**Paper 2: Challenges in the human environment**

**Section A: Urban issues and challenges**

**The urban world**

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| **1a. World population** – estimated at 7.5 billion in August 2017.* World population is increasing.
* The rate of growth as a percentage and absolute terms is slowing.
* Population in HICs is increasing slowly, static or declining.
* Rate of growth has been most dramatic in LICs since 1900.

Some scientists claim the carrying capacity of the earth is 10 billion; beyond this there will not be enough resources for all of the people. | **1b. Urbanisation** is when an *increasing percentage* of a country’s population comes to live in towns and cities.**Urbanisation** has taken place at different times & at different speeds in different parts of the world.More than half of the world’s population now live in urban areas, and cities all over the world are continuing to grow. **Urbanisation** is the result of**Urban growth** is the increase in the area covered by cities.**HIC** regions like Western Europe are highly urbanised. **LIC** regions like Africa are mostly rural but now have high rates of urbanisation.  |
| **2a. Rural to urban** migration is causes by push & pull factors.  |
|  | **1c.** A **megacity** is a city with a population of in excess of 10 million.  |
| **2b. Push factor** – Something that forces people to move e.g. a drought which has resulted in food shortages.  | **2c. Pull factor** – Reasons attracting people to relocate to a particular area e.g. increased employment opportunities. | **1d. Natural increase** – The difference between the number of live births and deaths per year. **Natural increase** occurs when there is a high proportion of young people 18-35 who are more likely to have children. Therefore birth rate is high. The low proportion of older people means that death rate is also low. |

**Rio de Janeiro**

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| **3a .** * Rio de Janeiro is in the continent of South America
* The city is on Brazil’s Atlantic coast
* It is located slightly north of the Tropic of Capricorn
* The terrain is mountainous and surrounds Guanabara Bay
* Population of Rio (city limit) is 6.5 million people (estimated)
* Population of the greater metropolitan area (surroundings) is12.5 million (estimated)
* Over a 1,000 favelas in the great Rio area
* Rocinha is Rio’s largest favela. The 2010 census revealed it had a population of 75,000 although the truer figure is likely to be a population of 250,000
* Rio has two sides:
	+ The beaches of Copacabana and Ipanema - backed by luxury housing
	+ The problems of rapid urban growth including favelas, traffic and crime
 | **3b.** **Global city** - A major urban area that has a significant role in controlling the international flows of capital and trade.**Newly-Emerging Economies** – Countries that have begun to experience high rates of economic development, usually along with rapid industrialisation (Brazil) **Informal sector** – Unofficial work, usually without regular pay and workers’ rights**Pollution** - Chemicals, noise, dirt or other substances which have harmful or poisonous effects on the environment. **Favela** – An illegal settlement in Brazil where people have built on land they do not own. |
| **4a. Rio de Janeiro** is a global city and is important **economically**, **culturally** and as a **transport hub**: |
| **4b. Economic importance** | **4c. Cultural and social significance** |
| **4d. Transport links** |
| **5a. Essential services** for the people of a city **include health care, education, water supply** & **energy**. Rio faces many challenges in providing these **essential services** for its rapidly growing population. |
| **5b.** Low levels of **health care** across the city:* In 2013 only 55% of the city had a local family clinic
* Services for pregnant women & the elderly particularly poor.

**Solution:** Send medical staff into the favelas to screen for & treat diseases. This occurred in Santa Marta and led to reduced infant mortality & increased life expectancy. | **5c. Education** provision is poor especially after the age of 14.* In Rio only 50% of children continue education after the age of 14.
* Many drop out & join drug trafficking gangs
* Low level of school enrolment due to:
	+ Shortage of schools
	+ Priority for children to earn money to support their family
	+ Low pay & training for teachers.

**Solution:** Authorities improved access to education by:* Recruiting volunteers to help in school
* Grants to poor families to keep children in school rather than sending them to work
* Money available for sports to help incentivise children to stay in school
* Opening a private university in Rocinha favela.
* **Schools of Tomorrow** programme focuses on young people in the favelas. Practical skills based courses are available as well as courses for adults who have left formal education. Free childcare is provided for teenage parents to help them return to education
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| **5d. Water supply** is inadequate:* 12% do not have access to running water
* 37% of water lost through leaky pipes, fraud or illegal access.

**Solutions:*** 7 new water treatment plants built 1998-2014
* Over 300km of new water pipes laid.
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| **5e. Energy** is unreliable:* Frequent electricity blackouts
* Illegal energy tapping in the favelas is not safe.

**Solution:** * 60km of new power lines
* New nuclear generator
* New HEP complex
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| **6. Rio’s urban industrial area and economic development has created the following benefits:****+** Boosted the city’s economy **+** Improved the infrastructure – roads & bridges **+** Improved services – health, education, police **+** Increased economic opportunities in the formal sector **+** Led to (relatively) high income per capita |
| **7a. High levels of crime:*** Problems include robbery and violent crime.
* Street crime is a problem especially at night.
* Powerful gangs exert control through violence & drug trafficking.
 | **7c. Unemployment**:* Brazil’s economy was hit by a deep recession in 2015.
* This further increased unemployment & inequality in the city.
* Unemployment in the favelas is over 20%
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| **7b.** To **tackle crime** the police have set up Pacifying Police Units (UPPs) to reclaim favelas from drug dealers and retake control.Other solutions could be continued push to improve education and therefore improve young peoples’ opportunity to get a job in the formal sector and not be tempted to turn to crime.  | **7d. Informal sector*** Most people in the favelas work in the **informal sector** earning less than £60 per month
* About 1/3rd of Rio’s workers don’t have a formal employment contract.
	+ These workers do not have insurance or unemployment benefits.
	+ Government receives no tax so can’t spend on public services
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| **8a.** The environmental challenges which affect the quality of life for people in Rio de Janeiro are caused by the **physical geography** of the city as well as by **human activities**. You need to know three environmental challenges and their solutions in Rio. These will be **traffic congestion leading to air pollution, water pollution and waste disposal.** |
| **8b. Air pollution**:**Solutions**: | **8c. Water pollution**:**Solutions**: | **8d. Waste pollution**:**Solutions** |
| **9a.** The **challenges of living in squatter settlements** include poor construction, lack of services, unemployment, high crime and poor health. |
| **9b. Construction**: | **9c. Services**: | **9d. Unemployment**: | **9e. Crime**: | **9f. Health**: |
| **10a.** Two main methods that can be used to improve life in the favelas:**Self-help schemes** - These give people the tools, materials and training to improve their homes. **Site and service** **schemes** – People are given the chance to rent or buy plots of land that are connected to key services.Prime importance is legal rights to the land. | **10b.*** 'The Favela Bairro Project' is a site and service scheme & means 'Slum to Neighbourhood' project.
* Complexo de Alamao is a specific example in Rio of the scheme.
* $1 billion budget, some from local authority and majority from the Inter-American Development Bank.
 | **10c.** Favela Bairro Project improvements (Complexo de Alamao):  |

**Urban change in the UK: Bristol**

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| **The UK’s population** in **2015** was **64.6 million**. Of these **82%** live in urban areas. The **distribution of the UK’s cities** reflects its industrial past. * Major (industrial) cities can be found near deposits of coal & raw materials like iron ore.
* London developed as the capital with good international links.
* Birmingham’s growth was based on its central location & industrial innovation.
* Ports such as Bristol and Liverpool profited from Britain being a maritime trading nation.

The established population distribution will change:* Increasing number of people moving to London and the south east.
* Immigrants settling in larger cities.
* Counter-urbanistion.
* Elderly retiring on the coast.
 | **Bristol** is the largest city in south west England – **population 440500.** Named by the Sunday Times as the best place to live in the UK (2017). |
| **Bristol has been changed by migration**. There is a large African & Afro-Caribbean population.**Positives of migration**:* Hard-working & motivated
* Enriched Bristol’s culture
* Balance aging population
* Fulfil important jobs; fill skills shortages
* Contribute to local & national economy

**Negatives of migration**:* Challenge of integration
* Pressure on housing shortages
* Provision of educating children who don’t speak English
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| **Bristol as a major UK and international city*** **Population:**
	+ Largest city in south west England
	+ Population of 440 500
	+ One of the UK’s ten ‘core cities’
* **Location and transport links:**
	+ Two major docks, Avonmouth and Royal Portbury, and the UK’s most centrally located deep sea container port
	+ Strategic position on M4 (Wales-London) and M5 (north-south) corridors
	+ Good road and rail links
	+ Easy access to London and ferry services to Europe
	+ Bristol airport links the city to major European centres and the USA
* **Economic and industry:**
	+ 700000 cars imported a year from Japan, Germany and Korea
	+ Financial and business services
	+ Defence, aerospace and technology sectors
	+ High level of inward investment including Foreign Direct Investment in manufacturing and high-tech businesses (Airbus, BMW, Siemens)
	+ Largest concentration of silicon chip manufacture outside of California
* **Social and cultural:**
	+ Bristol has two universities (Bristol University & University of the West of England) which attract pupils from all over the world. As graduates many will choose to stay in the city in professional, managerial and knowledge-based jobs
	+ Two cathedrals
	+ UK’s eighth most popular city for foreign visitors – Bristol Zoo, SS Great Britain
	+ Culture and entertainment – theatres, music venues, Bristol Old Vic Theatre, St Paul’s Carnival
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| **Integrated transport system:** Different forms of transport are linked together to make it easy to transfer from one to another.**Urban greening:** Process of increasing and preserving open space in urban areas.**Social deprivation:** The extent an individual or an area lacks services, decent housing, adequate income and employment.**Inequality:** The difference between poverty and wealth, as well as wellbeing and access to jobs, housing and education**Quaternary sector**: Uses modern technology to carry out research, handle information and give advice to other industries.**Footloose industries** are not tied to a particular location. They include high-tech industries and are located near motorway junctions or on the edges of towns and cities in business parks. The products are often electronics and computer components.**Green belts** were set up to prevent urban sprawl. The aim was to stop different cities and towns from merging, whilst preserving the special character of a town.**Greenfield sites**: An area of land not previously built on. **Brownfield sites**: An area that has been built on.**Urban sprawl**: When a city spreads over rural land. **Regeneration:** When a brownfield area is improved. **Gentrification** is the improvement of housing in an area that was formerly poor and run-down.**Counter-urbanisation** is the movement of people from urban areas to rural areas.  |
| Bristol’s **social opportunities**:**Culture** – Colston Hall, Bristol Old Vic, Bristol Hippodrome, Tobacco Factory, Bristol Harbourside.**Sport** – Bristol City, Bristol Rovers, Bristol Rugby. Stadiums can be multi-use (concerts)**Shopping** – Cribbs Causeway, Cabot Circus  | Bristol’s **economic opportunities**: Bristol’s unemployment rate is below the UK average (2015). High tech industries have developed in Bristol including 50 micro-electronic & silicon design businesses – the largest concentration outside of California’s Silicon Valley. Industry is attracted to:* £100 million government grant to become a Super-Connected City.
* Links between city council and universities
* Educated & skilled workforce – Bristol/UWE Uni graduates settle in Bristol
* University research
* Collaboration within industry
* Clean & non-polluted environment

Major Bristol employers include:Hewlett-Packard, Toshiba, Huawei, Aardman Animartions, Ministry of Defence Procurement Agency, Aerospace (Rolls-Royce, Airbus, GKN Aerospace) |
| **Bristol’s environmental challenges:**1. Waste disposal
2. Derelict industrial buildings within the city
3. Urban sprawl onto greenfield sites to accommodate growing population
4. Traffic congestion & atmospheric pollution
 | **Waste disposal in Bristol****The problem**:* Bristol produces over half a million tonnes of waste each year
* Food waste produced is amongst the worst in the UK

**The solution**:* **Educate & encourage** people to reduce their household waste & increase waste recycling. This has been done in schools and facilitated by special kerbside collections for recycling
* Increase the amount of waste that can be recycled through **new recycling technology**.
* Contractors handling household waste have agreed to higher targets for recycling
* Send non-recyclable material to **energy recovery plants** to produce electricity rather than sending to landfill.

**The success**:* Since 2000 Bristol’s population has increased by 9% but household waste has been reduced by 18%
* Recycling can generate income & energy. The Avonmouth waste treatment plant treats 200000 tonnes of waste each year. From this non-recycling waste generates enough electricity for 25000 homes in Bristol
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| Bristol’s **environmental** initiatives:* **European Green Capital 2015** – first UK city to be awarded this status
* Plan to increase jobs in low-carbon industries from 9000 to 17000 by 2030
* 175 companies created a ‘Green’ action plan
* 100x electric car charging points installed
* Every primary pupil in Bristol planted a tree
* Increase use of brownfield sites
* Monitor water to reduce pollution
* Increase the use of renewable energy
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| Building on **brownfield sites** meets the housing needs whilst minimising urban sprawl:* Between 2006 & 2013 only 6% of new housing developments were on greenfield land
* By 2026 over 30000 new homes are planned on brownfield sites
* Planned brownfield developments are high density with an average of 210 houses per hectare compared with 60 on greenfield sites

**Advantages of using brownfield sites**:* Existing buildings can be re-used for a variety of uses. This can generate income
* Derelict land is cleaned up & improved to improve the urban environment
* Reduces urban sprawl
* Residents are connected to urban services like transport & close to employment – reduces traffic congestion from commuters

**Disadvantages of using brownfield sites**:* Expensive to build on as land often needs to be decontaminated
* Making old buildings safe & fit for purpose (meeting modern standards) can also be expensive
* Gentrification may price out established local population
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| **Stokes Croft** is an inner-city area that became notorious for derelict 19th century terrace homes and industrial buildings including **Perry’s Carriage Works**. Bristol City Council obtained a lottery grant to reverse the economic decline & environmental decay. Major change has come from artists & activists who have moved in and created change through community action – graffiti artwork, independent shops, cafes & nightclubs. Was this a success or example of **gentrification**? | **Bristol Harbourside** has been regenerated over a 40 year period. The old industrial buildings have been re-used for residential, commercial, cultural and leisure uses.**Finzel’s Reach** is a 2 hectare high density mixed use development near the CBD built on a **brownfield site**. The redundant sugar refinery and brewery buildings have been transformed into office space, shops & 400 apartments.  |
| **Temple Quarter regeneration****Requirement for improvement**:* Very run down area due to decline of traditional heavy industry
* Created a bad impression of Bristol to those arriving on the train at Temple Meads or driving in from Wells or Bath

**Regeneration in the Temple Quarter**:* 70 hectare mixed use regeneration project aiming to bring economic, social and environmental improvements
* Aim for 4000 new jobs by 2020 & 17000 by 2037
* **Enterprise Zone** status encourages **economic growth** and creates jobs. They offer a range of incentives to businesses to move to the area, including business rate relief, low rents and easier planning procedures.
* **Improved access from in and around Bristol** – Electrification of the railway line to London will reduce transport time & reduce the **environmental impact**. Improvements to Temple Meads station to encourage more people to travel by train.

Improved road layout with links to the rapid transit network and the Bristol-Bath cycle path will reduce traffic congestion & air pollution bringing **environmental benefits**. New homes, shops and cultural areas will provide additional **social opportunities** for the people of Bristol**Bristol Arena is a new building** in the Temple Quarter regeneration scheme scheduled to open in 2018. Access will be by the new bridge over the river as well as a pedestrian and cycling bridge to ‘Arena Island.’ This route is to be redeveloped with cafes, offices and flats. The arena will allow for a capacity of 4,000 people (seated). It can also be used for major conventions, exhibitions and sporting events with up to 12,000 spectators.**Brunel’s Engine Shed** is an example of the re-use of a historic building. The new £1.7 million Innovation Centre is home to high-tech, creative and low-carbon sector companies.  |
| Building on **greenfield sites** helps to meet the national housing shortage but can be opposed by those wishing to prevent **urban sprawl**.**Bradley Stoke** was built in the 1980s to the north of Bristol. It is now an established commuter settlement with thousands of people commuting into Bristol to work every day. Further housing developments are planned at nearby **Harry Stoke**. Concerns include:* Traffic congestion, noise and air pollution
* Loss of habitats
* Loss of recreational space
* Strain on community services
* Flood risk
 | **Urban greening** is the process of increasing and preserving open space in urban areas, i.e. public parks and gardens. It is another environmental initiative. * More than a third of Bristol is open space
* 90% of the population live within 350m of parkland or waterways
* 8 nature reserves
* 300 parks
* Queen Square was once a dual carriageway but is now an open space with cycle routes
* Aim for 30% of the city to be covered with trees
* New housing developments may only be allowed if nature reserves are established in neighbouring areas (Portbury Wharf)
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| **Pupil notes** |
| Central to Bristol’s **environmental initiatives** is the **integrated transport system** which aims to provide a sustainable alternative to private car use.**Bristol’s transport problems**:* 2012 second most congested city in the UK
* Rush hour journey takes 31% longer

**Bristol’s transport solutions**:* Aim to double the number of people cycling to work by 2020
* **Integrated transport system (ITS)**:
	+ Links different forms of transport within the city & surrounding areas
	+ Includes **Rapid Transit Network** comprising 3 bus routes linking Bristol Temple Meads railway station with Park & Ride sites.
	+ Rail improvements include electrification of the line to London – cleaner and reliable
 | **Bristol’s atmospheric pollution****The problem**:* Vehicle emissions are the main cause of air pollution in Bristol
* Estimated 200 deaths are caused every year in Bristol from air pollution

**The solution**:* **Integrated transport system** with **Rapid Transit Network** and Park & Ride
* Encourage use of public transport by using a smartphone app with information on routes and times
* Reduce speed limits on nearby motorways and in residential areas
* Charging points for electric vehicles – 100 throughout the city including 40 in public car parks
* Encourage walking and cycling with urban greening and the **Frome Gateway**; a walking and cycling route into the city
* Ban diesel cars from city centre from March 2021.
* Bristol’s eco-friendly ‘**poo bus**’s will transport people between Bath and Bristol airport. It can travel up to 186 miles on one tank of gas, (approximately the annual waste of about five people to produce).
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| **Social deprivation:** The extent an individual or an area lacks services, decent housing, adequate income and employment.**Inequality:** The difference between poverty and wealth, as well as wellbeing and access to jobs, housing and education |
| **Filwood*** An area of social deprivation in Bristol
* Within top 10% of most deprived areas in the country
* 2010 survey showed over 1/3 of adults and ½ of children living in Filwood are part of low income households

**Problems include**:* Crime – over 1300 per year with most of these being violent crime. 62% of people feel unsafe going out at night
* Unemployment – 1/3rd 16-24 year olds are unemployed
* Low education – In 2013 only 36% of students got top GCSE grades including English & Maths
* Poor health – life expectancy 78 (2 years below Bristol average of 80), above average rates of cancer fatalities, lowest participation in sport & creative activities in Bristol, low access to fresh fruit & veg
* High rates of teenage pregnancy
* Drug use
* Bullying
* Poor environment
* Lack of transport
* Dumped cars
* Poorly insulated homes
 | **Stoke Bishop*** An affluent suburb in Bristol
* Less than 4% of children live in poverty
* Less than 300 crimes per year; most of these are for anti-social behaviour
* Less than 3% are unemployed
* Well educated – 94% of 16 year olds getting the highest grades in GCSE including English & Maths. Nearly 50% of the population have a degree or equivalent
* Highest level of car ownership in the city
* Pleasant environment overlooking Clifton Downs with many millionaires living in large Victorian & Edwardian villas around Sneyd Park
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| **Case study summary**:* **Stokes Croft** – inner city area now gentrified
* **Harbourside** – brownfield development
* **Finzel’s Reach** – High density, mixed use brownfield development
* **Temple Quarter** – 70 hectare brownfield urban regeneration meeting social, economic & environmental needs
* **Bradley Stoke** – large greenfield commuter settlement
* **Harry Stoke** – additional greenfield commuter settlement
* **Filwood** – socially deprived area
* **Stoke Bishop** – socially affluent area
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**Urban sustainability**

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| **Sustainability**: Actions that meet the needs of the present without reducing the ability of future generations to meet their needs | A sustainable city is organised without excessive reliance on the surrounding countryside. Strategies for a sustainable city include:1. Power itself with renewable sources of energy.
2. Use brownfield sites for new development.
3. Recycle or convert waste to energy.
4. Provide green spaces.
5. Reuse water to conserve supplies.
6. Reduce reliance on fossil fuels e.g. public transport.
7. Create energy efficient homes.
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| A **sustainable city** is one which is **environmentally friendly**, whilst considering the **economic security** and **social needs** of the people who live, work and visit.**Freiberg** is a sustainable city located in south west Germany. |
| **Social planning in Freiburg*** Social planning is about meeting peoples’ needs.
* The people of Freiburg are involved in decision making at the local and city level. This ensures their interests are met.
* Local people can choose to invest in energy schemes in return for financial rewards & football tickets.
 | **Economic planning in Freiburg*** Economic planning is about providing employment.
* Many jobs are available in the manufacture and research & design of solar technology.

**Freiburg’s ‘Solar Valley’:*** 10000 employed in 1500 environmental businesses
* 1000 employed in solar technology
* Conferences on solar technology are held in Freiburg creating jobs
 | **Environmental planning in Freiburg*** Environmental planning ensures resources are not wasted and the environment is protected for future generations.
* Waste reduction and traffic management is key
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| **Waste reduction in Freiburg*** 90kg of non-recyclable waste produced per person per year in Freiburg compared to 122kg German average.
* 350 community recycling collection points.
* More than 88% of packing waste is recycled.
* Biogas digester for organic food and garden waste – collected weekly.
* Burning waste provides energy for 28000 homes.
* Annual waste reduced from 140000 tonnes to 50000 tonnes in 12 years
 | **Sustainable energy use in Freiburg**:* The inner-city district of Vauban houses 5,500 people in low-energy buildings.
* 10 million kilowatts of electricity a year is created through solar energy.
* There are about 400 solar panel installations in the city e.g. the Heliotrope.
* The city plans to be 100% powered by renewable energy by 2050.
 | **Sustainable water use in Freiburg**:* Rainwater is collected & reused
* Green roofs are used to collect rainwater and help with insulation.
* Financial incentives for residents to use water sparingly
* Flood retention basins manage the river Dreisam, by storing excess water, which can used by the city.
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| **Urban greening in Freiburg**:* 40% of the city is forested, providing Freiburg’s ‘green lungs’, filtering pollutants in the air.
* 44,000 trees have been planted in parks and streets.
* 56% of forests are nature conservation areas.
* 44% of the city’s forest is used for timber but 77% grows back within a year
 | The **greening** of Freiburg has created a more peaceful environment for people to use. Green areas are quieter and cleaner and people can relax and socialise in them. They also create a more visually attractive area rather than a lot of buildings. Because these areas are traffic-free they are also safer for people. | **Vauban** is an inner city district in Freiburg. It is an example of **brownfield** development as it is built on the site of a former French army barracks; housing 5500 people in low energy buildings. Also an example of **urban greening** as green areas have been established between houses and green roofs have been fitted for insulation and water harvesting. |
| **Sustainable traffic management in Freiburg**:* Low fares allow unlimited travel in the city and surrounding district.
* 400km of cycle paths with 9,000 parking spaces for bikes including ‘bike and ride’ facilities at railway and bus stations.
 | * Any ticket for a concert, sports or other event is also valid for use on public transport.
* In 1973 the city centre turned into a pedestrian zone. Traffic calming measures were also introduced, 90% of residents live in 30km per hour zones.
* As a result of Freiburg’s transport plan, tram journeys have increased by over 25,000 in one year while car journeys reduced by nearly 30,000.
 | * Restrictions on car parking spaces, in Vauban district each one costs £20,000.
* The tram network covers 30km and is connected to the 168km of city bus routes (ITS).
* 70% of the population live within 500m of a tram stop, with a tram every 8 minutes.
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