

Geography 12

August 2001 Provincial Examination

ANSWER KEY / SCORING GUIDE

- Topics:**
1. The Nature of Geography
 2. Systems of the Earth
 3. Resources of the Earth

Part A: Multiple Choice

Q	K	S	C	T	PLO	Q	K	S	C	T	PLO
1.	B	1	U	2	2B1	21.	D	1	U	2	2C1c
2.	C	1	K	2	2A4	22.	C	1	U	2	2C1b
3.	A	1	U	2	2A2	23.	A	1	U	2	2C1b
4.	C	1	K	2	2A1	24.	D	1	U	2	2C1d
5.	D	1	K	2	2A2	25.	C	1	U	2	2C1e
6.	B	1	U	1	1C1, 2A3	26.	D	1	K	2	2D1
7.	C	1	U	1	1C1	27.	B	1	K	2	2D2
8.	A	1	U	1	1C2	28.	D	1	U	2	2D3a
9.	D	1	K	1	1B1, 2A4	29.	B	1	U	2	2A5
10.	D	1	U	2	2B1	30.	A	1	U	2	2D3b
11.	D	1	U	2	2B4	31.	B	1	K	2	2D3b
12.	C	1	K	2	2B3	32.	A	1	K	2	2D3c
13.	A	1	K	2	2B3	33.	B	1	K	2	2D3d
14.	A	1	U	1	1A1, 1C2	34.	C	1	K	2	2D3d
15.	C	1	K	1	1B3, 1C3	35.	C	1	K	2	2D3e
16.	A	1	U	3	3A1	36.	A	1	U	1	1C1
17.	D	1	K	3	3A1	37.	B	1	U	1	1C1
18.	D	1	K	2	2C1a	38.	D	1	U	1	1C1
19.	C	1	U	1	1B1	39.	B	1	U	3	3B2
20.	C	1	U	2	2C1a	40.	D	1	U	2	2B3

Multiple Choice = 40 marks

Part B: Written Response

Q	B	C	S	T	PLO
1.	1	H	6	1	1B4
2.	2	U	4	2	2D3d, 2D3c
3.	3	H	6	3	3A1
4.	4	U	4	2	2B2
5.	5	U	5	2	2B5
6.	6	H	6	1	1B2, 1B4
7.	7	U	5	3	3A3
8.	8	H	4	3	3C1
9.	9	H	10	3	3C4

Written Response = 50 marks

Multiple Choice = 40 (40 questions)

Written Response = 50 (9 questions)

EXAMINATION TOTAL = 90 marks

LEGEND:

Q = Question Number

C = Cognitive Level

T = Topic

K = Keyed Response

S = Score

PLO = Prescribed Learning Outcome

B = Score Box Number

PART B: WRITTEN RESPONSE

Value: 50 marks

Suggested Time: 80 minutes

INSTRUCTIONS: Answer each question in the space provided. You may not need all of the space provided. Answers should be written in **ink**. **Comprehensive answers are required for full marks.**

Use the air photograph on page 19 and the topographic map on page 21 to answer question 1.

1. With reference to the air photograph and topographic map, **discuss** the influence that physical geography and human activity have had on each other in this region. You must address both physical and human influences to receive full marks. Answer in **paragraph** form. **(6 marks)**

Response:

<p>Physical Geography</p>	<ul style="list-style-type: none">• The river is navigable as indicated by the locks and lift span.• The river was likely used as a food source.• The river would have provided and still does provide a fresh water supply for the settlement.• The rich prairie soils and the arable alluvial soils of the Red River are used for growing grain crops and raising livestock.• The river is used for transportation; for cleaning and cooling in manufacturing at the steel mill, the fabric plant and the explosives plant as well as for the irrigation of crops and in the production of thermal electricity.• The topography allows for major highways to be built.• Gravel deposits, artifacts from the glacial period, contribute to the construction in the area (transportation / building).• The absence of any appreciable grade facilitates the construction of transportation corridors (road and rail).• Historically, river floods contributed to alluvium buildup, a precursor to agricultural use.• There is relatively little development in marshy areas.
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Human Activity

- An urban centre has developed along the banks of the Red River creating a service centre for the region, providing amenities such as hospitals, recreation facilities, arenas, schools and churches.
- Paved areas would accelerate run-off.
- Several parks have been established to preserve the natural environment.
- The water filtration plant and pumping station indicate that fresh water is used for both industrial and domestic use.
- A golf course has been developed on the point bar in Selkirk (conversion of agricultural land; application of chemicals).
- An anchorage is located north of the town.
- CPR line brings raw materials to Selkirk for the manufacturing of steel and the generation of electricity.
- The river was an obstacle to travel; therefore, bridges were built.
- A floodway had to be constructed to the south of Selkirk.
- Urban development encroaches on arable land.
- There is domestic and municipal run-off containing oil as well as other contaminants; such as lead from the rifle range.
- Leachates from the coal dump seep into the groundwater.
- Effluent flows into the river.
- The sewage treatment plant is located near the river.
- Fertilizers and chemicals run off the croplands and pollute the water supply.
- The airport diminishes the potential agricultural land base while surface and air contamination give rise to pollutants.
- Both the river and the land are being used to dispose of solid and liquid wastes.
- Potential of train derailments.

Note to Markers:

This question is to be marked holistically. The synergistic nature of the question allows both discrete and interconnected answers.

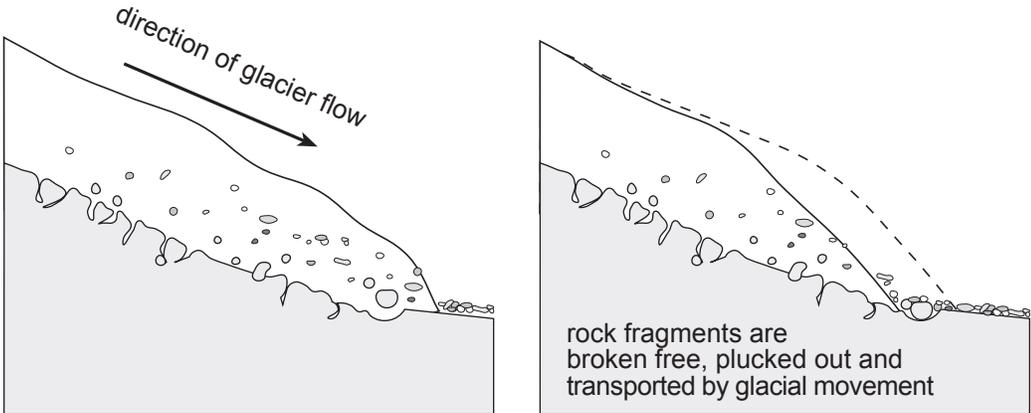
Select one of the following to answer question 2.
Indicate your selection with a ✓.

Glacial erosion

Coastal erosion

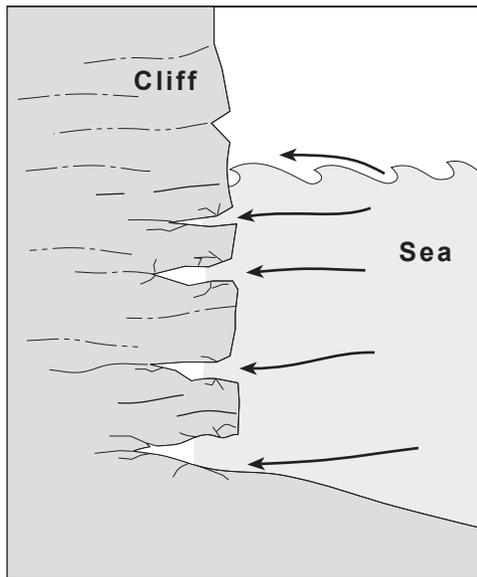
2. With the aid of a clearly labelled diagram, **explain** either the process of glacial erosion or coastal erosion. You may wish to use several diagrams to illustrate your answer. (4 marks)

Response:

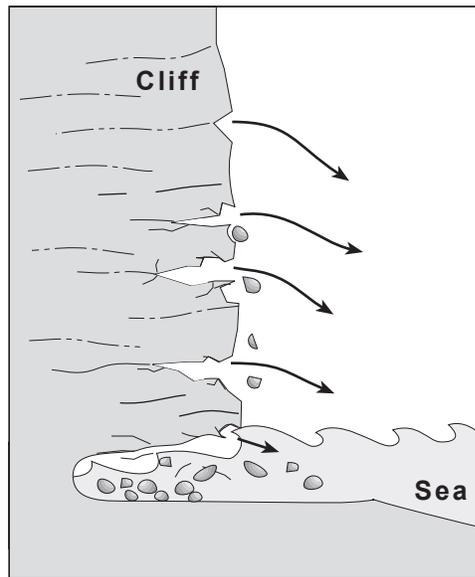
GLACIAL EROSION	
	
<p>Glacial erosion is the process by which sections of rock, frozen to the bottom of a glacier, are pulled out of place and carried away as the ice advances. This is aided by the physical weathering process of freezing and thawing which enables the rock to break free from the bedrock. Plucking / quarrying and abrasion erode bedrock. Abrasion occurs when rock fragments embedded in the glacier scour rock surfaces over which the glacier advances. Grooves and striations are often the result.</p>	
<p>Note to Markers: This question to be marked holistically. The explanation may be shown in the diagram.</p>	

Response:

COASTAL EROSION



water crashes against the cliff, pushing air into any cracks



water and air break off weakened pieces of rock

- In addition to the force of their weight, breaking waves also compress the air found in the cracks and crevices of the cliff face (hydraulic action). High pressures are brought to bear within these cracks and crevices. The compressed air expands, often explosively. This action causes the rocks to shatter and cracks to become enlarged and extended. Hydraulic action continues with each successive wave. Additionally, rock particles are carried by the waves and contribute to the corrosion of the cliff. In time, the undercut cliff collapses. Many consider abrasion (the erosive action by which rock particles are hurled against a surface) to be the effect of corrosion. In this instance, corrosion is the grinding away of solid rock surfaces by particles carried by water. Corrosion is generally considered one of the most significant forms of erosion. Under the influence of hydraulic action, corrosion and abrasion the cliffs erode.
- Chemical weathering (corrosion).
- Weight of water “plunging waves”.
- Longshore drift.

Note to Markers:

This question to be marked holistically. The explanation may be shown in the diagram.

Select one of the following industries to answer question 3.
Indicate your selection with a ✓.

Mining

Forestry

3. a) **Explain why** the resource used by the industry you have selected is either renewable or non-renewable.

(1 mark)

Response:

Mining	Non-renewable <ul style="list-style-type: none">Minerals are a resource that can only be renewed by natural processes which take a very long time (immeasurable in our lifetime). Once the resource is extracted, it is deemed to be exhausted.
Forestry	Renewable <ul style="list-style-type: none">Forests can be renewed naturally over time or through replanting / reforestation. Regrowth can be measured and monitored in our lifetime and the trees can be reharvested.

- b) **Suggest** two economic factors that may negatively impact the continued viability of the resource-based industry you have selected. **(2 marks)**

Response:

Mining	<ul style="list-style-type: none"> • royalties paid to the government for mining rights • costs more to extract a mineral from the ground than what it would sell for on the open market • “stringent” environmental regulations discourage mining companies from setting up operations in BC • the discovery (finds) of new ore bodies elsewhere can dictate pricing • the development of new technologies has made the extraction of certain mineral resources less profitable • fluctuations in international markets make it difficult to compete with the developing and least developed mineral rich countries (global copper industry) • recycling can lessen demand for new products
Forestry	<ul style="list-style-type: none"> • a reduction in the demand for BC forest products, especially in the US and around the Pacific Rim • international pressure by numerous non-government organizations such as Greenpeace to have BC forest companies change their forest practices—especially the practice of clear-cut logging • rising government stumpage fees • high labour costs • decreasing availability / accessibility of commercially viable timber • introduction of new technologies and the loss of traditional markets (stainless steel supports replacing two-by-fours; ceramic tiles replacing shake shingles)

- c) **Explain** three ways people may help to ensure the continued use of the resource by the industry you have selected. **(3 marks)**

Response:

<p>Mining</p>	<ul style="list-style-type: none"> • apply a green tax to non-renewable mineral resources • build better homes (reduce fuel needs—PowerSmart) • install energy efficient appliances which reduce energy needs (refrigerators) • recycle or reuse products (aluminum cans for scrap metal) • use alternatives (solar-powered cars in place of fossil-fueled vehicles) • conserve remaining resources (reduce the burning of fossil fuels such as gas through car pooling, high occupancy vehicle lanes, transit, rapid transit and / or fuel efficient cars) • increase conservation awareness through conferences, protesting
<p>Forestry</p>	<ul style="list-style-type: none"> • recycle wood / paper products • practise sustained yield • use selective logging • reduce annual allowable harvest • implement replenishment strategies (replanting) • cultivate trees that grow fast and are resistant to pests and diseases • increase conservation awareness through conferences, protesting

Use the following photograph to answer question 4.



4. a) **Identify** the natural vegetation associated with the region represented in the photograph.

(1 mark)

Response:

Natural vegetation	<ul style="list-style-type: none">• coniferous (cone trees)• boreal• taiga• temperate evergreen forest• actual names of species accepted (spruce)
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- b) Vegetation in this biome has adapted to the physical conditions in several ways.
Explain the reason for each of the following adaptations. **(2 marks)**

Response:

<p>Root structure</p>	<ul style="list-style-type: none"> • wide base supports tall conifers • maximizes the intake of nutrients from infertile, acidic, poorly drained soils • shallow roots are able to take advantage of thin soils
<p>Thick bark and leaf structure</p>	<ul style="list-style-type: none"> • thick bark protects the tree from fire • waxy acidic nature of needles with slow rate of decay form a thick mat on the forest floor, providing root insulation and some humus • waxy needles reduce the loss of moisture and warmth during the winter • needles take maximum advantage of the short summers to produce food to survive long winters

- c) **Outline** one major threat to this biome. **(1 mark)**

Response:

<p>Threats</p>	<ul style="list-style-type: none"> • disease • soil erosion • flash floods • climate change • invader species • urban encroachment • recreational development (resorts / golf courses) • wild fires, brush fires, bush fires • damage from all-terrain vehicles and dirt bikes • deforestation (softwood logging / pulp and paper)
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Use the following data to answer question 5.

**Carbon Dioxide Emissions
(metric tonnes)**

	1990	2020
United States	5 100	6 400
Canada	500	600
Australia	300	400
China	3 000	10 000
South East Asia	800	2 000

5. a) **Identify** the country or region which has the largest projected increase in carbon dioxide emissions.

(1 mark)

Response:

The largest increase in carbon dioxide emissions is found in	<ul style="list-style-type: none">• China
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- b) **State** two reasons why this country or region is expected to experience the largest increase in carbon dioxide emissions.

(2 marks)

Response:

Explanation	<ul style="list-style-type: none">• the country is starting to industrialize• large population demands result in greater consumption• improved standard of living will increase demand for internal combustion powered machinery and vehicles as well as domestic products• increased demand for domestic products increases the need for electricity• fossil fuels, especially coal, are relatively inexpensive• fossil fuels are readily available• many homes in urban centres still cook with coal and charcoal• lack of government regulations
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c) **Explain** two ways to reduce the levels of global CO₂ emissions.

(2 marks)

Response:

Global CO₂ emission levels can be reduced by	<ul style="list-style-type: none">• developing fuel efficient vehicles.• developing energy efficient appliances.• using alternative energy (wind, solar, geothermal).• improving energy conservation methods (PowerSmart).• reducing dependence on cars (transit, rapid transit, carpool, high occupancy vehicle lanes).• recycling manufactured products which have high energy demands at the processing stage (aluminum).
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6. a) **Identify** two natural hazards **associated** with the lithosphere. **(2 marks)**

Response:

Natural hazards associated with the lithosphere	<ul style="list-style-type: none">• earthquakes• mass wasting (landslides / avalanches)• volcanic eruptions
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b) **Explain** four strategies people could develop to reduce the effects of natural hazards associated with the lithosphere. **(4 marks)**

Response:

General	<ul style="list-style-type: none">• preparation of evacuation plans and disaster escape routes<ul style="list-style-type: none">– reduces confusion– saves lives that might ordinarily be lost by not evacuating– allows emergency response vehicles access to disaster sites• organization of emergency response teams to deal with natural hazards<ul style="list-style-type: none">– allows emergency facilities (hospitals) to deal with large intakes– organized, first response teams have expertise and skills to deal with life-threatening situations– allows first response teams to react quickly and efficiently as possible• restricted development in areas prone to natural hazards<ul style="list-style-type: none">– historical records allow planners to avoid high risk areas– people who do choose to live in high risk areas are aware of the risks and presumably take greater precautions• implementing strict building codes which take into account the natural hazard<ul style="list-style-type: none">– geological studies made before development reveal non-apparent hazards– new regulations predicated on code shortfalls– encourage architectural and engineering upgrades to existing building technology
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<p>Volcanic eruptions and earthquakes</p>	<ul style="list-style-type: none"> • seismic monitoring <ul style="list-style-type: none"> – the detection of increased tectonic activity could allow for warnings and advisories, thus creating greater lead time – intensive monitoring increases the body of knowledge and familiarity with lithospheric events • diversion channels for lava and mudflows <ul style="list-style-type: none"> – create pathways to direct flow away from built-up, urban areas at the base of volcanoes • transport systems designed to withstand diastrophic movement <ul style="list-style-type: none"> – upgrade old infrastructure to meet new generation standards <ul style="list-style-type: none"> ~ with most of the population being urban workers and commuting, the integrity of transportation systems needs to be assured ~ multi-level highways, bridges and interchanges increase single-event fatalities
<p>Landslides — mass wasting</p>	<p>Implement:</p> <ul style="list-style-type: none"> • rock scaling • reforestation • concrete barriers • bolting of rock faces • cementing rock faces • screens, nets • avalanche control (diversion channels, controlled avalanche triggering) • monitoring conditions; providing highway and radio reports; posting warning signs • snow ploughing during the winter months

7. a) **Describe** two conditions which make an ideal fish habitat.

(2 marks)

Response:

Ideal fish habitat	<ul style="list-style-type: none">• aerated• gravel beds• clear, clean moving water• nutrient rich waters• shading of shoreline• abundant algal beds• continental shelf depth is shallow and nutrient rich• temperature of river is cool• abundant food—phytoplankton• mixing of cold and warm ocean currents• excellent spawning grounds—coastal inlets, coves, estuaries• the absence of human development
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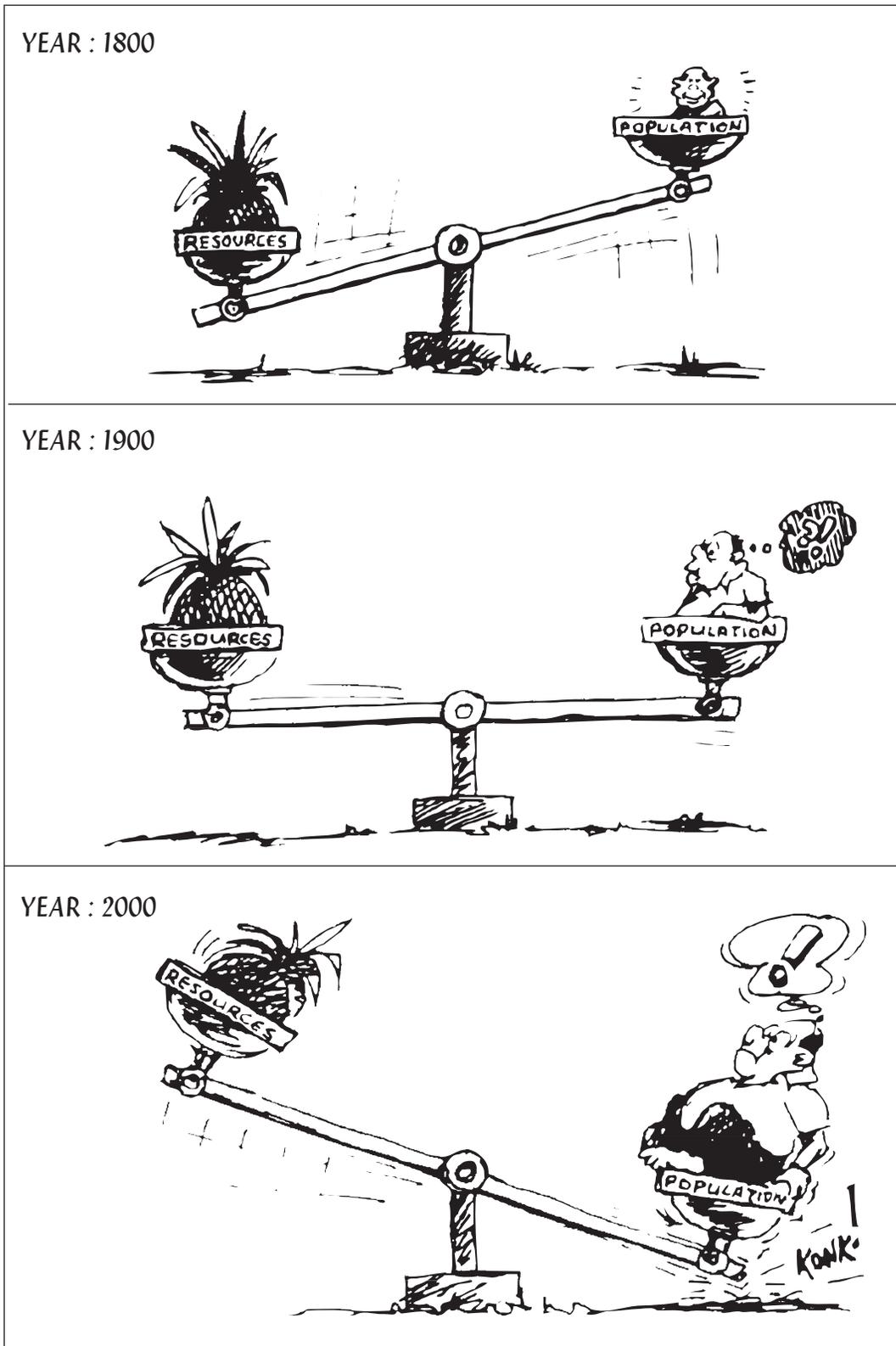
b) **Outline** three ways fish habitat is being destroyed.

(3 marks)

Response:

Pollution	<ul style="list-style-type: none">• siltation• chemical spills• industrial effluents• municipal sewage / septic fields• agricultural and urban run-off• pulp and paper discharge (chlorine, dioxin)
Development	<ul style="list-style-type: none">• log storage• aquaculture• mining leachates• offshore exploration• residential growth on the waterfront• expansion of coastal industrial activities• building causeways, piers and breakwaters• poor forestry practices / clearcutting
Shipping	<ul style="list-style-type: none">• cargo spills (oil)• ballast discharge• release of bilge water
Climate Change	<ul style="list-style-type: none">• El Niño (heats water)• global warming (causes a rise in water temperature and a rise in sea levels)• fish are sensitive to fluctuations of temperatures• ozone depletion (UV radiation damages phytoplankton, which in turn affects the food chain)

Use the following cartoon to answer question 8.



From Society Pieces by David Lambert, ©Cambridge University Press, 1993. Page 114.

8. a) What is the intent of the cartoonist's message?

(1 mark)

Response:

The cartoonist's intent is to point out	<ul style="list-style-type: none">• that as the population increases, resources diminish.• scarcity — human needs will exceed available resources.• that resources will not be able to meet the material expectations of a “developed” world mentality.• resources remained the same as population increased.
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Students may further clarify:

1800	<ul style="list-style-type: none">• there was an abundance of resources available for global populations — in fact, there was an excess
1900	<ul style="list-style-type: none">• the population of the world was such that there was a balance between human needs and wants on the one hand and the amount of resources available for consumption on the other
2000	<ul style="list-style-type: none">• because the global population is growing exponentially, there is an imbalance between the number of people worldwide and the amount of resources available — population increases result in a shortage of resources

b) **Explain** how the following issues threaten the sustainability of the global environment.

(3 marks)

Response:

<p>Resource consumption</p>	<ul style="list-style-type: none"> • Our current rate of resource consumption cannot be sustained if the number of people worldwide continues to increase. Non-renewable resources have already been depleted and renewable resources have been threatened; in some cases, beyond the brink of sustainability. As a result, alternative resources (particularly the development of energy resources) must be expanded. <p>NOTE: The student may choose any resource.</p>
<p>Waste management</p>	<p>Poor management may result in the:</p> <ul style="list-style-type: none"> • increase in methane which could increase global warming • loss of non-renewable resources • inefficient use of a resource • infiltration of leachates • release of toxins (CFCs from old refrigerators) • organic materials being lost instead of recycled through composting • loss of land for future use • bioaccumulation • health issues
<p>Gap between rich and poor countries</p>	<ul style="list-style-type: none"> • Poorer nations will want what the richer nations have and will exploit resources with little regard for the future or the environment. • For humankind to sustain its natural resources, alternative technologies must replace ecologically unsound practices, and the developed world has to share its technologies with less developed countries...the very thing that was asked for at the Rio Summit in 1994.

Use the Case Study data on pages 32 and 33 to answer question 9.

9. Using evidence from the data provided and your understanding of geography, **describe** the impact of human activity on the Danube Drainage Basin. **Suggest** ways to improve the conditions of the river and **explain** the difficulties faced when trying to implement change. Answer in **multi-paragraph** form. **(10 marks)**

Response:

<p>Impact of human activity on the Danube Drainage Basin</p>	<ul style="list-style-type: none"> • The river and its tributaries provide natural transportation corridors in the interior of the continent and act as conduits for pollution. • Toxic chemicals (including PCBs, heavy metals such as lead and cadmium, as well as other organic compounds) and sewage are discharged into the Danube which eventually drains into the Black Sea. • These contaminated waters have enormous effects within the related ecosystem (effects on human health, destruction of plant and animal species, toxic effect on soils and alluvial deposits downstream). • The Danube is used as a major transportation route and as a dumping ground for incinerated chemical wastes. <p>Domestic run-off</p> <ul style="list-style-type: none"> • Effluent from septic processes seeps into groundwater and into the river. • Run-off from the communities (untreated sewage). • Domestic run-off (detergents and lawn fertilizer). • Oil and gas run-off from roads. <p>Agriculture along the flood plain and the delta</p> <ul style="list-style-type: none"> • Toxic pesticides (including DDT), herbicides and fertilizers (nitrogen compounds and phosphates) have contaminated the Danube, resulting in algal blooms that have threatened fish life. <p>Fishing</p> <ul style="list-style-type: none"> • Polluted waters have drastically reduced the number of migratory fish (sturgeon). <p>Dam building</p> <ul style="list-style-type: none"> • Building of Gabčíkovo Dam Project, Slovakia. • Destruction of wetlands. • Contamination of water supplies. • 63 types of fish and 60 types of plants will experience a loss in habitat and possible extinction. • Flooding of agricultural and forested land. • Groundwater level reduced. • Reduced downstream water flow. • Spawning and young fish will be harmed by sediment and flow fluctuations.
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Ways to improve the Danube River Basin

Urban, industrial and agricultural run-off solutions

- Reduce, reuse, recycle waste water.
- Improve irrigation techniques (drip irrigation).
- Legislation — government support and policing; establishment of penalties for overuse.
- Education — active programs (school and health education programs) make vested interests aware.
- Technological applications (recent and up-to-date filtering systems).
- Preservation of wetlands as natural purifiers of contaminated water.
- Storm sewers to capture urban run-off and direct it to treatment facilities.
- Creation of settling ponds.
- Increase the number of sewage treatment facilities.
- Promote international cooperation.
- Commitment of adequate funds to the project.

General Solutions

- Environmental agencies must put pressure on countries in the Danube River Basin to solve environmental problems (Greenpeace, World Wildlife Fund).
- Formation of international agencies with plans to solve the problems of the Danube (1994 – Green Danube Program; 1995 – Danube Strategic Action Plan).
- Create national parks, bioreserves, protected areas, wetland habitats along the course of the Danube and at the river delta (Danube delta biosphere reserve).
- Establish an international agency to monitor and collect data as well as assess the impact of dam building / pollution on the Danube River (Danis-Danube Information System).
- Organize international environmental conferences and workshops to identify problems.
- Protect floodplain forests and use sustainable management techniques.
- Maintain biological diversity and assure ecological integrity of the wetlands and the floodplain area.

<p>The difficulty of change</p>	<p>International cooperation to clean up the Danube River Basin is essential, but is hampered by</p> <ul style="list-style-type: none"> • the NIMBY syndrome, environmental and social irresponsibility (individuals and groups responsible for the sources of the pollutants are often far removed — physically — from the areas that experience the greatest impact). Moreover, people allow the dumping of industrial, domestic and agricultural discharges to go on simply because <i>if it is out of sight...it is out of mind.</i> • the lack of governmental and inter-governmental regulations, coupled with the lack of political will, allows individuals and groups to dump waste. • apathy, a consumer-oriented lifestyle and the sheer cost of the clean-up inhibit the development of solutions. • the power of multinational corporations and agricultural lobby groups that hinder proactive initiatives. • population pressures, which make change difficult to implement, cause a disruption in supply. • historical and current political problems between various countries in the Danube River Basin, which make it difficult for solutions to be reached. • the lack of coordination among the affected countries with regard to conservation and environmental protection. • the great difficulty of ascertaining “Who pays for what?” • the cost of remedies being beyond the ability of any affected nation (or even group of nations) to pay. • the inevitable remedial steps resulting in corporate closures and worker layoffs, a political and economic conundrum that will transcend political boundaries and collective agreements.
<p>Note to Markers: This question is to be marked holistically.</p>	

END OF KEY