

'DO YOU KNOW' QUESTIONS

Answers

1 Water and carbon cycles

1.1 Water and carbon cycles as natural systems (p. 6)

- 1 Inputs are those elements that enter a system to be processed. Outputs are the outcomes of processing within the system.
- 2 Negative feedback is when a system acts by lessening the effect of the original change and ultimately reversing it. Positive feedback occurs within a system where a change causes a further effect, continuing or even accelerating the original change.

1.2 The water cycle (p. 14)

- 1 Dynamic equilibrium refers to the tendency towards a natural state of balance. The drainage basin element of the water cycle is an open system where the inputs and outputs can change. Dynamic equilibrium is easily upset by extreme events such as storms or droughts. Human activity can also cause disruption to the dynamic equilibrium, e.g. by modifying the drainage basin. This causes disruption or interference to the dynamic equilibrium and is evidenced through flooding, for example.
- 2 Sea ice is free-floating — the sea freezes and unfreezes each year. Ice shelves are firmly attached to the land.
- 3 Transpiration rates are determined by:
 - temperature: transpiration rates increase as the temperature increases, especially during the growing season, when the air is warmer due to stronger sunlight and warmer air masses
 - relative humidity: as the relative humidity of the air surrounding a plant rises, the transpiration rate falls
 - wind and air movement: increased movement of the air around a plant will result in a higher transpiration rate
 - soil-moisture availability: when moisture is lacking plants can begin to senesce (age prematurely, which can result in leaf loss) and hence transpire less water

- type of plant: some plants that grow in arid regions, such as cacti and succulents, conserve precious water by transpiring less water than other plants

4 Overland flow is created:

- when rainfall intensity exceeds the infiltration capacity of the soil
- when saturation of the soil takes place and any excess water must flow over the surface.

This often takes place at the base of slopes

5 The impact of precipitation depends on its extent, its direction of travel, its intensity and its duration. Intense periods of rainfall tend to be of a shorter duration but they can have great impacts. Equally, longer-duration events with lighter rainfall can cause flooding. The nature of precipitation — whether rain or snow — can also have an effect. Snowmelt is a major cause of floods.

1.3 The carbon cycle (p. 19)

1 When volcanoes erupt, they vent CO₂ to the atmosphere and cover the land with fresh silicate rock to begin the carbon cycle. Volcanoes emit between 130 and 380 million tonnes of CO₂ per year. For comparison, humans emit about 30 billion tonnes of CO₂ per year – 100 to 300 times more than volcanoes — by burning fossil fuels.

2 Natural sequestration includes: peat bogs — by creating new bogs or enhancing existing ones; reforestation — planting of trees on marginal crop and pasture lands; wetland restoration.

Human-induced sequestration includes: urea fertilisation — fertilising the oceans with urea, a nitrogen-rich substance that encourages phytoplankton growth; bio-energy with carbon capture and storage (BECCS), where carbon is captured in power stations and stored underground; biochar, — the addition of charcoal to a soil.

3 Carbon dioxide can be removed from fuel exhaust gases, such as from power stations. This carbon can then be stored in underground reservoirs, aquifers and even ageing oil fields. Carbon dioxide can be injected into depleted oil and gas reservoirs and other similar geological features.

4 Carbon dioxide is the single most important anthropogenic greenhouse gas in the atmosphere, contributing approximately 65% to the net warming by greenhouse gases. It is responsible for the majority of the increase in net warming over recent decades. The current carbon budget, at a global scale, is such that there is a net *gain* of 4.4 Pg of carbon per year in the atmosphere. The rising levels of CO₂ and other greenhouse gases in post-industrial times, due to human activity, are fuelling fears of climate change through atmospheric warming.

1.4 Water, carbon, climate and life on Earth (p. 23)

1 The enhanced greenhouse effect refers to the impact of increased levels of greenhouse gases (CO₂ and methane) on the atmosphere of the Earth. The greenhouse effect is a natural phenomenon. Atmospheric gases in the troposphere allow incoming short-wave radiation from the Sun to pass through and warm the Earth. Some of this radiation is reflected back from the Earth's surface into space at a longer wavelength. Greenhouse gases in the troposphere, such as water vapour and carbon dioxide, absorb some of this long-wave radiation and radiate it back again to the Earth's surface. This natural balance, however, has been affected by human activity. The atmospheric concentration of carbon dioxide has increased by about 15% in the last hundred years and the current rate of increase is estimated to be 1–2% per year. This, together with increases in levels of other greenhouse gases such as methane and nitrous oxide, has upset the natural balance, increased the amount of energy being radiated back to the surface, and led to 'global warming'.

2 The goal of the Kyoto Protocol was to reduce worldwide greenhouse gas emissions between 2008 and 2012 to 5.2% below 1990 levels. Compared with the emissions levels that would occur by 2010 without the Kyoto Protocol, this target actually represented a 29% cut. The Kyoto Protocol set specific targets for emissions reduction for each industrialised nation but excluded developing countries. To meet their targets, most ratifying nations would have to combine several strategies:

- place restrictions on their biggest polluters
- manage transportation in order to reduce emissions from vehicles
- make better use of renewable energy sources — such as solar power, wind power, and biodiesel — and use them in place of fossil fuels

The Kyoto Protocol has not been a great success in reducing emissions of greenhouse gases. Globally, between 1992 and 2007, emissions in greenhouse gases increased by 38%. China's emissions increased by 150%, India's by 103%, the USA's by 20%, and Japan's by 11%. Within the EU, there has been an overall fall of 0.8% from the group known as EU-15 (the EU members prior to 2004), with significant falls from the UK, Germany, Denmark and Sweden, but this is still below the target.

3 The EU has the EUETS — the European Union Emission Trading Scheme. This is a mechanism that sets limits (caps) on the emission of a pollutant but allows companies that are within the limit to sell credits (trade) to companies that need to pollute more. The power generation, steel, cement and other heavily polluting industries (such as airlines) are part of the

scheme. Any industry with an account in the EU registry can buy or sell credits, whether they are a company covered by the EUETS or not. Trading can be done directly between buyers and sellers, through several organised exchanges, or through the many intermediaries active in the carbon market. This scheme has also been adopted by Australia.

4 Other outcomes of the COP21 (Paris) Agreement include:

- accurate emissions records to be kept and made available to all other countries
- wealthy countries to share science and technology relating to low GHG emissions
- wealthy countries to make affordable finance available for those poor nations most affected by anthropogenic climate change
- countries that have historically emitted a lot of GHGs (e.g. the UK) to recognise the ‘loss and damage’ inflicted on poor countries because of climate change

5 The effects of El Niño in South America are noticeable and marked. El Niño is associated with warm and very wet weather in the months between April and October along the western coasts of South America, and causes major flooding. Some inland parts of South America experience drier weather, e.g. Amazonia, whereas other more distant areas experience wetter conditions, such as southern Brazil and northern Argentina.

2 Coastal systems and landscapes

2.1 Coasts as natural systems (p. 25)

1 For example, in Chichester harbour stores include:

- mudflats and saltmarsh, e.g. Nutbourne marsh
- gravel and sand beaches on west-facing shores of the Thorney and Bosham peninsulas
- intertidal sand banks deposited by the ebb tide, e.g. the Pole Sands just outside the harbour entrance
- spits of shingle and aeolian sand, e.g. East Head, Black Point and Ella Nore

2 Positive feedback: Dredging in a harbour improves navigation by making the channels deeper. It also increases the speed of tidal flows, however, thereby deepening the channel more.

2.2 Systems and processes (p. 32)

- 1 Friction between the sea floor and the moving water in the wave slows the wave and causes it to steepen. When water depth is <1.3 times the wave height, the wave breaks.
- 2 Flow velocities in rip currents often exceed the speed at which people can swim and, in combination with the large water depth, rip currents can easily drag unsuspecting swimmers out to sea.
- 3 Mechanical weathering involves the breakdown of rocks into smaller fragments through physical processes such as expansion and contraction due to temperature change. Chemical weathering involves the decay or decomposition of rock in situ by chemical processes only.
- 4 In a flow, there is a variation in the speed of movement, both laterally and with depth. Flows tend to have a higher water content. A slide is when materials in the regolith move with a large degree of uniformity — i.e. as a single unit. A slump has a rotational element to the movement.
- 5 Wave refraction is the tendency for waves to become parallel to the line of a coastline. The waves approaching a headland find the water shallows more quickly and movement is slowed down. Waves in deeper water are unaffected, however, and move more rapidly towards the bay. The line of the wave therefore begins to reflect the shape of the submarine contours.

2.3 Coastal landscape development (p. 39)

- 1 Wave-cut platforms continue to grow in width as waves break further and further away from the cliff face. This leads to a greater dissipation of wave energy such that eventually most waves will have little energy left to perform further erosion at the base of the cliff, hence slowing down the growth of the platform. Eventually, therefore, platforms tend to act as cliff protectors. Some suggest that the maximum width of a wave-cut platform is 0.5 km, though this will vary according to wave height and strength.
- 2 Because waves can be refracted around a headland.
- 3 Temperature change affects the volume of water stored on the land as ice, which in turn affects the volume in the oceans. It also affects the volume in the sea, as warmer water is less dense and so occupies a greater volume.
- 4 The south and east of the UK is sinking by up to 0.8 mm per year and so experiencing faster rates of sea-level rise. Land in the north and west is rising by up to 2 mm per year so that relative sea-level change is lower. This change in land level in the UK is due to the loss of glacier mass at the end of the last ice age. The land in the north, where ice was lost, is rebounding, causing the

south and east to dip downwards in a seesaw-like motion. Local isostatic change makes the impact of eustatic changes harder to predict.

5

- Coastal erosion: cliffs, caves, arches, stacks, stumps, geos
- Coastal deposition: beaches, berms, spits, tombolos, bars, barrier beaches, dunes
- Landforms created by sea-level change: rias, fjords, raised beaches, raised platforms, relic cliffs

2.4 Coastal management (p. 41)

- 1 Groynes, because their purpose is to trap sediment moving along the coast.
- 2 Hard engineering has significant financial implications and severe, often unpredictable, environmental costs; it tends to be focused on areas of greatest need, particularly urban areas with high land values and high population densities. Soft engineering is less costly and less environmentally damaging, and is regarded as being more sustainable.
- 3 SMPs are managed by coastal groups, made up of local authorities and the Environment Agency. They are therefore a mix of local and national decision making. This is important as the money will come from both local and national sources, and the decisions made have to fit into a national strategy. What happens on one area of coastline may impact somewhere else, so there has to be some ‘joined-up thinking’.
- 4 No active intervention.

3 Hazards

3.1 The concept of hazard in a geographical context (p. 46)

1 Primary effects — these are the effects of a hazard that result directly from that event. For a volcanic eruption these could include lava and pyroclastic flows. In an earthquake, ground shaking and rupturing are primary effects.

Secondary effects — these are the effects that result from the primary impact of the hazard event. In volcanic eruptions these include flooding (from melting ice caps and glaciers) and lahars. In an earthquake, tsunamis and fires (from ruptured gas pipes) are secondary effects.

2 Places that were once relatively safe may have become far more at risk over time. Deforestation, for example, could result in more flooding from torrential rain associated with

tropical storms and there could also be a greater risk from landslides. On the other hand, by learning from past experiences and adjusting their living conditions, people are able to reduce their levels of risk. For example, they could avoid living on sites that are at risk from storm surges but stay within the same area.

3 Speed of onset of a hazard can be crucial. For example, earthquakes come with very little warning, and the speed of onset of the ground shaking leads to maximum destruction. The 2004 south Asian tsunami illustrates the variation very well, with little awareness possible at Banda Aceh (Indonesia) and Thailand. Warnings were given in many other places in the wider region, however, such as Sri Lanka and Kenya, and evacuation could occur.

3.2 Plate tectonics (p. 49)

1 Oceanic plates are more dense than continental plates, and oceanic plates are thinner than continental plates. Oceanic plates are made of basalt, whereas continental plates are granitic.

2 There is an ongoing discussion about whether the Iceland hot spot is caused by a deep mantle plume or originates at a much shallower depth. The plume is believed to be quite narrow, perhaps 100 km across, and extends down to at least 400–650 km beneath the Earth's surface and possibly down to the core–mantle boundary. Studies suggest that the hot spot is only 50–100°C hotter than its surroundings, which may not be a great enough difference to drive a very buoyant plume. There is one significant difference between this hot spot and that of Hawaii: while the Hawaiian island chain shows a clear time-progressive volcanic track caused by the movement of the Pacific plate over the Hawaiian hot spot, no such track can be seen for Iceland.

3 Plate tectonics remains just a theory because the logistics and cost of drilling down to the Mohorovičić discontinuity (known as 'the Moho') — the boundary between the Earth's crust and the upper mantle, at its thinnest a distance of just 10 km — remain insurmountable.

4 Convergent boundaries/subduction zones produce explosive volcanic eruptions with multiple hazards.

5 Palaeomagnetism refers to evidence of the Earth's magnetic field being stored within rocks as 'fossil magnetism', in that magnetic minerals align themselves with the magnetic field that was operating at the time of their formation. When magma cools as it reaches the surface, ferromagnetic minerals will behave like a compass needle and point towards the North Pole. The Earth's magnetic field has reversed many times over the last 2 billion years; the time interval for these changes has varied from 20,000 to over 10 million years. These reversals are recorded in

rocks on either side of the divergent plate margin in the mid-Atlantic and the symmetry in this magnetic striping provides evidence that the plates are moving apart.

3.3 Volcanic hazards (p. 52)

1 Volcanoes occur in belts across the Earth's surface, following destructive and constructive plate boundaries (about 80% of the world's volcanoes are subduction volcanoes). Magma is produced where the mantle is rising along mid-ocean ridges and when crust is forced to sink and melt under oceanic trenches. The Pacific Ring of Fire is an almost continuous belt of volcanoes that comprises the Andes and Rocky Mountains (young fold mountains) and the island arcs stretching from the Aleutian Islands in Alaska to New Zealand. There are also volcanoes that are found away from plate margins. These are associated with hot spots, such as Hawaii.

2 The ash cloud from the Eyjafjallajökull eruption had a disruptive effect on global air travel because of the dangers of jet engines ingesting ash: over 100,000 cancelled flights cost more than £1 billion in losses; agricultural produce from places such as Kenya and New Zealand was unable to reach its markets.

3.4 Seismic hazards (p. 55)

1 The 2011 tsunami in Japan showed how the globalised, interdependent world economy could be affected by the economic and human impacts of disasters. Disruption to ports, factories and power supplies had impacts on global supply chains, for example car-production, Boeing jets and semiconductors used in modern electronics. The accompanying nuclear meltdown disaster at Fukushima was a catalyst in Germany abandoning its nuclear electricity programme.

2 No. The level of risk can be forecast, but precise times and locations (prediction) are not possible.

3 The architecture and engineering of structures, including buildings, bridges and tunnels, so that they can withstand a certain degree of earthquake energy.

3.5 Storm hazards (p. 59)

1 Tropical revolving storms have a variety of names around the world: hurricanes in the Caribbean (28% of such storms); cyclones in the Bay of Bengal (8%); typhoons in southeast Asia (43%); willy-willies in northern Australia (20%).

2 It is essential that warnings are as accurate as possible because of the high economic costs of evacuation, particularly in developed countries. Accurate predictions enable evacuation to take

place smoothly and safely, and emergency services to be put on full alert. Also, if warnings are inaccurate, people may not believe the next one (cry wolf syndrome).

3 Areas with lower levels of economic development suffer from a lack of insurance, poor land-use planning, inadequate warning systems and defences, and poor infrastructure and emergency services. This usually results in a higher death toll. Even within a wealthy country such as the USA, Hurricane Katrina exposed the problems of a largely uninsured and relatively poor population who struggled to cope during, and especially after, the event.

4 ‘Cry wolf syndrome’ occurs when predictions (and evacuation) prove to be wrong, so that people are less likely to believe the next prediction and warning, and therefore fail to evacuate.

3.6 Fires in nature and multi-hazardous areas (p. 62)

1 Managed fires are used to strip out areas of overly dense vegetation and, as the burnt plants provide valuable minerals in the soil, they promote fresh growth. Managed fires can be used to regenerate a whole ecology or to create an ecology for a particular purpose, such as a grouse moor (for shooting birds) in northern Britain.

2 Wildfires are concentrated in parts of Australia (New South Wales and Victoria), Canada (British Columbia), the USA (California and Florida), South Africa and southern Europe (Mediterranean areas). Some writers have suggested that such fires have become more prevalent in these areas as there is more movement of people into the countryside, as well as an increased incidence of drought due to climate change.

3 Pyrophytes are plants that have adaptations to enable them to withstand fire. This usually consists of bark that is fire-resistant. Examples of pyrophytes are the baobab tree and the acacia, both of which are typical of savanna regions. For some plants fire is required before they can regenerate. In Australia, for example, plants such as Banksia need fire for their woody fruit to open and thus regenerate.

4 Many of the rapidly growing megacities of the developed and developing world are located in hazard-prone areas. In some cases, rapid urbanisation has destroyed ecosystems by deforestation, which increases the risk of flash floods. Several such cities are in close proximity to plate boundaries and the tracks of tropical storms, and are within dry, but forested, environments. Some are at risk of a combination of these hazards. With high population densities, hazard management in large urban areas is both expensive and complex, making disasters inevitable both socially (high concentrations of vulnerable people) and economically (huge investment in infrastructure).

4 Global systems and global governance

4.1 Globalisation (p. 67)

1 The ‘shrinking world’ can be illustrated by the following:

- a** up to the mid-nineteenth century most travel was on horseback — an average speed of 10 mph
- b** steam trains then moved at up to 70 mph, and steam ships at over 30 mph
- c** by the mid-twentieth century air travel was prevalent, again reducing travel times across the world
- d** from the late twentieth century communication has become almost instant with the internet

2 Coca-Cola — the company uses the same formulae (one with sugar, the other with corn syrup) for all its markets. The classic contour bottle design is incorporated in every country. The size of bottle and can that is marketed in any particular country, however, is the same as that of other beverage bottles and cans in that country.

Mars — introduced a chocolate bar called Snickers around the world, though until 1990 it was marketed under the name Marathon in the UK and Ireland.

3 At the highest level, the top of the service hierarchy is to be found in world cities such as London, New York and Tokyo, which are the major nuclei of global industrial and financial command functions. Other cities of prominence include Frankfurt, Chicago, Paris, Milan and Los Angeles.

4 An imaginary example of a hub company would be a US-owned TNC that outsources some manufacturing to a South Korean TNC, which in turn has a branch factory in China. The US company also has a branch factory in Mexico, and a subsidiary in Germany. In addition, much of the administrative support for all of these is undertaken in back-office work in India. There is therefore a complex web of interconnections.

4.2 Global systems (p. 71)

1 Foreign exchange generated by international trade can be used in a developing country to invest in health and education services. FDI can bring benefits where the corporate social responsibilities of TNCs are applied. Bilateral relationships with developed countries can strengthen human rights.

2 India has become one of the most attractive locations for the outsourcing of services, in particular the state of Karnataka, which houses Bangalore — often known as India’s ‘Silicon City’. Much of this outsourcing has involved call centre work and software development. Labour costs are much lower, but the workforce is both highly educated and has good command of the English language. India is the second-largest English-speaking human resource in the world and has the world’s third-largest ‘brain bank’, with around 2.5 million technical professionals. There is also a burgeoning ‘middle class’ of some 250–350 million people, with increasing purchasing power.

3 Some examples of Chinese investments include:

- the shipping company Cosco has taken a 67% stake in Greece’s second-largest port, Piraeus, from which Chinese firms are building a high-speed rail network linking the city to Hungary and eventually Germany
- a Chinese-designed nuclear reactor in Pakistan, where China also announced it would finance a new highway and invest \$2 billion into a coal mine in the Thar desert
- a gas pipeline from the Bay of Bengal through Myanmar to southwest China
- a rail link between Beijing and Duisburg, a transport hub in Germany
- a military base in Djibouti that will help with anti-piracy in the Gulf of Aden

4.3 International trade and access to markets (p. 76)

1 The WTO

2 For: a huge potential market of around 500 million people; the combined strength of the members forms a powerful trade bloc; freedom of movement for workers within a wide employment market.

Against: poor distribution of EU income, particularly as the Common Agricultural Policy (CAP) takes so much of the budget; over-bureaucracy within the European Commission has brought into question its efficiency; the adoption of some European law has been inconsistent across the Union.

3 1978

4 SEZs have contributed hugely to ‘made in China’ as FDI has poured into that country over the last 30 years. Western consumers benefit from low-cost goods, but there are question marks about pay and working conditions in SEZs. Apple was subject to negative publicity in 2010 when working conditions in its supplier factories (owned by Foxconn) making iPhones and iPads

came under scrutiny. In many Chinese SEZs wages are now high by global standards and countries like Vietnam are more competitive.

5 Resource extraction — particularly in the mining, oil and gas industries: BP, Exxon, Royal Dutch Shell and Chevron.

Manufacturing — high-end products such as computers and electronics (Apple) and pharmaceuticals (GSK); large-volume consumer goods such as cars (Ford, Toyota) and tyres (Michelin); mass-produced consumer products such as cigarettes, drinks, foods, cosmetics, etc. (BAT, Fosters, Unilever, Kellogg's, L'Oreal).

Services — banking and insurance (HSBC), supermarkets (Walmart), advertising (Saatchi), freight transport (Norbert Dentressangle), hotel chains (Radisson) and fast food outlets (McDonalds, KFC).

6 Vertical: BP — owns oil fields, refineries and service stations.

Horizontal: Kraft — US company that also owns Cadbury and Heinz.

4.4 Global governance (p. 79)

1 To maintain international peace and security, and to that end: to take effective collective measures for the prevention and removal of threats to the peace, and for the suppression of acts of aggression or other breaches of the peace; to develop friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples; to achieve international cooperation in solving international problems of an economic, social, cultural or humanitarian character, and in promoting and encouraging respect for human rights and for fundamental freedoms for all without distinction as to race, sex, language or religion.

2 The UN plays an integral part in social and economic development through its UN Development Programme (UNDP). The UNDP administers the UN Capital Development Fund, which helps developing countries grow their economies by supplementing existing sources of capital assistance by means of grants and loans. In addition, it funds the World Health Organization.

3 Fairtrade pays farmers of cocoa, cotton, tea and coffee in developing countries a guaranteed price for their produce plus a 'Fairtrade premium' payment. This attempts to reduce the inequalities of global trade. The aim is to make incomes sustainable for farming families and to use some of the additional money to support community facilities like wells, schools and clinics. The downsides of Fairtrade are that the extra income is small, and Fairtrade products are more expensive for consumers.

4 Ethical trade and investment means that retailers, companies and their suppliers take responsibility for improving the working conditions of the people who make the products they sell. Most of these workers are employed by supplier companies around the world, many of them based in developing countries where laws designed to protect workers' rights are inadequate or not enforced. Companies with a commitment to ethical trade adopt a code of labour practice that they expect all their suppliers to work towards. Such a code addresses issues like wages, hours of work, health and safety, and the right to join free trade unions.

4.5 The 'global commons' and Antarctica (p. 83)

1 It marks the location where surface waters of the Southern Ocean moving northward sink below sub-Antarctic waters. It is a region of fast water current speeds and strong horizontal gradients in density, temperature and salinity. It also marks the location of one of several strong atmospheric jets within the Antarctic Circumpolar Current (ACC), which flows eastward around Antarctica. The AC marks an important climatic boundary in terms of both air–sea fluxes and the heat and salt budgets of the oceans.

2 There are no permanent human residents — between 1000 and 5000 scientists live there at any one time at research stations scattered across the continent.

3 A variety of flora and fauna is present on Antarctica, consisting of algae, bacteria, fungi, and some plants and animals, ranging in size from mites and nematodes to penguins and seals. Where vegetation does occur it can be classed as tundra.

4 Krill are small crustaceans and are found in all the world's oceans. Krill are considered an important trophic-level connection — near the bottom of the food chain — because they feed on phytoplankton and zooplankton, converting these into a form suitable for many larger animals. Krill make up the largest part of the diet of these larger animals. In the Southern Ocean, one species of krill makes up an estimated biomass of over 350 million tonnes. Of this, over half is eaten by whales, seals, penguins, squid and fish.

5 The International Whaling Commission (IWC) is the global body charged with the conservation of whales and the management of whaling. All members of the IWC are signatories to the International Convention for the Regulation of Whaling. The IWC coordinates and funds conservation work on many species of cetacean. It has also adopted a strategic plan for whale-watching to facilitate the further development of this activity in a way that is responsible and consistent with international best practice.

5 Changing places

5.1 The nature and importance of places (p. 87)

- 1** Space is the objective meaning of a location, such as its map coordinates. Place is the subjective meaning of a location, such as how you feel about where your home, school or college is. The same space can have different place-meanings to different people.
- 2** The phrase ‘field of care’ refers to what Tuan called the ‘affective bond between people and place or setting’. Tuan argued that through experience of a place, the daily activity of living in, and moving through, specific environments, we come to form attachments to places — they become private places. They are the places where people create interpersonal ties and develop social capital, both of which require extended time spent there as well as material settings.
- 3** For example: the TV series *Downton Abbey*. *Downton Abbey* presents a somewhat confusing relationship with place. The story is set in an imaginary part of Yorkshire — supposedly between Ripon and Thirsk. Yet the resident aristocratic family is that of Lord and Lady Grantham (named after the Lincolnshire town?). The main external shots of the abbey are of Highclere Castle in Hampshire. On the other hand, many scenes, including some of *Downton Abbey*’s key events, were filmed in and around the village of Bampton. This village is located in the Oxfordshire Cotswolds.

5.2 Relationships and connections (p. 89)

- 1** Availability of a resource such as coal can lead to a place becoming a coal mining village. As long as mining is economically valuable the place will prosper, but once the mine closes a downward spiral can set in. The location of a university can lead to a place developing as a centre of research and activities such as publishing.
- 2** Some writers contend that the process of globalisation highlights, rather than eliminates, place. For many urban high streets, place is constituted not by its own locality but by its global connections. On a clone high street you will see not only shops and offices that connect with the wider world through their ownership and the goods they sell, but also a range of ethnic groups within the people who walk on the pavements. Rather than the idea of a ‘local community’, a community is built through layered local–global interactions.
- 3** The EU, an international-scale government, can issue grants to support the construction of infrastructure, such as road widening or bridge building. National governments have departments responsible for the strategic planning that drives economic change, such as in education, training

and major transport links. Local government has responsibilities for planning and can bring about economic change, for example by supporting the building of an industrial estate or the regeneration of a town centre.

- 4 Something that has been reused or altered but still bears visible traces of its earlier form.

5.3 Meaning and representation (p. 93)

- 1 The Kurds are one group whose main spatial concentration is in the region where the borders of Iran, Iraq, Syria and Turkey come together. The Kurds have long campaigned, sometimes violently, for their own independent state, Kurdistan.
- 2 Informal representations of place are based on subjective opinions. Different people can give very different meanings to the same place based on the same photograph or painting. Some informal representations of place try to emphasise a certain characteristic and so convey a particular image.
- 3 Housing often takes a major share of a household's income, so differences in quality of housing directly reflect wealth inequalities. Inadequate housing leads to ill-health and this leads to poor educational performance and absence from work, and so a downwards spiral is created.

6 Contemporary urban environments

6.1 Urbanisation (p. 102)

- 1 For example, in Africa, several countries are more than 60% urban, with three (Gabon, Libya and Western Sahara) over 80% urban. Some, such as Chad and Ethiopia, are less than 25% urban. Among European countries, levels of urbanisation range from as low as 40% in Bosnia and Herzegovina to as high as 98% in Belgium.
- 2 Economic: loss of jobs; closure of businesses; increase in demand for state benefits; de-multiplier effect. Social: increase in unemployment; out-migration; higher crime levels; family breakdown and alcohol/drug abuse. Environmental: derelict land; long-term contamination of land areas; deteriorating road infrastructure.
- 3 Well-known megacities include Tokyo, Jakarta, Istanbul, São Paulo and Cairo. There are other lesser-known megacities — for example, Chengdu in China, Ghaziabad, Surat and Faridabad in India, Toluca in Mexico, Palembang in Indonesia, and Chittagong in Bangladesh.
- 4 You can consider:

- its ‘assets’ — attractions, climate, infrastructure (particularly transport), safety and economic prosperity
- its ‘buzz’ — combination of social media (Facebook likes and Twitter sentiment analysis) and media mentions
- its ‘connectedness’ — the transport networks to tie it into the world economy, such as a major international airport(s) and ideally its own docks. Also, home-grown media and communications industries

5 The proposed High Speed Two (HS2) rail network between London, Birmingham, Liverpool, Manchester and Leeds is a planned attempt to connect the poorer city regions to the economic core in London and the South East. Since the 1960s, there has also been considerable investment in regional airports like Newcastle, Manchester and Glasgow.

6.2 Urban forms and associated issues (p. 109)

1 For example: According to the concentric zone model the city grows outward, beginning with the CBD in the middle. The second ring is the zone in transition, where industry and poorer-quality housing can be found. Usually new immigrants to the city live in this zone in small quarters, and rooming houses for single individuals are located here, too. The third ring is the zone of independent workers’ homes. These are modest older houses occupied by the working class (or blue-collar workers). The fourth ring is the zone of better residences, with more spacious houses for middle-class families. Finally, the fifth zone is the commuter zone. People (often white-collar workers) who work in the centre choose to live in the suburbs.

2 For example: Average household income in Detroit (Michigan, USA) in 2015 was about \$25,000 — half the national average. Two-thirds of Detroit’s residents could not afford basic needs like food and fuel, and the poverty rate was 38%. Life expectancy in parts of Detroit was just 69 years, and fewer than 30% of students graduated from high school. Detroit had the second-highest murder rate of any US city. Average house prices in Detroit were about \$40,000 and it was estimated that there were 30,000 abandoned homes and 70,000 other abandoned buildings.

3 For example: Southwark (London) is changing, both demographically and culturally, because:

- each year about 13% of its resident population changes because people move away and new people move in

- Southwark was 63% white in 2001 but 54% in 2011, so its cultural diversity is growing rapidly
- most of Southwark's population growth is in the 20–35 age group; in other words young, dynamic, educated workers
- population growth is driven by high fertility rates, because young immigrant populations have higher fertility than the population in general (and youthful populations have low mortality rates)

4 In London, examples of post-modern buildings include the Gherkin, 20 Fenchurch Street (the walkie-talkie building), the Shard and City Hall. The Guggenheim Museum in Bilbao and the Museum of Contemporary Art in Barcelona are Spanish examples.

6.3 Urban climate (p. 113)

1 Temperature inversion is an atmospheric condition in which temperature increases with height, rather than the more usual decrease.

2 Los Angeles has had a serious problem with photochemical smog because of its high density of vehicles, frequent sunshine and the favourable topography that traps the high concentration of photo-oxidant gases at low levels. Beijing has for many years suffered from serious air pollution. Primary sources of pollutants include exhaust emissions from Beijing's 5 million plus motor vehicles, coal burning in neighbouring regions, dust storms from the north and local construction dust.

3 London has the Congestion Charge — taxing vehicles that travel through central areas, and the Greater London Low Emission Zone (LEZ) within which the most polluting vehicles are required to pay a daily charge.

6.4 Urban drainage (p. 114)

1 An urban storm hydrograph has a higher peak discharge, steeper rising and recessional limbs, and a shorter lag time.

2 The SuDS scheme at the Olympic Park (east London) has: porous asphalt strips on the pedestrian concourses; numerous swales adjacent to the arenas; rainwater harvesting on the velodrome; grassed and tree-planted landscaped areas to absorb rainwater; and areas of wetland to collect and store water before release into the local rivers.

6.5 Urban waste and other environmental issues (p. 118)

- 1** Developed/industrial economies are the sources of most electronic waste. The main destinations that are known of are countries that are developing. Other destinations that are suspected are mainly in least-developed and less industrialised countries. The USA exports its electronic waste all over the world; most of the EU's waste goes to Africa and Asia. Australia, Japan and South Korea export almost all their waste to China and India.
- 2** Preventing pollution in urban areas is often largely a public relations task. People need to be educated about proper ways to dispose of waste. Community schemes such as 'Yellow Fish' are important. This involves stencilling a yellow fish symbol beside drains to remind people that any waste entering them may go directly to the nearest stream, river, lake, canal, beach or bathing water.
- 3** The London Olympics site: a 350 ha area of East London was 'cleaned up' and has now become the largest new urban park in Europe, with 100 ha of open land and 45 ha of new habitat. More than 2.2 million m³ of soil was excavated, of which nearly half was treated by soil washing, chemical stabilisation, bioremediation or sorting. 80% of the excavated material was reused on site. A total of 235,000 m³ of contaminated groundwater was successfully treated.

6.6 Sustainable urban development (p. 120)

- 1** The Brundtland Report (1987) was the first to coin the term 'sustainable development'.
- 2** The best known sustainable cities include Curitiba (Brazil), Chattanooga (USA), Freiburg (Germany), Copenhagen (Denmark) and Putrajaya (Malaysia).
- 3** Local currencies, such as the Lewes Pound, serve the needs of local people because they keep money within the local economy. In contrast, for every pound spent in a chain store, only 35 pence is respent in the local economy. Local currency can also encourage a sense of community and can include a mechanism to generate donations for local charities and services.