charge the electric battery on the vehicles so there is less need for the vehicle to stop operating to be electrically charged.

Other sustainable transport measures introduced in London include the ***electric vehicle charging points***; ***green tomato taxis*** and the ***sustrans cycle network.*** |